WATER YEARBOOK: CENTRAL ASIA AND AROUND THE GLOBE 2021

Tashkent 2023

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Content

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,

In 2021, the team of SIC ICWC Central Asia and the water community as a whole have endured a tragic loss – **Viktor A. Dukhovniy** passed away at the age of 88 on 14 August.

We lost our outstanding leader, mentor, scholar, and, most importantly, a person who was not indifferent! He left a tremendous legacy and guidance to all of us to work for the well-being of the people in Central Asia and don't give up.

May his blessed memory live forever in the hearts of all who knew him.

We thank all the partners for supporting us in these hard times.

We continue along the path of Prof. Dukhovniy and are pleased to present you the new fifth edition of the 2021 Water Yearbook: Central Asia and around the Globe.

Editorial team

September 2022

Section 1

2021 Calendar of Events

January

January 21 – International conference "New Trends in Uzbekistan's Foreign Policy: State and Prospects of Cooperation with the Central Asian Countries and Afghanistan", Tashkent, Uzbekistan

January 27 – Online seminar "Joint Working Group on International and EU Water Diplomacy - In Focus: Central Asia", Brussels, Belgium

January 27-28 – 7th meeting of the Roundtable on Financing Water, online

February

February 2 – World Wetlands Day

February 2 – Online consultations "Water Related Disaster Risk Reduction under the COVID-19 Pandemic", Tashkent, Uzbekistan

February 4-5 – Seventh Meeting of the Implementation Committee of the UNECE Convention on Transboundary Water Resources, Geneva, Switzerland

February 11 – International Day of Women and Girls in Science

February 26 – Fifth Meeting of the Global Network of Basins working on Climate Change Adaptation "Climate change adaptation strategies and plans: elaboration, financing and implementation", online

March

March 2-3 – International Conference of EECCA NWO "Transboundary Water Cooperation in the EECCA countries: Lessons Learned and Future Directions", online

March 3 – World Wildlife Day "Forests and Livelihoods: Sustaining People and Planet"

March 3-4 – International Forum "Meeting New Opportunities: Green Recovery of Uzbekistan after the COVID-19 Coronavirus Pandemic", online

March 3-4 – International Conference "Facilitating Regional Water Cooperation and Dialogue in Central Asia through Knowledge Exchange, Partnerships and Educational Initiatives" as part of the Central Asian Water-Energy Program, online

March 10 – Roundtable "Towards the IWRM Implementation Strategy of Uzbekistan", Tashkent, Uzbekistan

March 11-12 – International Scientific-Practical Conference "Water Resources Management in the Context of Globalization" on occasion of the 105th anniversary of Prof. Tadjibayev, Almaty, Kazakhstan

March 14 – World Rivers Day

March 21 – International Day of Forests "Forest restoration: a path to recovery and well-being"

March 22 – World Water Day "Valuing Water"

March 23 – World Meteorological Day "The Ocean, our Climate and Weather"

March 26 – Day of the Aral Sea

March 29-31 – Global workshop on building climate resilience through improving water management and sanitation at national and transboundary levels, Geneva, Switzerland

March 31 – Kick-off workshop of the USAID Regional Water and Environment Project, Tashkent, Uzbekistan

April

- **April 14-15** – Twelfth meeting of the Working Group on Water and Health, Geneva, Switzerland
- **April 15** – Day of Environmental Knowledge
- **April 22** – International Mother Earth Day
- **April 22** – Day of Nature Reserves and National Parks
- **April 26-28** – Conference on Transboundary Waters in International Relations, Budapest, Hungary
- **April 29** – IWRA's Second 50th Anniversary High Level Panel "A Conversation on Water: The Past Informing Water Futures", online

May

- **May 11** – 80th meeting of ICWC Central Asia, Dushanbe, Tajikistan
- **May 12** – Day of Environmental Education
- **May 17-20** – XVI International Scientific-Technical Symposium and Exhibition "Clean Waters of Russia -2021", Yekaterinburg, Russia
- **May 20-21** – Thirteenth meeting of the Implementation Committee of the UNECE Convention on Transboundary Water Resources, Geneva, Switzerland
- **May 22** – International Day for Biological Diversity
- **May 25** – Regional dialogue "Policy and Governance Issues to Transform Food Systems in Europe and Central Asia", online
- **May 25** – International Conference "Enhancing Regional Water Cooperation in Central Asia", Tashkent, Uzbekistan
- **May 28-29** – III International Scientific-Practical Conference "Modern Technologies and Achievements in Water Engineering", Kherson, Ukraine

June

- **June 5** – World Environment Day "Ecosystem restoration"
- **June 8** – World Oceans Day "The Ocean: Life & Livelihoods"
- **June 15-16** – Online Capacity Building Seminar and Meeting of National Experts on Water and Energy Cooperation, Ashgabat, Turkmenistan
- **June 16** – Online conference "Uzbekistan-Tajikistan: Prospects for Mutually Beneficial Cooperation"
- **June 17** – Desertification and Drought Day "Restoration. Land. Recovery"
- **June 21** – International scientific-practical conference "Land Reclamation and Desertification" (LRAD 2021), online
- **June 21-July 2** – Singapore International Water Week
- **June 21-23** – VIII World Congress on Conservation Agriculture (8WCCA), Bern, Switzerland

June 28-30 – 24th Session of the IHP Intergovernmental Council, Paris, France

June 29-30 – Third Regional Conference "Education and Awareness for Climate Action in Europe and Central Asia", online

June 29 – Meeting of the Board of the International Fund for Saving the Aral Sea, Dushanbe, Tajikistan

June 30 – 11th APWF webinar "Groundwater: Making the Invisible Visible"

July

July 1 – Regular meeting of the EU – Central Asia High-Level Dialogue, Tashkent, Uzbekistan

July 1-2 – 5th Eurasian Green Energy & Waste Recycling Forum, Nur Sultan, Kazakhstan

July 6-15 – High-level Political Forum on Sustainable Development, New York, USA

July 7-9 – Seventy-first meeting of the Compliance Committee to the Aarhus Convention, Geneva, Switzerland

July 26-27 – Fourth Central Asia Climate Change Conference (CACCC-2021), Dushanbe, Tajikistan

July 29 – Earth Overshoot Day

August

August 12 – Day of the Caspian Sea

August 23-27 – World Water Week, Stockholm, Sweden

August 24 – First Youth Conference on Climate Change (LCOY Kyrgyzstan 2021), Bishkek, Kyrgyz Republic

September

September 3-11 – IUCN World Conservation Congress, Marseille, France

September 19 – World Cleanup Day

September 21-23 – 5th Arab Water Forum, Dubai, UAE

September 22-23 – International conference Seymartec Ecology 2021, Chelyabinsk, Russia

September 27-29 – WEFE Nexus Science Advances Conference, Nicosia, Cyprus

September 29-October 1 – Ninth session of the Meeting of the Parties to the Water Convention, Geneva, Switzerland

September 29-October 2 – October – 2nd International and 15th National Congress on Agricultural Structures and Irrigation (ICASI 2021), Diyarbakır, Turkey

September 30 – World Maritime Day

October

October 6-8 – Forum dedicated to digitalization and innovation in the water industry (Accadueo-H2O 2021), Bologna, Italy

- **October 12-14** – International specialized exhibition GETCA 2021, Tashkent, Uzbekistan
- **October 12-15** – International specialized exhibition Water and Air Technologies 2021, Minsk, Belarus
- **October 15** – International Day of Rural Women
- **October 18-19** – 18th Session of the Joint Task Force on Environmental Statistics and Indicators, Geneva, Switzerland
- **October 18-21** – Seventy-second meeting of the Aarhus Convention Compliance Committee, Geneva, Switzerland
- **October 18-23** – IWA World Water Congress and Exhibition, Copenhagen, Denmark
- **October 19-20** – Central Asian Sub-regional Preparatory Conference for the 9th World Water Forum, Dushanbe, Tajikistan
- **October 19-21** – International Exhibition SMAGUA 2021, Zaragoza, Spain
- **October 24** – Cairo Water Week 2021
- **October 27-30** – 13th International Conference on Irrigation and Drainage, Sacramento, USA
- **October 31-November 12** – XXVI Conference of the Parties to the UN Framework Convention on Climate Change (COP26), Glasgow, Scotland

November

- **November 3-5** – 27th session of the Committee on Environmental Policy, Geneva, Switzerland
- **November 8-14** – International Week of Science and Peace
- **November 22** – International Conference "The Aral Sea Region – a Zone of Environmental Innovations and Technologies", Tashkent, Uzbekistan
- **November 23-25** – International Scientific-Education Forum "Strategic Targets of Central Asia Development: History, Trends and Prospects" dedicated to 30 years of independence of CA states, Yekaterinburg, Russia
- **November 25** – Roundtable in memory of Prof. V.A. Dukhovniy "Water Security in the Central Asian Countries", Yekaterinburg, Russia
- **November 24-26** – 2021 European Forum for Disaster Risk Reduction, Matosinhos, Portugal
- **November 24-30** – 72nd meeting of the ICID International Executive Council, Marrakesh, Morocco
- **November 29-December 3** – IWRA XVII World Water Congress, Daegu, Korea
- **November 29-December 5** – Planet Budapest 2021 Sustainability Expo and Summit, Budapest, Hungary

December

- **December 2-3** – Second Eurasian Congress, Moscow, Russia
- **December 5** – World Soil Day
- **December 7** – 81st meeting of ICWC Central Asia, Tashkent, Uzbekistan, online

- **December 8-10** – 19th Europe-INBO International Conference, Malta
- **December 10** – Central Asian Conference "ARAL Issues Conference 2021", Almaty, Kazakhstan
- **December 11** – International Mountain Day

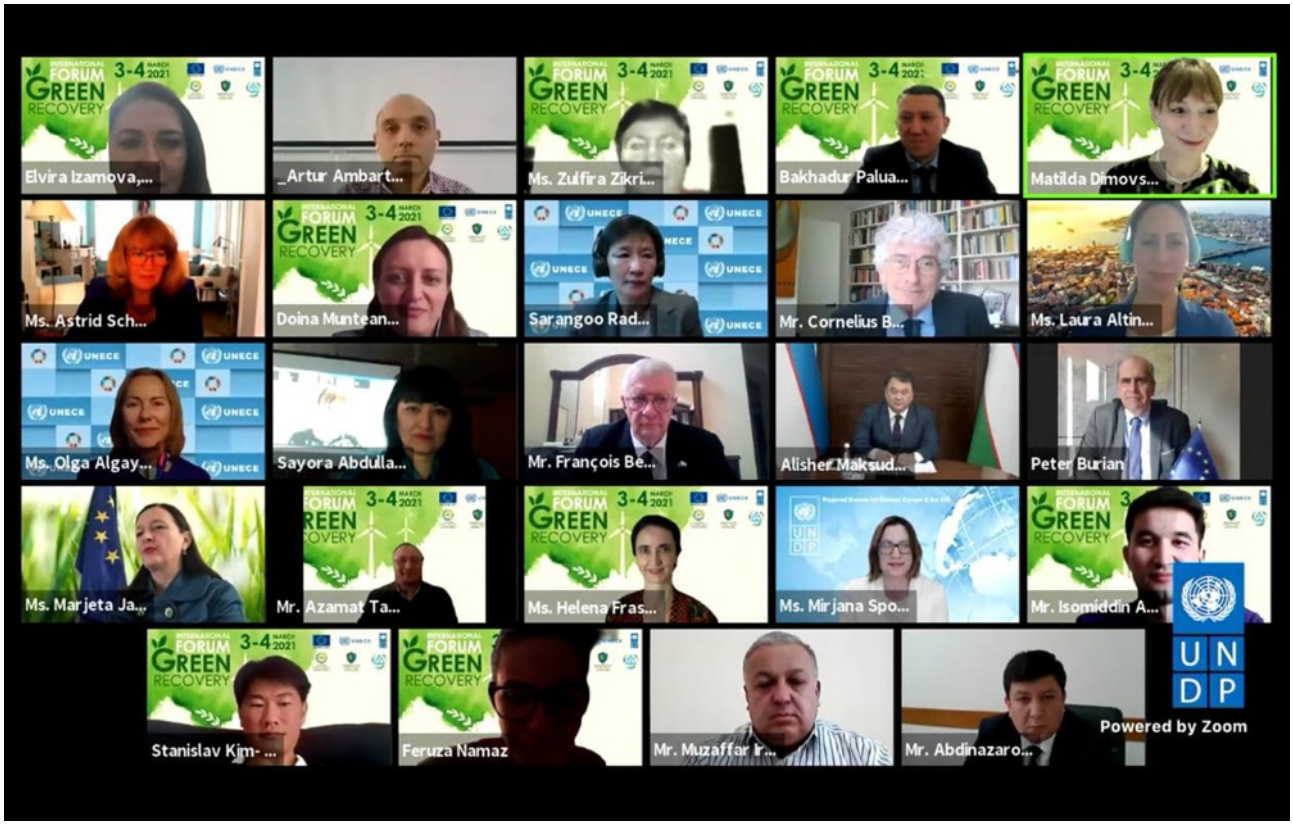
Major Events in Central Asia

International Online Forum "Meeting New Opportunities: Green Recovery of Uzbekistan after the COVID-19 Coronavirus Pandemic", Tashkent, March 3-4

The purpose of the Forum was to initiate a dialogue between the Government of the Republic of Uzbekistan, international development agencies, donors and investors, the private sector, and the civil community about the country's transition to a green economy and sustainable development in Uzbekistan.

The Forum was organized in the format of thematic sessions, such as: (1) Building Forward Better: Green Recovery and Way Forward; (2) Identifying Gaps and Opportunities for Green Recovery in Uzbekistan; (3) Deep Dive on Green Financing Instruments; (4) Enabling Environment for the Digital Transformation in the Private Sector.

The discussion was held on the UNDP's Policy Brief: Green Recovery and the Transition to Green Economy in Uzbekistan. The Forum concluded with a Declaration.



International Conference "Enhancing Regional Water Cooperation in Central Asia", Tashkent, May 25

The International Conference was organized by the International Institute for Central Asia and the UNESCO Office in the Republic of Uzbekistan. The participants discussed how to enhance the regional water and environment dialogue and cooperation in Central Asia.

Particular attention has been paid to the Resolution adopted by the General Assembly upon initiative of the President of Uzbekistan entitled "Declaring the Aral Sea region a zone of ecological innovations and technologies"[1]. The participants supported the proposal to declare the day when the Resolution was adopted an International Day for Ecosystem Conservation and Restoration.

Fourth Central Asia Climate Change Conference (CACCC-2021), Dushanbe, July 26-27

The Conference was organized by the Government of Tajikistan and the CAREC as part of the World Bank project "Climate Adaptation and Mitigation Program for Aral Sea Basin" (CAMP4ASB) under the motto "Regional Cooperation for Climate-Resilient Future". Two plenary sessions were held in the first day: (1) National climate policy and the role of civil society; and, (2) Climate financing: opportunities and prospects for CA. The Fourth Meeting of Representatives of Ministries of Foreign Affairs and Members of Parliaments of the Central Asian Countries on the issues of climate change and two thematic sessions on the progress in national legislations and climate policy implementation in CA states and the regional climate cooperation initiatives were conducted in the second day. The High-level segment, where the heads of the national environmental authorities participated, also took place that day. Finally, the Conference resolution was adopted.

Local Conference of Youth - LCOY Kyrgyzstan 2021, Bishkek, August 24

The First Youth Conference on Climate Change was organized by the public association "Students of Kyrgyzstan for a Green Economy" together with representatives of other youth organizations and university students in the country within the framework of the "Policy Action for Climate Security in Central Asia" project, implemented by UNDP in Kyrgyzstan, Tajikistan and Uzbekistan with the support of UK Aid.

This was the final event in the series of LCOY Kyrgyzstan conferences 2021. June conferences were held in the cities of Osh and Karakol, with participation of youth from Osh, Batken, Jalal-Abad, and Issyk-Kul provinces. The third and final event in Bishkek brought together youth from Talas, Naryn and Chui provinces.

Objectives of LCOY Kyrgyzstan 2021: (1) improve knowledge and build capacities of youth in climate change and ecology; (2) show multiple opportunities for youth to participate in climate security actions; (3) prepare a youth communiqué from Kyrgyzstan for the global 16th UN youth conference on climate change, which took place before COP26.

The participants have learned about the global climate crisis, the causes and consequences, in particular for Kyrgyzstan; got acquainted with the global negotiating processes on climate.

[1] Resolution (A/75/L.83) adopted at the 75th UN GA on May 18, 2021

Central Asian Sub-regional Preparatory Conference for the 9th World Water Forum "Water security for peace and development", Dushanbe, October 19-20

The Conference was organized by EC IFAS jointly with the Government of Tajikistan and international development partners to determine and agree upon the regional agenda of the 9th World Water Forum in line with the Forum's thematic priorities and the topical issues for the Central Asian region. The Conference was also aimed at strengthening regional cooperation and partnership at all level to facilitate the implementation of the International Decade for Action "Water for Sustainable Development", 2018-2028.

The plenary session and six thematic sessions were held in the context of achievement of SDGs: (1) Ensure universal access to safe water and adequate sanitation to respond to new challenges, including COVID-19; (2) Transboundary water cooperation for sustainable development; (3) Effective water resources management for higher agricultural production and more employment opportunities in rural areas; (4) Water, energy, food and environment nexus; (5) Climate adaption and water related disaster risk reduction; (6) Financing water.

International Conference "The Aral Sea Region – a zone of ecological innovations and technologies", Tashkent, November 22

OROLBO'YI
mintaqasini ekologik innovatsiyalar va texnologiyalar hududiga aylantiramiz

The Conference[2] was held by the Ministry of Innovations of Uzbekistan to draw attention to the actions aimed to transform the Aral Sea region from environmental and humanitarian crisis area into a zone of environmental innovations and technologies. The plenary and parallel sessions were held on the following themes: (1) Nature resource management in the context of climate change in the Aral Sea region: current challenges and future horizons; (2) Sustainable business model of circular agriculture in the arid Aral Sea region; (3) Transboundary environmental cooperation; (4) Innovative technologies and sustainable agriculture in the Aral Sea region.

A documentary film describing the work undertaken by the Government of Uzbekistan to overcome the negative consequences of desiccation of the Aral Sea was presented during the conference. On the sidelines, the Uzbek Ministry of Innovations has signed cooperation agreements with CASIB (Germany) for a joint competition as part of the CLIENT III Program and with JICA (Japan) for research under the SATREPS[3].

International Scientific-Education Forum "Strategic Targets of Central Asia Development: History, Trends and Prospects" dedicated to 30 years of independence of CA states, Yekaterinburg, November 23-25

The Forum was organized by the Ministry of Education of the Russian Federation, the Government of Sverdlowsk oblast, the Ural State Pedagogical University and the Ural Federal University named after the first President of Russia, B.N. Yeltsin. The key aspects of scientific and education cooperation between the CA countries and Russia, facilitation of socio-economic and policy research, and development of inter-

[2] The 75th UNGA at its 66 plenary session adopted the resolution on declaring the Aral Sea region a zone of ecological innovations and technologies (A/75/L.83). The text of the resolution was co-authored by about 60 countries. For implementation of the Resolution, the Presidential Decree PP-5202 of 29.07.2021 sets a number of tasks, including organization of relevant international conference

[3] SATREPS is a Japanese government program that promotes international joint research to address global issues

cultural dialogue were addressed during the Forum. The Forum's agenda included a plenary session (November 23), thematic sessions (on history and present development in the CA countries, security in the Central Asian region, and socio-cultural adaptation of migrants from the CA countries in the present context of Russia) (November 24), and interactive platforms, roundtables and panel discussions (November 25).

The roundtable in memory of Prof. V.A. Dukhovniy "Water Security in the Central Asian Countries" was held during the Forum on November 25. The most pressing issues of water security and key actions to be taken at the national and regional level were discussed. The participants suggested holding regularly similar meetings in the format of a "Kostyakov's readings".

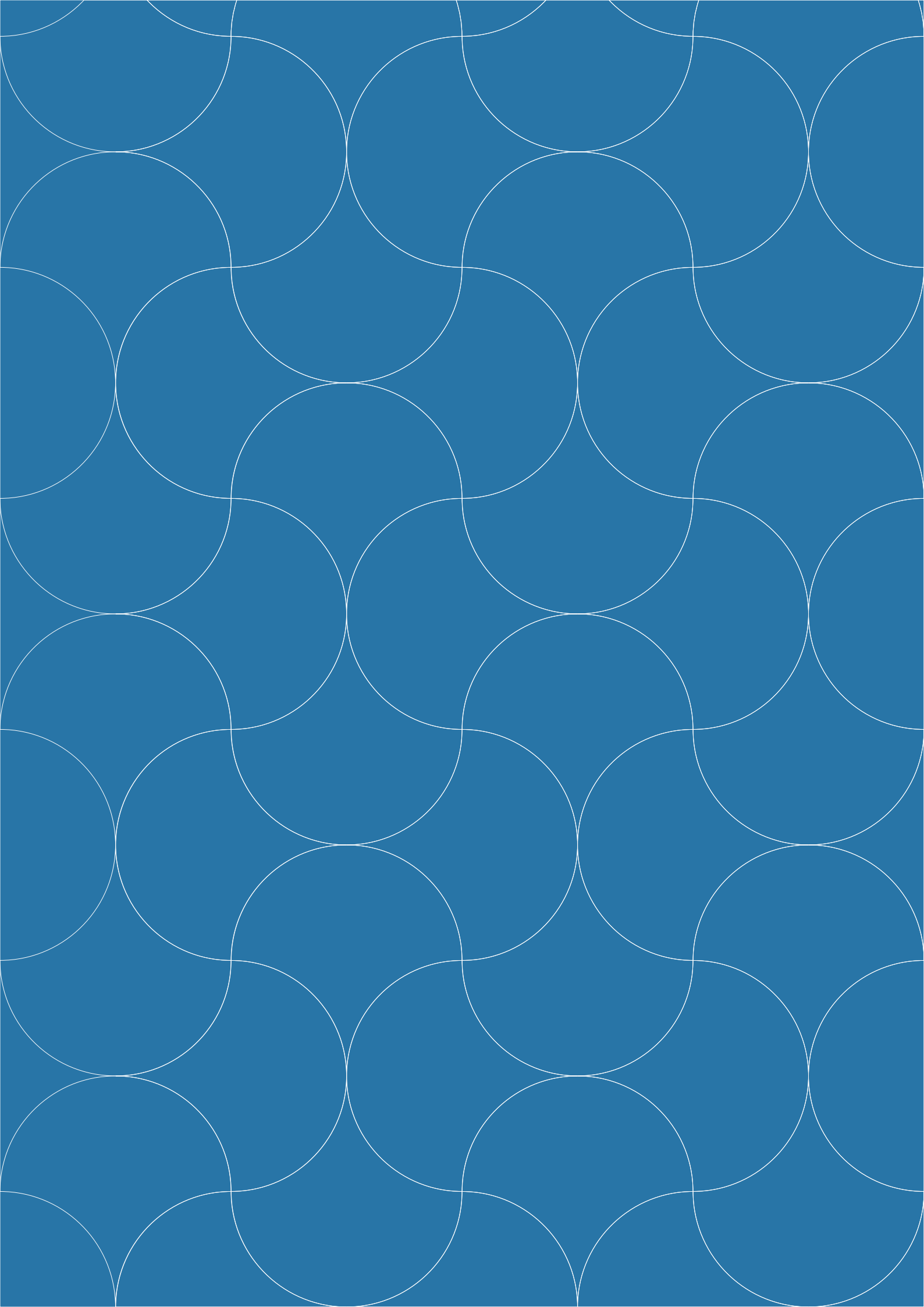
#ARALIssues Conference-2021, Almaty, December 10

The Conference was organized by the International Center for Journalism MediaNet and DW Akademie, with the support of the German Federal Foreign Office[4]. Representatives of government agencies, diplomatic missions, international organizations and universities, journalists and bloggers took part in the Conference.

The event was organized in the format of four sessions. The floor was given to experts from Kazakhstan and Uzbekistan and representatives of diplomatic missions and international organizations.

Also, Kazakh and Uzbek journalists and bloggers, who visited the Aral Sea region in September 2021, presented their multimedia stories on the current challenges and opportunities in the region. They addressed such issues as the restoration of flora and fauna in the region, the lives of fishermen in the Aral Sea region, an impact of chemical pollution on population's health, the development of ecotourism, etc. The documentary film of the Kazakh filmmaker, K. Suvorova "The Sea tomorrow" was demonstrated finally.

[4] As part of the Project "Multimedia coverage of problems in the Aral Sea Region"



Section 2

Water-Related Situation in the Aral Sea Basin

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

Water Resources

In 2021, the total annual flow in the basins of the Amu Darya and the Syr Darya was 98.49 km^3 or 84% of average long-term flow.

Amu Darya Basin

The annual flow in the basin, including the Amu Darya River and its tributaries plus the Zarafshan River, was 66.4 km^3, including 52.1 km^3 in the Amu Darya River (at the nominal Kerki section located upstream of the Garagumdarya River). The water content of the Amu Darya at this monitoring section was: 71% of the norm in the first quarter; 88% in the growing season; and, 71% in the first half of the non-growing season 2021-2022.

By the 1st of January 2021, the Nurek and Tuyamuyun reservoirs accumulated 12.37 km^3 of water in total.

Syr Darya Basin

The annual flow in the basin, including the Naryn, Karadarya, Chirchik and small rivers, reached 32.09 km^3, of which 19.12 km^3 in the Syr Darya River (estimated by inflow into three reservoirs – Toktogul, Andizhan, and Charvak).

By the 1st of January 2021, the total water storage by reservoirs in the basin was 25.93 km^3, including 13.56 km^3 in the key reservoirs in the flow formation zone.

Operation of Reservoir Hydrosystems

The annual inflow into the Nurek reservoir was 19.26 km^3, including 15.47 km^3 or 80% over the growing season. Water releases from the reservoir amounted to 19.03 km^3/year, of which 11.83 km^3 or 62% of annual flow was discharged during the growing season.

Because of insufficient flow from the Panj River[5], the annual inflow into the Tuyamuyun reservoir was 19.71 km^3. This inflow was lower than the forecast by 7.75 km^3 and 5.4 km^3 less for the growing season. Annual water releases from the reservoir were 18.25 km^3 or 74% of the value set in the schedule of the BWO Amu Darya. Accordingly, in the growing season the discharge of water from the reservoir made up 13.18 km^3 or 74%.

The annual inflow into the Toktogul reservoir located on the Naryn River was 11.59 km^3, including 8.76 km^3 (76%) over the growing season. Annual water releases from the reservoir amounted to 13.71 km^3, and only 5.17 km^3 (38%) were discharged from the reservoir during the growing season. Such re-distribution of flow led to emptying of the Toktogul reservoir from 12.24 to 10.1 km^3 in the course of the year.

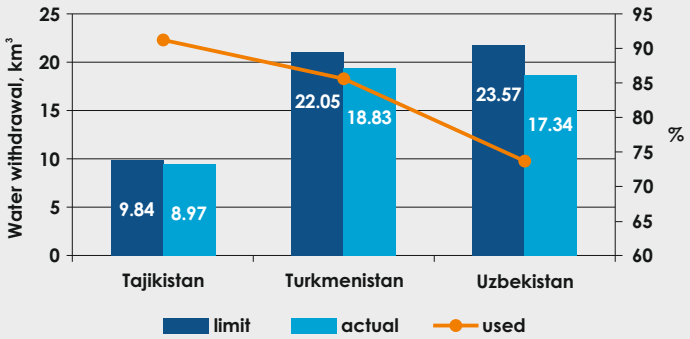
Water Allocation and Shortage

Amu Darya Basin

In 2021, given the established limit of water withdrawal from the Amu Darya Basin at 55.45 km^3, actually 45.14 km^3 (31.38 km^3 during the growing season) were diverted. In total, 81% of annual water limit was used. 79% of the established water withdrawal limit or 39.67 km^3 was used during the growing season. The following situation was observed at country level:

- **Tajikistan** – given the water limit of 9.84 km^3, the actual water withdrawal was 8.97 km^3 or 91.2%;
- **Turkmenistan** – given the water limit of 22.05 km^3, the actual water withdrawal was 18.83 km^3 or 85.4%;
- **Uzbekistan** – given the water limit of 23.57 km^3, the actual water withdrawal was 17.34 km^3 or 73.6%.

Water limits and actual water withdrawals from the Amu Darya over 2021



During the growing season, the shortage of water in the river reach from the Nurek HPP to the Tuyamuyun reservoir was estimated at 10% in Tajikistan, 9% in Turkmenistan, and 18% in Uzbekistan. Turkmenistan and Uzbekistan has received 32% and 37% less water than required, respectively, in the reach from the Tuyamuyun hydroscheme to the Samanbay post. Increased shortage of water the river during the growing season is explained largely by failure to ensure uniform distribution of water over the territory.

[5] Lower flow along the Panj River is possibly explained by increased water diversion by Afghanistan, improper accounting of water along the main course of the Amu Darya or inaccurate evaluation of river water losses. The exact causes of such lowering need thorough examination.

Syr Darya Basin

The total water withdrawal in the Syr Darya Basin amounted to 13.96 km^3, including 9.95 km^3 or 84% of the established limit (11.85 km^3) of water withdrawal into canals during the growing season. No water was discharged from the Syr Darya into Arnasay. The water allocation plan of BWO Syr Darya was fulfilled by 87% on average. In the reach from the Toktogul reservoir to the Chardara reservoir, Tajikistan under-received 22% of water, Kyrgyzstan – 42%, and Kazakhstan and Uzbekistan – 23% and 14%, respectively. The larger water shortage in Kyrgyzstan is explained by the fact that the allocated water limit/quota exceeded the country's actual water needs.

Inflow into the Aral Sea Region

According to the data of the Kazakhstan's Committee for Water Resources, in 2021, inflow into the Northern Aral Sea from the Syr Darya was 1.2 km^3, and 0.18 km^3 were discharged from the Northern Sea into the Large Aral Sea (Eastern part).

Based on SIC's estimates, the South Aral region should receive 8 km^3 of water from the Amu Darya in average and wet years and 3.5 km^3 in dry years. Actually in 2021, 1.6 km^3 or 20% of 8 km^3 was delivered to the South Aral region.

River Water Balance Discrepancies

In 2021, the balance discrepancies reached (1) 10.53 km^3 in the Amu Darya: 8.54 km^3 (6.93 km^3 in 2020) during the growing season, and 1.99 km^3 (2.49 km^3 in 2020) during the non-growing season; (2) 4.31 km^3 in the Syr Darya: 0.84 km^3 – growing season, and 3.47 km^3 – non-growing season. Thus, overall, the river water balance discrepancy decreased by 26% as compared to the previous year (5.85 km^3).

Meeting the Demands

The table below shows how water demands for the growing season were met among the CA countries.

CA countries	Meeting water demands in growing season, %	
	Amu Darya	Syr Darya
Kazakhstan	–	77
Kyrgyzstan	–	59
Tajikistan	90	78
Turkmenistan	84	–
Uzbekistan	71	86

Source: SIC ICWC using the data from BWO AmuDarya and BWO SyrDarya

2.2. Large Aral Sea and the Amu Darya Delta

In 2021, SIC ICWC continued monitoring changes in the water surface area of the Eastern and Western parts of the Large Aral Sea (LAS) as well as the lake systems of the Amu Darya delta through Landsat 8 OLI images (http://cawater-info.net/aral/data/monitoring_amu.htm).

New Methodology

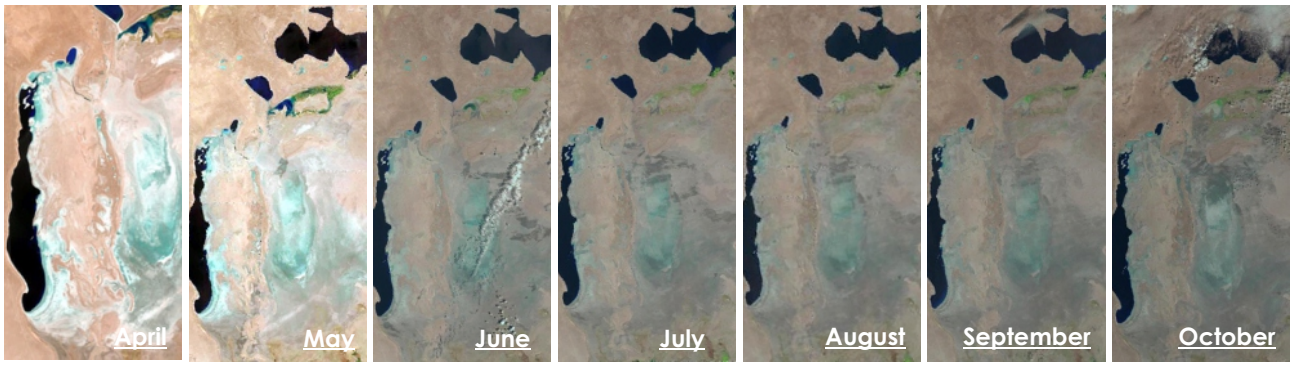
From 2012 to 2019, for identification of sea's water surface and wetland areas, the satellite data were digitized manually, with following comparison of NDVI (Normalized Difference Vegetation Index). Since 2019, SIC ICWC has been applying a new improved methodology for interpretation of satellite imagery through the supervised pixel classification (AWEI, Automated Water Extraction Index). At the beginning of 2022, it was decided to come back to using NDVI but with the refined threshold values. The principles of the past and new approaches are shown below so that the user could correctly interpret and compare multitemporal data.

Until 2022, the total area of a water body was determined as the sum of open water surface and wetland areas. However, the problem of detecting wetlands, i.e. the possibility to distinguish them from dry land remained unsolved. Therefore, since 2022, the refined threshold values of NDVI have been used to identify **three surface categories**: *1) open water surface, 2) wetland, 3) dryland*. Description and threshold values for those categories are given in the Table below. For classification of water sites the following threshold values were chosen for NDVI from analysis: < **-0.001** for open water; **-0.001÷0.05** for wetland; and, > **0.05** for other land surfaces.

	Surface category	Description	NDVI threshold values
1.	Open water surface	water depth 5-25 cm, depending on the rise or fall of water	< -0.001
2.	Wetland	water depth of up to 5 cm, wet and moist soil	-0.001÷0.05
3.	Dryland	all other land surfaces, except for open water and wetlands	> 0.05

By present, the information for 2021 and 2022 on http://cawater-info.net/aral/data/index.htm has been updated using the improved methodology. In this context, differences can be found when making comparison with the data for the past years.

Figure 1. Satellite images of Western and Eastern parts of the Large Aral Sea, *Landsat 8 OLI (2021 год)*

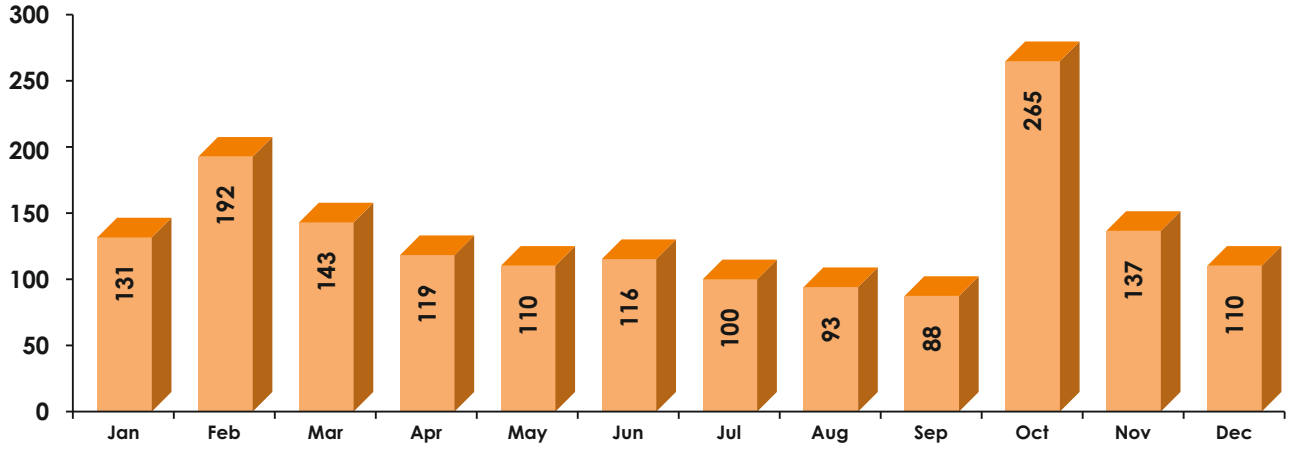


2.2.1. Water Supply to the Amu Darya Delta and the Large Aral Sea

Water Supply to the Amu Darya Delta

The analysis of water-related situation in the Amu Darya Basin (based on the data of BWO Amu Darya) shows that in 2021, 1,604 Mm^3 of water (flow from the river and water discharged from canals and collecting drains)[6] actually reached the Amu Darya delta. This is by 1,089 Mm^3 lower than in 2020.

Dynamics of total water supply to the Amu Darya delta in 2021, *Mm^3*



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

Bypassing the Amu Darya Delta, 467.35 Mm^3 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)[7]. This is almost 100 Mm^3 more than in 2020 (369 Mm^3).

Table 1. Flow from the Main South-Karakalpak collecting drain to the exposed bed of the Large Aral Sea in 2021, *Mm^3*

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YEAR
28.5	31.5	62.6	47.5	46.0	46.0	37.5	30.5	34.0	39.5	34.0	29.8	**467.4**

[6] Source: BWO Amu Darya

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

Total inflow into the Large Aral Sea

In 2021, as compared to 2020, the inflow into the Large Aral Sea (LAS) decreased: (1) from the Amu Darya delta[8], including collector-drainage water from the Main South Karakalpak collecting drain – by 129.35 Mm^3, making up 467.35 Mm^3; (2) from the Northern Aral Sea (NAS) – from 1003 to as low as 183 Mm^3 (Table 2). The total amount of water discharge into LAS decreased 2.4 times from 1,600 (2020) to 650.35 km^3 (2021). Water flowing from NAS is partially accumulated in Eastern part, reaches Western part of LAS, and is partially lost through evaporation and infiltration.

Table 2. Total inflow into LAS, *Mm^3*

Year	Northern Aral Sea[9]		South Aral Region		Total discharge into LAS
	Total inflow into NAS from the Syr Darya, Karateren post	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[10]	
2020	1,822	1,003	2,693	597	**1,600**
2021	1,196.88	183	1,604	467.35	**650.35**

2.2.2. Open Water Surface and Wetlands in Eastern and Western Parts of the Large Aral Sea

As monitoring and GIS data for 2021 shows, (1) from April to September, the water surface area in **Western part** of LAS shrank insignificantly from 231.1 to 222.1 thousand ha, while the wetland area decreased dramatically (from 60.7 to 0.2 thousand ha), and the area of the rest part increased 1.26 times (from 314 to 269.6 thousand ha); (2) the water surface area in **Eastern part** of LAS was within 0.017-0.019 in May and September and 0.67 in July. The wetland area increased almost twofold (from 5.78 to 11.97 thousand ha) and abruptly shrank to 0.003 thousand ha by September (Table 3).

Table 3. The area of wetlands, open water surfaces and dryland* in the Western and Eastern parts of LAS, 2021[11]

Month	Feb 21	Apr 10	May 12	Jun 29	Jul 31	Aug 16	Sep 17	Oct 3
Western part of the Large Aral Sea, ha								
Total area	**561,350****							
Wetland	clouds	60,683	6,754.3	3,220.9	2,960	200.07	202.9	clouds
Water surface	clouds	231,073	231,147.7	231,182.7	226,671.66	224,157.6	222,136	clouds
Dryland*	clouds	269,593.4	323,448.2	326,946.6	331,718	336,992.6	339,011.3	clouds
Eastern part of the Large Aral Sea, ha								
Total area	**1496824****							
Wetland	clouds	clouds	5,778.63	clouds	11,966	144.81	2.97	clouds
Water surface	clouds	clouds	17.01	clouds	668.88	141.39	19.35	clouds
Dryland*	clouds	clouds	1,491,028	clouds	1,484,189	1,496,538	1,496,802	clouds

** 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)

[8] In 2021, inflow into LAS from the Amu Darya delta equaled zero

[9] Source: Committee for Water Resources of the Republic of Kazakhstan

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

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

2.2.3. Lake Systems of the Amu Darya Delta

Table 4. The area of open water surface, wetlands and dryland* within the lake systems in South Aral region in 2021[12], *ha*

Water body	TAWB*, *ha*	Feb 21			Apr 10			May 12			Jun 13			Jul 31			Aug 16			Sep 01			Oct 03		
		WS	Wet-land	Dry-land	WS	Wet-land	Dry-land	WS	Wet-land	Dry-land	WS	Wet-land	Dry-land	WS	Wet-land	Dry-land	WS	Wet-land	Dry-land	WS	Wet-land	Dry-land	WS	Wet-land	Dry-land
Sudoche	72,697	13,346	465	58,886	12,964	474	59,259	11,985	338	60,374	10,223	20	62,454	5,756	464	66,477	4,941	39	67,717	4,405	48	68,244	4,481	27	68,190
Mejdureche	37,784	6,947	157	30,680	5,945	130	31,709	2,891	102	34,792	955	4	36,825	395	28	37,361	338	1	37,445	244	5	37,534	1,178	2	36,604
Rybache	11,493	2,107	204	9,182	2,348	29	3,116	1,412	405	9,676	172	3	11,317	1	1	11,490	2	0	11,491	5	0	11,488	73	2	11,418
Muynak	16,164	946	1,086	14,132	765	320	15,078	179	51	15,934	15	1	16,148	22	4	16,138	21	1	16,143	28	1	16,136	31	0	16,133
Djiltyrbas, dam-terminated	47,472	7,608	690	39,175	6,806	820	39,846	5,401	296	41,776	4,605	24	42,843	2,741	277	44,355	2,841	21	44,609	2,260	22	45,191	2,146	15	45,312
Djiltyrbas (together with former right and left streams)	98,951	443	1,178	97,331	1,018	698	97,235	133	33	98,785	54	1	98,896	18	5	98,928	14	0	98,937	11	0	98,939	18	0	98,933
Dumalak	16,050	284	33	15,734	233	18	15,798	10	2	16,038	0	0	16,050	0	0	16,050	0	0	16,050	0	0	16,050	0	0	16,050
Makpalkul	8,684	2,496	214	5,975	1,731	286	6,667	697	93	7,913	240	3	8,442	1	1	8,682	0	0	8,684	0	0	8,684	0	0	8,684
Mashan Karadjar	27,201	500	82	26,619	547	125	26,529	363	32	26,805	97	1	27,102	61	15	27,125	39	1	27,161	64	1	27,136	172	2	27,027
Water surface southward of Muynak	9,605	49	32	9,524	0	0	9,605	0	0	9,605	0	0	9,605	0	0	9,605	0	0	9,605	0	0	9,605	0	0	9,605
Water surface along Kazakhdarya river course	4,752	0	0	4,752	0	1	4,751	0	0	4,751	0	0	4,751	0	0	4,752	0	0	4,752	0	0	4,752	0	0	4,752
Zakirkol Lake	2,791	227	13	2,551	160	9	2,622	18	2	2,771	0	0	2,791	0	0	2,791	0	0	2,791	0	0	2,791	0	0	2,791
Total:	**353,644**	**34,951**	**4,154**	**314,539**	**32,518**	**2,911**	**318,216**	**23,071**	**1,353**	**329,219**	**16,362**	**58**	**337,224**	**9,095**	**796**	**343,753**	**896**	**64**	**345,385**	**7,018**	**77**	**346,549**	**8,097**	**49**	**345,498**

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

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

Lake systems of the Amu Darya delta are comprised of small local water bodies in the South Aral region. Overall, as compared to 2020, the hydrological situation in the South Aral region changed for the worse in 2021. The actual water area of the lake systems accounted for 10 (February) to 2.5% (October) of the design area (353,644 ha)[13]. The open water surface area of the lake systems shrank from 34.9 to 8.1 thousand ha in the period of February to October, while the area of wetlands decreased from 4.1 to 0.049 ha (Table 4). The supply of 1,604 Mm^3 of water to the Amu Darya delta does not provide necessary conditions[14] for fishery and ecosystem in such lakes as Sudoche, Rybache, Muynak and Djiltirbas. The reason is the lack of a special plan for filling of the lakes with water and the failure to control this process.

The decreased supply of water to the delta of Amu Darya (Figure 2) during the growing season leads to lower inflow of collector-drainage water into local water bodies in the South Aral region (Table 5).

Table 5. Inflow into local lakes in South Aral region during 2021[15], *Mm^3*

Lake	Monthly inflow into lake												Total over 2021
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Sudoche	17.31	17.33	20.12	17.88	15.27	14.84	16.92	17.48	17.88	27.21	18.54	14.57	215.35
Mejdureche	58.1	54.18	56.85	35.52	47.42	36.99	21.92	28.81	17.99	56.63	37.55	22.97	474.93
Djiltyrbas	10.61	11.79	31.55	32.34	17.21	17.27	15.43	11.39	15.14	38.94	16.26	11.1	229.03

Conclusion

Dynamics of water surface and wetland area in LAS and South Aral Region in 2021 indicates to the complicated hydrological situation due to variations in water availability in the course of the year. The water surface area of lakes was unstable. In this context, more targeted measures are needed to provide sustainably the right quantity of water for environmental needs of the Aral Sea region and the sea itself. Those are: to complete construction of the deltaic infrastructure in the Amu Darya delta, including the Mejdureche reservoir and the system of lakes to make use of collector-drainage water from the Ozerniy collecting drain; to improve performance of BWO Amu Darya and other basin authorities in lower reaches; to identify water level patterns in the lake systems; and, to develop the system of integrated monitoring combined with application of RS-measurements in the Aral Sea region and the Aral Sea.

2.3. Status of Water Bodies in the South Aral Region

Experts of SIC ICWC set up the expedition from June 10 to July 18 to assess the state of lake systems, such as Sudoche, Djiltyrbas, Muynak, Rybache, and other water bodies in the South Aral Region (Fig.3). They also checked the operation of gauging stations reconstructed by the "CAWa – Central Asian Water" Project in 2011. The expedition's route extended to about 2,500 km. The expedition covered by observation 80 points in total, including 59 points around/inside water bodies and 21 points at hydraulic structures.

Key findings

The recent measures taken in the Aral Sea Region to create water bodies, construct dams, ensure sound water use, and develop fisheries had been gradually contributing to stable water supply and better environmental and socio-economic situation in the South Aral.

The tasks still to be solved include the following:

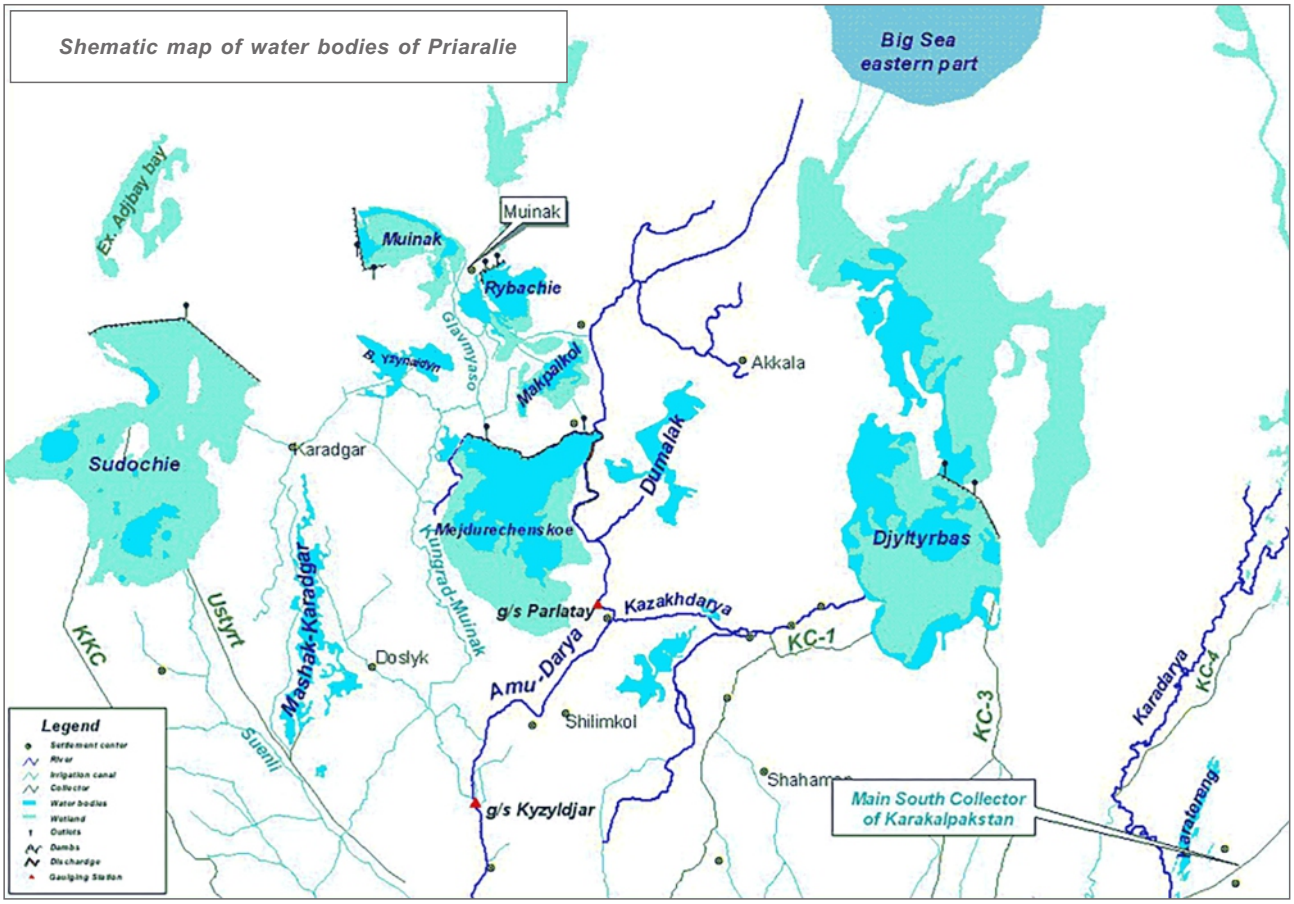
1. **Ensure sustainable water supply to the South Aral region.** The water surface area of lake systems in the Amu Darya delta and the South Aral region has been shrinking every year (Fig. 4). Currently, water for environmental needs is provided residually: partially from collector-drainage water and a small amount of river runoff left after meeting the demands of irrigated agriculture. Recently, due to recurrent drought, flow to the Amu Darya delta has decreased. This prevents from providing the minimum amount of water (3.5 km^3) as a sanitary flow (Fig. 5). Therefore, it is necessary to raise priority of the ecosystem demand,

[13] Monograph "Aral Sea and the Aral Region". UNESCO, "Complex Print", Tashkent 2020, http://cawater-info.net/library/rus/aral-sic-icwc-2020.pdf, стр.91-92

[14] According to SIC's research estimations, the South Aral region should receive 8 km^3 of water from the Amu Darya in average and wet years (in terms of flow) and 3.5 km^3 in dry years (like in 2020), http://cawater-info.net/biblio/Publicationview.php?KodItem=1179

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

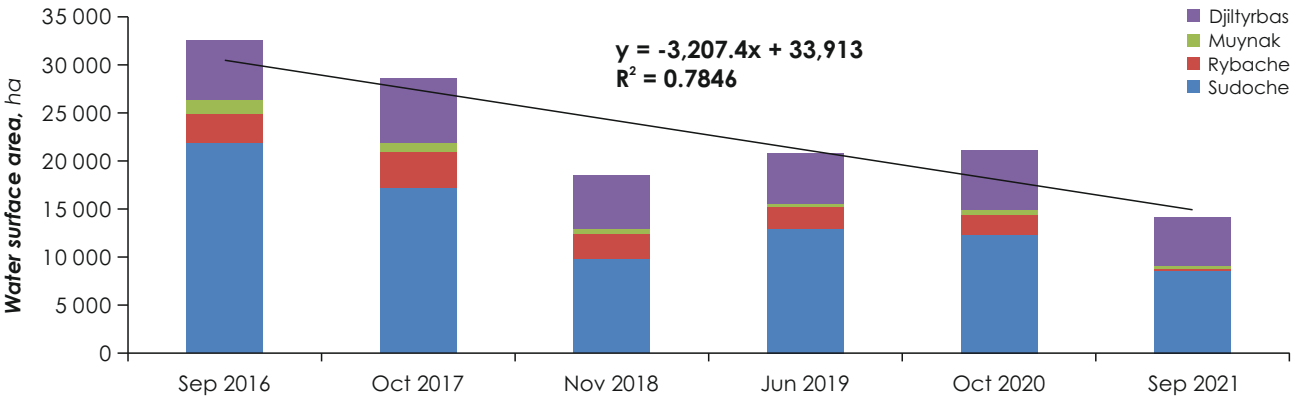
Figure 3. Schematic map of water bodies in the South Aral Region



ensure sustainability of water supply, and mobilize additional sources of water.

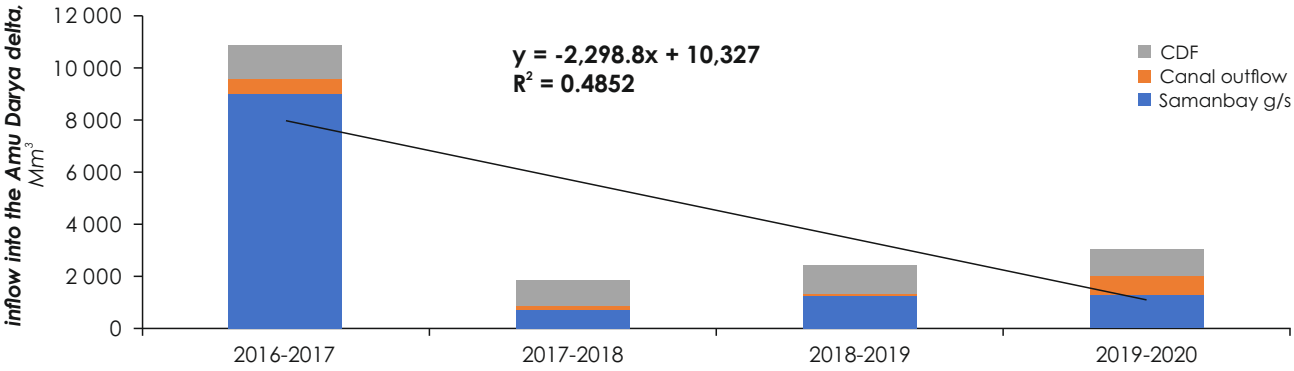
2. Put the primary focus on better water accounting and modernize and rehabilitate gauging stations. At present, accounting of water losses along main watercourses (rivers, canals and collecting drains) is very rough. As explained by the Delta's Dike Administration, if a canal or a river is 200 km long then water losses were taken equal approximately 20%. Most gauging stations reconstructed in 2011 under the CAWa Project for measurement of water level and flow rates in canals, collecting drains and water bodies in the Aral Sea region need to be modernized and rehabilitated. Some of gauging stations are out of service, some have no gauge-rods or the latter are not fixed. Thus, it is recommended also to recover canal and collecting drain sections to design parameters, make control measurements of water level and speed to update Q=f(h) curve, equip the gauging stations with automatic sensors for trouble-free data transmission, and provide monitoring

Figure 4. Dynamics of water surface area in the key water bodies in South Aral region



Source: http://www.cawater-info.net/aral/data/monitoring_amu.htm

Figure 5. Inflow into the Amu Darya delta over a hydrological year



Source: BWO Amu Darya

services with modern technologies (with bringing staff back).

3. Create favorable conditions for attracting staff and stable financing in improved delta management. There is significant shortage of personnel and financial resources. In 2021, the Delta Authority of the Aral Sea Region reduced its staffing almost twice.

4. Bring uncontrolled waterfowl hunting, bush cutting and dry reed burning to regulation. Herders set fire to reeds to track livestock and expand areas for pastures. However, spontaneously spreading fires damage flora and fauna. Thus, it is necessary to regulate and control burning of dried reeds by setting allowable places and time. RS and drones would also help to identify potentially hazardous places and scale of fire on wetlands. Awareness of the local population should be also raised to prevent fires. Unauthorized hunting and fishing in nature reserves must be strictly prohibited, while nature reserve protection inspectors should get more power, particularly in part of making those who violate the laws on forest and protected natural land accountable.

5. Mobilize the untapped resource of pasturable fish culture to have sustainable revenues and improved status of water bodies. The water bodies in South Aral region can serve a base for pasturable fish culture[16]. Bearing in mind the extended areas of water bodies, that resource could offer great opportunities. Success of pasturable fish culture will depend largely on the arrangement of nurseries for reproduction of baby fish inhabiting these environments.

6. Develop tourism on the Ustyurt Plateau and the coastal strip of Sudoche and treat the regional nature and history with care. The Roadmap[17] for implementation of initiatives voiced by the President of Uzbekistan at the Summit of IFAS founding states included the task for arrangement of a tourist center around Sudoche Lake. In this context, it is necessary to re-start developing relevant design documentation and think on mobilization of investments and grants. In doing this, it is necessary to preserve the historical appearance of the fishing village of Urga used to be a hive of fishermen activity more than half a century ago. Here, one can make use of the touristic experience in the Hula nature reserve (northern Israel), where visitors can watch water birds from an observation tower, and the Rhön biosphere reserve (Germany), with foot paths to enjoy wetland landscapes. The therapeutic potential of saline waters of the Aral Sea region is left unused also. Therefore, the hydrochemical composition of these saline waters (e.g. in the eastern part, Djiltyrbas lake, where the salinity is higher than 120 dS/m) should be thoroughly examined for health resort development.

7. Maintain constant monitoring over the state of water bodies in the South Aral Region through the combination of ground- and RS-based data. The existing monitoring system does not track all changes in the state of water bodies in such a vast area due to lack of accurate maps and weak network of operational observation points and ground-based stations, including meteorological ones. The RS-data can partially solve these problems.

SIC's experts make monthly assessments of water surface and wetland areas in the South Aral Region and the Western and Eastern parts of the Aral Sea through satellite images.

These data are uploaded every month to the SIC's website (www.cawater-info.net/aral/data/monito

[16] Pasturable fish culture is the production of fish from spawning to young fry under artificial conditions and the following fry stocking in open waters through natural feeding base

[17] Decree No.965-f of 16.11.2018 by the Cabinet of Ministers of Uzbekistan

ring_amu.htm). The materials (data matrix with description of 80 GPS points) of this expedition were used to improve the methodology for determining areas of water bodies and wetlands.

The expedition's report is available on http://www.cawater-info.net/library/rus/aralsea_monitoring_2021_ru.pdf

2.4. Northern Aral Sea and the Aral Sea Region

Thanks to the work done under the Syr Darya Control & Northern Aral Sea (NAS) Project, in 2010, the water volume in NAS was 27.35 km^3 at the water level of 41.15 m BS, with the water area reaching 3,340 km^2. The water salinity was within 11 g/l.

However, since 2010, the catastrophic regression of the Northern Aral Sea has been observed. From 2015 to 2021, the water volume decreased from 25.1 to 20 billion m^3 due to reduced inflow caused by natural-climatic conditions and growing water use. Thus, in 2021, the inflow amounted to 943 million m^3 only.

From 2010 to 2019, the mean inflow into NAS was about 5.6 billion m^3 (as per Karateren gauging station), of which 2.5-3.0 billion m^3 were left directly in NAS for maintenance of this water body.

In 2012, over 330 thousand ha of wetlands in the lower reaches of the Syr Darya River and within NAS were enlisted in the List of protected sites of the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention).

The lake systems and wetlands in the Syr Darya lower reaches consume about 1.5 billion m^3 out of required 3.0 billion m^3. The expected decrease in water resources in the basin and further growing anthropogenic load may lead to disappearance of the wetlands protected by the Ramsar Convention and to repeated degradation of NAS.

In the future in the Kazakhstan part of the Aral Sea region, if NAS continues to regress and given the hydrological link between surface water and groundwater, usable groundwater resources in Tolagay aquifer may deplete also.

This would compromise safe water supplies for 65 settlements in Aralsk and Kazalinsk districts (with population of about 160 thousand). Thus, a strategic environmental assessment needs to be done in this direction, in line with the national Environmental Code, Article 52.

It should be taken into account that recently Turkestan province has seen an increase in the demand for water from the Syr Darya River, including also through the development of the tourism cluster.

By the end of 2020, according to the "Single system of water quality classification for water bodies in the Republic of Kazakhstan", the Syr Darya River (at Kokbulak village site – 10.5 km to the north, north-west of the post) was evaluated as follows: water quality falls to Class 4 (suspended solids – 125.62 mg/dm^3, magnesium – 42.79 mg/dm^3, sulfates – 510.25 mg/dm^3, phenols – 0.0015 mg/dm^3); concentration of magnesium and phenols did not exceed the baseline; concentration of sulfates and suspended solids exceeded the baseline.[18]

In 2018-2020, as part of the "Phytomelioration on the Kazakhstan's dried part of the Aral Sea" Project and together with the Republic of South Korea, saxaul was planted on an area of 13 thousand ha.

At the expense of Kyzylorda province budget, 5 thousand ha are afforested every year. In 2020, forest was planted on more than 300 thousand ha in the Kazakhstan part of the dried seabed of the Aral Sea.

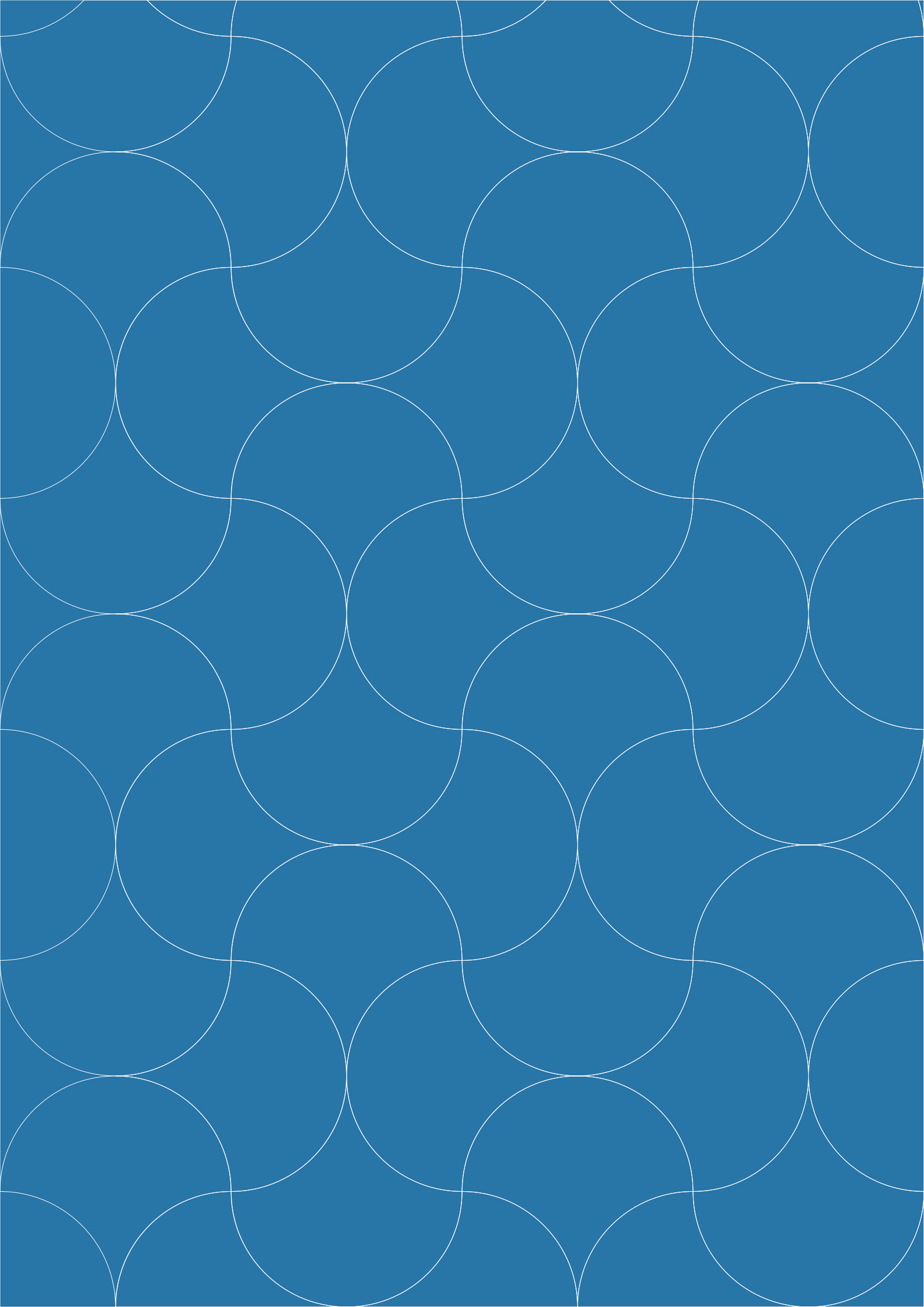
Source: ED IFAS in Kazakhstan

[18] KAZGIDROMET. Newsletter about transboundary transfer of toxic components in environment over 2020. Nur-Sultan, 2020, www.kazhydromet.kz/uploads/files/39/file/600aabe6ad292byulleten-tg-perenos-2020-god-rus-iyaf.pdf

Table 6. Status of NAS from 2010 to December 29, 2021

Year	Volume (km^3)	Area (km^2)	Inflow (Mm^3)	Water level (m BS)	Salinity (g/l)
2010	27.35	3,340	4,141	41.15	11
2011	25.82	3,197	1,174	41.59	10
2012	25.70	3,244	2,583	41.80	10
2013	24.43	3,240	1,682	41.78	10
2014	24.84	3,292	2,564	41.99	10
2015	25.09	3,246	3,090	41.90	10
2016	24.88	3,245	2,319	41.81	10
2017	24.70	3,333	2,546	42.13	10
2018	22.79	3,220	1,028	41.69	10
2019	25.09	3,246	2,869	41.90	10
2020	23.60	3,344	317	42.16	10
2021	20.04	3,123	943	41.25	

Source: Data of ED IFAS analyzed together with the Aralo-Syrdarya Basin Inspection (letter No.18-9-02-10/817 of 27.12.2021)

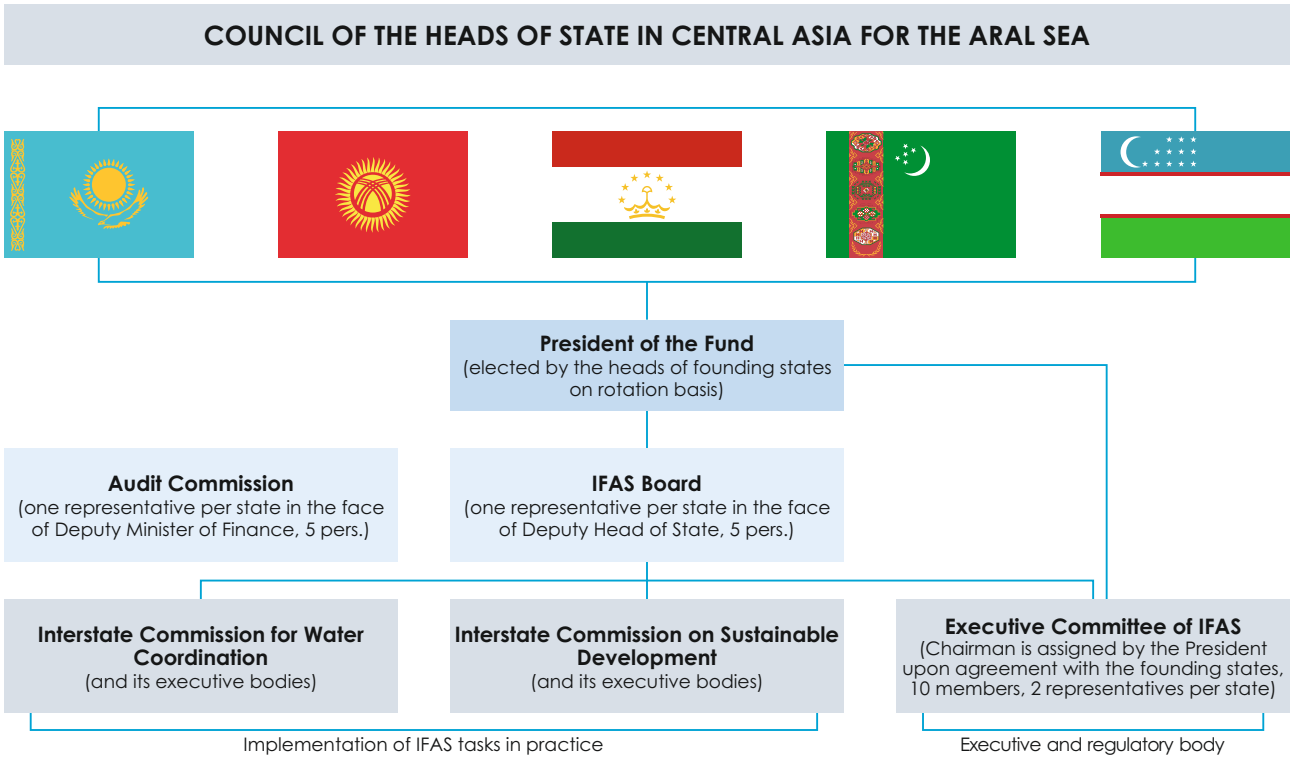


Section 3

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 a decision of the Heads of CA states on the 4th of January 1993 with the aim of developing and funding environmental and applied research projects and programs in order to improve ecological situation in the areas affected by the Aral Sea catastrophe and address the socioeconomic issues in the region. The organizational setup of IFAS is shown below.



Tajikistan took over the IFAS chairmanship for the period of 2019-2022 in line with the decision of the Second Consultative Meeting of the Heads of CA States (November 29, Tashkent). The President of Tajikistan, Emomali Rahmon has been elected as the chairman of IFAS.

3.1.1. Implementation of initiatives of the Presidents of CA States voiced at XII Summit of the Heads of IFAS Founder-States

The Presidents of CA States had put forward important initiatives and proposals at XII Summit of the Founder-States, which was held in the city of Turkmenbashi on the 24th of August 2018. Following the Summit, a Joint Communiqué was adopted.

Implementation of the initiatives in 2021 is described in the subsections of Executive Committee of IFAS and its National Branches, ICWC of Central Asia and in Key Water Developments in the Countries of Central Asia.

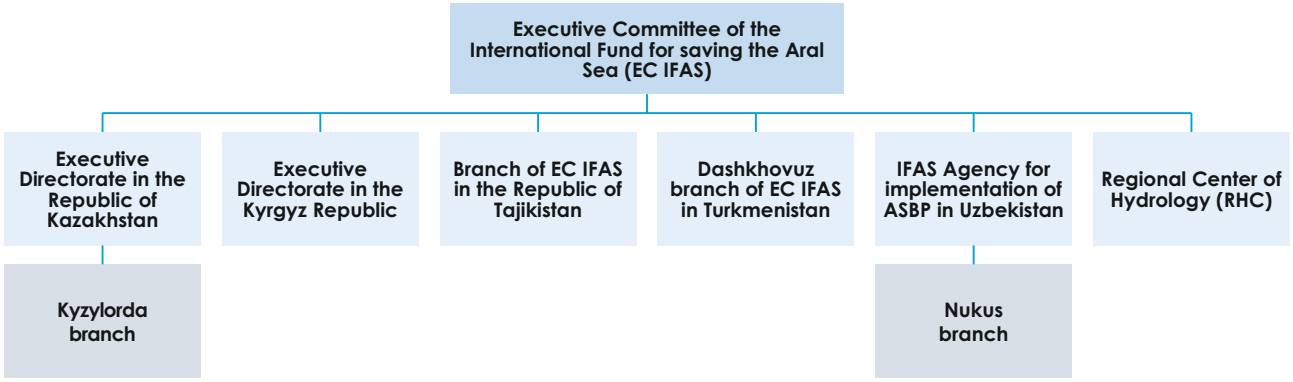
3.1.2. IFAS Board

A meeting of the IFAS Board was held in Dushanbe on June 29. During the meeting, the draft Work Plan of the IFAS Executive Committee, the Aral Sea Basin Program (ASBP-4), and the matters related to activities of the Working Group on Institutional and Legal Improvement of IFAS were addressed. In particular, the ASBP-4, which serves as an important basis for the development and implementation of projects aimed at environmental and socio-economic improvement in the region, has been approved.

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 of July 13, 1993. It serves as a platform for dialogue between the CA countries and the international community.



Location of EC IFAS by Country and Year

Mr. Sulton Rakhimzoda was appointed on September 28, 2020 **the Chairman of EC IFAS** by the Decree of the President of IFAS, the President of the Republic of Tajikistan.

Plans. The regional dialogue on institutional and legal improvement of IFAS and the implementation of the Aral Sea Basin Program (ASBP-4) are considered as priorities for Tajikistan's chairmanship.

Activity of EC IFAS in 2021

Institutional and legal improvement of IFAS

The cooperation aspects in the improvement of institutional and legal framework of IFAS were discussed during the meeting between the EC IFAS and the World Bank on August 24. In the course of the year, three meetings of the Working Group on Institutional and Legal Improvement of IFAS were held: (1) **4th meeting**, where EC IFAS presented progress and examples of *different river basin commissions all over the world* (Sava, Nile, Mekong, Columbia basins) and discussed next steps in RWG activity (online format, May 27); (2) an **extraordinary meeting** to discuss the current progress and plan further steps in light of the forthcoming 5th meeting of RWG, agree upon the operating procedures and work schedule of the Group (online format, August 16); (3) **5th meeting**, where participants discussed comments to the draft Discussion document prepared by international consultants of the World Bank on the base of RWG's visions and the proposals on the 1st stage of the improvement process. The 2nd stage is focused on "identification of challenges/shortcomings in fulfilling functions and tasks by IFAS' organizations" (October 18).

ASBP-4 was developed on the basis of the decision of the IFAS Board of January 30, 2018 and approved by the decision of June 29. The Program consists of the following four focus areas: (1) integrated use of water resources; (2) environmental; (3) socio-economic; (4) improvement of institutional and legal mechanisms. The Program is to be implemented over 2020-2030. On October 18, in Dushanbe, with the support of the WB's CAWEP Program, a Coordination Meeting of the EC IFAS with international development partners was held. As a result, a **Joint Statement on the implementation of the Action Program for Assistance to the Aral Sea Basin Countries (ASBP-4)** was adopted.

ASBP-4 was presented at the 2nd Regional Consultation Meeting on Water Pillar under the CAREC 2030 Strategy (September 14) and "The Future of the Water

Sector of Central Asia – Opportunities and Challenges" workshop in Budapest (November 29-30).

The importance of the implementation of ASBP-4 for the CA region was underlined by the Chairman of the EC IFAS at the high-level session "Water Resilient Food Systems: an essential pathway in the face of climate change" (November 9) and the High-level panel discussion at the virtual Asian Water Hub of COP26 Water pavilion (November 10). The aspects of cooperation as part of implementation of ASBP-4 were also discussed (1) during the meeting with the WB Regional Director for Central Asia, Mrs. T. Proskuryakova (August 24); (2) at the side event "Central Asia: Regional Approach to working with the Green Climate Fund" as part of COP26 (November 3); (3) with Charge d'Affaires of Canada, the Embassy of Canada in Kazakhstan, the Kyrgyz Republic and Tajikistan, Ms. N. Yegay (December 7); and, (4) with the EU Special Representative for Central Asia, Ms. T. Hakala (September 30, December 21).

Projects. EC IFAS implements the **first component** of the Climate Adaptation and Mitigation Program for Aral Sea Basin (CAMP4ASB), which aims at strengthening the knowledge base and capacity to counter climate change and promoting the regional multi-stakeholder dialogue and cooperation. For coordination and implementation of the regional components of the CAMP4ASB, an agreement between EC IFAS and WB on additional financing of the project (August 24) and an operational agreement on additional financing between EC EFAS and CAREC, through the Green Climate Fund (October 19-20) were signed.

During the meeting between EC IFAS and WB on August 24, the parties discussed implementation of joint regional projects, such as CAMP4ASB, CAHMP, and CAWEP.

A Memorandum of Understanding was signed between EC IFAS and GIZ on January 29.

Events. As part of preparation to the 9th World Water Forum "Water security for peace and development", the Central Asian Sub-regional Preparatory Conference was held in Dushanbe on October 19-20.

The chairman and representatives of EC IFAS participated and presented at: the side event "Aral Sea Basin: lessons, cooperation and prospects" on March 12; the Scientific-Practical Conference dedicated to the International Decade for Action: Water for Sustainable Development (2018-2028) and the World Water Day on March 31; the closing event of the Global Disruptive Tech Challenge 2021: Restoring Landscapes in the Aral Sea Region on April 9; high-level side event during the UNGA High-level Week entitled "How changing water availability from ice and snow will impact our societies" (September 22); 10th meeting of the EU–Central Asia Working Group on Environment and Climate Change (WGECC) "Green Recovery: New Opportunities for Cooperation" (October 4); opening (November 1) and closing (November 11) of the Pavilion of **Central Asia "5 countries, 1 region, one vote"** organized by CAREC together with EC IFAS at COP26 in Glazgow; panel session "Water and Food Security" within the framework of the Sustainability Expo and Summit "Planet Budapest 2021" (December 1); high-level panel titled "Transboundary aquifers on the international high level agenda" as part of the Second International UNESCO Conference on Transboundary Aquifers (December 7); launching of the report "The state of the world's land and water resources for food and agriculture: Systems at breaking point/SOLAW 2021" (December 9).

Publications. The following items were published in 2021: "The role of IFAS in strengthening cooperation between the Central Asian countries"; "Tajikistan's global initiatives: platforms for discussion and search for optimal and sound ways to solve water-related challenges."

Source: http://ecifas-tj.org/; www.facebook.com/ec.ifas

3.2.2. Regional Center of Hydrology

The Regional Center of Hydrology (RCH) at EC IFAS was established on the 23rd of August 2002 in line with a decision of the IFAS Board to improve the system of hydrometeorological forecasts, environmental monitoring and data exchange between the national hydrometeorological services in the region.

3.2.3. Executive Directorate of IFAS in Kazakhstan

ED IFAS renders assistance in addressing topical issues and coordinating measures to improve water-related, socio-economic and environmental situation in the Kazakh part of the Aral Sea basin.

Activity of ED IFAS in Kazakhstan in 2021

Projects:

- North Aral Sea Development and Revitalization Project (P170187, WB, Kyzylorda province): preparations were underway for the development of Project's feasibility study; work meetings were held with: (1) Kazgiprovodkhoz Insitute to discuss project components (February 16), a subcomponent for construction of the Main Kazalinsk collecting-drain to provide additional water for the South Aral Sea (March 4), and additional proposals for the feasibility study (September 27); (2) Vice-minister of ecology, geology and natural resources of Kazakhstan, S. Kozhaniyazov (February 28).
- GIZ regional project "Ecologically Oriented Regional Development in the Aral Sea Region" (ECO-ARAL):

representatives of ED IFAS took part in the work meeting with project executors (July), the first meeting of the Project's Steering Committee (December 2).

- "Greening the dried seabed of the Aral Sea: piloting a closed saxaul growing system"[19]: two saxaul greenhouses and the shadehouse were opened in Aral District, Kyzylorda province in April.

- "Kendirtex" as part of the new Strategy "The EU and Central Asia: New Opportunities for a Stronger Partnership": three-year research work was begun with the aim of adapting highly profitable and less water-intensive crops in the Aral Sea region on the basis of the EcoAral Science and Tourism Center.

ED IFAS supported and took part in the expedition to the dried seabed of **western, central and eastern parts** (Kazakhstan's territory) of the Aral Sea (June 16-22). The objective was to determine the scope and timeframe of planned afforestation work.

A report was drafted upon the results of the Fourth meeting of the Kazakhstan National Committee on Geoparks entitled "UNESCO Global Geoparks: opportunities and potential in Kazakhstan." The idea of arranging a Geopark titled "Aral sea Geopark" on the base of the Barsakelmes nature reserve was supported by the UNESCO Cluster Office (September 20).

Events. The following events were organized by ED IFAS: (1) scientific-practical conference "Water Resources Management in the Context of Globalization" on occasion of the 105th anniversary of Prof. Tadjibayev, together with the Kazakh National Agrarian Research University (online, Almaty, March 11-12); (2) roundtable "Lessons, the present and the future of the Aral Sea region" dedicated to 30th anniversary of independence in the Republic of Kazakhstan (December 14).

Deputy Director Mr. Narbaev on behalf of ED IFAS presented the following reports at workshops and webinars: (1) "Setting the economic basis for regional water cooperation in Central Asia" (April 15); (2) "Reduced vulnerability of Central Asian population to glacial lake outbursts due to climate change" (May 25); (3) "Conditions of irrigated land as the main factor of sustainable development of irrigated agriculture" (September 24).

Media. Director of ED IFAS B. Bekniyaz gave interviews to "Egemen Kazakhstan" (March 5) and "Kazakhstanskaya Pravda" (March 26) on the work done and plans for the Aral Sea region.

Source: www.kazaral.org

3.2.4. Agency for Implementation of IFAS Projects in Uzbekistan

The GEF Agency of IFAS established in 1998 is a working body of IFAS. It has the status of international organization and accreditation at the MFA of Uzbekistan as a representative body of EC IFAS in Uzbekistan.

Activity of the GEF Agency of IFAS in 2021

The **project activities** are carried out together with the Nukus branch of EC IFAS through the state budget of Uzbekistan as its contribution to IFAS and the donor's grants. The total financing by the end of 2021 was 109 952.158 billion soum (US$10.47 million). The work was done as part of the projects mentioned below.

- "Construction of small local water bodies in the Amu Darya Delta. Phase II". (1) Structures were put into operation within the framework of the: "Construction of embankment at Muynak airport and subsurface horizontal drainage" (total cost – 18,856.907 million soum); "Provision of irrigation water for subsidence plots (65 ha) in the city of Muynak through the polyethelen pressure pipeline network" (total cost – 10,546.357 million soum); (2) Work was continued on "Reconstruction of the Muynak Canal" (the total cost is 28,691.451 million soum, of which 8,352 million soum were disbursed in 2021) and (3) on "Reconstruction of a road dam around Maipost Lake and construction of an overflow structure on the Amu Darya River (Akdarya) together with measures to prevent canyon formation processes in Domalak Lake" (total cost – 398.0 billion soum), with the acceptance of the road dam, 6 m wide on the ridge and 10,645 m long on June 18 and the installation operations on the overflow structure.

- Afforestation: (1) Protective afforestation in Akhantai site" (450 million soum were allocated in 2021); (2) "Protective afforestation in Akkum ridge" (also 450 million soum were allocated in 2021). The Act of acceptance of a part of the protective forest plantations in the Akhantai site (4,799.88 ha) and in the Akkum ridge (589.98 ha), including the mechanical protection area of 118.2 ha, was approved on March 15.

- "National water resources management in Uzbekistan", Phase 2, SDC (project site – 13 BISAs, 13 land reclamation field offices, 48 ISAs, and 155 district irrigation divisions): drafting of the Water Code by forces of national, regional and international experts, jointly with the Information-Analytical Resource Center of Uzbek MWM was started; the Drainage Information System is finalized; the capacity building program for district irrigation divisions was developed; a package of training materials on water conservation was prepared for 11 professional colleges (a new textbook was tested in 4 colleges); and, the online training on irrigation e-scheduling and the webinars on water conservation were organized.

[19] Implemented in Kyzylorda province, Kazakhstan as part of the EU's "Nexus Dialogue in Central Asia" project on the basis of the EcoAral Science and Tourism Centre

- "Monitoring of biodiversity of wetlands in the South Aral Region" (together with the Karakalpak Natural Science Institute under OSCE's support): 2 expeditions were undertaken on June 4-13 and September 25 – October 5 to collect data on flora and fauna species and populations in wetlands (Makpalkol lake system, Mejdureche reservoir, Djiltyrbas lake, and Eastern Karateren). As a result, the risk assessment for regional wetlands was made.

Project proposals. In partnership with the Research-Consulting Center "Eco-service", the project proposals were prepared on the "Scientific platform for monitoring and restoration of ecosystem around Western part of the Aral Sea" for submission to AWC and on the "Possibilities of reversing negative natural processes in the Aral Sea region through innovation technologies" for submission to the Uzbek Ministry of Innovation.

Cooperation through regional projects. USAID Regional Water and Vulnerable Environment Activity (WAVE): The GEF Agency of IFAS assisted in the development of feasibility studies for two activities: (1) arrangement of exemplary oasis of forest plantation on the exposed seabed of the Aral Sea; (2) formation of temporary forest nursery for black saxaul and other plants for afforestation around the exposed seabed of the Aral Sea.

Regional GIZ Project "Ecologiocally Oriented Regional Development in the Aral Sea Project" (ECO-ARAL): The GEF Agency of IFAS supported the project in developing a strategy for building capacities of micro-, small- and medium-scale businesses, as well as of ministries and public agencies so that they could make investment decisions adapted to climate and oriented on environment.

Activities in support of IFAS. The GEF Agency of IFAS took part in briefings and coordination meetings of EC IFAS and its organizations; in activities of the working group on institutional and legal improvement of IFAS.

Political and civil engagement. The GEF Agency of IFAS took part in (1) the work of the Uzbek Oliy Majlis' Senate Committee on the Aral Sea region development (Committee's meetings and roundtables); (2) activity of the Ecological Party of Uzbekistan: thematic meetings, an ecological campaign; sessions of the Party's Political Council and the Tashkent party organization, etc. During the year, at the request of ministries and agencies, the GEF Agency of IFAS prepared proposals and analytical materials on implementation of international and regional initiatives of Uzbekistan in the field of ecology, transboundary water cooperation, etc.

Capacity building and education. Mr. Sokolov judged the "Global Disruptive Tech Challenge 2021: Restoring Landscapes in the Aral Sea Region" on the theme "Agriculture and Land Management" and has got the certificate "Innovative judge", as well as the regional stages of the Student Olympiad on Sustainable Development Goals (GKU, TIIAME). As a trainer, Mr. Sokolov delivered lectures within the framework of the Project "Multimedia coverage of problems in the Aral Sea Region" implemented by the "MediaNet" International Journalists' Center (in May and December).

The GEF Agency of IFAS also participated in the Water Day organized by the UNESCO Chamber at GKU. It distributed the "Illustrated Album on History of the Aral".

International cooperation. The GEF Agency of IFAS cooperated with **UNECE** as part of activities of the Working group on integrated water resources management and the Working group on monitoring and assessment; **ADB** and **CAREC**, in developing the Water Pillar of the 2030 CAREC Strategy, participated in the first regional consultation on the Water Pillar on April 16. Together with the **UNDP in Uzbekistan** took part in the discussion on the special project "System risk management" and the launching of the 3rd Environmental Performance Review of Uzbekistan (July 15).

Representatives of the Agency participated in the roundtable discussions with U.S. Ambassador H.E. Rosenblum on Environmental Protection and Development in Uzbekistan (February 2) and Water Challenges (December 15).

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 of Uzbekistan. In particular, the following events were organized: (1) consultations on water-related disaster risk reduction during the COVID-19 in Uzbekistan, Georgia, and Kyrgyzstan; (2) a roundtable "Strategy of the Republic of Uzbekistan for implementation of integrated water resources management".

The GEF Agency of IFAS took part in (1) Pan-Asian webinars (four subregions) of GWP to discuss preparations to joint project proposal on "Resilience to climate transformations in Asia"; (2) a workshop of GWP ToolBox – IWRM Action Hub; (3) annual GWP regional days on occasion of Partnership's 25th birthday; (4) GWP's annual Network Meeting of Partners "Leading Change and Innovation through our Partners"; (5) annual meeting of GWP CACENA Regional Council. Assisstance was also rendered in drafting the analytical report "Draft concept for revision of the National Action Program on drought and land degradation control in Uzbekistan".

The GEF Agency of IFAS is an active member of the Asian Water Council (AWC). Mr. Sokolov took part in (1) two AWC Board of Council meetings – 13th meeting, where he presented the mission of the Uzbekistan's water management agencies to AWC's members (March 31), and 14th meeting (November 30); (2) pre- 2nd AIWW – a series of virtual conferences entitled "2-AIWW ON-AIR" to discuss the draft Asia to World Statement as one of the main policy outcomes of 2-AIWW.

As a national expert of the **Expert platform on water security, sustainable development and future studies**,

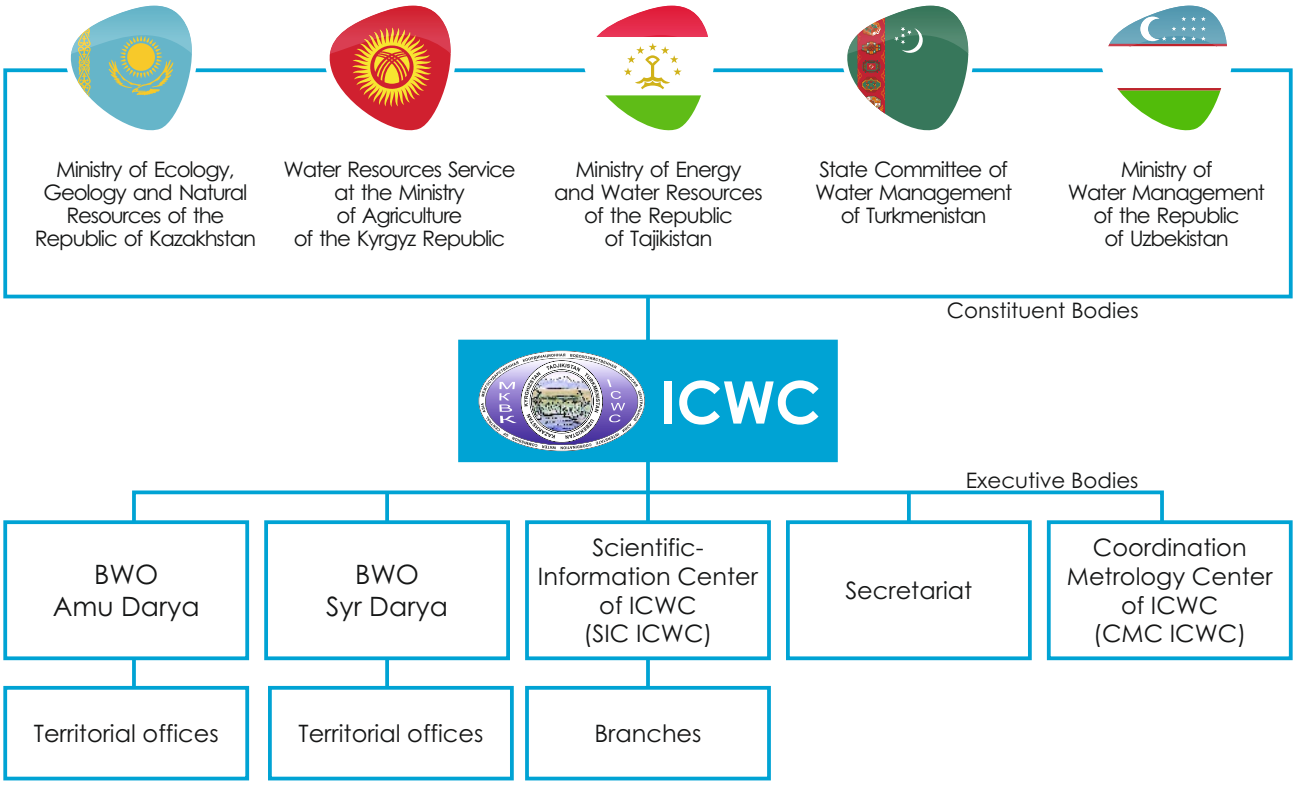
Mr. Sokolov contributed to discussion paper on "Water, Food and Energy Security in Central Asia: Background Analysis – Benefits of Cross-Sectoral (Nexus) Solutions" and the analytical review on "Identification of Future Water Needs in the CA Countries and Development of Optimization Simulation Models for Efficient Utilization of River Potential in the Aral Sea Basin" (AO Gidroproyekt Institute/EDB).

Media outreach. Events organized by the GEF Agency of IFAS were covered in media and on the web. Those included, in particular: regional TV channel of Karakalpakstan, Uzbekistan-24 and Oilaviy TV channels, Maxima and Uzbekistan-24 FM-87.9 radio stations, Podrobno.uz newswire, Global Landscapes Forum web-portal,UzbekKino and others.

Source: GEF Agency of IFAS; https://aral.uz/wp/about/

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 control, 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.



3.3.1. ICWC meetings

In 2021, ICWC had two meetings in a video conference format: 80th meeting under the chairmanship of Tajikistan (May 11) and 81st meeting chaired by Uzbekistan (December 7). ICWC members from Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan[20], as well as executive bodies (SIC ICWC, Secretariat of ICWC, BWO Amu Darya and BWO Syr Darya) and invited persons took part in those meetings.

Agenda. The main items on the agenda of the meetings were the **limits of water withdrawals and the operation regimes of reservoir cascades** in the Syr Darya and the Amu Darya basins. Based on the information provided by BWO Syr Darya and BWO Amu Darya, the Commission summarized the results for *the non-growing season 2020-2021* (80th meeting) and *the growing season 2021* (81st meeting). BWO Syr Darya was to submit to the Kazakh and Tajik parties a

[20] Since the 68th meeting, representatives of the Kyrgyz Republic have not taken part in ICWC activity

ICWC members in 2021

Yerlan N. Nysanbayev, *(since October 6, 2020)*

Vice-Minister of Ecology, Geology and Natural Resources

Serik S. Kojaniyazov, *(since January 27, 2021)*

Vice-Minister of Ecology, Geology and Natural Resources

Djamshed Sh. Shoimzoda, *(since November 3, 2020)*

First Deputy Minister of Energy and Water Resources

Guizgeldy N. Baijanov, *(since February 7, 2020)*

Chairman of the State Committee of Water Management

Shavkat R. Khamraev *(since 2005)*

Minister of Water Management

detailed calculation based on the results of the growing season 2021 for identifying inconsistencies in inflow to the Shardara reservoir along the Bakhri Tochik-Shardara reach (81st meeting).

For the growing season 2021 (80th meeting), the limits of country water withdrawals were approved and the proposed by BWO Amu Darya and BWO Syr Darya forecast operation regimes for the reservoir cascades in the both rivers were taken into account. Based on more accurate forecast data on water availability, ICWC members have agreed to consider additionally and agree upon the operation regimes by the end of May. The information by BWO Syr Darya on progress in drafting proposals for water withdrawal limits for the Karadarya River and the Chirchik River were taken into account. The proposals were to be submitted to ICWC members for consideration and approval of the water withdrawal limits since 2022.

For the non-growing season 2021-2022 (81st meeting), the limits of country water withdrawals were approved and the proposed by BWO Amu Darya and BWO Syr Darya forecast operation regimes for the reservoir cascades in the both rivers were taken into account. BWO Syr Darya is "to provide the Kazakh side with a detailed calculation explaining why, given that the forecast of water discharge from Bahri Tochik at the beginning of December was 100% correct, the forecast of inflow to the Shardara reservoir for the same period of time was not correct and, in fact, the inflow was 628 Mm^3 lower than the forecast."

As to *reaching agreement on the sanitary flow in the Syr Darya basin*, the Kazakh side was to provide ICWC members with additional information on the need to make efforts for determination of sanitary flow along the river courses in the basin and its approval with the relevant national agencies (81st meeting).

At the 80th and 81st meetings, ICWC members took into account the information by SIC ICWC on *progress in implementation of proposals and initiatives put forward at the Summit of the Heads of IFAS founder-states* and noted the satisfactory work of ICWC organizations in this area.

In line with the decision of the 80th meeting (1) SIC ICWC was to prepare ToR for a feasibility study on automation of gauging stations in the Syr Darya Basin, including small rivers; and, (2) BWO Amu Darya and BWO Syr Darya together with SIC ICWC were to define more precisely the actual water losses along the Amu Darya and the Syr Darya.

The 81st meeting took into account the draft Concept presented by SIC ICWC on celebration of the Commission's 30th anniversary. The members decided to hold the next 82nd ICWC meeting in Turkistan city, Republic of Kazakhstan combined with the 30th ICWC anniversary. The Kazakh side's proposal to nominate candidates for training at GKU in Almaty, as well as to take efforts to mobilize financing for the *resumption of training courses and exchanges between national experts* was also supported.

3.3.2. Activities of ICWC Executive Bodies in 2021

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 6th ICWC meeting on the 10th 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 5th 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 23rd October 1999, with the headquarters in Bishkek.

BWO Amu Darya

Activity of BWO Amu Darya in 2021

BWO Amu Darya continued working on distribution of water among the states, control in real-time regime of observance of the established water withdrawal limits (see Water-Related Situation in the Amu Darya and the Syr Darya River Basins) and on modernization and operation of waterworks facilities under its responsibility. BWO Amu Darya contributed to two ICWC meetings in 2021 (see ICWC meetings). Also, seven meetings of water management organizations responsible for the river's lower reaches were held to address water allocation matters.

In the course of the year, BWO Amu Darya maintained cooperation with national water agencies of Tajikistan, Turkmenistan, and Uzbekistan, national hydrometeorological services, SIC ICWC.

Source: BWO Amu Darya, http://amudarya-bwo.org/

BWO Syr Darya

Activity of BWO Syr Darya in 2021

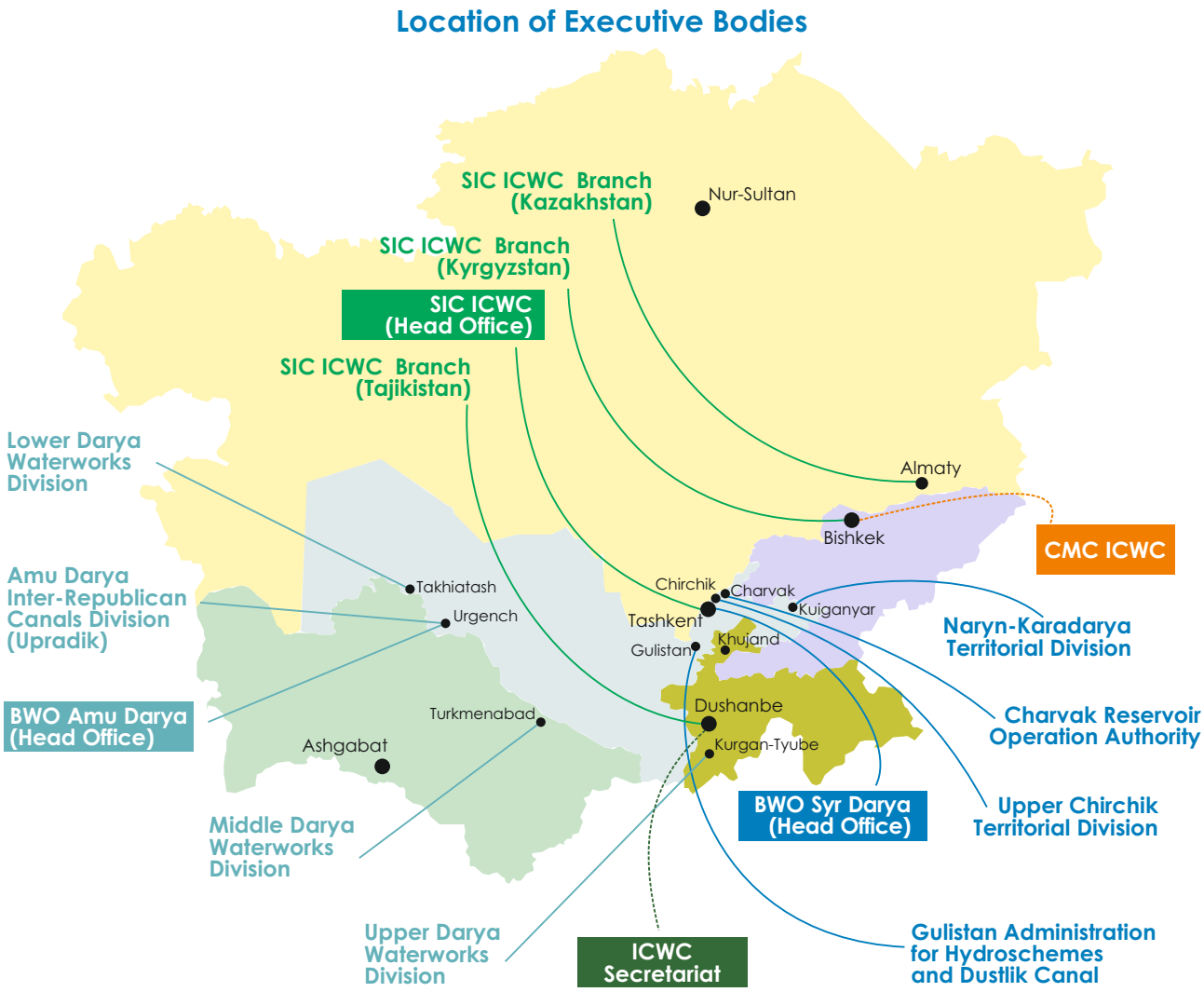
BWO Syr Darya and its territorial branches kept maintaining waterworks facilities, including canals, gauging stations, communication facilities, buildings and other structures under responsibility of the organization to ensure the sound use of water resources and trouble-free and sustainable supply of water to user-states.

Collective governance. In order to ensure unbiazed and efficient transboundary water governance in coordination with the Uzbek Ministry of Water Management and the Kazakh Ministry of Ecology, Geology and Natural Resources, Mr. M.E. Imangaliyev, representative of the Republic of Kazakhstan, has been engaged in activities of BWO Syr Darya as a deputy head since December 10, 2020.

ICWC meetings. BWO Syr Darya took part in preparation of 80th and 81st ICWC meetings. The reports on forecast and actual operation regimes of the Naryn-Syrdarya cascade of reservoirs and the limits of country water withdrawals for the growing season 2021, with account of the expected low-water conditions (forecast and actual), and the non-growing seasons 2020-2021 (actual) and 2021-2022 (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 Ecology, Geology and Natural Resources of Kazakhstan.

Repair and rehabilitation operations. The territorial branches of BWO have completed repair and rehabilitation of 30 hydraulic structures, undertook current planned repairs of 23 buildings and control stations, and performed mechanical cleaning of 18 canals.

Smart Water System. With the financial support of KOICA and assistance of the Uzbek Ministry of Water Management, the Smart Water system's equipment



was installed at (1) four structures of the Gulistan Waterworks Facility and Dustlic Canal Authority (K-1, K-3, Right-bank offtakes of the South Golodnostepskiy Canal (SGC) and the Dustlic canal); (2) 7 hydraulic structures (02-rod, head structures of Big Fergana Canal on the Naryn River and Zardarya canal on the Syr Darya River; (3) 1st head structure of the Parkent canal.

Reconstruction and modernization. As part of an investment program, the reconstruction of spillway and construction of a protection structure downstream of Kuyganiar hydroscheme to prevent erosion in Andizhan district, Andizhan province have been completed.

In line with the Governmental Decree of December 28, 2020 on measures for development of socio-production infrastructure in the Republic of Uzbekistan in 2021-2023, the construction work and modernization of the automation and control system have been completed under the "Reconstruction and modernization of the head structure at DP 145 of SGC in Shirin town, Syrdarya province".

Additionally, the construction work under the "Reconstruction and modernization of the head structure at the Dustlik canal in Bekabad district, Tashkent province" has been started.

ASBP-4. The data sheets with project proposals prepared jointly with SIC ICWC, Uzbek Hydrometeorological Service and other concerned institutions were included in the ASBP-4 approved by the decision of the IFAS Board on June 29, 2021, namely: 1.3. "Provision of dam and large hydraulic structure safety in Central Asia: capacity building and regional cooperation"; 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, https://bwosyrdarya.org/

ICWC Secretariat

Activity of the Secretariat in 2021

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

The Secretariat also took part in (1) the national workshop on coordination of reforms in the water sector aimed at ensuring a coordinated approach to implementation of IWRM in line with the National Development Strategy of the Republic of Tajikistan until 2030

(March 12, Tajik Ministry of Energy and Water Resources together with UNDP); (2) the seminars of the Tajik branch of SIC ICWC on "Automated system of water distribution regulation and management and data transmission to DP-7 in Yavan district, Tajikistan" and "Application of the geoinformation system"; (3) the Central Asian Sub-regional Preparatory Conference for the 9th World Water Forum (October 19-20, Dushanbe).

The roundtable on "Progress in sustainable development goals and the tasks related to water and sanitation with the involvement of women in Tajikistan" was held on August 28.

Source: ICWC Secretariat

Scientific-Information Center of ICWC

Activity of SIC ICWC in 2021

ICWC Working Groups. The work was continued in four areas of the "Implementation Plan on strengthening ICWC activities in key directions": (1) *Water conservation* – published review "Water conservation in Uzbekistan: theory and practices"; (2) *Implementation of integrated water resource management and adaptation to climate change* – published analytical review "Theory and practices in planning IWRM", articles[21,22] of V. Dukhovniy "Implementation of IWRM in the Aral Sea Basin" and N. Mirzaev "Lessons from implementation of IWRM in the Fergana Valley"; "Comparative analysis of WUA irrigation service pricing methods", "Assessments and challenges in planning integrated water resources management", "Analysis and assessment of water losses in the irrigation network"; (3) *Improvement of water accounting quality and accuracy* – prepared draft terms of references for the automation of gauging stations in the Syr Darya River basin, including small rivers, published review "Summarizing current practices of water accounting and reporting" and the article "Automation of the Syr Darya and the Amu Darya"; (4) *Building capacity of regional and national organizations* – published review "International experience in engineering education".

Organizational and technical activity. SIC together with other bodies of ICWC took part in organization of the two meetings of ICWC (see ICWC meetings), fulfillment of decisions and assignments of ICWC. In particular, SIC prepared analysis on the water-related situation in the region for growing (2021) and non-growing (2020-2021) seasons. Routine analysis reports on basin situation are published for each ten-day period on the SIC ICWC web-sites in sections "Water-related situation in the Amu Darya River Basin" and "Water-related situation in the Syr Darya River Basin". The RS-based monitoring of lakes and wetlands in the Aral Sea region has been conducted and the results have been published on: www.cawater-info.net/aral/data/monitoring_amu.htm. See details in Water-Related Situation in the Aral Sea Basin.

SIC ICWC contributed to activities following the Joint Communiqué adopted at the Summit of the Heads of IFAS Founder-States and to implementation of the CA presidents' initiatives and reported on its contribution to ICWC meetings. Technical, information and expert assistance was rendered to **national and regional organizations** through timely provision of relevant materials on their request. In particular, information and analytical materials and expert opinions were provided on matters related to:

- **fulfillment of laws and bylaws of Uzbekistan:** incl. Resolution of the Cabinet of Ministers on measures for agricultural digitization in the Republic of Uzbekistan; Decree of the President on measures for water management improvement in the Republic of Uzbekistan to increase drinking water supply and quality and draft Resolution of the Cabinet of Ministers on formation of a national water balance of the Republic of Uzbekistan; Resolution of the Cabinet of Ministers on measures for operationalization of the Research Center for Water Problems at the Cabinet of Ministers; Resolution of the President on approval of the Strategy of Water Management and Irrigation Development in Uzbekistan for 2021-2023; draft Concept on National Management Information System of the Water Sector; draft Resolution of the government on measures for further improvement of activity of the Uzbek Ministry for Water Management; Resolution of the government on measures for implementation of UNGA Special Resolution of 18 May 2021 on declaring the Aral Sea region a zone of environmental innovations and technologies; and, draft Law on water and water use. Additionally, SIC ICWC is a member of the Interdepartmental working group, which develops the Water code;

- **the Sardoba dam collapse:** prepared comments to the document of the National research society at the Moscow State University of Civil Engineering entitled "R&D support of rehabilitation of the Sardoba dam" and an opinion on possible causes of the collapse;

- **water supply of the Amu Darya delta and its lakes:** SIC ICWC repeatedly appealed to concerned ministries and departments of RUz emphasizing the need to strengthen control over water distribution along the Amu Darya River to ensure availability of sanitary-environmental flow downstream of Takhiatash and Samanbay. As a potential additional water source, it was proposed to consider the proposal of JSC "Uzsuvloyiha" and SIC ICWC on transferring water from the Ozerniy collecting drain in Khorezm province to the delta of the Amu Darya and the Aral Sea region. This would contribute additional 4.5 km^3 of water;

[21] EECCA NWO Collection of scientific papers "Lessons of transboundary cooperation in EECCA countries", Issue 15, – Tashkent: SIC ICWC, 2021. – 212 p., http://www.cawater-info.net/library/rus/eecca_papers_collection_vol_15_2021.pdf

[22] Collection of scientific papers, Issue 18, – Tashkent: SIC ICWC, 2022 – 141 p., http://www.cawater-info.net/library/rus/sb_tr_18.pdf

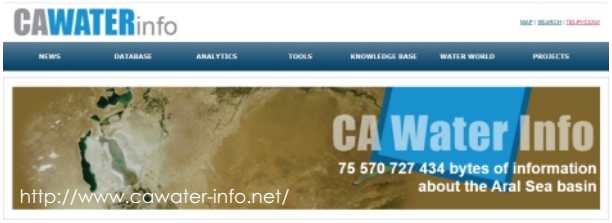
- **water-energy**, particularly, on the document "Assessing water-energy policies of Kazakhstan in Central Asia";

- **allocation of water for the Aydar-Arnasay lake system:** prepared information on existing compliance practices in water allocation between the riparian countries in the Syr Darya river basin and gave proposals to the analysis of relations between Kazakhstan and Uzbekistan.

Information and analytical activity. The regional information system on water and land use in the Aral Sea basin (CAWater-IS) has been populated with the information on (1) Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan for 2020 in the Economy block; (2) weather stations (monthly); (3) Amu Darya, Syr Darya, Kashkadarya, Surkhandarya, Chirchik, and Karadarya rivers over 2019-2020; (4) water supply to the Aral Sea and the Amu Darya and the Syr Darya deltas over growing and non-growing seasons. The information on water-related situation was published weekly in the information newsletter "Water management, irrigation and ecology in the EECCA countries". SIC ICWC has prepared and issued 17 analytical reviews: "Water, food, and energy security in CA: benefits of nexus-based decisions", "Planning IWRM", "Water conservation in Uzbekistan", "International experience in engineering education", "Key highlights in the statements made at the general debate of the UN General Assembly by the countries of Central Asia in 1992-2020", "Highlights on the environmental matters and international cooperation in the statements made at the general debate of the UN General Assembly by the Countries from Eastern Europe, Caucasus and Central Asia in 1992-2020".

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, analytical tools and models, such as the ASB management model (ASBmm) and the WUEMoCA tool, and regional web-resources, including the CA water and environment knowledge portal (CAWater-Info), ICWC, SIC ICWC, and EECCA NWO web-sites.

The knowledge base "Water in Central Asia" was enriched with 1,341 new entries, such as monographs, research papers, manuals, reference documents (guidelines, recommendations, etc.) and other publications.



Project activity:

- "Support to the development of a discussion paper to inform a dialogue on regional cooperation on the energy-water-land use nexus in Central Asia" under the contract with OECD. Jointly with national experts in CA countries prepared (1) energy-water-land use nexus fact sheets; (2) Discussion paper "Water, Food and Energy Security in Central Asia: Background Analysis – Benefits of Cross-Sectoral (Nexus) Solutions", which was presented at the regional conference "High-level dialogue on effective development of energy, water and land resources in CA countries" (October 15, Tashkent).

- "Support to the Network of Russian-speaking water management organizations and organization of the Network's conference in 2021" as part of EECCA NWO activities supported by UNECE. SIC organized the International EECCA NWO Conference "Transboundary water cooperation in EECCA countries: lessons learnt and future development" (March 2-3, online); published collections of papers "Lessons of transboundary cooperation in EECCA countries" and "Selected practices of IWRM and transboundary water cooperation in EECCA countries". Continued maintaining and updating the network's web-site, the knowledge base of the CAWater-Info portal as one of the sources of knowledge of EECCA NWO, the Atlas of water-management and environmental organizations in the EECCA countries, populated pages on Facebook and LinkedIn, disseminated weekly e-newsletter "Water management, irrigation and ecology in the EECCA countries". Created the web-site of the Expert Platform on Water Security, Sustainable Development and Future Studies and the database of international experts. As part of the Expert Platform, conducted research of "Key highlights in the statements made at the general debate of the UN General Assembly by the countries of Central Asia in 1992-2020" and "Highlights on the environmental matters and international cooperation in the statements made at the general debate of the UN General Assembly by the Countries from Eastern Europe, Caucasus and Central Asia in 1992-2020".

- "Research on More Precise Definition of the River Water Balance Components for the Amu Darya and its Main Tributaries and Development of XLSX Routine" under the contract with BWO Amu Darya. Developed the methodological and information base for calculating components of river and reservoir water balances for 4 balancing sites, starting from Kelif g/s to Samanbai g/s, as well as the recommendations on estimation of water losses.

- "Development and Adoption of a Water Use Plan and Organization of Water Accounting to Control the Actual Distribution of Water" under the contract with TCT Cluster. Completed work on (1) organization of efficient water use in the agricultural cluster; (2) arrangement of regular water accounting, monitoring, assessment and on-the-fly adjustment depending on water-related situation in the region; (3) development of a computer routine for water use planning; (4) analysis and identification of challenges before planning and fulfillment of water use plans. Developed recommendations on organization of water accounting to control the actual distribution of water and on repair and rehabilitation of canals, including hydraulic structures and metering facilities. Conducted training workshops for hydraulic engi-

neers/water managers in planning water use and measuring water discharge.

■ "Drafting of Aral Sea Basin Transboundary Water Early Warning Bulletins" under the contract with UNRCCA. Published four e-bulletins containing the information on actual situation in the Amu Darya and the Syr Darya basins for the current month and the forecast for the next month.

■ "2020 Water Yearbook: Central Asia and around the Globe" under the contract with UNRCCA. Collected and processed materials to generate analytical and thematic reviews in both Russian and English.

■ "Identification of Future Water Needs in the CA Countries and Development of Optimization Simulation Models for Efficient Utilization of River Potential in the Aral Sea Basin" under the contract with AO Gidroproyekt Institute (client – EDB). Provided analysis of water situation in the Aral Sea Basin. Assessed water needs in ASB countries by 2030, including the forecasts of (1) dynamics of irrigated land area and crop production; (2) population growth; (3) industrial production and unit water consumption growth.

■ "Development of E-rules of Intra-Annual Flow Regulation in the Amu Darya River Basin" jointly with the Institute of Geographic Sciences and Natural Resources Research of the Chinese Academy of Sciences (IGSNRR, CAS). Completed (1) quantitative assessment of natural water resources of the Amu Darya River and determined the share of the glacial component in the river runoff; modeled series of the annual river flow and its intra-annual distribution for 2020-2035; (2) assessment of water consumption in transboundary rivers of the Amu Darya basin, determined environmental requirements and estimated needed water supply to South Aral region (Amu Darya delta) and Large Aral Sea based on the condition of stabilization of its water regime; (3) assessment of water losses in the Amu Darya river and reservoirs of Tuyamuyun Hydroscheme using the data from the past research. Developed (1) the model and algorithms for planning flow distribution and regulation; (2) the model for operational management allowing correction of initial plan of water distribution and flow regulation by reservoirs; (3) the dynamic model and an algorithm for calculation of daily river hydrograph transformation in space and time.

■ "Support to the preparation phase of the IKI-funded project on the energy-water-land nexus transformation in Central Asia"[23]. Prepared for the CA countries (1) draft mapping of actors and stakeholders in each beneficiary country in water, energy and land use, adaptation policies; (2) database of projects implemented by international partners in the CA countries in similar areas over the last 5 years. Support rendered in organization of meetings with potential partners in the course of project document development (in Bishkek, Dushanbe and Ashkhabad). The work will be continued in 2022.

■ "Uzbekistan Water Security Outlook" under the contract with UNESCO. Developed methodology for assessing water security in Uzbekistan on the basis of available statistics. Identified key dimensions of water security and selected indicators/sub-indicators characterizing (quantitatively and qualitatively) the key dimensions. The work will be continued in 2022.

Capacity building and training. The web-site developed by SIC on capacity building and training was further enriched and populated. SIC staff improved its qualifications through training in 15 online workshops and webinars. (see Professional Development Courses and Trainings in 2020). SIC's experts made more than 20 reports and presentations at different international events. The following events were held: (1) the International Conference of EECCA NWO (online, March 2-3), OECD expert workshop (June 8), OECD regional conference (October 15), and a roundtable in the memory of Prof. Dukhovniy (November 25).

SIC maintained cooperation with the Corvinus University of Budapest as part of the research programme focusing on "Water as a driver of sustainable recovery: economic, institutional and strategic aspects of water resources management in Central Asia", the International Institute of Central Asia.

Regional and international cooperation

SIC kept maintaining cooperation with embassies, international organizations and financing institutions and took part in activities of OECD[24], UNESCO, INBO and IWRA, EECCA NWO, GEF Agency, GWP, and NWP of Uzbekistan.

As part of cooperation with (1) **EC IFAS**, SIC participated in the Working Group on institutional and legal improvement of IFAS, in preparing the Position Paper "Vision of Central Asia" for the 9th World Water Forum, the Central Asian sub-regional preparatory conference (October 19-20, Dushanbe). See Executive Committee of IFAS; (2) **UNECE** and the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, D.R. Ziganshina was re-elected as a member of the Implementation Committee and participated in its meetings (February 4-5; May 20-21) and activities of expert groups. The information on "Advisory assistance of the Implementation Committee to Albania and Montenegro regarding the shared Cijevna/Cem River basin" was prepared; (3) **ICID**, SIC coordinates acti-

[23] As part of the project submitted in 2019 on topic 4.7. "Regional mechanisms for the low-carbon, climate-resilient transformation of the energy-water-land Nexus in Central Asia" under the tender announced by International Climate Initiative 2020, Government of Germany

[24] As part of preparatory phase of the project on topic 4.7

vity of the ICID Working Group on irrigation and drainage in the states under socio-economic transformation (WG-IDSST). Deputy Director Sh. Kenjabaev made presentation (April 23), took part in the 3rd meeting to discuss the ICID initiative on registration of the world large-scale irrigation projects in the online Register of the world irrigation and drainage schemes to share experiences in implementation of irrigation projects (November 28, Marrakesh, Morocco), webinars (January 21, February 19, May 28, June 17), the 5th African Regional Conference and the 72nd meeting of International Executive Council of ICID (November 24-30, Marrakesh, Morocco); (4) **ADB** and **CAREC**, prepared comments and proposals to the Preliminary Report on Developing the Central Asia Regional Economic Cooperation Water Pillar. SIC took part in the introductory regional consultative meeting "Introduction to the Water Pillar" (April 16) and the second consultative meeting (September 14) where comments and proposals received to the preliminary report were considered and next steps for developing initial projects for inclusion in the Water Pillar were discussed.

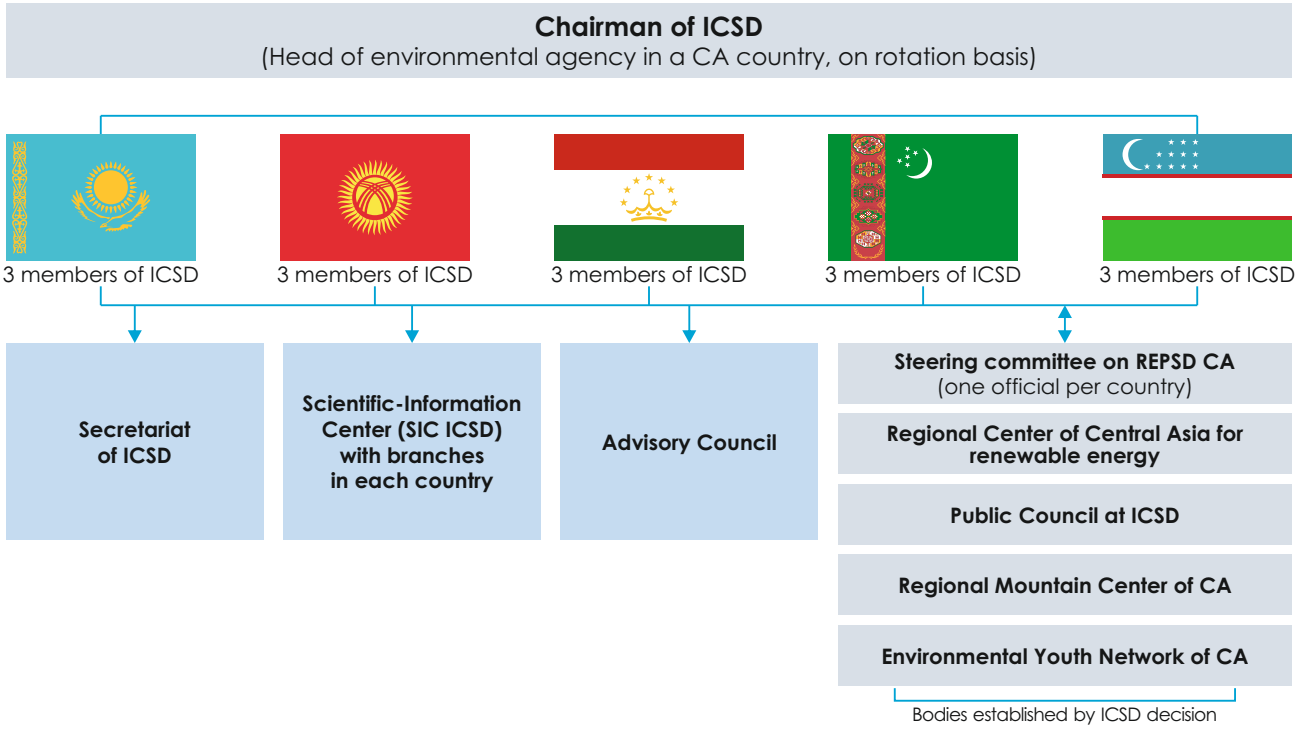
SIC had meetings with (1) Ambassador Guy Bonvin, the Swiss Special Envoy for Water in Central Asia, with whom such aspects of water cooperation development as automation, GIS, and Aral Sea bed monitoring were discussed (September 20); (2) Dr. P. Liebelt, Head of Central-Asian Sustainable Innovation Bureau (CASIB), to discuss how to boost innovations transfer in the sphere of sustainable development in Central Asia, expand research networks and enhance cooperation between German and Central-Asian organizations (September 21); (3) V. Caupin, Head of AFD Office in Uzbekistan (September 31); (4) Mr. A. Makarigakis, Head of Office and UNESCO Representative a.i., to discuss prospects for cooperation and progress on Uzbekistan Water Security Outlook (October 7, 22); (5) Ms. L. Gampp, Regional Water and Climate Change Advisor for Central Asia, SDC, to address cooperation prospects in view of the new SDC Strategy (November 18). Additionally, Dr. Ziganshina had an interview with R. Bosch and N. Swenson, experts for capitalization of the Swiss Blue Peace Central Asia (April 13).

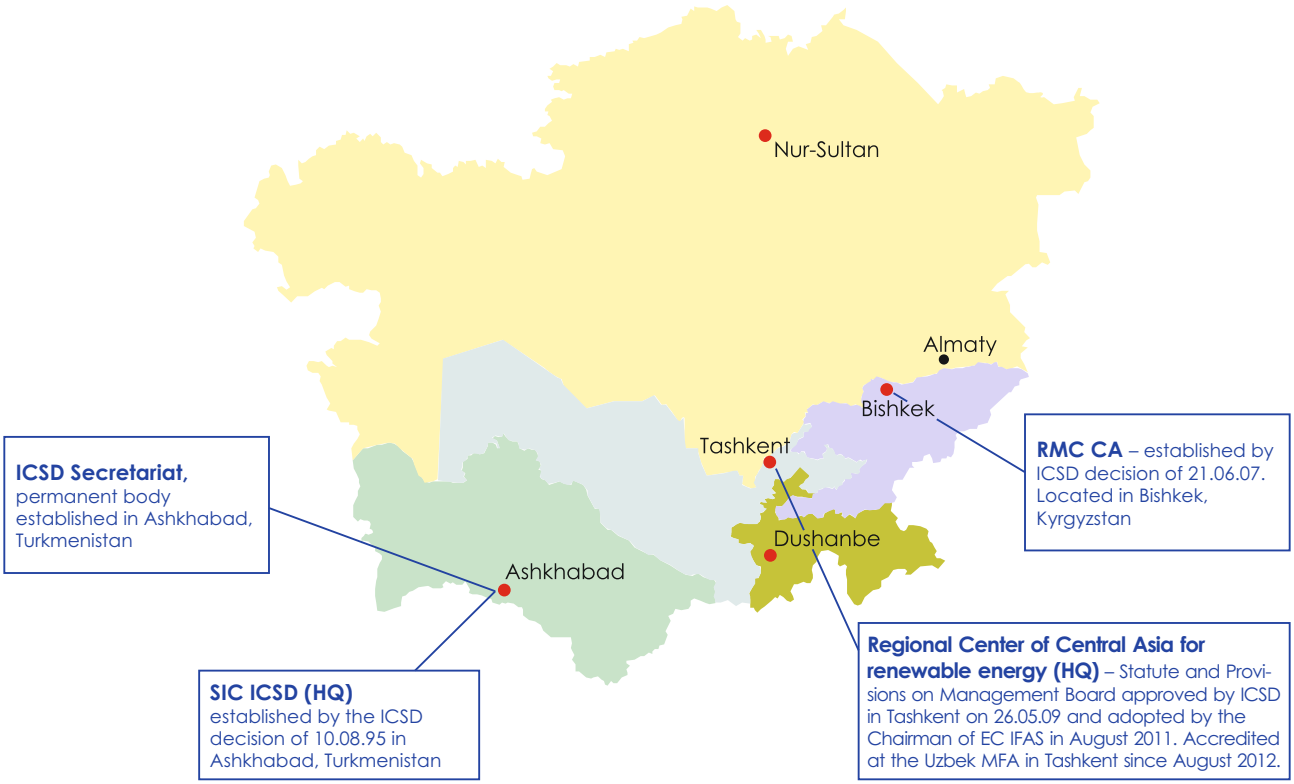
Publications. SIC's experts published 26 papers, including 7 papers in international journals and 19 ones in Uzbekistan. SIC also issued 33 publications in 2021.

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. The Republic of Uzbekistan was chairing ICSD over 2020-2021 (30th ICSD meeting, 24 October 2019, Nukus).





Activity of ICSD in 2021

Regional Environmental Program for Sustainable Development (REP4SD) in Central Asia. The draft REP4SD[25] is a policy paper, which sets the priority areas of environmental cooperation until 2030. Among the Program's advantages is the joint solution of topical challenges to ensure security, stability and sustainable development in CA, the regional approach to implementation of SDGs and UN Conventions, the enhancement of ASBP-4 environmental component, and building of capacities of ICSD as a regional institution. The Program was agreed among the respective countries in comformity with their national procedures and submitted to EC IFAS for further approval by the Board.

To maintain cooperation and coordinate activities on REP4SD, it was decided to establish an **ICSD Advisory Council**[26] consisting of authorized representatives from environmental agencies, economic block of the ICSD member-countries, and others. The first meeting of the ICSD Advisory Board was held on March 11. During the meeting, members of the Council discussed the possibilities of cooperation with international and regional partners within the framework of REP4SD.

The single Roadmap for implementation of REP4SD, the system of indicators and the data collection methodology[27] for implementation and monitoring of REP4SD were developed. The workshop on "Indicators, their types and use in monitoring and assessing environmental policy papers" was also held on February 9.

The Regional Strategy for drought risk management and mitigation in Central Asia for 2021-2030 and the Regional Midterm Strategy for sand and dust storm management in Central Asia developed as part of the "Regional Approaches for Combating Sand and Dust Storms and Drought" Project[28] **have been integrated into REP4SD** and will contribute to achievement of transboundary cooperation related SDGs.

International cooperation. The Memorandum of cooperation in the area of environmental protection, climate resilience, and sound nature use was signed between ICSD and GIZ on the sidelines of the Fourth Central Asia Conference on Climate Change (July 26-27, Dushanbe). One of the key areas is to facilitate the implementation of REP4SD. Cooperation was also envisaged under a range of regional programs worth more than US$20 million, such as Integrative and Climate-sensitive Land Use in Central Asia, Ecologically Oriented Regional Development in the Aral Sea Region; Green Central Asia; Supporting Green

[25] Approved by the decision of ICSD No.2 of 24 October 2019
[26] Provision on the ICSD Advisory Council approved by the decision of ICSD No.3 of 24 October 2019
[27] As part of the Regional Programme "Integrative and Climate-sensitive Land Use in Central Asia" supported by BMZ from March 2021 to February 2024
[28] Implemented by CAREC

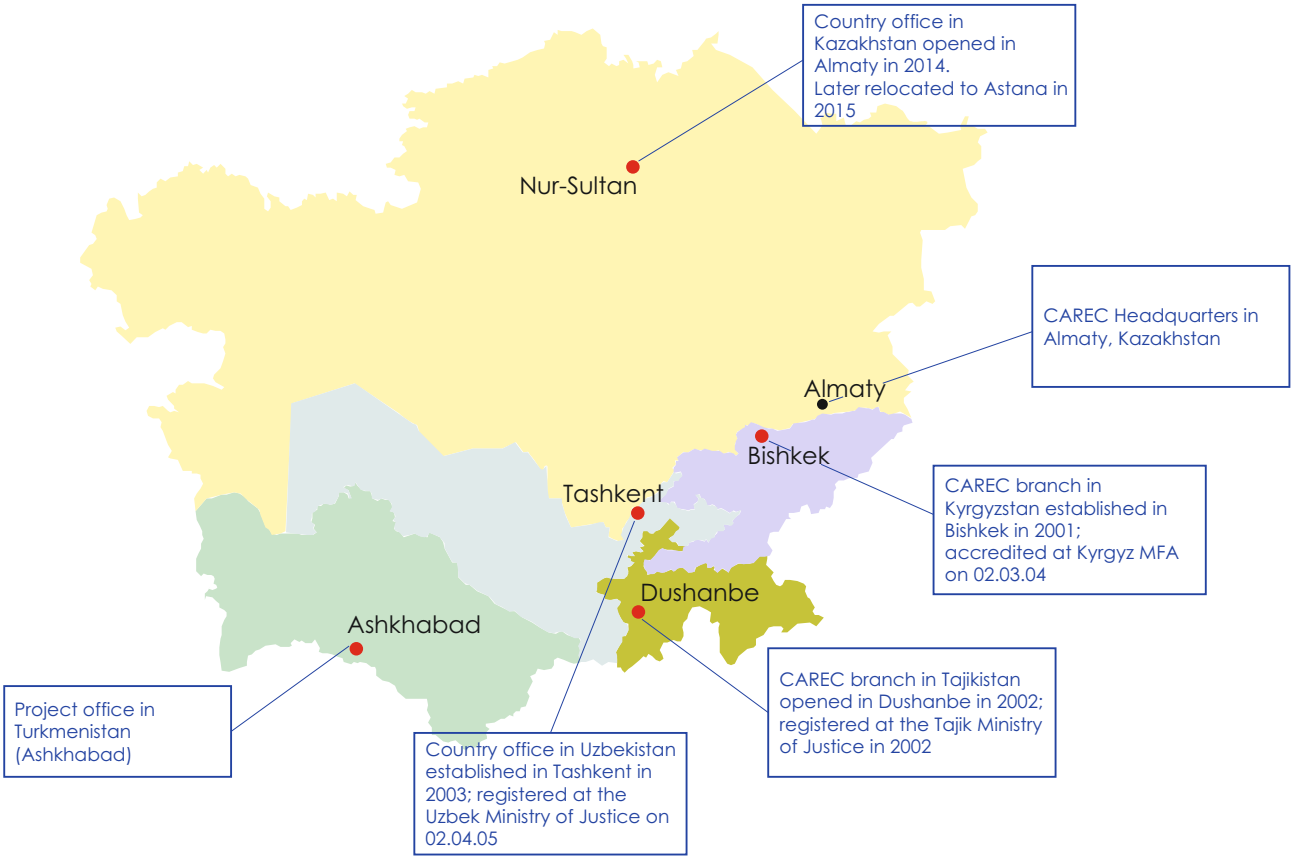
Economy in Kazakhstan and Central Asia for low carbon economic development.

With CAREC's support, the regional statement of the Central Asian countries on climate change "The Voice of Central Asia" was presented in the Central Asian Pavilion "5 countries-1 region-1 vote" at COP26. This regional statement reflected the countries' intention to consolidate regional cooperation in fighting climate change and contribute to sustainable development and the commitments to green growth. The countries also called the donors, international financing institutions and UN agencies to support regional efforts on climate change.

Source: Secretariat and SIC ICSD, https://sic-icsd.org/

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 five Central Asian states.



Activity of CAREC in 2021

Regional dialogue on water. CAREC continued serving as a Secretariat to the Dialogue Platform Blue Peace Central Asia. During online and offline meetings, experts from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan discussed progress in water quality management, monitoring and data exchange, water quality classification, and possibilities for transboundary cooperation. As part of the **World Water Week**, two thematic sessions were organized to address the strategic issues of water management in the post-Pandemic period and the key elements of informed water cooperation. The preparatory process of the CA countries to the **9th World Water Forum** was also supported with a session on transboundary cooperation to formulate key points of the final regional document to be presented at WWF in Dakar, Senegal on March 21-26, 2022.

With the support of SIWI, OSCE and CAREC have launched the joint **Mentoring and Career Development Programme for women water professionals** in Central Asia and Afghanistan. Women from Central Asia and Afghanistan will enhance their professional qualifications and skills to ensure their fruitful work in leadership positions. Training webinars with international and regional experts on water and career development were held every month.

The Nexus Dialogue in Central Asia Project, Phase II has held 10 regional and transboundary dialogues in the Central Asian countries attended by over 250 people to discuss the mid-term results of thematic demonstration projects in CA.

Climate change. The Fourth Central Asia Climate Change Conference (**CACCC-2021**)[29] was held in Dushanbe, Tajikistan on July 26-27. This is the platform for the Central Asian countries to discuss climate strategies, policies, NDCs developed at the national level for the implementation of the Paris Agreement with the participation of civil society. See details in 2021 Calendar of Events.

Three meetings of parliamentarians and representatives of MFAs of the CA countries were organized on climate change issues in 2021. The parties exchanged on development of legislation and strategic planning on climate change and discussed the representation of the region in the international negotiation process (March 17, July 27, November 4).

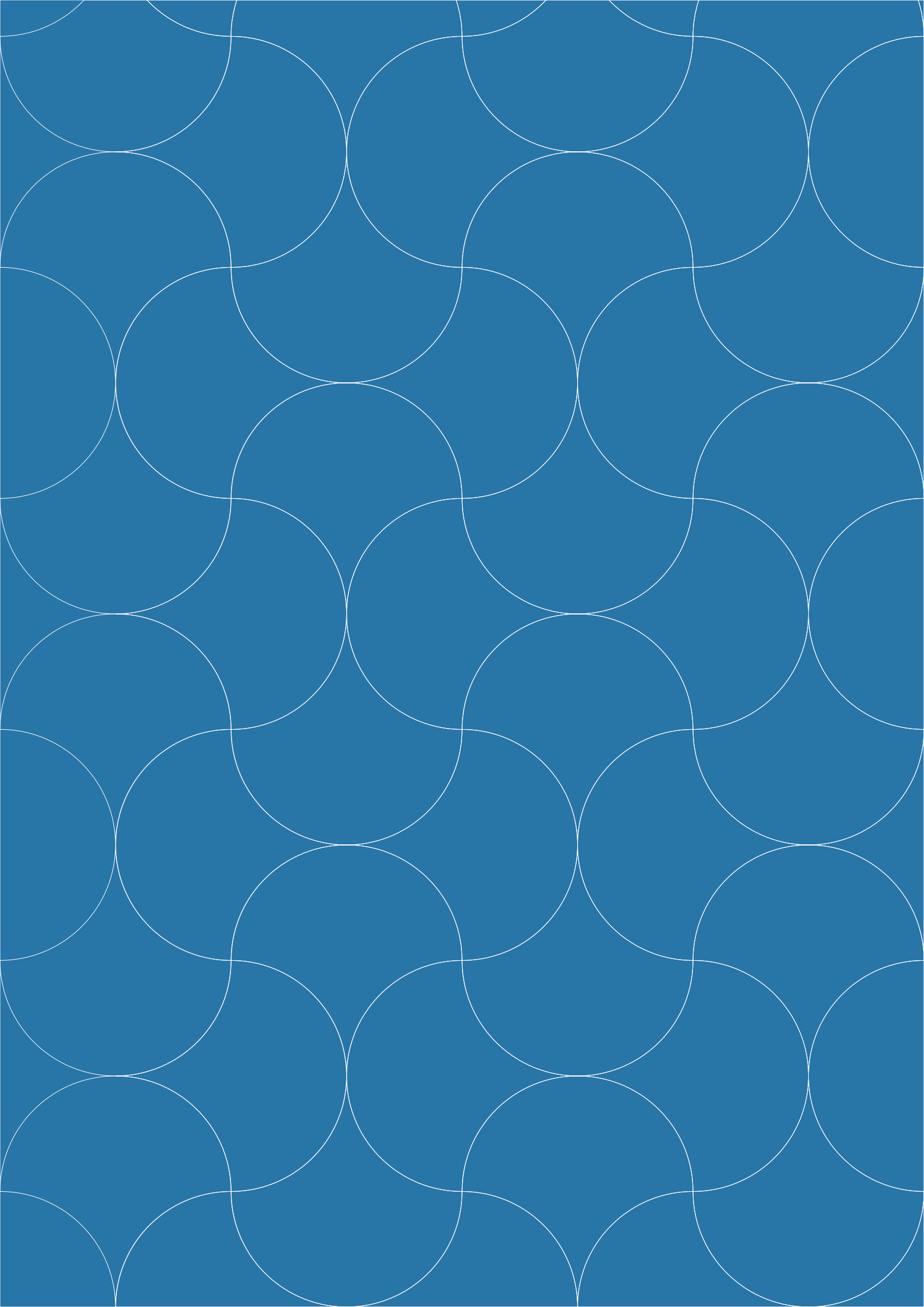
CAREC together with partners organized the Central Asia Pavilion "5 countries – 1 region – 1 voice" at the COP26. The Pavilion has hosted 24 events attended by over 1,400 people. A number of agreements, including the Memorandum of Understanding on preservation of snow leopard, its food reserve and habitat in Western Tien-Shan and Pamir-Alay and the Agreement on establishing Regional Climate Action Transparency Hub in Central Asia (ReCATH), has been signed. The CA countries voiced their consolidated position on climate change as one region through the **Voice of Central Asia Regional Statement**. NGOs announced the **Regional Statement of Central Asian Non-Governmental Organizations on Climate Change** urging the governments to enhance national and regional initiatives to avert the climate crisis in the region (November 1-12, Glazgow, Scotland).

Sustainable development. The Central Asian Leadership Programme (CALP) on environment for sustainable development is a flagship program of CAREC since 2010. The 12th CALP was focused on the issues of sustainable consumption and production, green economy, water and energy resources management and their significant impact on food supply and security, ecosystem services, transition towards a low-carbon, resource-efficient and circular economy.

CAREC has launched the EU's Project on Sustainable Consumption and Production practices in Small and Medium Businesses in Tajikistan and Uzbekistan (REAP). The Project aims to promote green development and sustainability in agrifood production and processing industry.

Source: CAREC, www.carececo.org/main/

[29] Within the framework of the WB/IFAS project "Climate Adaptation and Mitigation Program for Aral Sea Basin" (CAMP4ASB)



Section 4

Bilateral Water Cooperation between the Countries of Central Asia

4.1. Kazakhstan – Kyrgyzstan

High-level contacts

The President of Kyrgyzstan, S. Japarov paid a state visit to Kazakhstan in March. The Heads of State adopted a joint statement that, among other things, stressed a need to expand business ties for implementation of joint projects in industry, hydropower, fuel-energy sector, mineral resources, and agriculture. The parties also expressed their mutual interest in constructive cooperation in the area of environmental and energy security in Central Asia and integrated water and energy use in the spirit of partnership, trust, friendliness, equality and mutual consideration. A number of official documents for strengthened bilateral cooperation have been signed at the end of the visit.

The Presidents had telephone conversations in the course of which they discussed the armed conflict on the Kyrgyz-Tajik boundary (May 1) and the implementation of agreements aimed at enhancing trade, economic, investment, cultural and humanitarian cooperation (December 6).

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) is a joint body, 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. Over the period from 2006 to 2021, 29 Commission's meetings were held. In 2021, the Commission had two meetings:

28th meeting (April 15 and 23, online). The following matters were addressed in the agenda: results of the growing season 2020; operation regimes of interstate water facilities on the Chu and Talas Rivers in the 2021 growing season; allocated funds and the work done on the facilities in 2020; Kirov dam safety; amending and complementing the 2000 Agreement. The draft of the joint Strategic Action Plan for the Chu and Talas basins was adopted also. The parties took note of the information on drafting a project proposal for the GEF-funded SAP implementation and ordered the CTWC Secretariat to facilitate this process.

29th meeting (December 9, online). The Commission took note of the information on the approval of the National Action Plan for the Chu-Talas basins in Kazakhstan and on the inclusion of the National Action Plan for the Chu-Talas basins in the agenda of the Kyrgyzstan's National Water Council for approval. However, due to re-organization of the Government's structure, the National Water Council has not gathered.

Working groups and other activities. CTWC Secretariat Working Group on environment protection (WGEP) continued working according to the decision of the 28th meeting. Three surface water samplings were organized in the river basins with the OSCE's support. The 9th extended meeting of WGEP took place in Almaty on November 18. The participants listened to the results of the seasonal water sampling campaign and the needs assessment for the conservation of wetlands in the Chu River Basin (in Kazakhstan).

For fulfillment of decisions of the 9th meeting of the Kyrgyz-Kazakh Intergovernmental Council of April 2, 2021, a commission comprised of water experts from the two countries, the Kazgiprovodkhoz Institute and the Secretariat visited the Kirov reservoir to determine the scope and efforts for repair and rehabilitation for 2022-2024 (September 9). Following the visit, it was recommended to carry out a multifactor inspection of the dam and all structures and develop a Kirov dam safety declaration. Technical aspects on replacement of the 6th gate at the dam were discussed during a meeting in December.

Source: Head of Kyrgyz side in CTWC Secretariat

Other bilateral water-related arrangements

To avoid critical drawdown of the Toktogul reservoir and ensure irrigation water for agriculture in Kazakhstan, a Protocol was signed between the countries electric energy exchange on March 2, 2021 and the Governmental Decree on electric energy exchange between the Kyrgyz Republic and the Republic of Kazakhstan was issued by the Kyrgyz Government on March 19. The Parties agreed to exchange 900 MkWh of electricity at a conditional price of US$ 0.0000001 per 1 kWh during growing seasons 2021-2023. Electricity was to be supplied from Kazakhstan to Kyrgyzstan from March to November. The Kyrgyz party was to provide return of 300 MkWh of electricity and equivalent release of 330 Mm^3 of water annually from June to August 2021-2023.

4.2. Kazakhstan – Tajikistan

High-level contacts

The President of Kazakhstan paid an official visit to Tajikistan on May 19-20. The Heads of State have signed a joint statement, where, among other things, they underlined the role of the International Fund for Saving the Aral Sea as a unique institution and a solicited platform for solution of socio-economic, water and environmental issues in the Aral Sea Basin.

The President of Kazakhstan had a working visit to Tajikistan for the CSTO Collective Security Council session and had a meeting with the President of Tajikistan before the session on September 15. The Parties discussed the cooperation aspects and expressed their readiness to coordinate joint actions both in bilateral format and within the framework of multilateral structures.

In the course of telephone conversations, the Presidents discussed the boundary conflict and the current situation on the Kyrgyz-Tajik border (May 1), the implementation of agreements reached during the official visit of K.-J. Tokayev to Dushanbe in May (June 23), the situation in Central Asia in the context of aggravating situation in Afghanistan (July 5), and the prospects of bilateral cooperation in trade, investment and cultural-humanitarian fields (October 5).

Trilateral water-related arrangements (Kazakhstan, Tajikistan, Uzbekistan)

On June 14, water agencies of Kazakhstan, Tajikistan and Uzbekistan agreed on operation regime of the Bakhri Tojik reservoir for the period from June to August 2021. The Tajik party has agreed to provide additional releases of water from the reservoir, while the Kazakh and Uzbek parties have expressed their readiness to extend support to Tajikistan in order to reduce the negative impacts of the additional releases on intake structures of the reservoir and maintain embankments.

4.3. Kazakhstan – Turkmenistan

High-level contacts

The President of Kazakhstan, K.-J. Tokayev paid a state visit to Turkmenistan on October 24-25. The Heads of States have signed a joint statement, in which, among other things, they recognized the importance of consolidating efforts for comprehensive solution of socio-economic and environmental problems in the Aral Sea Basin and of institutional and legal improvement of IFAS. The Presidents have recognized transboundary water resources in Central Asia as the common good for people in the region and, therefore, acknowledged the need to continue open dialogue and constructive cooperation for searching mutually acceptable, equitable and sustainable solutions.

On August 6, the President Tokayev had a meeting with the President Berdymukhamedov on the sidelines of the Consultative meeting of the Central Asian leaders in Turkmenbashi. The parties announced their intention to boost trade and economic cooperation, make full use of transit and transport potential, and enhance cultural-humanitarian ties.

In the course of telephone conversations the Presidents discussed how to extent mutual trade and joint projects in industrial, agricultural, energy, transport and logistics spheres (April 28) and further collective actions to boost regional cooperation and achieve stability and security in the region (June 29).

4.4. Kazakhstan – Uzbekistan

High-level contacts

Shavkat Mirziyoyed visited Kazakhstan with an official visit on December 5-6. As a result of negotiations, a number of cooperation and mutual understanding deeds, including the Declaration of friendly relations and agreements on extended cooperation in trade, transport and communications, energy, science and education, defense, emergencies, and space, have been signed. The Governments have agreed to search for lasting sustainable mechanisms of mutually beneficial water cooperation. The urgency of application of water conservation technologies and joint actions for afforestation in the Aral Sea region has been particularly noted.

The Presidents had several telephone conversations, in the course of which, among other things, they discussed the matters related to cooperation for security, stability, and wellbeing in CA (March 15), implementation of agreements in industrial, mechanical engineering, agricultural and transport spheres and cooperation matters in the context of the situation in Afghanistan (June 3), trade and economic relations (July 24), etc.

Bilateral water-related arrangements

Several meetings of officials representing water sectors in Kazakhstan and Uzbekistan took place in 2021:

On April 12, Uzbek Minister of water management Mr. Khamraev and Kazakh Vice-minister of ecology, geology and natural resources Mr. Kozhaniyazov discussed in the online format the preparations to the 2021 growing season and the draft intergovernmental Agreement on joint management and use of transboundary waters.

On May 13, the ministers had a meeting in Tashkent. They have agreed on joint measures to increase water availability along the Syr Darya River and on the operation of the Bakhri Tojik reservoir in the growing season 2021, and also discussed other bilateral water management issues, including planned work at Uzbekistan's waterworks facilities located in Kazakhstan.

On June 29 in Dushanbe, Kazakh Deputy Prime Minister Mr. Sklyar and Minister of ecology, geology and

natural resources Mr. Mirzagaliev discussed with Uzbek Deputy Prime Minister Mr. Ganiyev and Minister of water management Mr. Khamraev the matters related to provision of unconstrained transit flow of additional water - released from the Bakhri Tojik reservoir – through Uzbekistan to increase inflow into the Shardara reservoir.

On July 19, Kazakh Minister of ecology, geology and natural resources Mr. Mirzagaliev and Uzbek Minister of water management Mr. Khamraev discussed the joint measures for better water supply in middle and lower reaches of the Syr Darya River. The ministers have agreed to increase water discharge from the interstate Dostyk canal from 80 to 90 m^3/s for farmers in Makhtaaral and Zhetysai districts, Turkestan province and continue working jointly on the improvement of inflow into the Shardara reservoir.

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

The Kazakh-Uzbek Joint Working Group (Commission) on Environment Protection and Water Quality in the Syr Darya River Basin (hereinafter Working Group) is formed of experts from Uzbekistan and Kazakhstan in line with the 2017-2019 Strategy for Economic Cooperation between Kazakhstan and Uzbekistan and 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.

Meetings. By 1 January 2022, the Working Group had four meetings: on September 27-28, 2018 in Tashkent; on November 7-8, 2019 in Nur Sultan; on December 24, 2020 in the video-conference format; and on December 13, 2021 in Almaty.

The fourth meeting was attended by national experts representing environmental, geology, health care, emergency, hydrometeorology, and water sectors from Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan and international experts and representatives of CAREC. The meeting was co-chaired by the Chairman of the Committee for Environmental Regulation and Control at the Kazakh Ministry of Ecology, Geology and Natural Resources, Mr. Zholdosov and the Deputy Chairman of the Uzbek State Committee for Ecology and Environment Protection, Mr. Kazbekov.

The Parties considered progress on the work plan, including quarterly water sampling and analysis in the Syr Darya and data exchange. As a result of comparison of samples, the experts found that the measurement error was reasonable. The Parties informed each other on the results of their activities in 2021 regarding public water monitoring and suggested performing joint analysis of water. The participants listened to the information on the regional project "Development of joint measures to prevent and respond to pollution of the Syr Darya river in emergency situations", which started with the involvement of the Working group. Finally, the work plan for 2022 was adopted.

Source: State Committee of RUz for Ecology and Environment Protection

Trilateral water-related arrangements (Kazakhstan, Tajikistan, Uzbekistan)

See Subsection 4.2. Kazakhstan-Tajikistan.

4.5. Kyrgyzstan – Tajikistan

High-level contacts

The President of Kyrgyzstan, S. Japarov paid a state visit to Tajikistan on June 28-29. The Parties discussed the aspects of Kyrgyz-Tajik state boundary delimitation and demarcation and prospects for bilateral cooperation in political, economic, cultural-humanitarian and other spheres. The Presidents have adopted a joint statement, by which, among other things, they agreed to reopen the inter-departmental Kyrgyz-Tajik working group for dealing with bilateral aspects of water use. As a result of the visit, a number of documents was signed to extend the Kyrgyz-Tajik cooperation in different spheres.

4.6. Kyrgyzstan – Turkmenistan

High-level contacts

The President of Kyrgyzstan paid a state visit to Turkmenistan on June 27-28. The Heads of State discussed the cooperation aspects in trade and economic, energy and cultural-humanitarian spheres and adopted a joint statement, where they underlined the importance of strengthening cooperation in the field of emergency prevention and elimination, environmental protection, biodiversity conservation, nature management and climate mitigation. As a result of the visit, a number of bilateral documents, including Memorandums of Understanding between the Kyrgyz State Committee for Ecology and Climate and the Turkmen Ministry of Agriculture and Environment Protection and between the Kyrgyz Ministry of Energy and Industry and the Turkmen Ministry of Energy, has been signed.

Also, bilateral negotiations were held between the Presidents of Kyrgyzstan and Turkmenistan on the sidelines of the Consultative meeting of the Central Asian leaders in Turkmenbashi.

4.7. Kyrgyzstan – Uzbekistan

High-level contacts

A state visit of the President of Kyrgyzstan Sadyr Zhaparov to the Republic of Uzbekistan took place on March 11-12. As a result of negotiations, the Heads of State approved a joint statement, in which, among other things, they underlined their commitment to integrated and sound use of water and energy resources in Central Asia. To that end, they agreed to develop sustainable long-term mechanisms for mutually beneficial cooperation. The Uzbek side expressed its readiness to take part in hydropower projects in the Kyrgyz Republic. Also, the Parties noted the importance of intensifying and deepening cooperation in the area of natural disaster control. They intended to carry out regular exchange of information on the status of high-altitude breakthrough-prone lakes between the emergency agencies and hydrometeorological services of the two countries, and the radioecological and geotechnical state of radioactive and toxic waste tailings located in the territories of the Parties. In the course of the visit, more than twenty bilateral documents have been signed. In particular, they signed an agreement on joint investment project for Kambarata-1 in the Kyrgyz Republic and a protocol on mutual power supplies.

On the sidelines of the Consultative meeting of the Central Asian leaders in Turkmenbashi, the Presidents of Uzbekistan and Kyrgyzstan held bilateral negotiations. They addressed the implementation of agreements reached during the state visit of the Kyrgyz President to Uzbekistan in March, as well as the aspects of regional security and cooperation in the energy sphere, particularly the joint construction of Kambarata-1.

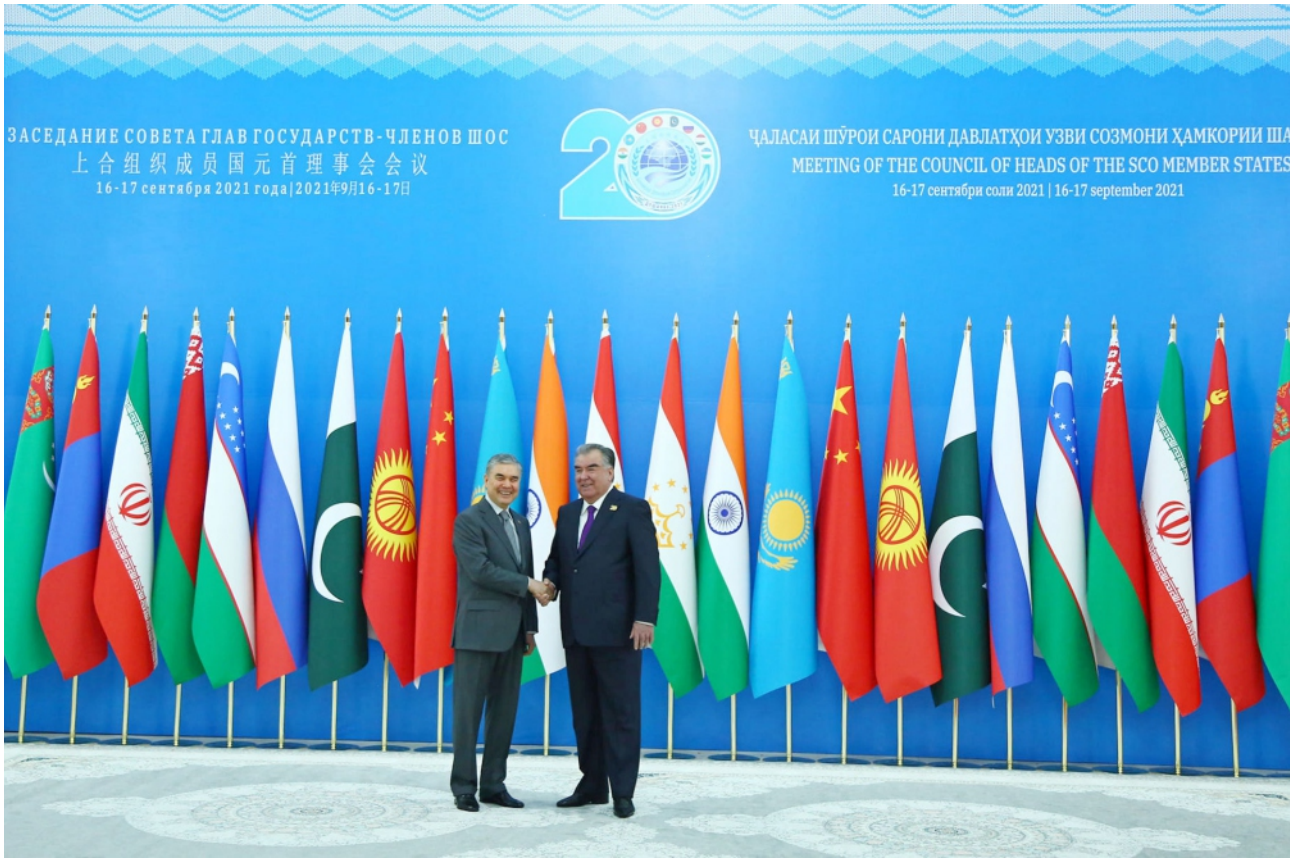
Bilateral water-related arrangements

To avoid critical drawdown of the Toktogul reservoir and ensure irrigation water for agriculture, the Kyrgyz Ministry of Energy and Industry and the Uzbek ministries of energy and water management have agreed to mutual power supplies of 750 million kWh at a conditional price of US$ 0.0000001 per 1 kWh during the growing seasons 2021-2023. Electricity is to be supplied from Kazakhstan to Kyrgyzstan from March to November. The supply of power from Uzbekistan to Kyrgyzstan will be provided since March till October, with the return of power by Kyrgyzstan in equivalent amount since June till August.

Meetings of the Working group on water management

The Working group did not gather in 2021.

4.8. Tajikistan – Turkmenistan



High-level contacts

The President of Tajikistan Emomali Rakhmon paid a state visit to Turkmenistan on August 4 to 5. As a result of negotiations, the Presidents adopted a joint statement, where they undelined the importance of existing and ongoing hydropower projects along transboundary watercourses, taking into account the interests of all countries in the region in promoting social and economic development of Central Asia. They also noted the progress made within the framework of the International Fund for saving the Aral Sea during the chairmanship of Turkmenistan and the efforts of the current chairmanship in the face of the Republic of Tajikistan to further intensify activity of the Fund, including its institutional and legal improvement, prioritize the climate change issues and deepen regional cooperation. The Parties stressed that the recently adopted Aral Sea Basin Program (ASBP-4) would serve an important tool for promotion of national and regional projects aimed at water, environmental and socio-economic improvement in the region.

The President of Tajikistan also had working visits to Turkmenistan to take part in the Consultative meeting of the Central Asian leaders in Turkmenbashi on August 6 and in the 15th Economic Cooperation Organization Summit in Ashgabat on November 27. On the sidelines, the Presidents of Tajikistan and Turkmenistan held bilateral negotiations to address country ties in economy, industry, agriculture and other spheres. The Presidents also had a meeting within the framework of the Summit of the SCO Heads of Member States, where they discussed priorities of Turkmen-Tajik cooperation on both bilateral and regional scales (September 17, Dushanbe).

Bilateral working groups

The 10th meeting of the Joint Turkmen-Tajik Inter-governmental Commission on Trade-Economic and Science-Technological Cooperation was held in Dushanbe on July 28. The participants have discussed the key aspects of cooperation in energy, industry, agriculture and water, as well as joint activities in transport domain.

4.9. Tajikistan – Uzbekistan

High-level contacts

The President of Uzbekistan, Sh. Mirziyoyev paid an official visit to Tajikistan on June 10-11. As a result of negotiations, the Heads of State signed a joint statement, in which, among other things, they underlined their commitment to integrated and mutually beneficial use of water and energy resources in Central Asia, their intention to develop lasting collaborative arrangements to this end, and their readiness to develop jointly hydropower projects in Tajikistan. Taking into account the processes related to climate change, the Parties noted the need for closer interaction between the relevant agencies of the two countries to mitigate the impact of this global phenomenon and joint measures to prevent natural and man-made disasters and overcome their consequences. Also, the Heads of State underlined the great importance of cooperation within the International Fund for saving the Aral Sea, which serves a unique platform for addressing the socio-economic, water and environmental problems in the Aral Sea basin and expressed their hope that the International Innovation Center of the Aral Sea Region under the President of the Republic of Uzbekistan and the UN Multi-Partner Human Security Trust Fund for the Aral Sea Region would contribute to environmental, social and economic improvement in the Aral Sea region.

In the course of negotiations, a number of documents have been signed also. Those included the Agreement between the Governments of Tajikistan and Uzbekistan on establishment of a joint stock company, development of a feasibility study for construction and operation of two hydropower plants in the Zarafshan basin, and a Roadmap for development of agricultural cooperation between Tajikistan and Uzbekistan for 2021-2022.

The Presidents of Tajikistan and Uzbekistan also met on the sidelines of the Summit of the SCO Heads of Member States (September 16, Dushanbe) and the 15th Economic Cooperation Organization Summit (November 28, Ashgabat). The parties discussed priorities of bilateral cooperation and interaction at the regional and international levels.

Meetings of the Working Group on integrated transboundary water use in Central Asia

As part of the state visit of the President of Uzbekistan to the Republic of Tajikistan, an Uzbek-Tajik Working Group on integrated transboundary water use in Central Asia was established (March 9-10, 2018). The Working Group did not gather in 2021.

Cooperation on the Zarafshan River

In June, as part of the state visit of the Uzbek President to Tajikistan, the parties signed an Agreement on development of a feasibility study for construction and operation of two hydropower plants in the Zarafshan basin and on establishment of a joint stock company. The construction of hydropower plants will have two stages: 1st stage – construction of 140-MW Yavan HPP to generate 800 million kWh a year (tentative cost – US$282 million; and, 2nd stage – construction of 135-MW Fondaryo HPP to produce 600 million kWh a year on average (estimated cost – US$270 million).

Trilateral water-related arrangements (Kazakhstan, Tajikistan, Uzbekistan)

See Subsection 4.2. Kazakhstan-Tajikistan.

4.10. Turkmenistan – Uzbekistan

High-level contacts

The President of Turkmenistan paid an official visit to Uzbekistan on October 4-5. As a result of negotiations, the Presidents adopted a joint statement, where, among other things, they noted that the transboundary water resources of Central Asia were the common good of the people in the region and that the fate of tens of millions currently living and of future generations, stability and well-being of the entire region depended on equitable and sound use of these resources. They further noted the importance of continuing open dialogue in this sphere. The Parties consider the International Fund for Saving the Aral Sea (IFAS) to be a universal platform for joint implementation of environmental and scientific-technological projects and programs aimed at environmental rehabilitation of regions affected by the Aral Sea disaster. They also underlined the need for the two countries to work closer together to mitigate global climate change processes, develop and undertake joint measures for prevention and control of natural and man-made hazards and the importance of the regional program "Green Agenda for Central Asia" launched during the Third Consultative Meeting of the Heads of Central Asian States. In the course of the visit, 23 documents, including the Memorandum of Cooperation on water saving technologies and the Agreement on conservation of biodiversity, have been signed.

The Presidents held bilateral negotiations on the sidelines of the Consultative Meeting in Turkmenbashi on August 6. The parties addressed the issues of bilateral cooperation agenda, prospects of transport and logistics development, and entries to new markets via South Asia and South Caucasus corridors, including establishment of an international transport-transit corridor as part of the Ashgabat agreement.

Bilateral water-related arrangements

On May 26[30], an Agreement between the Governments of Turkmenistan and Uzbekistan on formation of a joint Turkmen-Uzbek Inter-governmental Commission for Water and a Sub-agreement to the Agreement between Turkmenistan and Uzbekistan on compensated land use were signed in Ashgabat. The Sub-agreement covers the construction by the Uzbek party of the Sultan-Sanjar dam of Tuyamuyun reservoir. According to the Uzbek Ministry of Water Management, as a result of this Sub-agreement, 1.0 billion m^3 of water will be accumulated additionally to improve water supply of 1.2 Mha and increase the guaranteed reserve of drinking water.

Bilateral working group

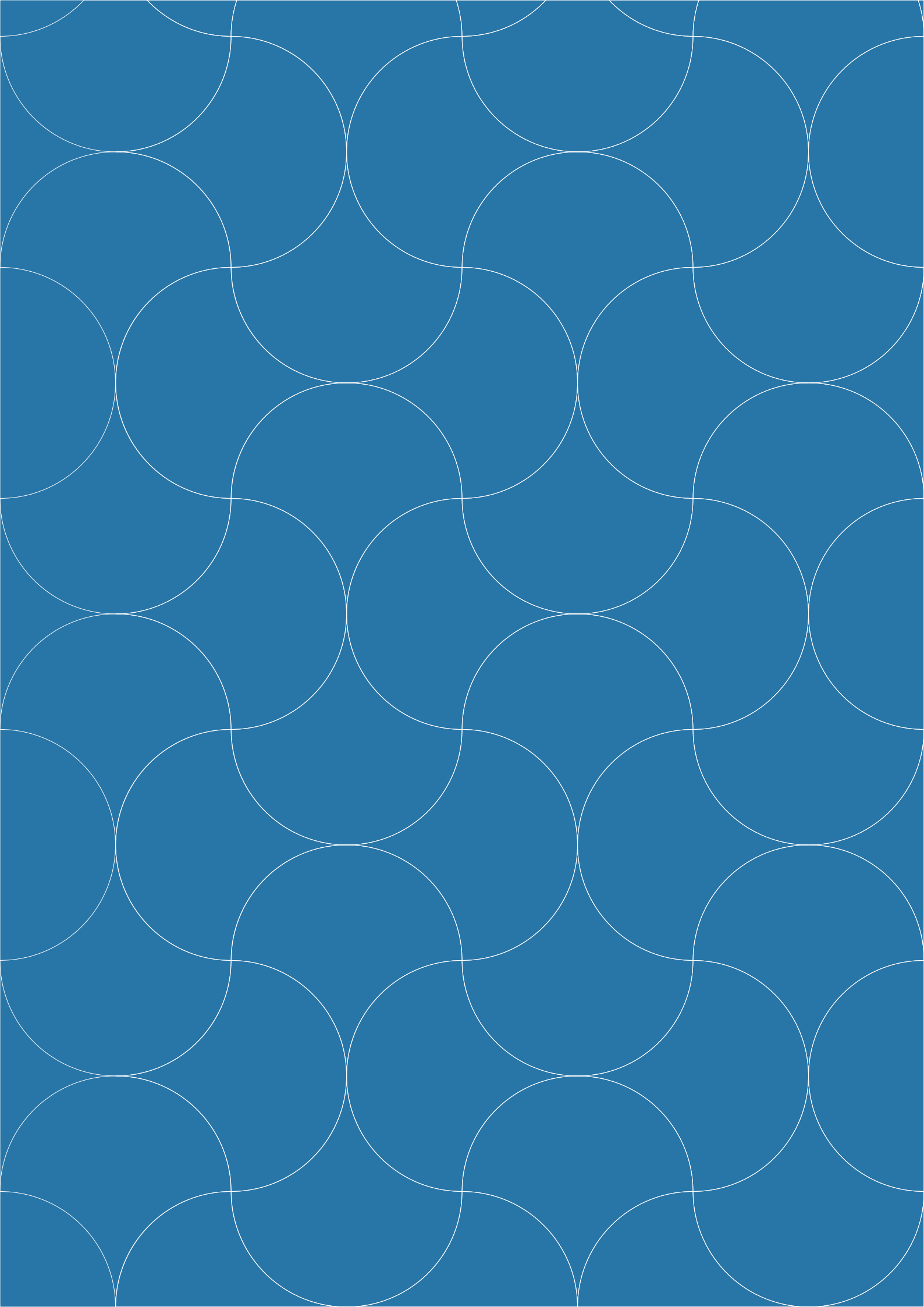
The first meeting of the joint Turkmen-Uzbek Inter-governmental Commission for Water was held on September 13 in Tashkent. The participants discussed such matters as interactions in the course of operation of structures and use of water along the Amu Darya River.

Trilateral working group for water

Water cooperation between Uzbekistan and Turkmenistan is also maintained within the framework of the trilateral Working Group, which includes BWO Amu Darya as well. By January 2022, the Group had 225 meetings, including 6 meetings in 2021 where the heads of water management organizations of the Amu Darya lower reaches discussed water allocation issues.

Source: BWO Amu Darya

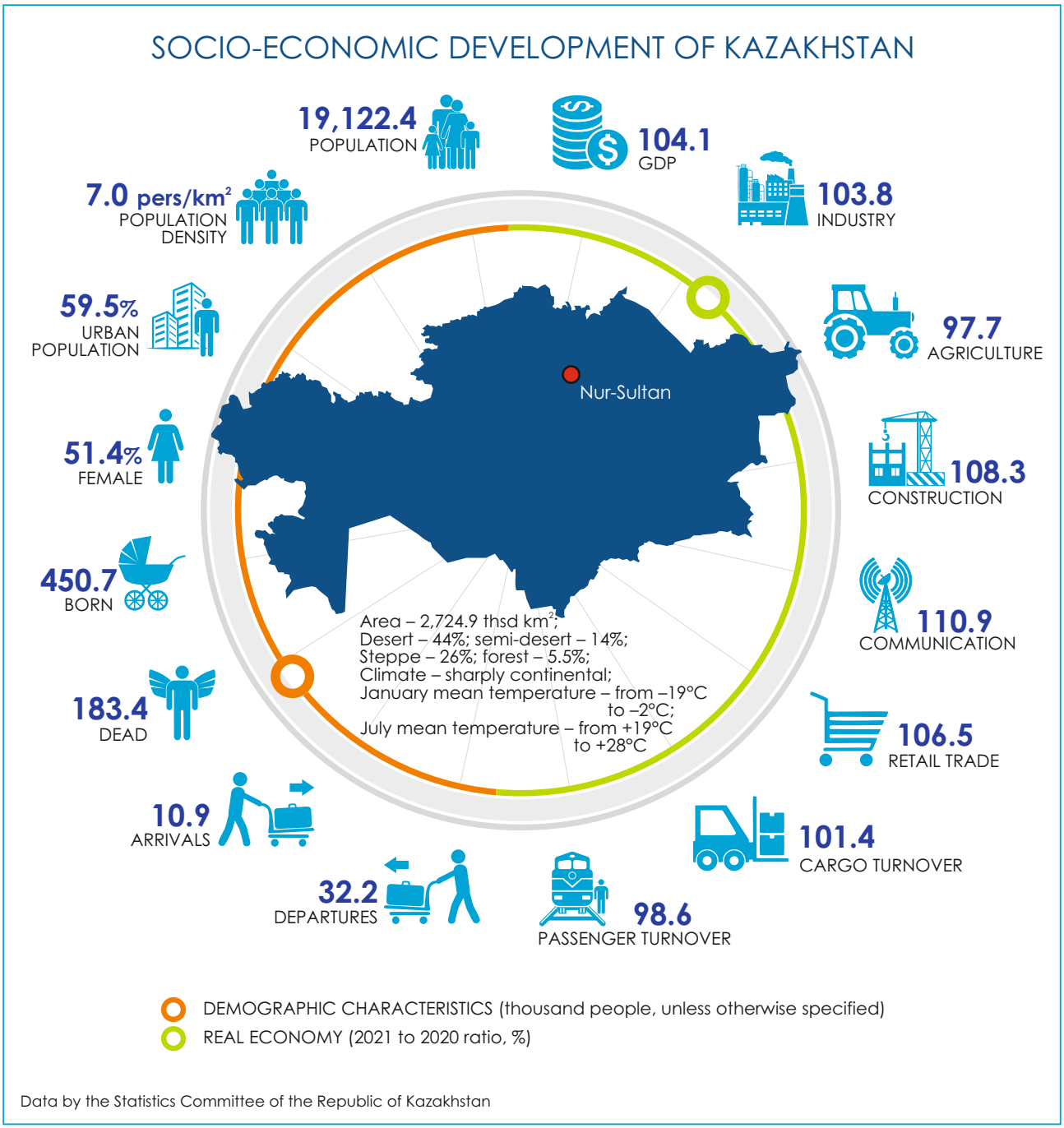
[30] Documents signed during the visit of the Uzbek delegation to Turkmenistan



Section 5

Key Water Developments in the Countries of Central Asia

5.1. Kazakhstan



Data by the Statistics Committee of the Republic of Kazakhstan

Water Sector

Water resources. There are 85 thousand rivers, with the largest of them the Irtysh, Ishim, Ural, Syr Darya, Ile, Chu, Tobol, and 48 thousand large and small lakes in Kazakhstan. The largest lakes are the Caspian Sea and the Aral Sea, followed by Balkhash, Zaisan and Alakol lakes. Glaciers are one of major sources of river water. The total quantity of water in rivers is 101 km^3, of which 57 km^3 are formed within the republican boundaries. The remaining quantity the country gets from neighboring countries: Russia – 8 km^3; China – 19 km^3; Uzbekistan – 15 km^3; Kyrgyzstan – 3 km^3. The available water supply in Kazakhstan is 37 thousand m^3/km^2 or 6 thousand m^3 per inhabitant a year.

Latest developments in legislation. (1) Law on amending and supplementing the Water Code of Kazakhstan in part of division of powers between local and central authorities in subsidizing drinking water supply (411-VI of 25.01.2021); Law on ratification of the Protocol for the protection of the Caspian Sea against pollution from land-based sources and activities to the Framework Convention for the protection of the marine environment of the Caspian Sea (71 of 01.11.2021);

(2) Resolutions of the Government of Kazakhstan: on amending and supplementing the Resolution on the list of hydrostructures of strategic importance that can be leased or transferred to fiduciary manage-

ment (214 of 07.04.2021 and 379 of 04.06.2021); on implementation of the Investment Agreement for establishment of a network of demonstration farms and construction of a plant for production of irrigation facilities together with the VALLEY KUSTO GB BV (768 of 26.10.2021);

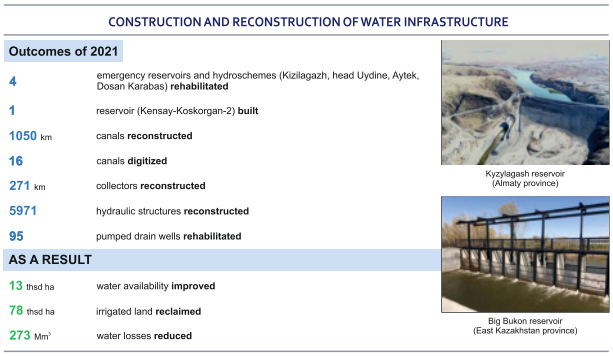
(3) Resolution of the Kostanai province Akimat (government) on approval of the list of particularly important local water supply systems as having no alternative option for the province (221 of 04.04.2021) and of the Karaganda province Akimat on establishment of water buffer zones in Balkhash Lake around Zelyoniy island and mode of their use (33/03 of 17.05.2021);

(4) Orders by: the Minister of Finance on amending the Order 404 of March 26, 2018, on approval of the format of information about the users who pay for surface water, animals, forests, and specially protected natural territories (508 of 31.05.2021); the Minister of Ecology, Geology and Natural Resources approving the Safety criteria of water systems and structures (172 of 02.06.2021) and the Rules for setting standards of admissible anthropogenic impact on water sites (254 of 16.07.2021); the Minister of Industry and Infrastructure Development on approval of the methodology for charging one cubic meter of drinking water supplied for population from particularly important group or local water supply systems having no alternative (470 of 27.08.2021).

New appointments. S. Bekeshev has been appointed the Minister of Ecology, Geology and Natural Resources of Kazakhstan by Presidential Decree (657 of 10.09.2021).

Results of the growing season. The south of Kazakhstan faced drought again in 2021. To overcome the situation, the irrigation queue was set, additional pumps were installed, and drainage water was put into re-use. Additionally, the acreage under water-intensive crops was reduced: cotton – by 17.9 thousand ha in Turkestan province; rice – by 7.1 thousand ha and 2.4 thousand ha in Kyzylorda and Almaty provinces, respectively. By the beginning of the growing season, the Toktogul reservoir was 52% full of the norm. As a result of negotiations with the upstream countries in the Syr Darya Basin (Kyrgyzstan, Tajikistan, and Uzbekistan), farmers in Turkestan and Kyzylorda provinces has got additional 700 Mm^3 of water (by 24% more than in 2020) from the Toktogul reservoir and the Bakhri Tojik reservoir. The Kirov reservoir (Talas River, Kyrgyzstan) accumulated 20% less water than in 2020. Small inflow into the Orto-Tokoy reservoir (Shu River, Kyrgyzstan) was observed during the growing season due to low temperatures in mountains. Negotiations with the Kyrgyz side allowed supplying peasant farms in Zhambyl province with irrigation water.

Water infrastructure. 60% of 3,298 irrigation networks extending to about 20 thousand km is in poor condition. Reconstruction of this poor network is performed on regular basis. Over 2019-2020, 1,734 km of canals were repaired and 111.5 thousand ha of irrigated land were put into use, while in 2021, these were 1,050 km of canals and 78 thousand ha of irrigated land, respectively. Reconstruction and repair of 42-Mm^3 Kyzylgash reservoir, re-conservation of 2-MW Nurly-Shyrak HPP, and construction of the Kensai-Koskorgan-2 reservoir in Turkestan province were completed.



https://www.primeminister.kz/ru/news/reviews/ekologicheskie-iniciativy-i-sovershenstvovanie-zakonodatelstva-razvitie-sfery-geologii-i-prirodnyh-resursov-kazahstana-po-itogam-2021-goda-2812150

Projects. In Turkestan province, (1) first pilot project on digitization of 12-km long K-19 main canal (Makhtaaral district) was implemented. This helped to detect up to 45% of irrigation water over-use. The 2021-2025 plan was prepared for automation of 119 main canals, with the total water diversion of about 6 km^3 and the total length of 2,830 km, in Almaty, Zhambyl, Turkestan and Kyzylorda provinces. Briefing for Kazakh companies wishing to participate in the tender for irrigation canal automation projects was held; (2) the project "Improvement of irrigation and drainage systems, phase 2" (PUID-2) aimed to improve water availability and conditions of 62.3 thousand ha of irrigated land is implemented. The project will help to reduce 199 million m^3 of water losses annually, increase water availability for crops from 65% to 100% and create 12,400 new jobs.

USAID Central Asia water and vulnerable environment project, which is to strengthen regional capacities for management of water resources and reduction of environmental risks in Syr Darya and Amu Darya basins, has been continued. First meeting of the regional steering committee was held in Almaty on November 6.

Capacity building. A training workshop was organized on "Climate Change Adaptation and Mitigation in Central Asia: Climate Change, Water Security and Governance" for young civil servants of Central Asia and Afghanistan, with the support of OSCE Program Office in Nur-Sultan and CAREC on September 21-22. The training was also held for the staff of district water organizations belonging to Almaty, Zhambyl, Turkestan and Kyzylorda branches of RGP "Kazvodkhoz" on October 19 to build capacities of more than 3,000 staff-members (KazNIIVH training base, Taraz).

Kazakh experts took part in the international conference "Promoting regional water sector dialogue and cooperation in Central Asia through knowledge networking, partnerships and education" held annually as part of CAWEP (online, March 3-4).

Events. The MEGNR organized a meeting with water sector long-service employees, scholars, and representatives of SIC ICWC, Institute of Geography and Water Security, and KazNIIVH to address the issues of water development (November 11).

Interstate cooperation. In 2021, Kazakhstan took part in: 80th (May 11) and 81st (December 7) meetings of ICWC (see ICWC Meetings); IFAS Board meeting (Dushanbe, June 29); and, 4th (online, May 27), 5th (Dushanbe, October 18), and extraordinary meetings (online, August 16) of the Working group on institutional and legal improvement of IFAS (see International Fund for Saving the Aral Sea).

Among other meetings held as part of interstate water cooperation were: (1) 28th meeting of the Kazakh-Kyrgyz Chu-Talas River Commission to agree upon the operation modes of reservoirs, schedules of water conveyance along interstate canals and the Strategic Action Program (April); (2) 4th meeting of the Uzbek-Kazakh joint Working Group on environment and water quality in the Syr Darya basin, after which the 2022 Work Plan was adopted (December 13); meetings with relevant ministries of riparian countries: Tajikistan – an agreement was reached on additional releases of 315 million m^3 of water from the Bakhri Tojik reservoir over June-August 2021; Uzbekistan – water releases from the interstate Dostyk canal were increased for farmers in Turkestan province, an agreement was reached to increase inflow into the Shardara reservoir, a draft Interstate agreement on transboundary water sharing and the preparation to the growing season 2021 were discussed; Russian Federation – progress on Kazakh-Russian cooperation programs for ecosystem conservation and restoration in transboundary Ural and Irtysh basins was considered, a water-related situation in the Zhayik basin was considered and an agreement was reached on daily exchange of data on operation regimes of Irikla, Aktyubinsk, and Kargala reservoirs; Kyrgyz Republic – progressing of the growing season 2021 in the Syr Darya, Chu and Talas basins was reviewed, topical aspects of cooperation under the Chu-Talas Commission and a need for an agreement on the Chumysh waterworks facility were discussed, the dates and amounts of electricity re-delivery by the Kyrgyz party to Kazakhstan as part of water-energy exchange were agreed upon, etc. See also Bilateral Water Cooperation between the Countries of Central Asia.

Drinking Water Supply

Construction of new and reconstruction of old water supply systems were continued as part of the Kazakhstan's 2020-2025 State Housing and Communal Development Program. A fully automated water supply system equipped with up-to-date facilities and energy-saving units has been launched in Turkistan. In 2021, a water conduit and intake structures from the Kishkentay aquifer were constructed to supply Makinsk town in Akmola province, a group water mains were put into operation in two settlements in Aktyubinsk province, and the freshwater group water mains were reconstructed in North-Kazakhstan province.

DRINKING WATER SUPPLY

There are **76** **clustered water mains** (hereinafter – CWM), **15.6** **thousand km long,** in the Republic; of which **39** **CWM, 13.4** **thousand km long,** are in the republican property. These CWM provide safe drinking water to **655** **rural communities** (RC) of **1.4** **mln. people**.

5 projects **were commissioned:**

- Reconstruction of Presnovsk CWM (II phase) in North Kazakhstan province. Adjustment
- Relocation of Eskulin CWM at the mine site 55 in Karaganda province
- Reconstruction of Eskulin water intake for water supply, Zhezgazgan city
- Reconstruction of Nurin CWM in Akmola province
- Construction of CWM of Kishkintay field to water supply facilities, Makinsk city, Akmola province

3 projects **were launched in test mode:**

- Construction of Talap CWM in Kyzylorda province
- Construction of Eskulin CWM in Karaganda province. Adjustment
- Construction of Janis-Bi CWM in Aktobe province

800 km of water mains **were constructed or reconstructed**

Pumping station of Makinsk CWM (Akmola province)

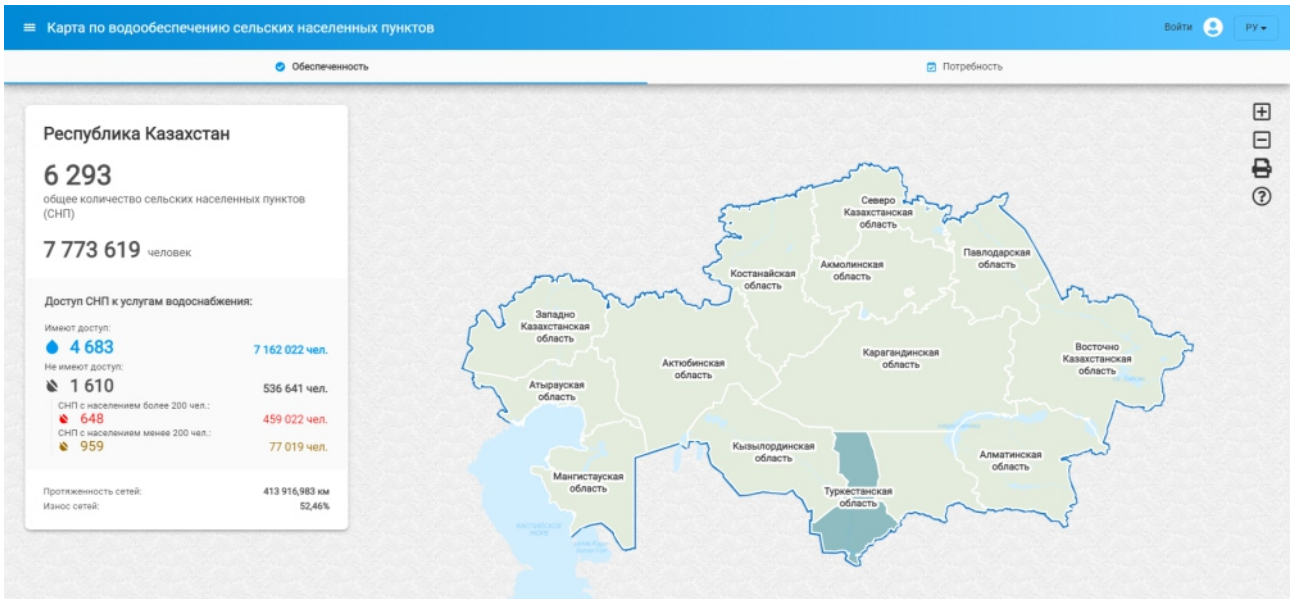
Improved Water Supply

3 cities

56 RC

209 thsd people

Free interactive map of rural water supply showing the information on access to water, financing availability and needs, population, network extension and deterioration, and other aspects has been launched (https://auylsu.kz/provision).



Agriculture

In 2021, the gross agricultural production was 7,515,433.5 million KZT, including 4,387,236.5 million KZT from crop production and 3,116,973.5 million KZT from animal husbandy.

Latest developments in legislation. (1) Laws: on amending national legislative enactments on the cotton sector and invalidating the law on cotton sector development (409-VI of 05.01.2021); on amending and supplementing some national legislative enactments on land relations (39-VII of 13.05.2021 and 59-VII of 30.06.2021).

(2) Resolutions of the Government of Kazakhstan: on amending Resolution 172 of 2009 on approval of the Rules for translation of land within the especially protected natural territories into the reserve land (607 of 03.09.2021); on approval of the national agro-industry development project for 2021-2025 (732 of 12.10.2021); on amending Resolution 1071 of 2003 on approval of maximum sizes of agricultural land plots within one administrative district (city) that can be owned by a Republican citizen for farming purposes, a non-state legal person of the Republic and its affiliated persons for agricultural commodity production purposes and that can be leased by foreigners, persons without citizenship and foreign legal persons for agricultural commodity production purposes (839 of 24.11.2021); on approval of the Concept of agro-industry development in Kazakhstan for 2021-2030 (960 of 30.12.2021).

The **Fisheries Development Program 2021-2030** was approved by Governmental Resolution 208 of 04.05.2021 to supply population with fish products and create conditions for development of fishery (aquaculture). Another Governmental Resolution (732 of 12.10.2021) approved the **National Project for agro-industry development in Kazakhstan for 2021-2025**. The Project aims to create competitive agro-industrial sector by increasing productivity 2.5 times, increasing exports of agro-industrial products 2 times and providing domestically the socially important foodstuffs.

A Land Reform Commission was established for deliberations on the **draft Land Code of Kazakhstan** and to develop proposals on the improvement of land legislation. A draft Law on individual subsidiary farming (PP RK 985 of 31.12.2021) is under debate.

State strategies and programs. In 2021, as part of the State agro-industry development program in Kazakhstan for 2017-2021 (PP RK 423 of 12.07.2018), a steady inflow of investments in agriculture was continued: investments increased by 33.3% and amounted to 773.2 billion KZT, and food production increased by 3.1% and amounted to 114.4 billion KZT. Labor productivity per person employed in agriculture was 2,153.5 thousand KZT for 9 months (1,823.5 thousand KZT for 9 months of 2020). The state program for productive employment and mass entrepreneurship development for 2017-2021 (PP RK 746 of 13.11.2018) allocated 20 billion KZT from the republican budget and 15.3 billion KZT from the national fund. These funds were used in full: 11,118 loans were given and 9,051 jobs were created.

As part of the 2025 National Development Plan, National priority 8 "Build diversified and innovative economy", Task 5 "Agro-industrial reformation for adaptation to new context", the **Concept of agro-industry development in Kazakhstan for 2021-2030** was developed and adopted. The agro-industrial reforms will be focused on: re-orientation of associated cost policies to achieve the long-term competitiveness; knowledge and digitization as drivers of productivity; value chains.

Agro-industry reform and modernization. By the end of 2021, more than 67.7 billion KZT of budget funds (65%) was allocated for subsidizing agricultural machinery, about 13.3 billion KZT (13%) subsidized investment projects in animal husbandry, and 23 billion KZT (22%) was directed to support crop production projects.

The Ministry of Agriculture approved the list of insurance products in agro-industry, including on the index of soil moisture deficit and soil moisture excess. Farmers can ensure the safety of their capital with the Agroinsurance information system (www.qoldau.kz/). In 2021, insurance companies provided insurance for 144.8 thousand ha of crops (121.3 thousand ha against drought and 23.5 thousand ha against moisture excess). Agricultural producers received 825 million KZT under 92 insurance contracts.

The RS monitoring of agricultural land use has been introduced countrywide since January 2021. Measures have been taken to return wasteland to the state: preliminary, 22.4 million ha have been identified in the Republic and 3.2 million ha were returned to the state property.

Digitization of agriculture is underway:[31] (1) Kazakh agrarian universities together with leading IT universities have introduced curricula for training of agricultural staff in digital skills (Digital agrosystems, Bio-informatics, Agro-informatics); (2) Kazakh Beeline has developed the Egistic digital product (https://egistic.kz/), which helps to timely respond to emergencies and adjust crop or animal production schedules, analyzes RS-data, identifies hotspots at field level, and provides recommendations on differentiated fertilization.

International cooperation. An investment agreement was signed with the Valmont Industries to create in Kazakhstan a network of demonstration farms and construct a plant for manufacturing modern irrigation systems.

The National Agrarian Research Education Center and Belorussian Agrarian Technical University have signed the cooperation agreement in the field of research, education and training.

Agricultural ministers of Kazakhstan and Hungary signed the Memorandum of Understanding, which provided for the establishment of an International Kazakh-Hungarian Center for Agro-industrial Innovations on the base of National Agrarian Research University of Kazakhstan (KazNAIU). The Minister of agriculture and the WB have agreed to cooperate under the technical assistance to agricultural development.

A "Smart Greenhouse" based on South Korean technology was created at the educational experimental farm of KazNAIU.

Events. Among the events organized in 2021, the following can be cited: (1) International scientific-practical conference "Current problems of agro-science in adaptation context" (June 17-18); (2) International specialized agricultural exhibition "AgriTek Astana" (June 23-25). The Minister of Agriculture participated in the 3rd Meeting of Central Asian Ministers of Agriculture on March 15.

Energy

As of January 2022, the total installed capacity was 23.959 thousand MW (23.55 in 2020), while the available capacity was 20.2 thousand MW (20.04 in 2020). In January-December, energy generation amounted to 114.4 billion kWh (by 5.8% more than in 2020), including 91.16 billion kWh by thermal stations, 10.7 billion kWh by gas-turbine thermal stations, 9.18 billion kWh by hydropower plants, 1.76 billion kWh by wind stations, 1.64 billion kWh by solar stations, and 0.0025 billion kWh by biogas installations. Consumption increased by 6% as compared to 2020 and amounted to 113.89 billion kWh. Electricity exports reached 2.65 billion kWh (1.33 to Russia and 1.32 to CA), while imports were 2.09 billion kWh (1.79 and 0.31, respectively).

By orders of the Minister of Energy, changes were made to the: Development Plan of the Ministry of Energy for 2020-2024 (345 of 11.11.2021); Tariffication rules to support renewables (252 of 31.07.2022); Rules for centralized purchase and sale by the Financial Settlement Center of electricity generated from renewables, waste utilization and flood energy (252 of 30.04.2021). The forecast balances of electricity and capacities have been also approved for 2022-2028 (16 of 14.01.22).

New appointments. M.M. Mirzagaliev was appointed Minister of Energy by UP RK 655 of 09.09.2021.

Hydropower. The total hydropower potential of 170 billion kWh a year in Kazakhstan is formed by river basins of Irtysh (Bukhtarma, Shulbinsk, Ust-Kamenogorsk HPPs), Ily (Kapshagai, Moynak HPPs) and Syr Darya, Talas and Chu (Shardara HPP). The technically feasible potential is 62 billion kWh, of which 30 billion kWh are estimated as economically feasible. Charyn, Chilik, Karatal, Koksu, Tetek, Khorgos, Tekes, Talgar, Usek, Aksu and Lepsy rivers are most promising for hydropower construction.

According to the 2020-2030 Hydropower Development Plan[32]: (1) Turgus-1 and 2 on the Chazha River and HPP on the Keles River, with commissioning 90 MW in 2021, are to be completed; (2) by 2030, the installed capacity of operating HPPs is to be increased by 464 MW and the total volume of operating HPPs is to be raised by 6 km^3; (3) 1 500 MW of small hydropower and 1 300 MW of large hydropower are to be commissioned by 2030.

AO Samruk-Energy[33] started constructing a counter-regulating 40-MW Kerbulak HPP on the Ily River (2021-2026) downstream of Kapshagai HPP to increase regulating capacity of the latter to 300 MW, balance non-uniform weekly and daily water releases and

[31] As part of the State Program "Digital Kazakhstan", Task 3. Agricultural digitization

[32] Approved in 2020

[33] By January 2022, the established capacity of AO Samruk-Energy's stations was 6,214.1 MW (26% of total installed capacity in the Kazakhstan energy system) and the production was 35,609 million kWh (31% of total production in Kazakhstan)

compensate peak loads in the capacity- and energy deficit Almaty energy system and South Kazakhstan energy zone.

Thermal power. Thermal power stations still dominate in the national energy balance contributing 88% to generation (including gas-turbine stations)[34].

Alternative energy sources. In 2021, power generation from renewables amounted to 4.22 billion kWh (by 30.1% more than in 2020). Kazakhstan has 134 RES facilities (19 new facilities were commissioned in 2021), with the total capacity of 2,010 MW (wind – 684; solar – 1,038; small hydropower – 280; bio – 8). It is planned to commission 10 facilities with the total capacity of 290.6 MW by the end of 2022. RES potential in Kazakhstan is estimated as follows: wind – 920 billion kWh/yr; hydro – 62 billion kWh/yr; solar – 2.5 billion kWh/yr; geothermal – 4.3 GW.

To develop alternative energy and convert the half of total country consumption to alternative and renewable sources by 2050[35], the Consultation document of regulatory policy to the draft law on alternative energy development was developed.

Small hydropower. In 2021, generation by small hydropower decreased by 18% as compared to 2020 and amounted to 799.7 million kWh.

As part of One Belt, One Road, the Turgusun HPP was put into operation in Altay mountains, East-Kazakhstan province in 2021. The total installed capacity of the plant is 24.9 MW, and the average annual generation is 79.8 million kWh. The 25.8-MW HPP-2 on the Chazha River was commissioned in Almaty province.

AO Samruk-Energy conducts the pre-design work on construction of HPP-29. Also, reconstruction and modernization of the hydropower cascade in Almaty province is planned for 2022-2028 for more efficient utilization of hydro-resources of the Bolshaya Almatinka River.

Solar power took the second position among RES by generation in 2021 – 1,641 million kWh (38.9%). 50-MW Shoktas station with the forecast annual production of 102,000 MWh and 10-MW Kushata station to generate 20,100 MWh annually were commissioned by the Khevel company group[36] in Turkistan province. The solar stations would allow avoiding 62,000 t of CO_2 emissions.

Wind power was the leader by generation in 2021 – 1,776 million kWh (42.1% of green generation). This is 61% more than in 2020.

The 50-MW Ybyray station was commissioned in Kostanai province and 48-MW Badamsha-2 was launched in Aktyubinsk province. In 2021, AO Samruk-Energy[37] implemented solar projects with the established capacities from 45 MW to 60 MW in Almaty and Akmolinsk provinces.

Events. For the first time in CA, Kazakhstan hosted the **World Energy Week 2021: Energy for better lives**[38] in Nur-Sultan in October 4-8.

International cooperation. A memorandum of cooperation was signed with EBRD for development and implementation of the long-term Power and Gas Infrastructure Development Strategy aimed to ensure carbon neutrality of power and gas infrastructure in Kazakhstan by 2060.

Agreements were reached with the Arabian ADQ and French "Total Energies" on gradual commissioning of new RES capacities of 5 GW in the near decade. Such joint investment project will help to reduce emissions by 8 million t, generate additional 20 billion kWh of green energy, and create 3 thousand jobs.

Environment and Climate Change

Latest developments in legislation. The new Environmental Code of the Republic of Kazakhstan went into effect in January 2021.[39] This latest edition provides for the stronger responsibility of industrial enterprises for environmental pollution, the waste management hierarchy, and the construction of plants for waste-to-energy. Laws were adopted on amending and supplementing the Code on administrative offences in environmental area (403-VI of 02.01.2021) and on ratification of the Protocol on environmental impact assessment in a transboundary context in the Caspian Sea Region to the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (66-VII of 04.10.2021).

The national project "Green Kazakhstan" was approved in October 2021 for environmental improvement in the Republic. The Project includes four directions: (1) Clean Kazakhstan, for air quality improvement, sustainable waste management, and aquatic ecosystem conservation; (2) Economical Kazakhstan, for better productivity through water saving and energy efficiency; (3) Nature, for development of especially protected nature territories, restoration of rare and endangered fauna, conservation of fish and other aquatic animals, and preservation of forests; (4) Future of ecology, for mainstreaming of environmental aspects in education and formation of ecologically oriented information space.

Strategies. The ongoing strategy "Kazakhstan 2050: new policy course of the established state" sets clear

[34] In 2021, the stations of AO Samruk-Energy provided 5,766 thousand Kcal of thermal energy

[35] Strategy "Kazakhstan 2050: new policy course of the established state"

[36] The total capacity of solar generation projects by Khevel is 288 MW

[37] AO Samruk-Energy has five RES projects, with the total generation amounting in 2021 325.3 million kWh. This is 7.7% of electricity generated by all RES facilities in Kazakhstan

[38] Organized by KAZENERGY Association together with the World Energy Council

[39] First Environmental Code was adopted in 2007

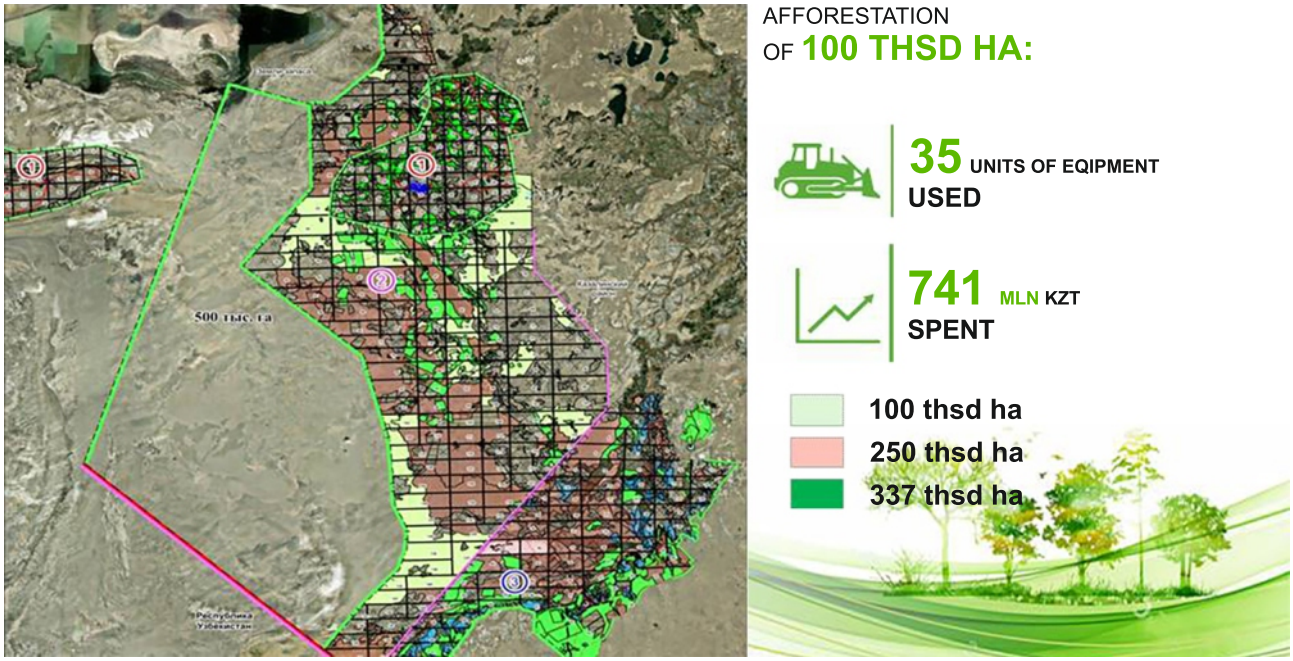
targets for building sustainable and effective economy based on green transition.

Progress in implementation of the Concept for green transition of Kazakhstan for 2021-2030 was discussed at the roundtable "Green economy – a paradigm of innovative and sustainable development in Kazakhstan" on May 25 and at the meeting of the Council for Green Transition in June.

A draft Doctrine (Strategy) for the achievement of carbon neutrality in Kazakhstan by 2060 was presented at the international conference "Ways for achievement of Paris Agreement goals and carbon neutrality by Kazakhstan" on October 13 in Nur-Sultan. The Strategy includes the analysis of climate actions, the assessment of co-benefits from the reduction of greenhouse gas emissions and the increase of carbon catchment, incentives for investments and market, etc.

As a follow-up to the President's order on saxaul plantation on the exposed bed of the Aral Sea, 100,000 ha were afforested in 2021. It is planned to afforest additional 250,000 ha in 2022.

PLANTING SAXAUL ON THE DRIED BED OF THE ARAL SEA



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The President in his message to the people of Kazakhstan in 2020 instructed to plant 2 billion trees. In 2021, 138 million trees were planted. An interactive map for monitoring of afforestation has been launched (https://orman.gharysh.kz/ru/map). During the annual "All-Kazakhstan afforestation day" over 60 thousand people planted about half a million of trees in 2021.

Projects. As part of: (1) EcoQoldaý project dealing with waste processing and utilization, first children ecological theater including the "Eco-workshop" was opened; (2) Regional approaches for combating sand and dust storms and drought project, a National action plan on mitigation of sand and dust storms in Kazakhstan for 2021-2024 has been developed. The NAP includes an overview of Kazakhstan's current national efforts and international commitments in combatting desertification, as well as a map of SDS sources and a comprehensive analysis of the sources and causes; (3) Assistance to media coverage of transboundary environmental issues in Central Asia and the courses[40] on the media coverage of the Aral Sea problems were held for journalists in Kazakhstan and Uzbekistan. Upon completion, a press tour to the Aral Sea was organized and #ARALIssues Conference-2021 was held to present multimedia stories (December 10, Almaty). See Major Events in Central Asia.

Capacity building. Training courses for journalists on "Environmental journalism for sustainable development" were held within the framework of the Memorandum of Understanding and Cooperation between the Kazakh Ministry of Information and Social Development, KazNU and MEGNR (March 15-19).

International cooperation. A Program of Kazakh-Russian cooperation[41] in the field of especially protected nature territories was signed for 2021-2024 in March.

[40] By the International Center for Journalism MediaNet and DW Akademie, with the support of the German Federal Foreign Office

[41] As part of the Agreement between the Government of Kazakhstan and the Government of the Russian Federation on environmental cooperation

MAJOR ENVIRONMENTAL PROMLEMS IN THE REGIONS

Air pollution

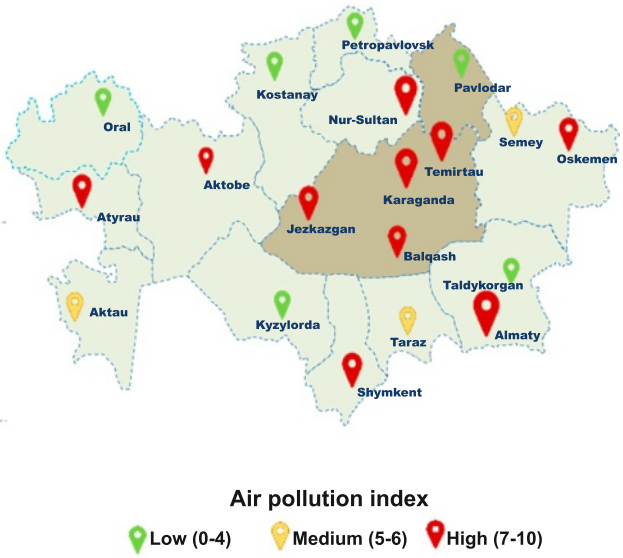
- Out of **45** industrial cities and megacities, **10** cities have a **high air pollution index** (API)
- **2.4** Mt of pollutant emmissions (2021)

Surface water pollution

- Outdated wastewater treatment plants in Actobe, Atyrau, Kostanay, Semey cities
- **2.6** Mt of pollutant discharged (2021)

Poor system of waste management

- **2,024** landfills do not meet sanitary and environmental requirements
- **7,328** unauthorized dumpsites identified



https://www.primeminister.kz/ru/news/reviews/ekologicheskie-iniciativy-i-sovershenstvovanie-zakonodatelstva-razvitie-sfery-geologii-i-prirodnyh-resursov-kazahstana-po-itogam-2021-goda-2812150

First "Kazakhstan-Ukraine" climate dialogue[42] was held in hybrid format on May 25-26. Development of partnership and international cooperation, exchanges on protection of especially protected natural territories, development of transboundary ecological tourism and environmental awareness were on the agenda.

Developments and events. In 2021, the Eurasian Environmental Fund (EEF)[43] was established for implementation of green projects in Kazakhstan, extension of afforestation area and assistance in shifting to low-carbon economy. The State National Nature Park "Ulytau" was formed on an area of 58.9 thousand ha in Karaganda province.

120 thousand volunteers, ecologists and other sectoral representatives took part in the Clean Kazakhstan campaign on the World Environment Day.

Prime-Minister of Kazakhstan, while speaking at COP 26 in Glasgow, has underlined that Kazakhstan would increase 5 times the share of RES (from 3 to 15%) and 2 times the generation by clean energy sources (20 to 38%), reduce energy from coal from 70 to 40%, and increase the potential of carbon sequestration by planting over 2 billion trees by 2025. He also acknowledged the commitment of Kazakhstan to act as a Regional CA climate hub for sustainable development. As part of COP26, Kazakhstan joined the Declaration on forest and land use and the commitment on youth education and representation and signed with Tajikistan the Charter of the Green Bridge Partnership Program[44].

Emergencies and Disasters

Over 13 thousand natural and anthropogenic emergencies were registered throughout the country in 2021. The damage from natural disasters was estimated at 6,993 million KZT.

Preventive measures. As part of implementation of the Comprehensive Plan for Mudflow, Landslide and Avalanche Safety for 2020-2024, construction of mudflow retaining dams on the Aksai and Ayusai rivers was continued to protect the population of Almaty and Almaty provinces and minimize economic damage from mudflows. Kazakhstan,together with the PRC is also constructing the Chukurbulak mudflow retaining dam, as well as protective structures on the Khorgos River.

The following measures were taken: cleaning of discharge channels, installation of traps on 17 most hazardous moraine-dammed lakes, controlled discharges of more than 6 million m^3; strengthening of 51 km of banks and cleaning of 72 km of river bed, construction and current repair of 78 km of protective dams, construction and cleaning of 21 km of drainage channels, installation of 4 local warning systems.

[42] Organized on initiative of the Embassy of Kazakhstan in Ukraine with the support of environmental ministries

[43] Non-profit organization established by the AIFC Green Finance Centre, the Corporative Fund "Biodiversity Conservation Fund of Kazakhstan" and TOO "Green Investment Group

[44] Initiated at 66 UNGA and approved as an inter-regional, practical and voluntary mechanism for green transition

Kazakhstan

Eastern Europe and central Asia

OVERVIEW INDICATORS

SDG Index Rank	SDG Index Score	Spillover Score
65/163	71.1	93.5

SDG Dashboards and Trends

SDG in Kazakhstan

Implementation of SDGs is continuously monitored by both the Government of Kazakhstan and UN representatives. The SDG monitoring system of Kazakhstan includes 280 indicators (205 global and 75 national ones). Kazakhstan ranked 65th among 163 countries in the annual sustainable development rating published by the UN and the Bertelsmann Foundation https://dashboards.sdgindex.org/rankings

Foreign Policy and International Cooperation

The key principles of the Kazakhstan's foreign policy as set in the Foreign Policy Concept for 2020-2030 speak as follows: external openness of the state; favorable external conditions for the well-being of Kazakhstanis; multivectorness, pragmatism and proactivity; collective vision and effective approaches of the international community to address a wide range of problems; symbiotic relationship between security and development at the national, regional and global levels.

Working and official visits. In 2021, the Head of State visited South Korea (August), Turkmenistan (August, October), Turkey (November), Belgium (November), Switzerland (November) and the Russian Federation (December) as part of his state, working or official visits.

Development of alliances and strategic partnerships. Kazakhstan expands ties and strengthens cooperation with CIS countries, the SCO and Central Asia in trade, economic, cultural and humanitarian spheres.

While speaking at the Consultation meeting of the Heads of State, the President of Kazakhstan has underlined: (1) the Concept of low-carbon development until 2050, which would allow the country to achieve carbon neutrality by 2060 and reduce emissions by 15%; (2) the need for systemic adoption of innovations and training for the energy sector and the New Energy Skills Center formed to this end; (3) the important aspect of new country water policies in the region as the digitization of water distribution, accounting and monitoring. Cooperation should be resumed under the 1998 Agreement on the use of water-energy resources in the Syr Darya River Basin. To this end, it is proposed to form a special working group at the level of vice-ministers to find mutually acceptable solutions. The possibility of establishing an Interstate water-energy consortium in CA in order to harmonize the interests of all the countries in hydro-

power, irrigation and environment can be revisited. "It is important to intensify efforts of the Regional working group on institutional and legal improvement of the International Fund for saving the Aral Sea as it plans to discuss the above matter" (August 6).

During the official visit to Turkmenistan, 20 agreements were signed in the areas ranging from trade, transport, agriculture to science (October 24-25). Kazakhstan-Uzbekistan relations received a new impetus during the state visit of the President of Uzbekistan to Nur-Sultan. A Declaration on allied relations between the Republic of Uzbekistan and the Republic of Kazakhstan was adopted. According to this Declaration, the Supreme Interstate Council, the Council of Interparliamentary Cooperation, and the Council of Ministers of Foreign Affairs of Uzbekistan and Kazakhstan are to be established (December 6). See Bilateral Water Cooperation between the Countries of Central Asia.

Kazakhstan and Russia held the **XVII Forum of Interregional Cooperation between Russia and Kazakhstan** on the theme "Environmental and Green Growth Cooperation". A package of documents was signed on the margins of the Forum (September 28-30).

Kazakhstan participated in the (1) CIS meetings: the Council of Foreign Ministers (April 2, Moscow; October 14, Minsk), the Council of CIS Heads of State (October 15, online), and informal summit of CIS Heads of State (December 28, St. Petersburg); (2) ECO meetings: 4th Business Forum of the ECO Member States (November 26, Ashgabat), 25th meeting of the ECO Council of Ministers (November 27, Ashgabat), 15th ECO Summit, which resulted in the "Ashgabat consensus of actions" (November 28, Ashgabat) (3) SCO meetings: regular meeting of the Council of National Coordinators of the SCO Member States (April 27-30, Tashkent; November 19-21, Nur-Sultan); 16th Meeting of Secretaries of the Security Council of the SCO Member States (June 23); meeting of the Council of Foreign Ministers of the SCO Member States (July 13-14); the CSTO Collective Security Council session (September 16); the high-level meeting of the SCO Heads of State Council (September 17).

Chairmanship in international organizations. In 2021: (1) the meetings of the Supreme Eurasian Economic Council were held under the chairmanship of Kazakhstan (May 21, online, October 14, online, December 10, Almaty). Kazakhstan also took part in the meetings of the Eurasian Intergovernmental Council (April 29-30, Kazan, August 19-20, Cholpon-Ata, November 18-19, Yerevan); (2) at the 4th General Assembly of the Islamic Food Security Organization (IFSA)[45] Kazakhstan was delegated chairmanship in IFSA (September 8-9); (3) under the chairmanship of Kazakhstan in CICA[46], a series of events were held, including the 4th Meeting of the CICA Youth Council (June 18), the Conference "Food Security in Asia: Prospects for Cooperation in the CICA Area" (September 15), and the 6th Meeting of CICA Foreign Ministers (October 11-12).

Promotion of the national interests and reinforcement of the country's image. Kazakhstan actively cooperates with the OIC, UN, EU, OSCE, ECO and others. At the initiative of the first President Nazarbayev, an **informal summit of the Cooperation Council of Turkic-speaking States** was held. The agenda included the expansion and strengthening of multifaceted interstate partnership. As a result, the Turkestan Declaration was adopted (March 31, online).

K.-J. Tokayev noted, speaking at (1) the opening ceremony of the **second OIC Science and Technology Summit** as chairman of the first Summit: "...we need to increase investment in human capital development, especially in good education. It is also vital to strengthen and develop our scientific cooperation. With these measures we will be able to revive the glory of the Islamic world in science and innovation" (June 16, online); (2) **general debate of the 76th UNGA session:** "...we focus on Central Asia's water related problems, including water scarcity, quality deterioration and inefficient use. Our region's water security is inextricably linked to energy, food and the environment... Kazakhstan continues proposing a regional water and energy consortium as a way to coordinate current strategies for achieving common goals" (September 23).

Sources:

Official sites of:

the President of Kazakhstan, www.akorda.kz/ru;

Ministry of Ecology, Geology and Natural Resources, https://www.gov.kz/memleket/entities/ecogeo?lang=ru;

Ministry of Agriculture, www.gov.kz/memleket/entities/moa?lang=ru;

Ministry of Energy, www.gov.kz/memleket/entities/energo?lang=ru;

Legal Information System of the Republic of Kazakhstan, http://adilet.zan.kz/rus

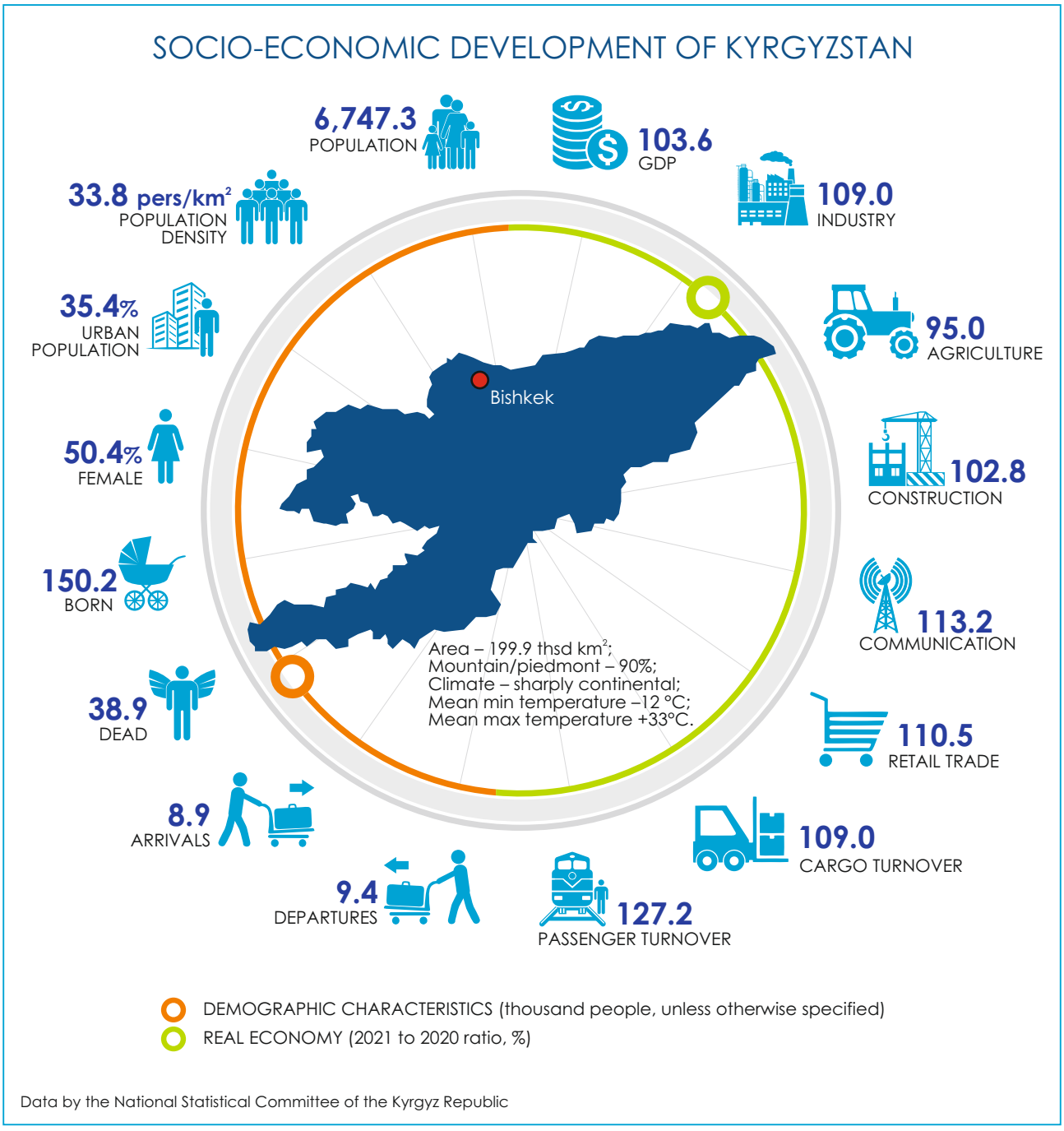
Information agencies and sites:

https://inbusiness.kz/ru;
https://ainews.kz/;
www.kazenergy.com/ru/;
https://forbes.kz/;
https://kursiv.kz/;
https://informburo.kz/;
https://liter.kz/;
http://kazaral.org;
https://kazakh-zerno.net;
https://lenta.inform.kz/ru;
https://kaztag.kz/ru;
https://centrasia.org

[45] IFSA is a specialized organization of OIC, with headquarters in Nur-Sultan

[46] Kazakhstan serves as the chairman of CICA in 2020-2022

5.2. Kyrgyz Republic



Data by the National Statistical Committee of the Kyrgyz Republic

Latest developments in legislation. The following legal documents were approved in 2021: (1) Constitution of the Kyrgyz Republic in new edition (ZKR 59 of May 5); "National Development Program of the Kyrgyz Republic until 2026" (UP 435 of October 12). The Constitutional Law "On the Cabinet of Ministers of the Kyrgyz Republic" has been adopted as well.

Water Sector

The total available water resources in the Kyrgyz Republic are 2,458 km^3, including 650 km^3 (26.4%) in glaciers, 1,745 km^3 (71%) in lakes, 13 km^3 (0.5%) as potentially usable groundwater resources, and 44.5 to 51.9 km^3 (2%) as average annual river runoff. There are about 3,000 rivers and streams, the catchment area of which occupies 7% of the territory. The amount of annually renewable groundwater in major artesian basins is within 7.7 km^3. The current glaciation accounts for 4% of the country's territory.

The total water consumption in the republic is estimated at 10-12 km^3 per year. The water transportation losses in rivers, canals and irrigation structures amount to 1.7-2.3 km^3. Owing to natural (mainly relief) conditions, irrigation water is supplied mainly from small rivers serving about 800,000 ha or 76% of the total irrigated area: 80,000 ha (11%) are irrigated from regulated sources, while the rest of 720,000 ha, by natural flow.

Public administration reforms. By the Decree "On institutional measures amid the adoption of a new Government structure and reform of executive authorities in the Kyrgyz Republic" of February 12, 2021, the following restructuring was undertaken: (1) the Ministry of Agriculture, Food Industry and Land Reclamation was transformed into the **Ministry of Agriculture, Water Management and Regional Development**; with the transfer of regional development functions from the Ministry of Economy and Finance; (2) the **State Water Resources Agency** was transferred from the Government of the Kyrgyz Republic to the Ministry of Agriculture, Water Management and Regional Development, except for the Department of Drinking Water Supply and Sanitation, which was transferred to the Ministry of Transport, Architecture, Construction and Communications; (3) the State Agency for Environmental Protection and Forestry under the Government of Kyrgyz Republic was transformed into the State Forestry Agency with the transfer under jurisdiction of the Ministry of Agriculture, Water Management and Regional Development, except for functions in the field of ecology and environmental protection that were passed to the Ministry of Emergency Situations.

In 2021, by government decrees, the following organizations were renamed: (1) State Water Resources Agency under the Ministry of Agriculture, Water Management and Regional Development into the Water Resources Service under the Ministry of Agriculture; (2) State Land and Water Inspection under the Ministry of Agriculture, Water Management and Regional Development into the Service for Land and Water Supervision under the Ministry of Agriculture of Kyrgyzstan. The Department of Development of Drinking Water Supply and Sanitation under the Ministry of Transport, Architecture, Construction and Communications has become part of the State Agency for Architecture, Construction, Housing and Communal Services under the Cabinet of Ministers of Kyrgyzstan.

Latest developments in legislation. Amendments have been made in the Water Code of the Kyrgyz Republic and the Law on gatherings (associations) of water users and unions of Water User Associations".

The procedure for calculation and charging of fees for the use of surface water, particularly the tariffs for industrial users, has been approved by the relevant decree of the Cabinet of Ministry of October 18.

Water-saving technology. A new leasing project valuing 426.7 million KGS has been developed to disseminate modern irrigation technologies, sprinkler and drip irrigation systems. Agricultural producers can get agricultural and processing machinery, as well as equipment for drip irrigation on preferential terms for 10 years with the interest rate of 4.5%.

Projects. The following projects continued in 2021: (1) **Additional financing to the National Water Resources Management Project** (AF NWRMP, SDC, State Water Resources Agency), providing for the establishment of 30 community water councils (in addition to the 73 established under Phase 1)[47]. A number of **trainings** was organized and held for specialists from State Water Resources Agency, Main and Regional Departments for Water Resources and BWAs of Karadarya-Syrdarya-Amudarya basin in GIS mapping, Public Water Councils, WUA management plans for on-farm irrigation and drainage infrastructure, water use improvement, etc.

(2) "Improvement of agricultural productivity and nutrition" (APNIP, US$ 38 million, GAFSP, WB): 31 WUAs of the southern and northern regions were included into a rehabilitation program as a part of Rehabilitation and modernization of irrigation and drainage infrastructure component (Component 1).

Rehabilitation works were completed in 8 WUAs, including in "Kur-Tash" of Aravan district, Osh province in 2021. The work in WUA "Khodja-Ariq" is underway in Nookatsk district, Osh province.

Projects aimed at increasing and improving water availability were implemented in the following districts: Kadamjaysk (1.5 ha), Batken (1.5 thousand ha), Leylek (2.5 thousand ha), Panfilov (3.6 thousand ha)[48], Jailyk (0.7 thousand ha), Keminsk (2.6 thousand ha).

Drinking Water Supply

Projects and programs. In 2021-2023, development of irrigation, water supply and social infrastructure were among the most important priorities of state investments. More than 16.4 billion KGS have been allocated for drinking water supply projects.

According to the plan of "National Development Program until 2026", it is planned to allocate US$ 470 million for provision of clean water to 95% of settlements in the country within the next 5 years at the expense of external donors and republican budget. It is planned to connect about 100 villages to clean and safe drinking water facilities every year. To ensure sustainable water supply, the financial model of drinking water operators functioning is developed.

Construction and rehabilitation of drinking water infrastructure were planned in 96 villages for 2021 and in 645 villages up to 2024 through donor funds, republican budget and other sources.

Implementation of the following projects have been continued: "Improvement of water supply in Bishkek (Phase II)" (EBRD-SECO), "Water supply and sewerage system rehabilitation in Talas" (EBRD-SECO), "Water supply and sewerage system rehabilitation in Kant" (EBRD-SECO), "Water supply and sewerage system rehabilitation in Batken city" (IFCA, EBRD), "Water supply and sewerage system rehabilitation in Naryn

[47] The Talas and Karadarya-Syrdarya-Amudarya Basin Water Administrations were established and their provisions were approved by Order No. 211 and No. 212 of 23 December 2020 of the Director State Water Resources Agen

[48] As part of the "Sustainable Rural Development in the Kyrgyz Republic" (IDB, ISFD, GKR, $11 million, 2017-2021)

city" (SECO-EBRD), "Water supply and sewerage system rehabilitation in Osh", Phase-2 (EBRD, IFCA, EIB), "Water supply and sewerage system rehabilitation in Kara-Suu, Kyzyl-Kiya, Mailuu-Suu, Cholpon-Ata, Tokmok, Balykchy, Toktogul (EBRD, IFCA, EIB)" and others.

New projects have begun: "Water supply system rehabilitation in Karakol city" (EBRD), "Water supply system rehabilitation in local self-governance entities of Myrza-Ake, Don-Bulak and Kurshab" (EBRD), "Water supply and sewerage system rehabilitation in Zhalal-Abad city", Phase-2 (EBRD), "Water supply system rehabilitation in Isfana town" (EBRD), "Improvement of rural water supply and sanitation in the Kyrgyz Republic" (IDB, WB, SFD).

A number of loan and grant agreements have been ratified between the Kyrgyz Republic and international partners, in particular:

(1) "Water supply and sewerage system rehabilitation **in Kerben city**" (€6.5 million, including 2.5 million – EBRD loan, €3.0 million – EU grant from IFCA funds, €1.0 million – EBRD grant from technical cooperation funds). (2) "Water supply and wastewater disposal system rehabilitation **in Nookat city**" (€4.6 million, including €2.2 million – EBRD loan, 2.0 million – EBRD grant, 0.6 million – non-reimbursable technical assistance from the Japanese Government through the Cooperation Fund).

The work on development of the WB project "Climate Resilient Water Supply" has been started ($100 million, implementation period scheduled for late 2022). The project is aimed at (1) increasing access to climate-resilient water services in selected river basins; (2) strengthening institutional capacity for climate-resilient water management at local and national levels.

Agriculture

Agricultural production. Heat waves in summer and irrigation water shortage during the growing season have caused a decrease in cereal yields. Thus, the bulk yield of wheat and barley decreased by 42% and 46%, respectively, compared to the same date last year. In addition, the bulk yield of oilseed crops decreased by 25.4%, sugar beet, by 19%, melons, by 14%, fruit and berry crops, by 3.9%, corn, by 3.3%, potatoes, by 2.9%, and vegetables, by 1.3%.

Irrigated area. According to the State Statistics Committee of the Kyrgyz Republic, the total crop acreage amounted to 1,226.2 thousand ha, which is 2.6 thousand ha more compared to 2020. Grain crops (without pulses, rice and buckwheat) were cultivated on 580.8 thousand ha (47.4% of all sown area), pulses – on 60.7 thousand ha (5%), oilseeds – on 17.1 thousand ha (1.4%), cotton – on 19.2 thousand ha (1.6%), tobacco – on 0.4 thousand ha (0.03%), sugar beet (factory farming) – on 10.3 thousand ha (0.8%), potatoes – on 74.9 thousand ha (6.1%), vegetable and forage crops – on 54.3 thousand ha (4.4%) and 384.3 thousand ha (31.3%), other crops (rice, cucurbits and others) – on 24.2 thousand ha (2%).

Public administration reforms. The Ministry of Agriculture of the Kyrgyz Republic has been formed according to the Presidential Decree (425 of 12.10.2021) "On the structure and composition of the Cabinet of Ministers of the Kyrgyz Republic and the structure of the Presidential Administration of the Kyrgyz Republic". By the Decree of Cabinet Ministers (259 of 15.11. 2021), amendments were made to the Presidential Decree (83 of 09.03.2021) "On the Ministry of Agriculture, Water Resources and Regional Development of the Kyrgyz Republic".

A Coordinating Council of Agriculture Development Partners in the Kyrgyz Republic has been formed. The Council included national partners (key government agencies), development partners (foreign embassies in the Kyrgyz Republic, donors, and international organizations) and financial institutions. The main objective of the Council is to coordinate the current technical and financial assistance and conduct a coordinated policy to strengthen cooperation and ensure effective interaction of plans and actions for agricultural development in the Republic.

Latest developments in legislation. A list of agroindustry development recommendations has been defined for the Government of Kyrgyz Republic to develop agriculture, food and processing industry and agricultural commodities, raw materials and food market, increase export potential of the agroindustry, and boost agricultural sub-sectors as the basis of country food security (Presidential Decree 25 of 8.02.2021). In particular, it is ordered to examine the possibility of transferring a portion of land from the State Agricultural Land Fund to responsibility of an authorized agricultural body for development of cooperatives, seed and breeding farms. In pursuance of Decree 309 of December 17, 2021 "On the development of agricultural cooperatives, seed and breeding farms", the "Concept of Agricultural Development of the Kyrgyz Republic for 2021-2025" planning a number of reforms for sustainable and efficient land and water use has been developed.

The Presidential Decree "On measures to support entities engaged in agricultural activities" adopted on December 6, 2021 aims at drafting a law providing for exemption from land tax of the use of agricultural land for the period of 2022-2024, including with compensation for losses of the local budget.

The Ministry of Agriculture of the Kyrgyz Republic proposed to approve draft veterinary and sanitary standards and requirements for organization and management of aquaculture.

Projects. The project "Financing of agriculture-9", providing for favorable interest rates at 6.8 and 10% per annum with a crediting period up to 60 months, depending on the target sector, was approved by the Presidential Decree 34 of 04.02.2021. More than 9.5 thousand loans for 4.8 billion KGS were issued.

The above-mentioned project "Improvement of agricultural productivity and nutrition" (APNIP, US$ 38

million GAFSP, WB) also provides extension services for selected WUAs to improve productivity of irrigated land and expand access to markets (Component 2), develops measures to improve food security and nutrition quality of beneficiaries (Component 3).

On implementation of IFAD and FAO projects in the area of agriculture and food in Kyrgyzstan in 2021, see section "United Nations and its specialized agencies".

International cooperation. During the official visit of the Kyrgyz President to Turkey, a number of agreements were concluded on different topics, including on agriculture. In particular, it was proposed (1) to organize a joint venture to attract investment in resource-saving technologies – drip irrigation systems and (2) to implement investment projects of agricultural processing, as well as cooperate and develop the cooperative system in Kyrgyzstan (June).

Also, (1) the Center of the Korean Program for International Agriculture (KOPIA) in the Kyrgyz Republic and the agricultural demonstration field at the Botanical Garden of the J. Balasagyn Kyrgyz National University and the (2) **Fishery Demonstration Center**[49] at the K.I. Skryabin KNAU were opened.

Energy

Public administration reforms. By the Government Decree 38 of 12.02.2021, the **State Committee for Industry, Energy and Subsoil Use of the KR was reorganized into the Ministry of Energy and Industry.**

According to Presidential Decree 425 of October 12, 2021 "On the structure and composition of the Cabinet of Ministers of the Kyrgyz Republic and the structure of the Presidential Administration of the Kyrgyz Republic", **the Ministry of Energy of the Kyrgyz Republic** was determined as part of the Kyrgyz CM. The Regulation of the Ministry of Energy and the management scheme was approved by the Decree of the Cabinet of Ministers 247 of November 15.

The President outlined **the main priorities of the energy policy** in the Kyrgyz Republic. The state administration bodies were given orders to ensure energy security of the country. In particular, **the Cabinet of Ministers** was ordered to (1) resolve the issue of importing the necessary amount of electricity from neighboring countries for 2021 and 2022 for trouble-free autumn-winter period; (2) increase power generation and capacity at the Bishkek CHP; (3) identify priority measures and sources of funding to accelerate the construction of Kambarata HPP-1; (4) take necessary measures to rehabilitate Toktogul and At-Bashi HPPs, modernize Uch-Kurgan HPP, timely implement investment projects to rehabilitate Oshelektro and Vostokelektro, improve power supply to the Arka massif of Batken province and CASA-1000; (5) develop and approve long-term measures to strengthen the energy potential of the KR; (6) develop and implement effective mechanisms for energy conservation and energy efficiency in the consumption of energy resources at all facilities, regardless of ownership; (7) consider the possibility of wider application of innovative technologies in the national energy sector through the full-scale implementation of an automated system for remote control of transmitted and consumed electricity; and, **the Ministry of Energy** was ordered to: (1) analyze and develop proposals to update strategic documents for development of alternative (renewable) energy sources and small hydropower plants; (2) develop proposals to increase capacity and update the state strategy for water management; (3) together with the ministries of justice, economy, and the Prosecutor General's Office, conduct an inventory of current energy legislation and possible gaps as well as contradictions in order to amend it in the liquidation part; (4) speed up development and adoption of technical norms and standards applicable to the energy sector.

Hydropower construction and modernization

There are seven functioning hydropower plants in Kyrgyzstan: Toktogul (1,200 MW), Kurpsai (800 MW), Tash-Kumyr (450 MW), Shamaldy-Sai (240 MW), Uch-Kurgan (180 MW), At-Bashi (40 MW) and one unit of Kambarata-2 (120 MW). The plants generate 3,030 MW of electricity in total. The project of launching the second unit of Kambarata-2 is under development, Toktogul and At-Bashi HPPs are under modernization, and projects for construction of Kambarata-1 and Kara-Kul HPP are developed as well.

The first phase of large-scale reconstruction of At-Bashi HPP has been completed with the replacement of 2 out of 4 hydrounits. The modernization will increase power generation by 30%. Further on, it is planned to upgrade distributors, power transformers, and protection and control systems.

The relevant agencies of Kyrgyzstan and Uzbekistan have signed an agreement on joint preparation of an investment project "Construction of Kambarata-1 on the Naryn river" (capacity – 1,860 MW, average annual power generation – 5.6 billion kWh, dam height – 256 m, reservoir volume – 5.4 million m^3, project cost – US$ 2.9 billion).

Small hydropower. According to the Ministry of Energy, the development of small hydropower in Kyrgyzstan is only 1.27% of the total volume, while the potential is about 1 billion kW. The Republic has 19 small hydropower plants, with the total capacity of 54 MW, and there is the potential to build more than 100 small hydropower plants. The appropriate legal framework for construction of small hydropower has been developed, RES entities are exempted from VAT on

[49] Within the framework of the FishEDU project "Development and strengthening of educational capacity in the field of fisheries and aquaculture in the Kyrgyz Republic", implemented jointly with the University of Eastern Finland with the financial support of the MFA of Finland under the Instrument for Institutional Cooperation of Higher Education Institutions Program

import of equipment, income tax (up to five years), and a guaranteed repayment of generated electricity has been determined, with the increasing factor for a preferential period of 10 years. The construction of small HPPs is ongoing in Batken, Jalal-Abad, Issyk-Kul and Osh provinces. The plans are for Chu and Talas provinces. The total capacity will be over 100 MW.

In Leilek district of Batken province a small hydropower plant is constructed on the bank of the Kozu-Baglan River (cost – US$ 7 million, capacity – 6 MW). Sokuluk HPP-2 (installed capacity – 2.4 MW; average annual power generation – 11.9 million kWh) was reconstructed and put into operation in Sokuluk district of Chu province. This will help to reduce grid losses and improve reliability and stability of power supply to consumers.

A capsule was laid in the downstream of Kirov reservoir (Talas province) for construction of Bala Saruu small hydropower plant (cost – US$ 22.9 million, three generators with the total capacity of 25 MW, average annual power generation – 92 million kWh), which would meet 20% of the province's electricity needs. Bala Saruu HPP will become the state engine of small hydropower in the country.

It is planned to build Orto-Tokoi, Sary-Dzhaz, Kara-Kul, and Tort-Kul small hydropower plants.

Regional and international cooperation. In order to preserve water resources of the Toktogul reservoir and ensure uninterrupted power supply to the population and economic sectors and trouble-free autumn-winter period 2021-2022:

Agreements[50] on exchange of electric power have been reached between the Kyrgyz Republic, Kazakhstan and Uzbekistan. According to the agreements, **Kazakhstan** will supply 900 million kWh of electric power to the Kyrgyz Republic (as of December 8, 616.4 million kWh has been received); **Uzbekistan** will provide 750 million kWh of electric power to Kyrgyzstan from March 2021 to April 2022. In turn, **Kyrgyzstan** will supply up to 300 million kWh of electric power to **Kazakhstan** and up to 250 million kWh to **Uzbekistan** within 3 years from 2021 to 2023 since June till August. It is planned to increase the load of Bishkek CHP in summer to 155 MW and up to 420 MW in winter, with annual generation of 2.5 billion kWh.

A branch of JSC "Hydroproject Institute" has been opened in Bishkek. The priority plans for cooperation include development of a master plan for hydropower development, studying of the current state of hydrostructures, examination of promising sections for hydropower, design of new facilities and advice to the Kyrgyz government on energy development.

Environment and Climate Change

Public administration reforms. According to the Decree of the Cabinet of Ministers (11 of 19.05.2021), **the State Committee on Ecology and Climate** was established on the basis of the State Agency of Environmental Protection under the Ministry of Emergency Situations. By Presidential Decree 425 of October 12, 2021 "On the structure and composition of the Cabinet of Ministers of the Kyrgyz Republic and the structure of the Presidential Administration of the Kyrgyz Republic", **the Ministry of Natural Resources, Ecology and Technical Supervision** – the legal successor of the State Committee on Ecology and Climate – was established. Regulations of the Ministry and the management structure were determined by Decree of the Cabinet of Ministers 263 of November 15, 2021.

By Decree of the Cabinet of Ministers 338 of 24.12.2021, **Regulations**[51] of several departments of the Ministry were approved: (1) Department of Geology and Subsoil Use, (2) Department of Biodiversity Conservation and Specially Protected Natural Areas, (3) Environmental Monitoring Department, (4) Department of State Regulation for Environmental Protection and Ecological Safety, (5) Environmental and Technical Supervision Service, (6) Climate Finance Center.

Latest developments in legislation. The Decree of the President "On measures for environmental security and climate resilience in the Kyrgyz Republic" (77 of 19.03.2021) sets the most important tasks of state agencies, local governments, business entities, community and other organizations to improve the natural environment, ensure sustainable use of natural resources and minimize the negative effects of climate change.

Projects. The project "Support to development of a green agriculture by local communities" (EU, €1.1 million, December 2020-June 2023, implemented by the Rural Development Foundation of Kyrgyzstan in cooperation with the Greek NGO "KMOP Social Action and Innovation Centre) has started. The aim of the project is to contribute to climate change mitigation through the development of a model of agricultural value chain that respects biodiversity, allows adapting the production to environmental challenges, increasing productivity, and fostering the creation of locally based agro-enterprises.

As a result, the following products were developed: (1) an online climate platform for knowledge and information on climate change[52], the main purpose of

[50] Protocol on Electricity Exchange between the Ministry of Energy and Industry of Kyrgyzstan, Ministry of Energy of Kazakhstan, Ministry of Ecology, Geology and Natural Resources of Kazakhstan (Protocol №103 of March 11, 2021, Nur-Sultan); Protocol on Mutual Power Supplies between the Ministry of Energy and Industry of Kyrgyzstan, Ministry of Energy of Uzbekistan, Ministry of Water Management of Uzbekistan (Protocol №75 of March 11, 2021, Tashkent)

[51] As amended by Decree of the Cabinet of Ministers "On Amending and Repealing Some Decisions of the Government of the Kyrgyz Republic and the Cabinet of Ministers of the Kyrgyz Republic" (№ 231of April 26, 2022)

[52] Within the framework of the UNCC: Learn project on climate change education in the Kyrgyz Republic, with the financial support of the Government of Switzerland, UNITAR, UNDP and implementation by the Climate Finance Center of Kyrgyzstan

which is to strengthen institutional capacity, provide information and create a dialogue platform on climate change and climate finance for all stakeholders; (2) a map of environmental incidents[53] that collects and displays landfills, air, water and soil pollution, deforestation, shooting of red listed animals (poaching), illegal fishing (poaching), radiation and toxic chemicals in 24/7/365 mode.

The environmental organization "MoveGreen" has launched an open environmental database to store and use the data for the purpose of publishing analysis, research and journalistic materials indirectly or directly related to environmental issues in Kyrgyzstan.

An agreement was signed between the Government of the Kyrgyz Republic and the UN World Food Programme on implementation of the project "Empowerment of vulnerable communities with low food security through climate services and diversification of climate-sensitive livelihoods in the Kyrgyz Republic" (US$ 8.6 million, GCF grant). The project will cover more than 100,000 vulnerable smallholder farmers in Naryn, Osh and Batken provinces and will build the capacities of the Kyrgyz Government, line ministries, local authorities and communities for adaptation in the food, nutrition and agricultural sectors. The technical assistance will be provided to the National Meteorological Service in establishing agrometeorological stations to collect, analyze and disseminate weather data among farmers.

As part of the EU's Multi-Annual Indicative Program for the Kyrgyz Republic for the period 2021-2027, grants will be allocated to finance projects in such areas as governance and digitization, human development, green and climate-resilient economy until 2024 .

On the implementation of UNDP environmental projects in Kyrgyzstan in 2021, see section "United Nations and its specialized agencies".

International cooperation. The 41st session of the UNESCO General Conference (November 23, Paris) unanimously adopted a resolution on "Strengthening mountain glacier monitoring and research" initiated by the KR and voiced by the Kyrgyz President at the 76th session of UNGA. The main objective of the resolution is strengthening international cooperation in mountain glacier and permafrost monitoring and research through joint actions to ensure a safe and stable environment for future generations based on the principles of sustainable development and the 2030 Agenda.

Emergencies and Natural Disasters

In 2021, 40 emergencies were registered. Half of them were mudflows, floods and related waterlogging and coastal erosion. The damage caused by natural disasters in the republic amounted to more than 1.3 billion KGS. In particular, as a result of heavy rains in spring and summer, houses were submerged, roadbeds were destroyed, water pipes and bridges were damaged in Osh, Jalal-Abad, Talas, Issyk-Kul and Batken provinces. In August in Issyk-Kul oblast, villages in Jety-Oguz and Ton districts were damaged; in Karakol city, water streams submerged several houses and household plots, washed out roads, destroyed bridges and flooded the zoo.

Projects. The regional project "Reducing vulnerabilities of populations in the Central Asia region from glacier lake outburst floods in a changing climate" (GLOFCA, US$ 6.5 million, UNESCO-Adaptation Fund, 2021-2026) was launched. The project aims to strengthen adaptation in Central Asia by reducing social risks and vulnerability. An inception conference of the project was organized by the UNESCO Office in Almaty on April 29, 2021.

Loan and Grant Agreements have been signed between the Kyrgyz Republic and ADB for a total amount of US$ 39 million for the project "Landslide Risk Management in the Kyrgyz Republic" aimed at building country's capacity to control and reduce landslide risks. Implementation period is 6 years.

Preventive measures. An Action Plan on Cooperation in Emergency Prevention and Response was signed between the Ministry of Emergency Situations of the Kyrgyz Republic and the Ministry of Defense of Turkmenistan for 2021-2025.

FAO transferred server equipment to the Kyrgyz Ministry of Emergency Situations[54] for Central Database of the Unified System of Integrated Emergency Monitoring and Forecasting at the national level and for tracking current state-of-affairs of hazardous natural processes.

Foreign Policy and International Cooperation

Working and official visits. In 2021, the President of the Kyrgyz Republic made state and working visits to the Russian Federation (February, May, December), Uzbekistan and Kazakhstan (March), Turkey, Turkmenistan, and Tajikistan (June), Turkmenistan (August), Tajikistan (September), Turkey (November), and the

[53] As part of the "Ecomap" project by the EcoMiR Public Foundation

[54] Regulations on the Unified System of Integrated Emergency Monitoring and Forecasting in the Kyrgyz Republic were approved by the Government Resolution 569 of 23.10.2019

United Kingdom of Great Britain and Northern Ireland (November). The President of Tatarstan paid an official visit to the country in November.

In the course of the year, **the president of the Kyrgyz Republic** had multiple meetings with the heads of governments (Armenia, Hungary), ambassadors (Saudi Arabia, Turkey, Qatar, etc.), foreign ministers (Uzbekistan, Turkey, Iran, Hungary, Austria), and heads of international organizations (WHO, OSCE, CSTO, and UN among many others).

Videoconferences were held with the UNESCO Director General (April), President of the EBRD (July), UNESCO Regional Representative (September), the President of the Senate of Uzbekistan (September), Executive Director of the GCF (September), EU Special Representative for Central Asia and EU Special Representative for Human Rights (October), Director for Global Sustainability of Facebook (Meta) (November), the Secretary General of the CCTS (November).

In 2021, **telephone talks were held with Presidents** of Kazakhstan, Turkey, Uzbekistan, Tajikistan, Russian Federation, Afghanistan, Turkmenistan, Azerbaijan, China, etc.

Among the priorities of the Kyrgyz Republic's foreign policy in 2021 were: strengthening of interstate relations with neighboring countries, development of effective political and economic cooperation with EU countries; development of multifaceted relations with Tajikistan (including on delimitation and demarcation of the Kyrgyz-Tajik state border and water and energy cooperation); cooperation with CSTO member states; development and strengthening of bilateral cooperation between the Kyrgyz Republic and China in the fight against crime, terrorism and extremism, ensuring security in the region; continuation of cooperation within the UN, in accordance with the SDGs and major international programs to which the country is a party; further fruitful and long-term cooperation within the framework of the CCTS, TURKPA, Organization of Turkic culture TURKSOY and International Turkic Academy; development and strengthening of Kyrgyz-Turkmen political dialogue in the sphere of trade and economic relations, combating of the COVID-19 pandemic and other challenges of our time, such as terrorism and extremism, illegal migration and human trafficking, illegal arms trade, drug trafficking and cybersecurity, etc.

Development of alliances and strategic partnerships. Joint communiqués on the establishment of diplomatic relations were signed with Antigua and Barbuda (June 3) and the Republic of Palau (October 7).

Turkey. The plans were set to increase the trade between the Kyrgyz Republic and Turkey up to US$ 1 billion. Eight documents between Kyrgyzstan and Turkey were signed at the international level in the field of health, agriculture, culture, sports, youth policy and copyright protection as part of the 5th meeting of the Supreme Council of Strategic Cooperation. It was agreed to open the Kyrgyz-Turkish Development Fund to support Kyrgyz businessmen and Turkish investors. Also, the Turkish side expressed its desire to provide military and technical assistance to the Ministry of Defense of Kyrgyzstan on a grant basis. A number of memorandums were signed as part of the joint business forum.

The 10th meeting of the Kyrgyz-Turkish Joint Intergovernmental Commission on Economic Cooperation was held. A Memorandum of Understanding on Environmental Cooperation was signed, as well as the final Protocol and Action Plan on Economic Cooperation (September 10, Bishkek).

Hungary. The national governments have ratified an Agreement on the Hungarian-Kyrgyz Development Fund. It is assumed that the Fund, with an authorized capital of US$ 16 million (to be increased subsequently to US$ 50 million), will finance self-sustaining projects in the priority economic sectors of Kyrgyzstan by providing loans, participation in capital and other financial instruments. For further strengthening relations with Hungary, the Embassy of Kyrgyzstan was opened in Budapest. The 1st meeting of the Kyrgyz-Hungarian Strategic Council was held on October 4 in Budapest.

Uzbekistan. An agreement establishing the Uzbek-Kyrgyz Development Fund has been ratified. It is assumed that the Fund, with an authorized capital of US$ 50 million (to be increased subsequently to US$ 200 million) will finance self-sustaining projects in the priority economic sectors of Kyrgyzstan by providing loans, equity and other financial instruments in relations with economic entities registered and operating in the territory of Kyrgyzstan.

UN. Kyrgyzstan has offered its candidature for the UN Human Rights Council for 2023-2025 and as a non-permanent member of the UN Security Council for 2027-2028. At the initiative of the Kyrgyz Republic and with the support of more than 93 member states, the UNGA declared 2022 the "International Year of Sustainable Mountain Development" by unanimously adopting a resolution of the same name (December 16).

Initiatives put forward by the President of the Kyrgyz Republic. The Kyrgyz President proposed (1) to host the headquarters of the Turkic Investment Fund in Bishkek at the 8th Summit of the Cooperation Council of Turkic Speaking States (November 12); (2) on behalf of the Friends of Mountain Countries, declare 2022 the "International Year of Mountains", approve a five-year program for sustainable development of mountain areas, and convene a Global Summit "Bishkek+25" in 2027 during the UNGA (September 21).

The President of the Kyrgyz Republic took part in the Fourth Asia-Pacific Water Summit "Water and Sus-

tainable Development – New Generation and Best Practices" (April), the 5th meeting of the Supreme Council for Strategic Cooperation between Kyrgyzstan and Turkey (June), the Consultative Meeting of the Heads of Central Asia (August), the UNGA 76th session (September), the 15th Summit of the Economic Cooperation Organization (November), the Summit of the Cooperation Council of Turkic Speaking States (November), the World Leaders Summit of the 26th Conference of the Parties to the UN Framework Convention on Climate Change (November), First Economic Forum "European Union – Central Asia" (November), and informal meeting of CIS Heads of State (December).

The following events were held in a videoconference format: 14th Summit of Economic Cooperation Organization (March); Turkic Council Meeting (March); informal summit of the leaders of the CIS countries (March); 77th UNESCAP session (April); meeting of the Supreme Eurasian Economic Council (May, October, December); extraordinary session of the CSTO Collective Security Council devoted to the situation in Afghanistan (August); anniversary Council meeting of the CIS Heads of State (October); 15th meeting of the Conference of Parties to the Convention on Biological Diversity (COP-15) (October).

Among the important international events, where the Kyrgyz Republic was represented in 2021, were: the 16th Meeting of the Secretaries of Security Councils of SCO Member States (June, Dushanbe); the Kyrgyz-Turkmen Economic Forum (June, Ashgabat); a joint meeting of the Council of Foreign Ministers, the Council of Defense Ministers and the Committee of the Secretaries of Security Councils of the CSTO (September, Dushanbe); the SCO Summit (September, Dushanbe); First International Economic Forum "Central Asia – European Union" (November, Bishkek); Meeting of the Secretaries of Security Councils of CIS Member States (November, Moscow); Meeting of the Third Regional Dialogue on the situation in Afghanistan (November, New Delhi); International Kazakh-Kyrgyz-Alashtan Scientific Conference (December, Almaty).

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http://barometr.kg;

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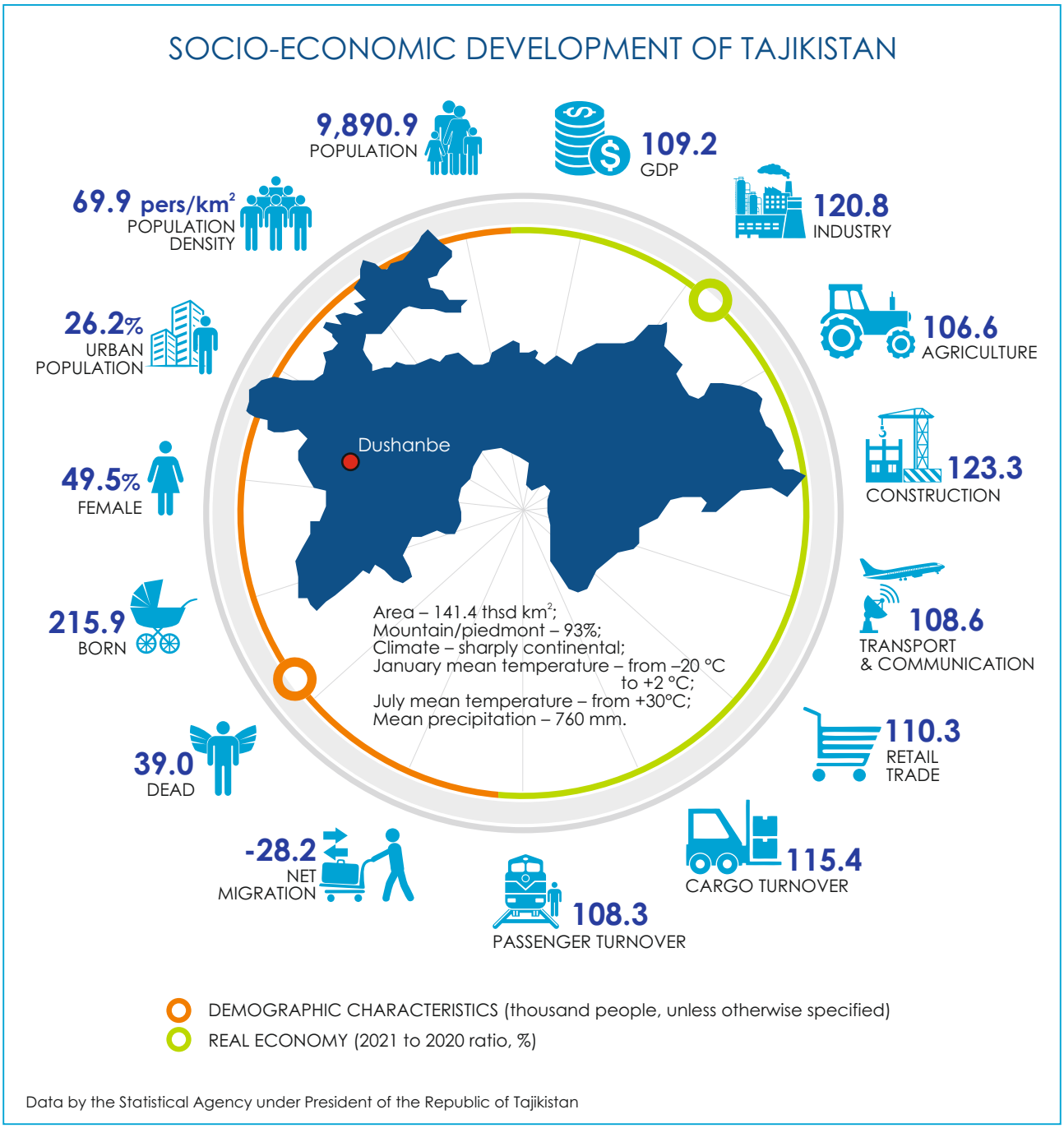
5.3. Tajikistan



Data by the Statistical Agency under President of the Republic of Tajikistan

Water Sector

Water resources. Tajikistan has got water resources from glaciers, rivers, lakes, reservoirs and groundwater. There are 14,509 glaciers with the total glaciation area of 11,146 km^2 (approx. 8% of the country's area) and the total glacial volume of about 845 km^3. 947 rivers stretching to more than 28,500 km flow across the country. The main watercourses are the Amu Darya and the Syr Darya and their tributaries. The average annual runoff generated in Tajikistan is 64 km^3/year (62.9 km^3/year in the Amu Darya basin and 1.1 km^3/year in the Syr Darya basin) or 55.4% of the average annual surface runoff in the Aral Sea Basin. Tajikistan possesses about 1,300 lakes covering 705 km^2. The lakes contain over 46.3 km^3 of water, including 20 km^3 of freshwater. The potential groundwater stock is 18.7 m^3/year, while usable groundwater resources are estimated at 2.8 km^3/year.

Latest developments in legislation. The resolution (PPRT 26 of February 25) was adopted on the procedure of development, coordination and approval of the reservoir use rules, the list of which had been determined in Article 25 of the Water Code of Tajikistan. The Ministry of Energy and Water Resources of Tajikistan is set responsible for the development of these rules.

Projects. ADB approved grants (1) for modernization of the Yavan irrigation and drainage systems in the lower basin of the Vakhsh River (US$ 30 million). Technical assistance (US$ 1 million) is also envisaged to improve operation, maintenance, and financial management in the irrigation sector. The project will help to increase agricultural productivity, improve water use, and empower women in land and water management; (2) to improve climate resilience in the Panj River Basin (US$ 1.3 million). The River Basin Management Plan will be complemented by climate risk considerations, taking into account possible climate mitigation at the local level. This will support future planning, development and sustainable management of water resources.

The Government of Tajikistan and the ADB signed a grant agreement under the "Water Resources Management in the Panj River Basin Project, Second Additional Financing"[55] for US$ 15 million (PMN MO RT 355 of April 7). Provisions have been made for the construction and commissioning of a hydraulic structure for cyclic flushing of sediments (silt) at the Chubek canal's dam in Khamadoni district. As a result, the water management system and irrigation situation in the region will be improved and agricultural production growth will be ensured in the Panj River Basin.

USAID has launched a new water and vulnerable environment project to strengthen regional cooperation in transboundary water management in the Syr Darya and Amu Darya River Basins.

Regional cooperation. Given the complicated water-related situation in the Syr Darya River Basin, the Ministry of Energy and Water Resources of Tajikistan and the Ministry of Ecology, Geology and Naturlal Resources of Kazakhstan have reached an agreement to supply additional 315 million m^3 of water from the Bakhri Tojik reservoir for the needs of Turkestan and Kyzylorda provinces during the period from June to August. In this context, Tajikistan has increased water delivery to the Kazakh part of the transboundary Dostyk canal from 80 to 100 m^3/sec.

Drinking Water Supply

Latest developments in legislation. The following Governmental Resolutions have been approved in 2021: (1) "On the procedure for forming and use of financial, material and technical reserves for rehabilitation of water supply and sanitation system adversely affected by emergency situations" (PPRT 502 of November 25); (2) "On the Order of state control in the field of drinking water supply and sanitation system", which determines the procedure, main tasks and the competence of the authorized state agency in this field (PPRT 519 of December 3).

Projects and programs. The project agreement was signed between the GUP "Housing and Communal Services", GP "Water supply and wastewater system of Kulob" and EBRD on the project " Kulob Water and Wastewater Project" (total cost – €15 million, of which €7.5 million – EBRD credit and €7.5 million – EU grant for 2021-2024). The aim of the project is to construct and rehabilitate existing reservoirs, improve drinking water quality and decontaminate and provide safe drinking water to population in the Kulob city.

As part of the Japanese program "Grant Assistance for Grass-Roots Human Security Projects" (US$ 86.1 thousand), a project was implemented for the improvement of drinking water quality in five villages of Rudaki district. As a result, 7,000 people have gained access to safe drinking water.

New water mains were commissioned in villages of Tajikistan with the support of the Aga Khan Habitat Agency, EBRD, Caritas Germany, USAID and Aga Khan Foundation. Within the framework of the International Decade for Action "Water for Sustainable Development, 2018-2028", the first stage of new water main has been completed for the rural community in Oksu Dangara district.

Agriculture

Agricultural production reached 39.7 billion somoni in 2021. This is 6.6% higher than in 2020. The production growth rate in crop growing and livestock sectors was 5.9% and 8.4%, respectively.

Gross Domestic Product (GDP) per capita was over 10,052 somoni (US$ 890) by the end of 2021. GDP amounted to almost 99 billion somoni (over US$ 8.7 billion).

Agricultural Export In 2021, Tajikistan exported 208.9 thousand tons of agricultural products for US$ 36.6 million (US$ 16.6 million more than in 2020). The key export commodities were onion (95.8 thousand t), grapes (51.2 thousand t), dried fruits (42.4 thousand t), peanut (2.4 thousand t), plum (2.6 thousand t), fresh apricot (2.15 thousand t), persimmon (1.6 thousand t), peach (1.4 thousand t), cherry and bird cherry (1.25 thousand t). The agricultural products were exported mainly to Russia, Kazakhstan, China and EU countries.

Latest developments in legislation. The "State Program for development of the Tajik Academy of Agricultural Sciences for 2021-2025" approved by Government Resolution (PP RT 171 of April 30) aims at improving the quality and effectiveness of research, promoting and applying research results in practice, training and strengthening cooperation with domestic and foreign scientific and educational institutions.

New appointments. A. Satorov was appointed Director of the Public Agency "Agricultural Entrepreneurship Development" (PP RT 471 of November 5).

International cooperation and projects. In 2021, the Ministry of Agriculture of Tajikistan signed MoUs with

[55] Project Report for January-June https://www.alri.tj/storage/WMD1HUhcRpxBG9BLcoVB.pdf

the Ministry of Agriculture of Iran and with the Ministry of Agriculture of Palestine on agricultural cooperation.

The WB approved grant financing of US$ 58 million for the Strengthening Resilience of the Agriculture Sector Project aimed at strengthening the foundations of sustainable agriculture in order to accelerate its diversification.

JICA and FAO launched a pilot project to provide small farmers with access to critical agricultural inputs and extension services to improve their livelihoods by increasing crop yields and promoting market-oriented agriculture.

FAO, in close collaboration with the MoA of Tajikistan, handed over seeds of white and golden beans, maize, carrot and cucumber to flood-affected farmers in the southwest of the country. The initiative reached over 787 households and about 312 dehkan farms that cultivate 850 ha of arable area in Kulob, Vakhsh and Jom districts, Khatlon province.

Energy

Energy production and export. In 2021, more than 20.6 billion kWh of electricity were produced. This is 853.8 million kWh (4.3%) more than in 2020. Thermal energy production was 1.2 million Gcal or 46.7 thousand Gcal (4%) more than in previous year. Electricity exports reached almost 2.5 billion kWh or 911.6 million kWh more than in 2020. In just eleven months, the country raised more than US$ 93.5 million through energy supplies to neighboring countries. This is 1.8 times more compared to the same period in 2020.

Latest developments in legislation. The following legal documents were approved in 2021 among others: (1) "Action plan for the improvement of energy investment climate in Tajikistan for 2021-2023" (PP RT 252 of June 26); (2) "Regulation on the State Energy Supervision Service" (PP RT 441 of October 22).

New appointments. A.A. Kurbonzoda was dismissed from the position of the Head of the State Energy Supervision Service ar the MEWR of Tajikistan (PP RT 63 of March 5) and G.H. Ubaidullozoda was appointed the Head of the State Energy Supervision Service (PP RT 70 of March 5).

Projects. Grant agreements between Tajikistan and ADB on the project "Energy Sector Development Program" were ratified by Resolutions 334 and 335 of March 3, 2021.

The WB approved an additional financing of US$ 10 million to the project aimed at providing access to electricity to remote mountainous areas in southern Tajikistan and supporting efforts to export electricity to Afghanistan. Grant assistance has been provided from IDA to help build 63 km of 110-kV transmission lines connecting the Khorog city with Kozideh village in Ish-Kashim region.

A new five-year USAID Power Central Asia program has been launched (US$ 39 million) to assist the CA countries in achieving their national energy priorities. In addition, the Program is aimed at gaining economic benefits from cross-border energy trade and improving energy security through the greater regional integration.

EBRD and ADB have provided a US$ 110 million financing package (US$ 25 million – EBRD loan and US$ 85 million – ADB grant) to improve performance of the state-owned power company "Shabakahoi Taksimoti Bark". The project is expected to reduce the company's energy losses by about 30 GWh and cut CO_2 emissions by almost 2 thousand t per year.

Hydropower modernization

Nurek HPP. The Government of Tajikistan ratified the Agreement on financing the second phase of the Nurek Rehabilitation Project (US$ 148.6 million, implementation period 2024-2028). It is planned to reconstruct the remaining 6 units and renovate hydroturbine units, replace high-voltage transformers, switchgears and loading mechanisms, etc. The WB Board of Directors approved additional financing for the second phase in the form of a US$ 65-million grant.

Hydropower construction

Rogun HPP. By early June, 2.92 billion kWh were generated at HPP (1.3 billion kWh in 2020). The actual operating capacity of each hydroelectric unit was 94.2 MW. It is planned to bring the installed capacity of each unit up to the design value of 600 MW after their thorough reconstruction.

Construction of upper and lower parts of the dam has been continued. The dam height of the first stage was raised to 1,120 m above sea level.

OJSC "Tajikgidroelektromontazh" has become a subcontractor for the "Construction of the Right Bank Structures of the Rogun HPP" by Lot № 3. The contract is valued at US$ 1.64 billion with the duration for 13 years.

The Government of Tajikistan plans to allocate the equivalent of US$ 221 million from the state budget in 2022 to continue construction of the Rogun HPP. In December, a round table was organized by the Government and invited about 30 international organizations and foundations to attract external financing.

HPP on the Zeravshan River. An agreement was signed between the Governments of Uzbekistan and Tajikistan on hydropower construction in the Zaraf-shan River Basin. The first phase will involve the construction of 140-MW Yavan HPP at a projected cost of US$ 282 million. and the plant will have an average production of 800 million kWh per year. The second phase would explore the possibility of constructing 135-MW Fandarya HPP at US$ 270 million to produce 600 kWh per year. New plants are to generate up to 1.4 billion kWh of energy for the needs of Uzbekistan. It is also planned to supply the generated hydropower to other regions in Uzbekistan and Tajikistan on a parity basis.

CASA-1000. Tajikistan plans to sell 75 billion kWh within 15 years under the CASA-1000. The changes made earlier in the project would enable Tajikistan to increase power exports to Pakistan and Afghanistan. Based on the changes in the construction of 500-kV transmission line from Sangtuda (Tajikistan) to Peshawar (Pakistan), Pakistan will receive electricity directly from Tajikistan. 300 MW from the Geran substation will be delivered to Pul-i-Khumri (Afghanistan) through a 220-kV transmission line. Implementation of the Tajik part of the project was scheduled until the end of 2021. In December, it was reported that the deadline for import of equipment and auxiliary tools was extended until July 31, 2023.

The CASA-1000 Community Support Project was launched to improve socio-economic infrastructure in the areas adjacent to the route of the international transmission line. The project is to be implemented in 65 villages, 22 communities, 12 districts and 50 border mahallas. It is expected that more than 200 thousand people will benefit from this project.

Climate Change, Glaciers and Environmental Protection

Latest developments in legislation. By the Government Resolution "On the Committee for Environmental Protection under the Government of the Republic of Tajikistan", the regulations, central bodies and management structure and composition of the Committee were approved (PP RT 357 of September 9).

New appointments. D.S. Dustzoda was dismissed from position of the Director of the Agency for Hydrometeorology at the Committee for Environmental Protection (PP RT 278 of July 5) and A.H. Kurbonzoda was appointed the Director (PP RT 282 of July 5).

Projects. Climate Adaptation and Mitigation Program for Aral Sea Basin: Tajikistan and the World Bank signed an agreement on additional financing from GCF funds (US$ 9 million); seven automatic weather stations were installed in Varzob district, Roghun and Tursunzade towns, Shamsiddin Shohin, Dangara, and Temurmalik districts in Khatlon province and Darvaz district of Gorno-Badakhshan Autonomous province.

The project "An integrated landscape approach to enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan" (UNDP, Committee for Environmental Protection of Tajikistan, with financial support of the Adaptation Fund, Kofarnigan River Basin): an inception workshop was organized to give an overview of the project, to highlight the economic benefits, while reducing the environmental load (March 17).

New projects were launched: (1) "Participatory mapping in Tajikistan"[56] on applying GIS to improve access to public information. The project is implemented by French cartographic NGO "CartONG" with the support of GIZ and in cooperation with the Tajik ecological NGO "Small Earth"; (2) US$ 2.7 million project to boost climate change resilience in Tajikistan through National Adaptation Plan. It will be implemented during 3 years by UNDP jointly with the Committee for Environmental Protection under the Government of Tajikistan and with support of GCF.

Memorandum of Understanding was approved between the Committee for Environmental Protection under the Government of Tajikistan and the National Environmental Protection Authority of the Government of the Islamic Republic of Afghanistan on cooperation in the field of environmental protection (PP 87 of March 27). A Memorandum of Cooperation was signed between the Forestry Department of Sughd province, Executive Committee of Logoisk district and Forestry Production Association of Minsk province to strengthen cooperation in the field of forest restoration, forest product processing, development of bee-farming, ecological tourism, exchange of information and experience.

Events. The following events were held: (1) a series of trainings on climate diplomacy for the national delegation from Tajikistan as part of preparation to COP26 (May 25-27, UNDP); (2) Republican scientific conference "Biodiversity of Pamir mountain ecosystems in the context of climate change" (September 22-23, NAST, Pamir Biological Institute named after Kh. H. Yusufbekov, Authority of Gorno-Badakhshan Autonomous province).

Emergencies and natural disasters

New appointments. H.L. Latifzoda, I.N. Ibrohimzoda, and S.U. Isozoda were appointed the Deputy Chairmen of the Committee for Emergency Situations and Civil Defense under the Government of Tajikistan.

Emergencies. In 2021, 358 emergencies of natural origin, including 52 natural disasters, were registered (213 – in 2020). The population and national economy have suffered serious material losses estimated at 142 million somoni (over US$ 12.566 million); 2.4 times greater than in 2020. The Committee for Emergency Situations and Civil Defense carried out 758 operations (781 in 2020) and rescued 188 citizens.

Preventive measures. The warning and monitoring system of highland Lake Sarez has been updated with the financial support from ADB to track the lake's hydrological and geological activity and transmit the data every hour.

A dam deformation monitoring system based on the Chinese Beidou satellite navigation system has been put into operation at the Usoi Dam to transmit timely warnings to Dushanbe and the National Time Service Center in Xi'an (northwest China).

[56] Is a part of the regional project "Technology-based Adaptation to Climate Change in Rural Tajikistan and Kyrgyzstan"

The modern DMRL-C-5 radar designed to protect crops, orchards, vineyards and other crops from hail was put into operation in Gissar[57].

Capacity building. The following trainings were conducted: (1) fourth phase of the training course for 16 Committee's rescuers (January) and 16-day interactive course for rescue divers (June-July)[58]; (2) a stakeholder workshop on disaster risk reduction (DRR), which presented the system approach to DRR, approaches and methods to build national capacity and identified areas for improvement in DRR management (May)[59].

International cooperation in disaster risk reduction. As a part of cooperation of the Committee for Emergency Situations and Civil Defense under the Government of Tajikistan: (1) with OSCE Program Office in Dushanbe and the "National Disaster Risk Management Project" (ADB), the Committee was provided with two cars and 50 modern portable radio stations (February 5); (2) with UNICEF in Tajikistan, a joint "Plan for Strengthening Emergency Preparedness and Response, Promoting Disaster Risk Reduction, and Child-Friendly Climate Change Adaptation in Tajikistan for 2021-2022" was signed (June 18).

Foreign Policy and International Cooperation

Working and official visits. The President of Tajikistan Emomali Rahmon made official and working visits to the Russian Federation (May and December), Belgium (October), the Islamic Republic of Pakistan (June), France (October), and Turkmenistan (August and November). The Chairman of the Majlisi Milli Majlisi Oli of Tajikistan, Rustami Emomali paid an official visit to Kazakhstan in September 2021.

The Minister of Foreign Affairs of Tajikistan visited the Russian Federation, Uzbekistan, China, the Republic of India, and the United States. The Minister met with his counterparts from other countries, including Russia, Belarus, Azerbaijan, Armenia, Turkey, Saudi Arabia (online), Kuwait, China, Japan (online), Korea, India, Germany, Austria, Hungary, Portugal, Sweden, Finland, Norway and Italy. The priority areas of bilateral cooperation in economy, trade, energy, agriculture, water management and other sectors have been discussed.

Development of alliances and strategic partnerships. Relations and cooperation with the CIS and Central Asia countries in economic, commercial, cultural and humanitarian fields are strengthened. 19 bilateral cooperation documents had been signed and a wide range of issues on regional and international agenda has been addressed during the official visit of the President Emomali Rakhmon to Turkmenistan (August 3-6). See "Bilateral Water Cooperation between the Countries of Central Asia" and "Central Asia Awards in Water-Related Sectors". During the visit, the President participated in the Consultative Meeting of CA Heads of State (August 6). The President Emomali Rahmon noted that trade, economy, investment, agriculture, industries, transport and communication infrastructure, rational and efficient water use are among important areas of cooperation in Central Asia. He drew the attention of the Central Asian Heads of State to the global problems of climate change, melting of glaciers, disaster risk reduction and impact of COVID.

Dushanbe hosted the following conferences in 2021: (1) Ninth Ministerial Conference "Heart of Asia – Istanbul Process"[60] inaugurated by Presidents of Tajikistan and Afghanistan. Finally, the Dushanbe Declaration defining the areas of joint cooperation was adopted (March 30); (2) the 14th Meeting of the Foreign Ministers of the Central Asia and the Republic of Korea Cooperation Forum. A Joint Statement of Foreign Ministers was adopted at the end of the meeting (November 30).

Tajikistan participated in the (1) CIS meetings: the Council of Foreign Ministers (April 2, Moscow; October 14, Minsk), the Council of CIS Heads of State (October 15, online), and informal summit of CIS Heads of State (December 28, St. Petersburg); (2) ECO meetings: 4th Business Forum of the ECO Member States (26 November, Ashgabat), 25th Meeting of the ECO Council of Ministers (November 27, Ashgabat), 15th ECO Summit (November 28, Ashgabat).

Foreign investments. By January 1, 2022, 78 projects totaling 42 billion somoni (US$ 3.7 billion) have been under implementation (39 grants, 7 loans and 32 combined loan-grant).

In 2021, inflow of foreign capital to the republic amounted to US$ 718.3 million; this is US$ 289.9 million (1.7

[57] Within the framework of the National Disaster Risk Management Project supported by ADB

[58] As part of the EU Project in Tajikistan, with the financial support of the OSCE Program Office in Dushanbe

[59] As part of the European Union - funded Strengthening Financial Resilience & Accelerating Risk Reduction Program in Central Asia

[60] The Heart of Asia-Istanbul Process (CA-Istanbul Process) is an initiative of the Republic of Afghanistan and the Republic of Turkey, which was officially launched at a conference hosted by Turkey in Istanbul on 2 November 2011. It aims to enhance regional security, economic and political cooperation centered on Afghanistan through dialogue and a set of confidence-building measures. The initiative includes 15 countries: Afghanistan, Azerbaijan, China, India, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Russia, Saudi Arabia, Tajikistan, Turkey, Turkmenistan, Uzbekistan and the United Arab Emirates.

times) more than in 2020. US$ 342.2 million of the total foreign investments are direct investments allocated to the mining sector (56.9%), manufacturing (9.9%), construction (2.1%) and other sectors (31.1%).

For further improvement of the investment climate in the country, the International Forum "Dushanbe-Invest 2021" was organized on July 12-16. During the Forum, 11 contracts for US$ 450 million in total were signed for joint ventures in textile and pharmaceutical industries, energy and other spheres.

Chairmanship in international organizations. Tajikistan was the chairman country in SCO over the period of 2020-2021. The resolution on "Cooperation between the United Nations and the Shanghai Cooperation Organization"[61] was adopted by consensus at the 75th UNGA session. The resolution was drafted by Tajikistan in co-authorship with the SCO member states as well as with the Republics of Azerbaijan, Belarus, Kiribati, Costa Rica and the Kingdom of Cambodia (March 25).

The following events were held under the chairmanship of Tajikistan in 2021: (1) regular meeting of the Council of National Coordinators of the SCO member states (April 27-30, Tashkent); (2) 16th meeting of Secretaries of the SCO Security Council (June 23); (3) meeting of the Council of Foreign Ministers of the SCO member states (July 13-14); (4) CSTO session (September 16); (5) high-level meeting of the SCO Heads of State, followed by adoption of the Dushanbe Declaration of the SCO (September 17).

As part of **chairmanship in IFAS (2019-2022)**[62], the following meetings were held: (1) meeting of the IFAS Board, where the draft Work Plan of EC IFAS, ASBP-4, and issues of the Working Group on institutional and legal improvement of IFAS were considered (June 29, Dushanbe); (2) Central Asian sub-regional preparatory conference for the 9th World Water Forum "Water Security for Peace and Development" (October 19-20, Dushanbe), see "International Fund for Saving the Aral Sea".

Promotion of the national interests and reinforcement of the country's image. Currently, the 4th initiative of Tajikistan – the International Decade for Action "Water for Sustainable Development, 2018-2028"[63] is implemented at the national, regional and global levels. It raises the issues of global climate change and the need for joint efforts to overcome effects and impacts of climate change. The President Emomali Rahmon participated and spoke at (1) the first meeting of the High-Level Panel on Water and Climate and proposed to declare 2025 as the "International Year of Glacier Protection" and set the date of the "World Glacier Protection Day" (March 3); (2) the high-level meeting on "Implementing the 2030 Agenda for Water" March 18, New York, online); (3) the 77th ESCAP session (April 26-29); (4) the 5th UN Special Session on Water and Natural Disasters (June 25, online); (5) the UN High-Level Thematic Debate "Implementing Action on Climate" (October 27); (6) the UN Framework Convention on Climate Change High-Level Panel Briefing on Water and Climate (November 2).

The Permanent representation of Tajikistan to the UN in cooperation with the Permanent Missions of Hungary, Pakistan, Nepal and Russia to the UN, as well as the UN Office for Economic and Social Affairs, the UN Environment Programme, the World Meteorological Organization, the UN Institute for Water Resources and the UNESCO Intergovernmental Programme on Hydrology organized a side event during the High Level Week of the 76th UN GA session on "How the change in water availability due to melting glaciers and snow will affect our society". The main topics were climate change impact, glacier protection from rapid melting, and relationship between climate and water availability (September 22).

While speaking at the general debate of the 76th UNGA session, the President Emomali Rahmon stressed that climate change challenges had been causing a serious obstacle on the way to achieve SDGs and noted that more than 1,000 of 13,000 glaciers in the mountains of Tajikistan had completely melted. He also noted that Tajikistan would host a high-level International Conference to review the International Decade for Action "Water for Sustainable Development" in 2022 (September 24).

The Minister of Foreign Affairs of Tajikistan, S. Mukhriddin participated at the special session dedicated to SDG-6 "Clean Water and Sanitation" during the High-Level Political Forum on Sustainable Development 2021/ HLPF2021 (July 9, online).

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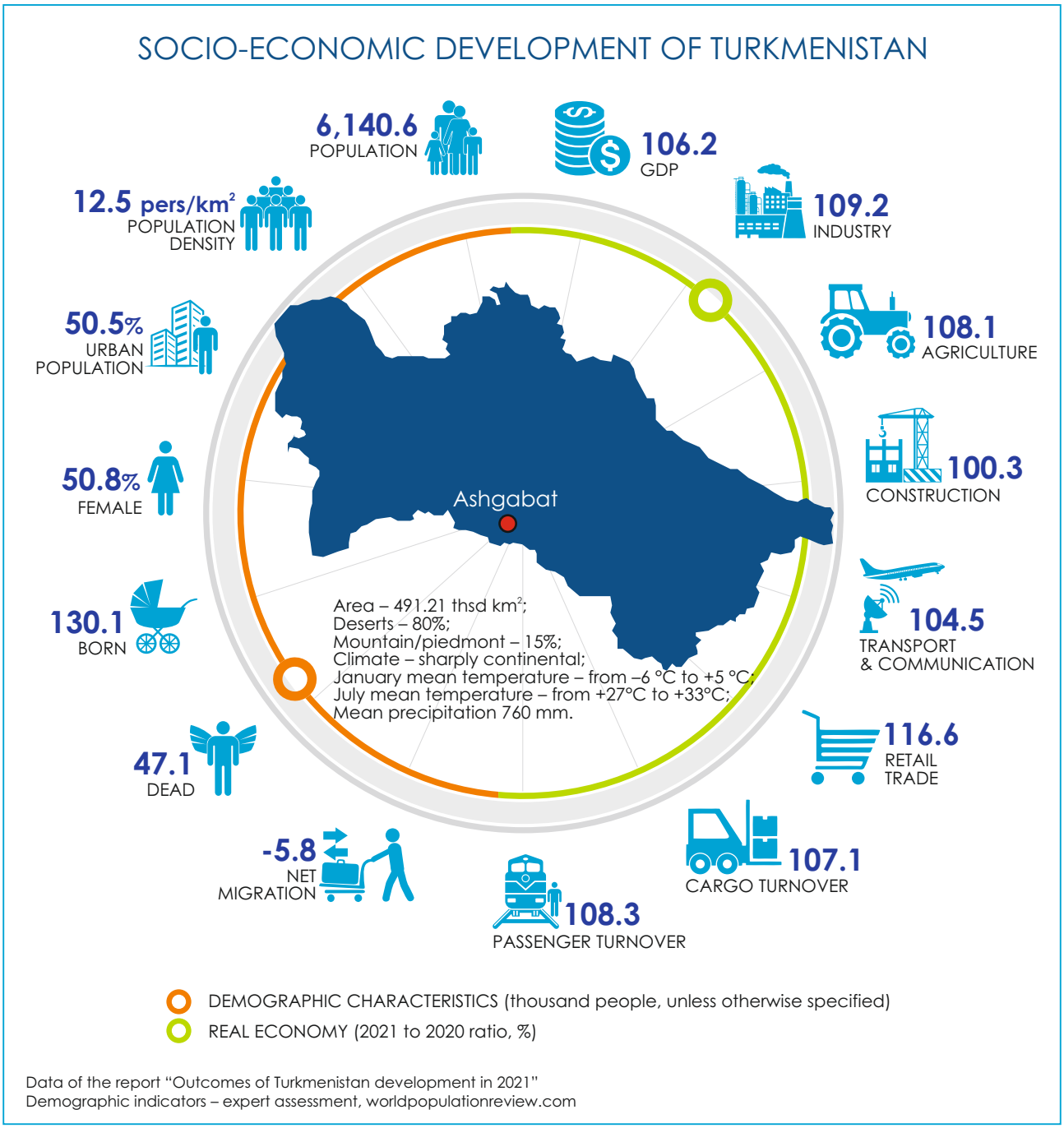
[61] 58th plenary meeting
[62] Decision of the 2nd Consultative Meeting of the Heads of Central Asian States (November 29)
[63] Resolution 71/222 of 21.12.2016, 71st UNGA session

5.4. Turkmenistan



Data of the report "Outcomes of Turkmenistan development in 2021"
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Water sector

Water resources. The total volume of water resources of Turkmenistan is comprised of the surface runoff of the Amu Darya (88%), Murgab (6.5%), Tedjen (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 groundwater resources and collector-drainage waters. All large rivers of Turkmenistan are transboundary, i.e. 95% of surface water in the water balance of Turkmenistan is formed outside the country.

The efforts under the **Socio-Economic Development Program for 2019-2025**, which envisaged measures for water saving, augmentation of water stock, prevention of salinization and reclamation of agricultural land, were continued.

A 18-million m^3 reservoir was put into operation at the 1096-km of the Karakum River in Bereket district, Balkan province. The total extention of the dam and ponds is more than 7.8 km. Commissioning of the new waterworks facility with a capacity of 10 m^3/s, together with road and energy infrastructure will improve the reliability of irrigation water supply in the district (August 11).

PO "Karakumderyagurlushyk" has started construction of a new reservoir (design capacity of 4 billion m^3)

in Lebap province. Construction of the feeder canal from the Amu Darya River 14 km deep into the territory to the west was started in 2021. Water will be diverted from the river by gravity.

Water meters have been installed at 13 points along the Murgap River in Mary province. The automated water monitoring system allows controling level and flow rate in real time.

JSC "Miwe" has been constructing a large-scale diversion structure to catch and collect mudflow from the Kopetdag mountains in Kaakhki distict, Akhal province for irrigation purposes. The structure is designed to store about 6.5 million m^3 of water.

Capacity building. A number of seminars and trainings were organized and held: seminar "International experience on implementing digital technologies in the water industry" (August 10-11, OSCE Center in Ashgabat, online); training in innovative water saving methods (September 19, UNDP and "Goskomvodkhoz",Turkmenistan, online); training in water diplomacy (November 2, Training Center for the Priority Areas of Diplomacy, Institute of International Relations at the MFA of Turkmenistan).

International cooperation. The following events were held: working meeting on water use efficiency in the region among officials and experts of the State Committee for Water Resources of Turkmenistan (Goskomvodkhoz), the Ministry of Energy and Water Resources of Tajikistan (MEWR RT) and EC IFAS (February 3, online); 1st meeting of the joint Turkmen-Uzbek Intergovernmental Commission for Water (September 13, Tashkent). See "Bilateral Water Cooperation between the Countries of Central Asia".

The ICWC member from Turkmenistan participated at the 80th and 81st meetings of ICWC (May 11 and December 7); representatives of the State Committee for Water Resources of Turkmenistan took part in the conference "Strengthening regional water cooperation in Central Asia" (May 25, online) and the IFAS Board meeting (June 29, Dushanbe), see "International Fund for Saving the Aral Sea".

Projects. As a part of: (1) the "Central Asia Nexus Dialogue Project: Fostering water, energy and food security nexus and multi-sector investment" (phase II, CAREC), Turmenistan and Uzbekistan implement the demo-project "Tuyamuyun Hydroelectric Complex". The Technical Working Group gathered together several times in the course of the year (February 23, July 23, November 2); (2) "Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan" (UNDP/GEF), a scientific-practical workshop on improving the water use efficiency in irrigation systems was held online on May 26; production of two types of materials for channel lining was arranged; solar power systems were istalled for pumping and purifying water in remote villages El, Byashkak and Kelleli in Akhal province.

Drinking water supply. Implementation of the "General Clean Water Program" is continued. According to the Law of Turkmenistan on drinking water (136-IV of September 25, 2010), the Ministry of Construction and Architecture drafted the Rules of use of water supply and sanitation systems. The document provides for the regulation and accounting of supplied drinking water and discharged sewage, sets obligations, rights and responsibilities of drinking water operator and consumer.

Agriculture

At year-end 2021, Turkmenistan harvested 1.25 million tons of cotton and more than 1.4 million tons of grain, reached the state order for rice production for 82.4 thousand tons.

Latest developments in legislation. The following legal documents were adopted in 2021: (1) amended law "On state land cadaster" (416-VI of November 13), which defines the legal, economic and institutional framework of activities in the field of the state land cadaster; (2) Law "On amendments and additions to certain legislative acts of Turkmenistan" (№ 431-VI of November 13) which amended:

- The Land Code (approved by Law of October 25, 2004);

- The Law on Dayhan/Peasant Associations (113-III of March 30, 2007). The Law was supplemented by the article "Water Use by Dayhan Associations", which defines the procedure of water supply and transfer of on-farm irrigation, collector-drainage networks and associated hydraulic structures to Dayhan associations that are "responsible for the conditions and use of on-farm irrigation and collector-drainage networks, water facilities and devices, as well as for delivering water resources to respective leaseholders and other water users" and "take appropriate measures to ensure efficient and economical use of water resources", etc.;

- The Law on Dayhan Farms (445-IV of November 9, 2013). The new version stipulates that "the minimum amount of the authorized capital of a Dayhan Farm shall be 5 times the size of the base value for calculation of taxes and fees" (Article 6, paragraph 3). The Law was supplemented with the article "Water use by Dayhan Farms" also.

Agroindustry reformation and modernization under the "Program of Socio-Economic Development of Turkmenistan for 2019-2025". Private investments increasingly play the key role in developing modern agricultural production and creating new jobs. According to Resolution of the People's Council of Turkmenistan (Khalk Maslakhaty) "On further reformation of the agricultural sector" (of September 25, 2018), land plots shall be allocated to private producers for growing crops from the 'state order' list in accordance with the established procedure. For instance, over 61 thousand ha of fertile land in Ruhubelent district, Dashoguz province have been allocated for a term of 99 years provided that not less than 70% of the arable area would be covered by crops.

Land and water management efficiency is improved by introducing drip and sprinkling irrigation methods.

At the final meeting of the agroindustry leaders, it was proposed to reduce the area under cotton by 40 thousand ha and plant potatoes and other vegetable and melon crops on the released land.

Turkmen scientists and breeders have developed new varieties of cotton, tomatoes, watermelon and melons. Production capacities are extended: greenhouse farms equipped with the latest technologies and water-saving systems and designed for production of 8.75 thousand ton of vegetables per year were put into operation in Akhal, Dashoguz, Lebap, Mary, and Balkan provinces. As a result, about 400 new jobs were created.

Projects. As a part of the "Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan" (UNDP/GEF), the following events were organized: a webinar "The use of multicluster agro-ecological maps in the process of planning adaptation to climate change" (May 11); field days dedicated to rational use of irrigation water (July 15 and 24); training on the development of greenhouse facilities (August 20-21); online national workshop on the development of a system of measurement, reporting and verification (MRV) of adaptation measures, with the participation of an international expert (August 24); a seminar "The importance of modeling agroecological zones (AEZ) for the optimal placement of crops by regions of the country" (November 12). An online Roundtable discussion on the concept of a draft Law on agricultural consulting services was also organized. The participants of the Roundtable reviewed recommendations for further actions of agro-information centers, state bodies and institutions involved in agricultural consulting services to facilitate development and further adoption of the proposed legal framework (August 25).

Project "Integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey" (CACILM-2) (FAO/GEF): field trainings were held in the format of Farmer Field School on the territory of 3 pilot regions – in the desert (on the basis of Central Karakum station, the southern edge of the Central Karakums), in mountains (Nohur, Bakharden district of Akhal province) and under oasis conditions (Gurbansoltan-eje district of Dashoguz province, Anau city, Research Institute at the Turkmen Agricultural Institute). Permanent farmer field schools are planned to be established in the three pilot regions.

International cooperation. Turkmenistan extends cooperation with FAO. Meetings were held between the FAO Sub-regional Coordinator for Central Asia, Viorel Gutu and the Deputy Prime Minister, Minister of Foreign Affairs of Turkmenistan R. Meredov (October 22, December 10), Minister of Finance and Economy of Turkmenistan M. Serdarov (December 10) to discuss partnership in the area of food security, as well as issues related to opening of the FAO office in Turkmenistan.

The following official documents were signed between FAO and Turkmenistan: (1) Country Programming Framework 2021-2025, priorities of which are in line with the state priorities of Turkmenistan and the Sustainable Development Cooperation Framework between the Government of Turkmenistan and the United Nations, 2021-2025: strengthening institutional capacity on statistical data collection and reporting on agricultural development, production, and trade; digitalization of agricultural sector, support to the country's climate mitigation and adaptation efforts; (2) two agreements aimed at improving the cotton sector in Turkmenistan (corresponding national strategy is to be developed) and increasing the efficiency of small livestock breeding in order to reduce greenhouse gas emissions; (3) Agreement on implementation of development projects funded under the FAO-Turkey Partnership Program on Food and Agriculture.

Turkmenistan establishes cooperation with Russian agrarian universities : (1) Memorandum "On scientific cooperation and training of agrarians was signed between the Turkmen Agricultural University named after S.A. Niyazov and the Scientific and Production Seed Growing Association (Association "Semena", Moscow); (2) Memorandum of Cooperation is drafted between the Turkmen Agricultural University and the Kazan State Agrarian University in the field of education, science, culture, sports and innovations.

Events. The Conference "International cooperation in the field of food security" was held on June 25 (Ashgabat, online). Delegation of Turkmenistan took part in the 35th session of the FAO Regional Conference for the Near East and North Africa – #NERC35 (September 21-22).

Energy

12 state power plants, with the total installed capacity of 6,511.2 MW, are operated by the Ministry of Energy. In January-October, electricity production in the country grew by 111.6% and exports increased by 134.5%. The plan was completed by 113.3% and 178.1%, respectively.

The generating capacities of the sector are extended. A new 432-MW gas turbine power plant was completed in Lebap province. Negotiations are underway to advance construction of the Turkmenistan-Afghanistan-Pakistan-India gas pipeline and the Turkmenistan-Afghanistan-Pakistan power transmission line (January 8).

Alternative Energy

Latest developments in legislation. The law "On renewable energy sources" (337-VI of March 23, 2021) was adopted. It defines the legal, organizational, economic and social frameworks of activities in the field of renewable energy sources and regulates relations in use of renewable energy.

Implementation of national strategies and programs. The work on implementation of the State Program for Energy Saving for 2018-2024 and the National Strategy on Renewable Energy Development in Turkmenistan until 2030 has continued.

Capacity Building. Training webinar "Learning international experience in the development of regulatory technical documents for the development of renewable energy in Turkmenistan" as part of UNDP project "Sustainable cities in Turkmenistan: Integrated green urban development in Ashgabat and Avaza" (March 3); a training course to present best practices in developing target indicators for renewable energy sources in Turkmenistan (June 8-11) and a seminar on energy diplomacy (October 21-22), organized by the OSCE Center in Ashgabat.

Events. The following conferences were organized: Scientific and practical conference on green diplomacy and alternative energy development (June 12); XXVI International Conference "Oil and Gas of Turkmenistan-2021" (October 27-28).

A meeting was held with the Director General of the International Renewable Energy Agency (IRENA), Francesco La Camera on enhancing cooperation in the field of rational use of renewable and alternative energy sources (March 23).

Environment and Climate Change

Latest developments in legislation. The Law "On accession to the Agreement on the Establishment of the Global Green Growth Institute"[64] was adopted on November 13.

Amendments and additions were made to: (1) the Law "On atmospheric air protection" (429-VI of November 13, 2021). Article 7 of the Law is supplemented with the following paragraphs: "shall create forest strips to reduce the dispersion of dust and salt aerosols that have a negative impact on atmospheric air; shall study and introduce into production plant species that are more resistant to negative atmospheric conditions (dust and salt aerosols)"; (2) Law "On environmental safety" (430-VI of November 13, 2021). The law is supplemented by Chapter VI1 "Environmental disaster and emergency zones", which provides for monitoring of the ecological state and research efforts in these zones; (3) Law "On fishing and conservation of aquatic biological resources" (391-VI of June 5, 2021).

National programs. The following national programs were approved: (1) National Forestry Program of Turkmenistan for 2021-2025 and related Action Plan (June 25). The program provides for the development of a plan for planting deciduous trees, conifers, fruit trees, vine seedlings, and desert plants, the identification of key areas of international cooperation and the introduction of best practices in the forestry; (2) National Program of Turkmenistan for the Aral Sea for 2021-2025 and the related Action plan (October 22). The program provides for the modernization of land and water legislation, improvement of the system of management and use of water resources, formation of forest zones, protection of biodiversity, improvement of health service quality and implementation of preventive measures.

Implementation of the National Climate Change Strategy of Turkmenistan has continued.

Projects. (1) "Supporting climate resilient livelihoods in agricultural communities in drought-prone areas of Turkmenistan" (UNDP/GEF): the following events were organized: a workshop on the development of measurement system, reporting and verification (MRV) of adaptation measures (August 24); a five-day training "Features of atmospheric circulation and synoptic processes in Turkmenistan and neighboring states" (November); (2) "Sustainable cities in Turkmenistan: Integrated Green Urban Development in Ashgabat and Awaza", (UNDP/GEF): a working meeting to create a platform for strategic discussions and experience exchanges in environmental protection, waste management, and natural resource management was held; local adaptation plans including local gender-sensitive aspects were developed and approved for farmers' associations and livestock farms; a training (January 19-20) and a seminar "Practical use of new laboratory equipment and capacity building of the environmental monitoring and control system" (December 7) were organized.

The following projects were launched in 2021: (1) "Capacity-building of Turkmenistan and support to the development of country programs and regional actions to address climate change" (CAREC/CCF), aimed at ensuring the country's readiness for systematic and effective interaction with the GCF in line with the established norms and procedures. A meeting was organized on the development of a project coordination mechanism (June 21-22); (2) "Developing a National Adaptation Planning Process in Turkmenistan" (UNDP/GCF) aimed at increasing the adaptation capacity and resilience of the country to climate change through the development of the National Adaptation Planning (NAP) process by integrating climate risks and building a strong evidence base for adaptation planning, including budgeting process (November 16); (3) "Conservation and Sustainable Management of Land Resources and High Nature Value Ecosystems in the Aral Sea Basin for Multiple Benefits" (UNDP/ GEF), aimed at promoting land degradation neutrality, restoration and improvement of the use of land and water resources, as well as conservation of biodiversity in the Aral Sea crisis zone in Lebap and Dashoguz provinces to enhance the sustainability and resilience of livelihoods and globally significant ecosystems. The validation workshop (February 19) and a meeting (December 17) were organized in 2021.

Events. A working meeting was held on preparation of the Fourth National Communication on Climate Change and Initial Biennial Update Report of Turkmenistan under the UN Framework Convention on Climate Change (UNFCCC), and on development of Nationally Determined Contributions (NDC) under the Paris Climate Agreement[65] (March 10, Ashgabat, online).

[64] The Global Green Growth Institute (GGGI) is an international intergovernmental organization headquartered in Seoul that is "dedicated to supporting and promoting strong, inclusive and sustainable economic growth in developing and emerging economies. The agreement establishing the GGGI was adopted on June 20, 2012 in Rio de Janeiro.

[65] The documents are developed with the support of UNDP jointly with UNEP and coordinated by the UNDP project "Sustainable Cities in Turkmenistan: Integrated Development of Green Cities in Ashgabat and Awaza"

The OSCE Center in Ashgabat organized seminars on issues of environmental protection system development (June 17-18), promotion of the Aarhus Convention's principles (June 24-25), and advanced environmental management in oil and gas extractive sector (July 8-9).

The following events were organized as well: International conference "Multilateral Dialogue on the Promotion of Cooperation in the Aral Sea Basin" (April 22); Scientific and practical conference "State policy of the President of Turkmenistan in the field of environmental protection and environmental well-being: achieved milestones and tasks to be solved" (June 4); Conference organized by the UNFCCC Secretariat and the Cabinet of Ministers of Japan, with participation of representatives of environmental agencies from 45 countries in Eurasia, the Americas, and Australia; Scientific and practical conference "Current issues of Turkmenistan's transition to green technologies" November 23).

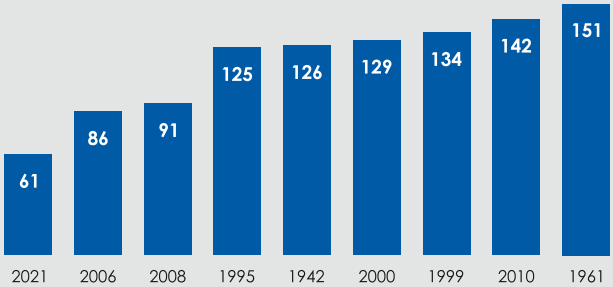
Representatives of Turkmenistan took part in the roundtable on resisting the climate change (April 21), IX Nevsky International Environmental Congress (May 27-28, St. Petersburg), the Fourth Central Asia Conference on Climate Change (CACCC-2021) (July 26-27, Dushanbe), the "C5+1" ministerial meeting (September 16), and the 26th session of the Conference of the Parties to the UN Framework Convention on Climate Change (COP26) (October 31-November 12, Glasgow, Scotland).

Emergencies

Latest developments in legislation. The following official documents were approved in 2021: (1) The Law "On the prevention and liquidation of emergency situations" (new edition) (334-VI of March 13), which establishes the legal and organizational frameworks of relevant activities; (2) The state program for implementation of the public policy on civil defense for the period 2019-2030, focusing on disaster risk reduction (DRR), formation of an appropriate legislative framework, creation of modern rapid response emergency services, strengthening of seismic safety, desertification, etc.

Drought. 2021 was the driest year in Ashgabat and a number of other regions in Turkmenistan. Ashgabat got only 61.1 mm of precipitation in the course of the year (as of December 27). Previously, less than 100 mm of annual precipitation was recorded for the capital in 2006 and 2008.

Years with a minimum amount of precipitation. Ashgabat, 1891-2021



Source: https://meteojurnal.ru/

A similar situation was recorded in Serakh district, where 50.5 mm of precipitation fell (earlier, the year 2000 was considered dry – 76 mm of precipitation), and in Bairamal district – 38.7 mm (the year 1917 was drier – 36 mm) and other regions.

Khauzkhan, Zeyd and Saryyazin reservoirs were shallow in 2021.

Khauzkhan reservoir in early May 2021 and 2020

Zeyd reservoir in early May 2021 and 2020

Source: "Meteojournal" online publication (https://meteojurnal.ru/)

Capacity building. The Nature Conservation Society of Turkmenistan, with the support of the USAID Governance Support Program in Turkmenistan, held a series of thematic workshops on capacity building and institutional development of organizations dealing with disaster risk reduction (July 26, October 13, November 16, December 14).

SDG in Turkmenistan

The process of establishing the National Platform for collection and dissemination of the data on SDGs has been completed as part of the project "Partnering for SDG acceleration" implemented jointly by the State Statistics Committee, the Ministry of Finance and Economy and UNDP. The National platform for SDG reporting and the developed multifunctional software includes information on the country's achievements, metadata, charts, graphs and disaggregated data within SDG indicators. Also, webinars were held on "Application of public-private partnership to achieve the Sustainable Development Goals" (February 16) and "SDG Financing: Introduction to UNDP service offers and tools" (June 4).

The UN and the Government of Turkmenistan held a series of meetings to discuss the interim results of implementation of the UN Sustainable Development

Cooperation Framework between the Government of Turkmenistan and United Nations, 2021-2025 (November 24-30). Joint teams of the UN and national ministries reviewed the results of the five key areas: (1) people-centered governance and the rule of law; (2) sustainable economic diversification, competitive private and financial sectors, expanded trade and its promotion; (3) disaster risk reduction, climate change adaptation and resilience (4) quality and accessible health care and social services; (5) quality, inclusive and accessible education and systems for professional development.

Young SDGs Ambassadors of Turkmenistan participated in (1) a seminar on the International Mother Earth Day, where they presented to students and schoolchildren the history of this day, told about the importance of environmental protection and the ways to maintain the ecological equilibrium (April 22). The online seminar was organized jointly by UNICEF and the Ministry of Education of Turkmenistan; (2) a Youth conference on climate was held with the support of the United Nations and the British Embassy (October 8).

Cooperation on the Caspian Sea

Turkmenistan continues taking active part in developing the international treaty framework of cooperation, strengthening good-neighborly relations and broad cooperation between the riparian countries of the Caspian Sea. The work on preparation to the VI Summit of the Heads of the Caspian Sea States is underway. A package of new regulatory and legal documents is prepared and will be included in the agenda of the Summit. Among them are agreements on research and rescue operations in the Caspian Sea.

Within the framework of the **Coordinating Committee on Hydrometeorology and Pollution Monitoring of the Caspian Sea** (CASPCOM) and the **Tehran Convention**[66], Turkmenistan participated in technical meetings of the Caspian Environmental Monitoring Program (EMP) (March 5, October 12); the 25th session of CASCOM (October 25, online); the scientific conference on Climate Change in the Caspian Sea Region (October 27-28, online); a meeting of executive and operational bodies on implementation of the Protocol on Regional Preparedness, Response and Cooperation in Case of Oil Pollution Incidents (Aktau Protocol[67]) (November 1-3).

In cooperation with partners, Turkmenistan held: Russian-Turkmen web-conference "Ecosystem of the Caspian Sea Region" (May 12); Scientific and practical conference "Cooperation on marine environment protection of the Caspian Sea" timed to the Caspian Sea Day (August 12).

Turkmenistan took part in: a meeting of the Prosecutors General of the Caspian riparian countries, which resulted in signature of the Cooperation Declaration on environmental protection and use of natural resources of the Caspian Sea (July 7, St. Petersburg); a meeting of experts "Green economy for the Caspian Sea-2021: realities and prospects" (August 20, Astrakhan); the 14th Caspian Energy Forum (December 8, Moscow).

Foreign policy and International cooperation

In 2021, the President of Turkmenistan made official and working visits to the UAE (October), Uzbekistan (October), Tajikistan (September), Turkey (November), Russia (December).

The following high level officials visited Turkmenistan: Minister of Foreign Affairs of Uzbekistan (May), President of the Republic of Tatarstan of the Russian Federation (May, September), President of the Kyrgyz Republic (June, November), Minister of Foreign Affairs of China (July), Minister of Foreign Affairs of Pakistan (August), President of Kazakhstan (October), Presidents of Turkey, Azerbaijan, Uzbekistan, Iran, Prime Minister of Kazakhstan, Federal Minister of European and Foreign Affairs of Austria (November).

Key developments in the foreign policy of Turkmenistan

Development of alliances and strategic partnerships. Turkmenistan builds relationships with neighboring countries based on the good-neighborliness and equality principles, both in a bi- and multilateral format. In particular, cooperation is developed in ener-

[66] The Tehran Convention serves as a comprehensive governance framework that establishes common requirements and institutional mechanism for environmental protection and sustainable development in the Caspian Sea region

[67] Adopted and signed at the 3rd session of the Conference of the Parties (COP3) in Aktau, Kazakhstan on August 12, 2011. This is the first protocol ratified by all the riparian countries and entered into force on July 25, 2016

gy, transport, trade, ecology, water, etc. The Consultative meeting of the Heads of Central Asian States was held in Turkmenbashi on August 6 and resulted in adoption of a Joint Statement. A number of side events included the Dialogue of Central Asian Women, the Economic Forum of the Central Asian countries, the International exhibition of national commodities of the Central Asian countries, the International festival of national dishes in the region's countries. As a result of the Dialogue of Central Asian Women, a Declaration acknowledging the position of the Dialogue to find effective ways for unlocking the scientific, technical, creative, intellectual and entrepreneurial potential of women in the region was adopted. The Joint Statement of the Heads of Central Asian States and the Declaration of the Dialogue of Central Asian Women are recognized as documents of the 75th UNGA session, published in the UN official languages and distributed among member states.

Turkmenistan, as an honorary guest, took part in: meeting of the Council of the SCO Member States (September 17, Dushanbe), XX meeting of the Council of the Heads of Government of the SCO Member States (November 25, online), meeting of Deputy foreign ministers of Central Asian countries (December 8, Dushanbe). As a member of CIS, Turkmenistan participated in the meetings of the Council of Foreign Ministers (April 2, Moscow; October 14, Minsk); meetings of the Council of Heads of Government (May 28, November 12); meeting of the Council of the Heads of State (October 15, online); informal summit of the Heads of State (December 28, St. Petersburg).

Promotion of the national interests and reinforcement of the country's image. Turkmenistan actively cooperates with the United Nations, EU, OSCE, OIC and ECO.

UN. Upon the initiative of Turkmenistan, 2021 was declared the "International Year of Peace and Trust"[68].

The International conference "Turkmenistan and the United Nations: Cooperation for Peace and Trust" was held on occasion of the 29th anniversary of Turkmenistan's membership in the UN (March 2). The following bilateral documents were signed: Agreement between the Government of Turkmenistan and UNFPA on co-financing, as well as the Work Plan 2021 between the Ministry of Sport and Youth Policy of Turkmenistan and UNFPA within the framework of the project "Strengthening mechanisms of youth participation in implementation of the national youth policy and advancement of gender equality".

The following resolutions were adopted unanimously by the initiative of Turkmenistan at the 75th UNGA: (1) Resolution[69] "The Role of the UN Regional Center for Preventive Diplomacy for Central Asia"; (2) Resolution[70] "Strengthening the links between all modes of transport to ensure stable and reliable international transport for sustainable development during and after the coronavirus disease (COVID 19) pandemic".

Speaking at the 76th UNGA session, the President of Turkmenistan: (1) stressed the need to intensify multilateral cooperation through scientific diplomacy and strengthen the activities of the UN; (2) proposed to develop a draft UNGA resolution on "Strengthening regional and international cooperation to ensure peace, stability and sustainable development in the Central Asian region and create a zone of peace, trust and cooperation "Central Asia – Caspian Region"; (3) stated his intention to create a UN Special Program for the Aral Sea Basin" together with partners in the region" (September 22).

The United Nations Office for Project Services (UNOPS) was officially opened in Turkmenistan on June 10. This is a UN office that assists countries in restoring peace and post-conflict stability, provides early recovery services after natural disasters, promotes economic development based on local capacities and supports environmental sustainability as well as adaptation to climate change.

Turkmenistan has been elected (1) to the Executive Board of the UN Entity for Gender Equality and the Empowerment of Women (UN-Women) for the period 2022-2024, at the United Nations Economic and Social Council regular meeting (ECOSOC) (April 20); (2) to the post of Vice-Chairman of the United Nations Economic Commission for Europe (UNECE) for the period 2021-2023, during the 69th UNECE session (April 20-21, online); (3) to the Executive Council of the UNESCO Intergovernmental Oceanographic Com-

[68] 106th plenary meeting of the 73rd UNGA session, 12.09.2019
[69] 59th plenary meeting co-sponsored by 72 Member States of the Organization (April 16)
[70] 96th plenary meeting, co-sponsored by 48 states (July 29)

mission (IOC[71]), during the 31st session of the Assembly of the Commission (June 21, Paris); (4) as a member of the Intergovernmental Council of the International Hydrological Programme[72] for the period 2021-2025, during the 41st session of the UNESCO General Conference (November 18).

Ashgabat hosted an International Conference "The Peace and Trust Policy is the Basis for International Security, Stability and Development" on December 11. Finally, 26 multilateral documents have been signed. Among those were: the Memorandum of Understanding between the Government of Turkmenistan and the UN on climate change mitigation and adaptation; the Action Plan for 2022 on implementation of the UNDP program to ensure socio-economic outcomes related to climate impacts on population engaged in agricultural sector in arid regions of Turkmenistan; the Programme on developing the national adaptation planning process in Turkmenistan by the Ministry of Agriculture and Environmental Protection of Turkmenistan and UNDP Office in Turkmenistan for 2022-2024.

Turkmenistan took over the chairmanship in ECO in 2021 at the 14th ECO Summit (March 4, online). At the proposal of Turkmenistan, a resolution on cooperation between the UN and ECO was unanimously adopted at the 102nd plenary meeting of the 75th UNGA session (September 9). Turkmenistan hosted the following meetings as the chair: (1) a senior officials meeting of the ECO countries-members (November 26); (2) Business forum of the ECO member-states (November 26); (3) 25th meeting of the Council of Ministers (COM) of the Economic Cooperation Organization (November 27); (4) 15th Summit of the Leaders of the ECO member states, as a result of which the Ashgabat Consensus for Actions was adopted offering a path to regional stability and to achievement of the main goal of sustainable socio-economic development and prosperity in the ECO region (November 28).

Other organizations. The CICA Committee of Senior Officials decided to grant Turkmenistan the status of observer in CICA (June 23, Nur-Sultan, online). At the 8th Summit of the Cooperation Council of Turkic speaking states, a decision was made that Turkmenistan would join the association as an observer (November 12, Istanbul).

Sources:

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Ministry of Energy of Turkmenistan, https://www.minenergo.gov.tm/

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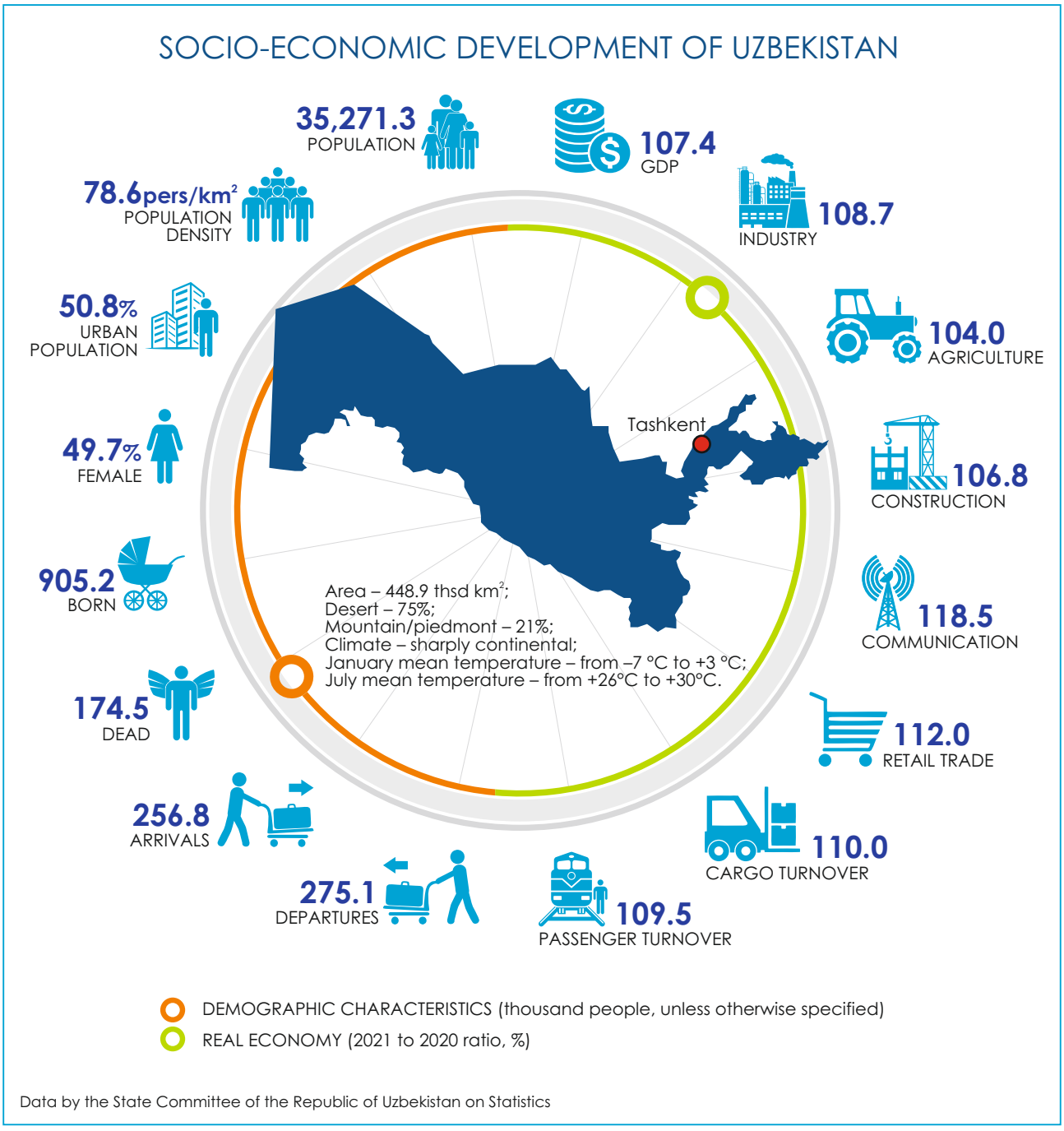
https://www.oilgas.gov.tm/en;
https://orient.tm/en/home;
https://arzuw.news/;
https://www.parahat.info/;
https://ashgabat.in/?lang=ru

[71] IOC – UNESCO promotes international cooperation in marine sciences to improve ocean, coastal, and marine resource management
[72] https://en.unesco.org/themes/water-security/hydrology

5.5. Uzbekistan



Data by the State Committee of the Republic of Uzbekistan on Statistics

Water Sector

Water resources. Uzbekistan's average water use is 51-53 billion m^3, of which 80% (approx. 41 km^3/year) is provided from transboundary rivers. The estimated natural fresh and brackish groundwater deposits potentially yield 27.6 km^3/year; however, they are unevenly distributed throughout the country. The water demand is met through a combination of surface water (50.9 km^3/year), usable groundwater (0.5 km^3/year), and the reused collector and drainage water (1.6 km^3/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 sectors.

Latest developments in legislation. Law on amending and supplementing the Law on water and water use, among other things: strengthened the powers of public departments and authorities dealing with water and their financing; set that financing of water user associations was formed from annual membership fees, water service fees and other legitimate sources; prohibited from breach of sanitary-protection and water buffer zone regime; and, specified that water sites or their parts can be used or operated by PPPs (ZRU-733 of 30.11.2021).

For implementation of the national **Concept on Water Sector Development 2020-2030:**

- The **Strategy for water resources management and the development of the irrigation sector in Uzbekistan for 2021-2023** was approved (PP-5005 of 24.02.2021). The Strategy includes a number of measures covering sustainable water resources management and modernization of the country's irrigation sector. In particular, it is planned to increase performance of irrigation system and networks from 0.63 to 0.66; reduce irrigated area with poor water supply from 526 to 424 thousand ha; extend coverage by water-saving technologies from 0.308 to 1.1 million ha, including that of drip irrigation technologies from 121 to 822 thousand ha; reduce salinized soil area from 1,926 to 1,888 thousand ha; convert 232 thousand ha of withdrawn irrigated land into agricultural use; automate 60 large waterworks facilities, etc.

- a Decree on measures for further improvement of public administration and control system in water and for ensuring safety of water infrastructure was adopted (UP-6200 of 06.04.2021). The Decree **sets key tasks and areas of the Ministry for Water Management**, which is also assigned the **functions of authorized public agency for accounting of all types of water**, coordination of actions for better water use, and consolidation of water balance. The State Inspectorate for control over safety of water infrastructure was set to report to the Cabinet of Ministers of Uzbekistan and a Roadmap was approved for development of a draft law on safety of hydrotechnical constructions, etc. A number of resolutions were also adopted in 2021 in support of the Decree.

- a Resolution on measures for improvement of the Research Center for Water Problems at the Cabinet of Ministers of Uzbekistan[73] was adopted (PKM 453 of 23.07.2021) and set the mandate and financing sources of the Center;

- the Water Code of the Republic of Uzbekistan is under development.

Water management system. The 28.4-km long irrigation system, more than 54 thousand hydraulic structures and 70 reservoirs and mudflow storage at the total capacity of 19.4 billion m^3 are operated in the Republic. About 60% of land is irrigated through 1,687 pumps consuming 8 billion kWh annually. WUAs, farms and clusters operate 155.2 thousand ha of irrigation network and more than 10 thousand pumping units. For land reclamation, 142.9 thousand-km drainage, which includes 106.2 thousand km of surface drainage and 36.7 thousand km of subsurface horizontal drainage, 172 pumping stations and 3.8 thousand of vertical drainage wells are operated.

As part of implementation of the **Strategy**, funds were allocated for reconstruction of 865 structures; 552 structures were commissioned; irrigation of 906 thousand ha was improved; and 17.5 thousand hydraulic structures and almost 17 thousand gauging stations were repaired.

Experts from Uzbekistan together with experts from the Moscow State Building University has worked on rehabilitation and reconstruction of the Sardoba reservoir[74].

AO Uzbekgidroenergo was instructed to equip the Tupalang reservoir in Sariosiyo district, Surkhandarya province with metering facilities for regular measurements and protection devices for safe and reliable operation of the reservoir in line with relevant resolution adopted in 2021.

Online control and monitoring of water delivery along Mirishkor and Kamashi canals in Kashkadarya province was achieved through the automation system installed by the Australian Rubicon Water Pty. Ltd. The Kuvanish-zharma canal on the Amu Darya River was equipped with the Smart Water system to control water in the real-time mode that helped to lessen a human factor in water management and prevent transportation losses.

As part of implementation of the resolution (PP-5201 of 29.07.2021) on measures for modernization of 95 pumping stations in Bukhara, Navoiy, Kashkadarya, Samarkand, and Surkhandarya provinces, an agreement was signed between Uzbekistan and the Russian state corporation WEB.RF on the sidelines of the Uzbekistan Economic Forum 2021 (September 29-30, Tashkent).

Projects. The following projects were continued: (1) "Fergana Valley Water Resources Management Project", Phase II (WB) – 18 km of canals in four districts of Andizhan province are in process of renovation. It is planned to put into operation 46.4 km of canals by November 2022; (2) National Water Resources Management Project in Uzbekistan (SDC) – a training workshop in water-saving technologies was held for the staff of the Ministry of Water Management and its organizations (April 26-June 11); the Meliorative Information System has been developed and followed by training for land reclamation field offices; (3) "Improvement of Water Resources Management in Sur-

[73] Formed in 2020

[74] The Sardoba Dam burst was on May 1, 2020

khandarya Province (reconstruction of Khazarbag-Akkapchigai canal system" (ISDB) – training for farmers, WUAs' staff and irrigation system heads (March 29-May 1) and workshops for the staff of Surkhandarya Province Water Authority and district irrigation divisions (June) were held; etc.

As part of the USAID Regional Water and Vulnerable Environment Activity aimed at strengthening water cooperation across Central Asia, an introductory online workshop was held on March 31 to present goals, tasks and planned actions.

Capacity building. In the course of the year, a number of trainings and practical workshops were organized for water sector staff on water-saving technologies, geo-information technologies in the water sector, water management reforms, etc.

Regional cooperation. The ICWC member from Uzbekistan took part in the 80th meeting of ICWC (May 11) and chaired the 81st meeting (December 7). See "ICWC Meetings".

In 2021, officials of the Government of Uzbekistan signed: (1) an Agreement with Kyrgyzstan on territorial division and sharing of water between the countries (March 25); (2) an Agreement with Turkmenistan on Joint Inter-governmental Commission for Water and an additional agreement to the Inter-governmental Agreement on charged land use (May 26); (3) a trilateral protocol with Kazakhstan and Tajikistan on operation of the Bakhri Tojik reservoir over June-August 2021 (June 14).

Officials of the water sectors of Uzbekistan and Kazakhstan met to discuss the water cooperation issues and favorable conditions for the trouble-free growing season (June 29), the joint measures for the improvement of water-related situation in the middle and lower reaches of the Syr Darya and the draft intergovernmental agreement on joint management and use of transboundary water bodies (July 19).

The Joint Turkmen-Uzbek Inter-governmental Commission for Water held its 1st meeting on September 13 and addressed such issues as cooperation on water use along the Amu Darya River, operation of water

infrastructure in the two countries, and research and technical cooperation on water. The Uzbek-Kazakh Joint working group on environment and water quality in the Syr Darya basin adopted the work plan for 2022 during its 4th meeting on December 13. See also "Bilateral Water Cooperation between the Countries of Central Asia".

IFAS. The permanent representative of Uzbekistan was assigned to EC IFAS. Uzbekistan took part in the meetings of (1) IFAS Board (June 29); (2) Working group on institutional and legal improvement of IFAS (May 27, October 18, August 16). See also "International Fund for Saving the Aral Sea".

Events. Tashkent hosted the: (1) International conference "Strengthening regional water cooperation in Central Asia" organized by IICA and the UNESCO Office in Uzbekistan (May 25); (2) Regional conference "High-level dialogue on effective energy, water and land development in Central Asia" (October 15); (3) International Conference "The Aral Sea Region – a zone of environmental innovations and technologies" (November 22).

Representatives of Uzbekistan took part in the 3rd session of the Asian Interparliamentary Consultative Council for Water (May 12, online); Singapore International Water Week /SIWW 2021 (June 21-July 2); International workshop "Irrigated land reclamation as the main factor of sustainable irrigated agriculture" (September 24, online, Kazakhstan); Central-Asian subregional preparatory conference for the 9th World Water Forum "Water Security for Peace and Development" (October 19-20, Dushanbe); #ARALIssues Conference-2021 (December 10, Almaty).

Drinking Water Supply

According to the Central Public Utility Organization *(AO Uzsuvta'minot)*, "the Republic has 10,269 settlements, of which 3,350 are fully covered by centralized water supply and 4,654 are partially covered. 2,265 settlements do not have access to centralized water supply. There are 72 thousand km of water mains, 9.4 thousand water structures, 11.6 thousand pumps, 58 sewage treatment structures, and 8.6 thousand sewerage networks."

As part of the State Program for the improvement of villages *("Obod kishloq")*, large-scale efforts are made for building new water supply networks to improve access to drinking water.

Projects. The following projects were continued: (1) Improvement of drinking water supply in Dzhizak province through water resources of the Zarafshan River: completed construction, in Bulungur district, of "Uzunbuloq" water-treatment station (capacity 100 thousand m^3/day), laboratory,100-thousand m^3/day pumping station, filtration station, etc.; built Dzhizak water divide and two 5-thousand m^3 water ponds; (2) Alat and Karakul Water Supply Project (WB): reconstructed 50-thousand m^3/day water treatment structure and 4 water distribution structures, laid 52 km of main and 160 km of additional water pipes, 280 km of

urban and 1,936 km of rural distribution networks; (3) Tashkent Province Water Supply Development Project (ADB): completed construction of 100-thousand m^3 water treatment structure and 21 km of main water pipes. Improved drinking water supply of 66,000 residents in Kibrai district.

Signed: (1) a loan agreement for US $70 million with EBRD under improvement of water supply in Namangan province (June 7); (2) grant agreements for US$ 239 million under the Water Supply Services Development and Institutional Support in Uzbekistan Project to modernize sewage and treatment structures (May 17).

Capacity building. It is planned to open a Water Academy in Uzbekistan to perform special trainings on water supply system, make competence assessment of drinking water supply and sanitation operators, and build effective cooperation among national and international higher educational institutions.

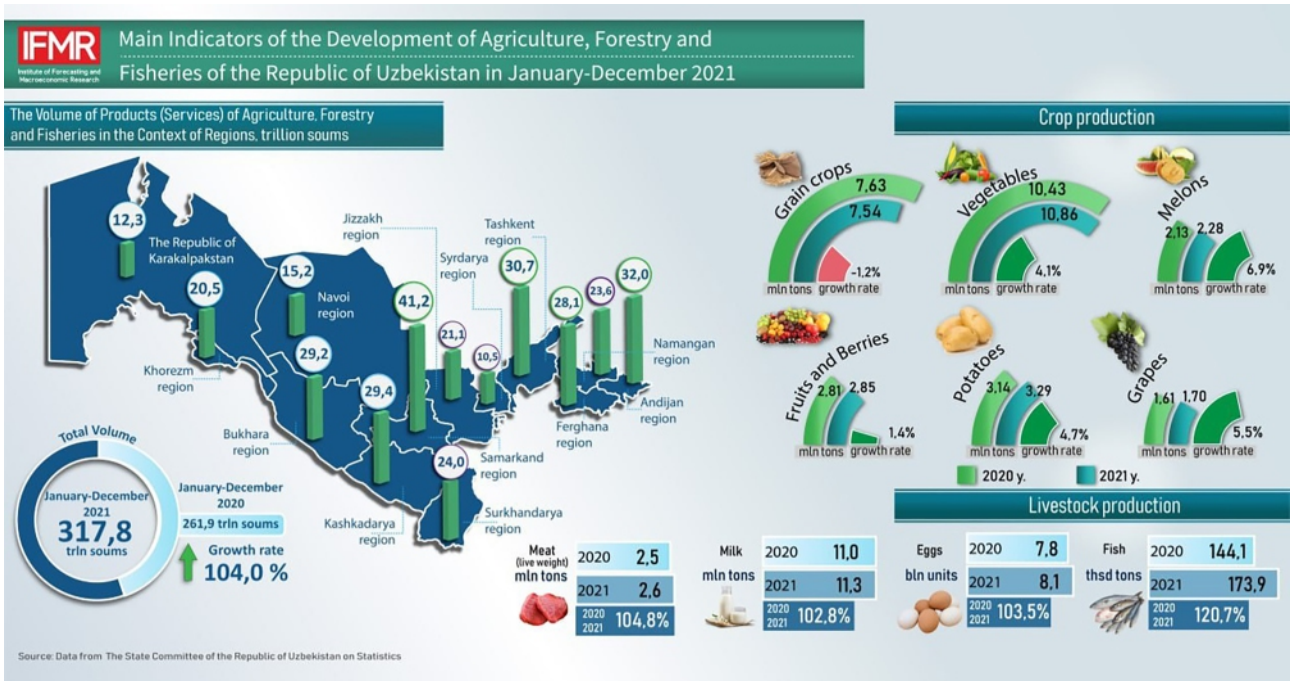
Conducted: training course for the *AO Uzsuvta'minot* (September 21-24); workshops for laboratory staff of regional water supply enterprises (November 9) and for the heads of provincial public utilities and engineering companies (November 19).

International cooperation. *AO Uzsuvta'minot* has signed: (1) Cooperation Agreement on wastewater and sewage treatment with "Ekolos-Projectstroy" LLC (Russia) and "UzEkolos" LLC (April 5); Memorandum on establishment of joint venture to build water facilities for drinking water supply and sewage and modernization of existing facilities using modern technologies with "SAYIN İNŞAAT TİCARET VE SANAYİ LTD" Turkish company (February 11); (3) Minutes of discussions on a pilot project to launch "smart" meters in the Mirabad district of Tashkent with Korea Water Resources Corporation ("K-water"), Shin Dong-A Electronics Co., LTD (December 13).

A Memorandum of joint actions for introduction of smart water accounting system in Tashkent was signed with Suez International in June.

Agriculture

By the end of 2021, crop acreage was 3,260.7 thousand ha. Agricultural production amounted to 302,524.9 billion soums, including crop production – 151,083.4 billion soums, livestock – 151,441.5 billion soums. The growth rate of production amounted to 103.1% in plant growing and 104.1% in livestock production.



Source: Institute of Forecasting and Macroeconomic Research, https://ifmr.uz/infographics (https://ifmr.uz/infographics/136)

Latest developments in legislation. In 2021, for implementation of the Agricultural Development Strategy of the Republic of Uzbekistan for 2020-2030, a number of laws and resolutions were adopted: on dekhkan farms, on subsistence farming, on the improvement of land leasing and use, on additional measures for financial support of individual farms, peasant farms and subsistence farmers, on additional measures for the improvement of agricultural land use and protection, and on equality and transparency of land relations and protection of land rights, etc.

Implementation of strategies and programs. In follow-up to resolution 794 of the Cabinet of Ministers on measures for digitization of agroindustry in Uzbekistan, a **special land map** on plots allocated to youth in Yangikurgan district, Namangan province (http://yerajratish.uz/) and the information system *(E-Ijara)* so that the farmers could have full information on free agricultural land and submit their applications for agricultural land leasing (https://ijara.soliq.uz/) have been developed. As part of the Agricultural Development Strategy, the Agricultural

Knowledge and Innovation System (**AKIS**, http://akis.agro.uz/uz) has been developed. First pilot AKIS agroservice center in Tashkent province (80 ha) includes fields for crop, fertilizer and technology experiments, the Agricultural state service center and the Agrobusiness service center, research laboratories, mobile laboratories and agricultural machinery polygon, agromarket, etc. AKIS centers will be formed in all provinces.

Agroclusters. Clusters are provided with wide development opportunities, in particular: (1) cotton textile clusters will be able to get 24-month credits on raw cotton and yarn; (2) grain clusters and farmers will have a right to sell wheat at market prices. During 3 years, 2.5 t of grain per hectare should be sold via exchange, while the rest harvest can be sold on farmer's own.

The Republican commission for coordination of cotton textile cluster activities was formed by Presidential Decree UP-14 of 16.11.2021 "On measures for regulation of cotton textile cluster activities".

Projects. The following projects continued: (1) Integrated natural resources management in drought-phone and salt-affected agricultural production landscapes in Central Asia and Turkey (CACILM-2, FAO/GEF): rural people in Bukhara and Kashkadarya provinces has got greenhouses, motocultivators, water pipes, and other equipment; the Bukhara fodder seed research-production center was equipped with up-to-date laboratory and agricultural facilities; UzHydromet received 12 automatic weather stations; new geoinformation system laboratory was opened at the Tashkent State Agrarian University; (2) CADI (Central Asian Desert Initiative): training was held for rural women in settlements of Navoiy and Bukhara provinces (October) and the International conference on temperate deserts was organized on December 2-3 in Tashkent; the CADI Regional Secretariat Office opened in December; (3) Smart farming for the next generation (FAO, with support of the Republic of Korea): at the AKIS Center, a series of training in greenhouse production and crop growing in covered soil (November) and in modernization and optimization of greenhouses was held.

The following projects were launched: (1) Strengthening sustainable food systems through geographical indications (FAO/Ministry of Agriculture of Uzbekistan); (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 (EU, €4.15 million, 2021-2025, pilot regions – Tashkent, Kashkadarya and Fergana provinces.

Capacity building. Training was held for managers of the Karakalpakstan Ministry of Water Management and the provincial authorities for irrigation systems, electric and pumping stations in April as part of AKIS. Also, training workshops were conducted on effective application of drip irrigation technology on cotton fields (May, Bukhara province) and on new procedure of agricultural land leasing (November, Samarkand province).

Farmer schools were formed in Tashkent, Andizhan, Samarkand, Termez and Nukus to transfer new knowledge on agriculture and doing business, improve business skills and prepare skilled young farmers.

The trilateral MoU signed between the Uzbek Ministry of Agriculture, the Royal Agricultural University (RAU) and the Lithuanian Vytautas Magnus University (VDU) provided for the establishment of a new International agricultural university.

International cooperation. Uzbekistan and FAO signed the US$ 17-million Country Programming Framework for 2021-2025 aimed to support the Government transforming Uzbek food systems.

During the sixth meeting of Ministers of SCO member states on agriculture, a draft Joint Statement on food security was accommodated among the participants and the Concept of SCO Demonstration polygon for agrarian technology exchange and training was approved (August 12).

Events. The following events were held in Uzbekistan in 2021: Republican scientific-practical conference "The role of institutional reforms and development of agroclusters in increasing the economic power of agriculture: problems and solutions" (May 18); Agro-marathon to encourage, make aware and guide newcoming and potential agricultural entrepreneurs (October-December); Global Symposium on salt-affected soil (GSAS21) (October 20-22); National symposium "Integrated salt-affected soil management and re-cultivation for food security: new approaches and innovative solutions" (October 20).

Uzbekistan took part in the regional dialogue on "Policy and governance issues to transform food systems in Europe and Central Asia" (May 25) and the FAO-SCO Independent Dialogue in preparation for the 2021 UN Food Systems Summit (August 9).

Energy

The available generating capacities in Uzbekistan amount to 12,900 MW, of which 11,000 MW (84.7%) – TPP; 1,850 MW – HPP (14.3%); and, more than 133 MW (1%) – isolated stations.[75] As expected, the energy system capacity will reach 29.2 thousand MW (share of RES, including hydro, solar, and wind – 40.4%) by 2030. By the end of 2021, the installed capacity of electric stations increased by 1.2% to 16,527 MW.

In 2021[76], 71.3 billion kWh of electric power (66.4 billion kWh in 2020) were generated in Uzbekistan. The electricity export was 2.15 billion kWh (2.7 in 2020), while

[75] Concept on provision of Uzbekistan with electric power for 2020-2030

[76] By 2030, generation is to reach 120.1 billion kWh

the import was 6.2 billion kWh (5.3 in 2020). Around 60.5 billion kWh of electricity was delivered to consumers (by 8.5% more than in 2020). As forecasted, by 2030, the republican consumption will reach 120.8 billion kWh.

Latest developments in legislation. The Resolution of the Cabinet of Ministers (PKM RUz 382 of 18.06.2021) on organization of effective utilization of electrical grid facilities sets the list of 16 facilities of the national grid to be transferred to economic entities AO REC and AO TEC. The Institute of Energy Problems (PKM RUz 273 of 04.05.2021) will be established on the base of AO UzbeEnergy's Research and Technological Center. The Institute will formulate Uzbekistan's energy development strategies and fuel-energy system modernization and development programs.

A new version of the law on electric energy has been drafted. This new law is significantly expanded and integrates all recently adopted legal documents.

Hydropower

Due to low-water, hydropower generation dropped to 5 billion kWh in 2021 against 6.5 billion kWh in 2019 (by almost 23%).

Latest developments in legislation. The approved **Program of additional measures** for hydropower development and efficiency for 2021-2030 (PP-44 of 10.12.2021) envisages an increase in country's hydropower capacity from 2,051.9 to 3,416 MW (+66.5%) by 2030 through construction of new and gradual modernization of existing stations and wider utilization of green energy sources. It is planned to amend current laws to include hydropower below 0.5 MW as micro, 5 MW as small, 30 MW as medium, and over 30 MW as large in classification of hydropower. These will be treated as renewables.

Hydropower construction and modernization. Reconstruction of **Farkhad HPP** in Syrdarya province has been completed. The total capacity of HPP increased from 114 to 127 MW through modernization of 4 units. 76-MW **Lower Chatkal HPP** on the Chatkal River in Tashkent province is under construction. It is to be commissioned in December 2022. Modernization of **Tupalang HPP** has started in Surkhandarya province. After installation of 2 units the HPP's capacity will be increased to 175 MW.

Construction of 400-MW Pskem HPP (annual generation – 950 million kWh, dam height – 195 m, full reservoir capacity – 511.2 million m^3, useful volume – 468.9 million m^3) has been started. This will be the second large HPP after Charvak HPP.

Small hydropower. The feasibility reports of joint investment projects for 10.7-MW HPP at the Sardoba reservoir and two HPPs on the Dargom canal (6.4MW and 6.45 MW) have been approved by the Uzbekistan's Cabinet of Ministers.

37.4-MW Zarchob-1 and 38.2-MW Zarchob 2 were commissioned in Saryasi district, Surkhandarya province. The project cost is US$ 80 million, including US$ 29 million – Chinese investments, and the rest – funds of AO UzbeEnergy. These HPP will provide about 300,000 people with electricity.

The unique in Central Asia Kamolot HPP equipped with four submerged units, each 2.15 MW, (US$ 22.6 million) and a new 120-kW micro HPP are to be commissioned soon.

Regional and international cooperation. On March 14, Kyrgyzstan and Uzbekistan signed a Roadmap on **Kambarata-1** project (capacity – 1,900 MW, annual generation – 5.6 billion kWh, reservoir volume – 4.65 billion m^3) – the largest plant in the cascade of Kambarata HPPs.

AO UzbeEnergy and AO Eximbank of Russia have signed an agreement on financing the construction of new hydropower plants for US$ 340 thousand, including 140-MW Mulallak HPP on the Pskem River and 51-MW small HPP cascade on the Big Andizhan Canal.

Since 2021, investment projects for the construction of Rabat, Chappasu and Tamshush HPPs on the Aksu River (US$ 75.3 million, installed capacity – 24 MW) has started in cooperation with ADB.

Thermal power

Thermal power is still the main source of electricity in the Republic. By 2030, it is planned to increase the total capacity of TPPs to 14.7 thousand MW (10.6 thousand MW in 2019)[77].

In 2021, modernization of Syrdarya TPP, the largest one in Uzbekistan, was completed. Two TPPs were commissioned in partnership with the Turkish Aksa Enerji Üretim A.Ş.: 270 and 240 MW in Bukhara and Tashkent provinces, respectively.

Over the next 4 years, Navoi, Talimarjan and Tashkent TPP will additionally have 2,264 MW of new capacity. By 2026, 20 projects worth US$ 12 billion will be launched and will generate additional 71 billion kWh.

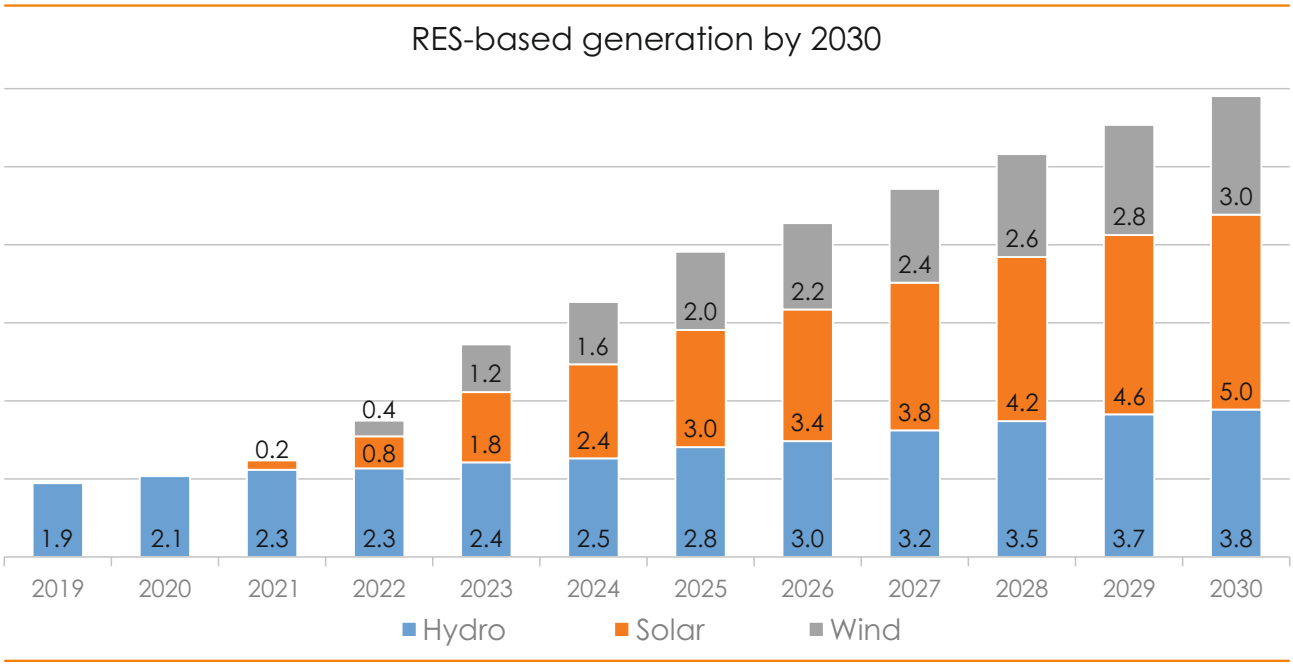
Alternative energy sources

Latest developments in legislation. To support adoption of energy efficient technologies and development of renewables, (1) the Regulation on the procedure of compensation for buying energy efficient devices and coverage of a portion of credit payments in this respect was adopted (PKM 217 of 14.04.2021); (2) measures were set for supporting development of alternative energy, electrical engineering and microelectronics and enhancing activity of the Research Institute of semiconductor physics and microelectronics (PKM 639 of 12.10.2021).

[77] Concept on provision of Uzbekistan with electric power for 2020-2030

The National Renewables Research Institute and the Interdepartmental commission for renewable and hydrogen energy are established in line with Government Resolution 5063 of 09.04.2021.

Plan of actions for carbon neutrality in the energy sector of Uzbekistan. A roadmap was developed with the support of EBRD and Japanese financing to assist the Uzbek Government in setting priorities for development of renewables and low-carbon technologies and bringing energy sector in conformity with commitments under the Paris Agreement. A five-component approach is planned: (1) Transformation of electricity generation infrastructure; (2) Develop-ment of legal framework for wider adoption of RES; (3) Reform of subsidies and mechanism of carbon pricing; (4) Awareness raising campaign to mobilize public support; (5) Environmental conservation. The key conclusion is that energy transition in Uzbekistan by 2050 is technically and economically feasible and will be mainly through the development of solar and wind energy, the technical potential of which is estimated at 520-1000 and 3,000 GW, respectively.



Source: Concept on provision of Uzbekistan with electric power for 2020-2030, https://minenergy.uz/uploads/1a28427c-cf47-415e-da5c-47d2c7564095_media_.pdf

Solar power. Small 40-kW solar photovoltaic station was commissioned in Yukori Chirchik district, Tashkent province in March; first industrial 100-MW solar station "Nur Navoi Solar" was launched in Navoiy province in August.

Project Agreements have been signed with Masdar for the construction of two 220-MW solar stations in Samarkand province and Djizak province (July).

For the first time in Uzbekistan, the solar power generated by households started to be purchased.

Wind power. Masdar (UAE) has decided to increase the installed capacity of wind station under construction in Navoiy province to 1.5 GW. The station is to be commissioned at the end of 2024.

The investment agreements between the Uzbek Government and the Saudi company ACWA Power (investor) on the construction of 2 wind stations, 500 MW each, in Bukhara province were approved. The projects to be commissioned in 2024 are expected to reduce carbon emissions by 1.6 million t and thus contribute to transfer 40% of energy capacities to RES by 2031.

ACWA Power won the tender for construction of a 100-MW wind farm in Beruni district of the Republic of Karakalpakstan. An agreement was signed with the company also for design, construction and operation of a 1500-MW wind power project in Karakalpakstan (May 3).

Environment and Climate Change

Latest developments in legislation. The law on environmental audit (ZRUz 678 of 15.03.2021) sets the key principles, standards, tasks and forms of audit and the rights, obligations and responsibilities of an environmental audit organization.

Resolution 343 of the Cabinet of Ministers approved the **Program of environmental monitoring in the Republic of Uzbekistan for 2021-2025**. The Program provides for monitoring of natural environment, forecast of pollution level, monitoring of pollution sources and environmental impact.

The Resolution on measures for environmental protection and organization of activity of public environmental control agencies (PP-76 of 30.12.2021) sets out the updated tasks for environmental control agencies at the national, provincial and district (city)

levels. The roadmap was adopted for further improvement of sectors of ecology, environmental protection, nature use and restoration, and environmental control system.

Implementation of strategies, programs and resolutions. In the follow up to the Concept on the Environmental Protection until 2030, the following legal documents were adopted: (1) Resolution of the Cabinet of Ministers (202 of 12.04.2021) on further improvement of economic mechanisms for environmental protection in the Republic of Uzbekistan, by which the Regulation on compensatory payments for environmental pollution and waste disposal has been endorsed; (2) Resolution of the Cabinet of Ministers (501 of 06.08.2021) on approval of the Order of provision of specialized services in hydrometeorology and environmental monitoring; (3) Presidential Decree (UP-46 of 30.12.2021) on measures to accelerate afforestation and effectively organize tree protection in the Republic, which provided for launching a nationwide project "Green territory" and extending moratorium for cutting of valuable trees and bushes.

The Aral Sea Region. In 2017, the State Program for the Aral Sea Region Development over 2017-2021 was approved. In 2020, a Committee on the development of the Aral Sea Region and ecology was formed. In the course of 2021, the Committee had several meetings to address environmental and social matters in the region. Intensive activity is maintained to transform this zone of environmental crisis into that of socio-economic development. In particular, a US$ 1.1-million water treatment and desalination equipment was installed in Takhtakupyr district in Karakalpakstan. The Committee negotiates with UNESCO to include Karakalpak yurta into the UNESCO list of intangible cultural heritage.

In 2021, UNGA adopted a Special resolution[78] on declaring the Aral Sea region a zone of environmental innovations and technologies that was put forward by the President of Uzbekistan. In this context, a Roadmap, a list of priority innovation projects, the composition of Interdepartmental commission for implementation of the Special resolution and of working groups to ensure timely and good implementation, monitoring and control were adopted (PP-5202 of 29.07.2021) and the parliamentary supervision over implementation of the resolution has been set (PC-370-IV of 27.08.2021).

MPHSTF for the Aral Sea Region. Two meetings of the Consultative Committee[79] for sustainable development of the Aral Sea Region were held in 2021 (March 30, July 8). The Uzbek Government presented the draft **Multilateral Roadmap**, which was aimed at implementation of a **Special resolution** for steady improvement of living conditions in the Aral Sea region, restoration of ecosystems and increase of biodiversity in adjacent territories. Within the framework of MPHSTF, projects were implemented to ensure access to drinking water, improve the perinatal care service, support youth initiatives in agriculture, improve sanitation in schools and strengthen the healthcare system. MPHSTF announced the third call for proposals on **Youth Employment and Innovations, Health, and Green Growth**.

For wider coverage on the Aral Sea catastrophe: (1) a website SAVEARAL (http://savearal.uz/) was developed. The website contains articles, documentary films and other stuff highlighting developments in the Aral Sea basin; (2) the courses on the media coverage of the Aral Sea problems were held for journalists in Kazakhstan and Uzbekistan. Upon completion, a press tour to the Aral Sea was organized and #ARALIssues Conference-2021 was held to present multimedia stories (December 10, Almaty)[80]. See "Major Events in Central Asia".

Projects. The Project "Sustainable natural resource and forest management in key mountainous areas important for globally significant biodiversity" (UNDP/ State Committee for Ecology of Uzbekistan, US$ 6.5 million, 2017-2022) was continued. The economic ecosystem assessment was made in 2021. The Center for visitors of the Chatkal state biosphere reserve was opened on December 7. In addition, SMART patrolling systems were developed for monitoring biodiversity and snow leopard, followed by organization of a training workshop. A memorandum of understanding was signed between Uzbekistan, Kyrgyzstan and Tajikistan on transboundary cooperation in protecting snow leopard in the western Tien Shan and Pamir-Alai landscapes in CA.

See "United Nations and its Specialized Agencies" for other UNDP projects on environmental conservation in Uzbekistan in 2021.

Grant Agreements were signed between (1) KOICA and GGGI on implementation of the "Green Rehabilitation Investment Project for Karakalpakstan Republic to address impacts of the Aral Sea Crisis" (US$ 5.6 million, 2021-2024). The Project aims to assist the Republic of Karakalpakstan's green rehabilitation to address the adverse impacts of the Aral Sea ecological crisis and establish viable measures to pursue disaster resilient sustainable livelihood for communities of the most affected districts (July 2); (2) EBRD and the State Committee for Ecology of Uzbekistan to implement the project aimed to support the republic in recultivation of uranium legacy sites – Charkesar and Yangiabad (€2 million, 2022-2023) (October 22).

As part of (1) the Darwin Initiative[81], the UK Government will allocate more than US$ 500 thousand for the project "Resurrection Island: enterprise, conservation and development around the Aral Sea". The Project

[78] Resolution (A/75/L.83) adopted on 66th plenary meeting, 75 UNGA session, May 18, 2021, New York

[79] First meeting of the Consultative Committee was held on 01.12.2020

[80] Organized by the International Center for Journalism MediaNet and DW Akademie, with the support of the German Federal Foreign Office

[81] The Darwin Initiative was announced at the Rio Earth Summit in 1992. The Darwin Initiative supports developing countries to conserve biodiversity and reduce poverty

will lay the foundation for designating Resurrection Island as a Protected Area, while developing sustainable income streams (including tourism) enabling residents to benefit; (2) the UNESCO Man and the Biosphere Program, the Lower Amu Darya State Nature Park in Uzbekistan was included in the World Network of Biosphere Reserves.

Uzbekistan has become a member of the **International Union for Conservation of Nature (IUCN)**.

Events. The 3rd Environmental Performance Review of Uzbekistan was launched on July 15 in Tashkent. The report covers legal and policy frameworks and environmental compliance assurance mechanisms and addresses the topics of greening the economy, environmental monitoring, public participation and education.

Uzbekistan hosted the following events: (1) International Forum "Towards new opportunities: green recovery of Uzbekistan after the COVID-19 pandemic" (March 3-4); (2) roundtable on occasion of the International Day for Biological Diversity (May 26); (3) policy dialogue series "Green growth and climate change in Uzbekistan" (20.08.21-17.02.22, 11 roundtables); (4) Regional Conference on strategic environmental assessment in Central Asia (November 10); International Conference "The Aral Sea Region – a zone of environmental innovations and technologies" (November 22, https://innoweek.uz/).

Representatives of Uzbekistan took part in: (1) 4th Central Asian conference on climate change (July 26-27); (2) 2nd meeting of the Heads of Environmental Ministries and Departments of SCO member-states (July 29); (3) 10th meeting of the EU-CA Working Group on environment and climate change (October 4-5); (4) meeting of the Parties to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (October 18-22); (5) Steering Committee meeting of the Global Snow Leopard and Ecosystem Protection Program (GSLEP) (October 22); (6) UN Climate Change Conference in Glasgow (COP26) (November 9-10); etc.

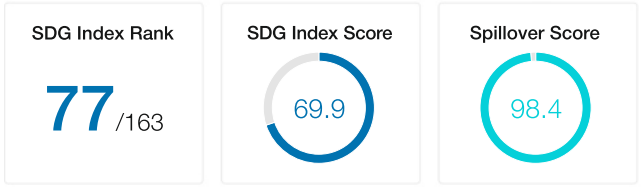
SDG in Uzbekistan

The country implements the UN Sustainable Development Cooperation Framework 2021-2025[82], which sets

Uzbekistan

Eastern Europe and central Asia

OVERVIEW INDICATORS



SDG Dashboards and Trends

[82] Approved by the Government of Uzbekistan and the UN agencies in Uzbekistan on 24.10.2020

three priorities: effective governance and justice for all; inclusive human capital development leading to health, well-being and resilient prosperity; sustainable, climate responsible and resilient development.

In October 2018, the Uzbek Government passed a resolution adopting 16 national SDGs. The State Statistics Committee collects and publishes the data on national SDGs on http://nsdg.stat.uz. Uzbekistan ranked 77 of 163 countries in the annual ranking of sustainable development (https://dashboards.sdgindex.org/rankings).

A series of roundtables was organized as part of the Sustainable Development Goals week, including the round table "Protection and restoration of terrestrial ecosystems, sustainable use of forests, combating desertification, and halting the loss of biodiversity" (June 15).

Uzbekistan hosted: (1) the International Forum of Global Interparliamentary Cooperation in the Implementation of the Sustainable Development Goals, which adopted the Bukhara Declaration (June 23-24, Bukhara); (2) international conference on New Uzbekistan's National SDGs: Milestones and Perspectives (September 24, Tashkent).

Emergencies

According to long-term observations, the key hydrometeorological hazard areas are Fergana, Namangan, Andizhan, Kashkadarya, Surkhandarya, Tashkent, Samarkand and Navoiy provinces. In 2021, 27 mudflow cases were registered in mountain and foothill areas of the republic. Consequently, 64 houses were flooded.

Preventive measures. In 2021, 25 households (125 citizens) were resettled from the risk-prone areas to safe places permanently and 46 households (248 citizens), temporarily. Aerial observations are maintained to assess snow stock in mountains and the status of lakes in highlands and to identify avalanche- and flood-prone places. About 75.7 billion sum of budgetary funds were allocated for stabilization of river banks and cleaning of river channels. Special tactical exercises were conducted in high-risk zones.

Uzbekistan and Kazakhstan have signed an intergovernmental cooperation agreement on emergency prevention and elimination. The Agreement provides for (1) regular exchange of information on monitoring and forecasting of natural and man-made emergencies; (2) organization of interaction between relevant government agencies in emergency situations; (3) joint planning, development and implementation of research projects, exchange of research results, etc.

Implementation of strategies and programs. As part of the State Program for Development of the Aral Sea Region 2017-2021, the Ministry of Emergencies and the State Forestry Committee conduct afforestation on the exposed Aral Sea bed to prevent transportation of harmful salts from the bed into the atmosphere.

Afforestation on the exposed bed of the Aral Sea in 2018-2021 (thsd ha), under a state program by the Ministry of Emergency and State Forestry Committee

	2018-2019	2019-2020	2020-2021
Afforested area, thsd ha	461	706	354
– by seeding, including:	400	663	341
– aeroseeding	300	497	300
– mechanized seeding	100	166	41
Planting seedlings	61	40	13
Seeded pastures	–	3	3

The "Strategy for implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 in the Republic of Uzbekistan" (PCM RUz 299 of 12.04.2019) is further carried out. Uzbekistan chaired the Working Group meeting[83], which considered and agreed upon a number of draft documents (July 28-29, Tashkent) proposed for discussion at the upcoming Regional Forum-Meeting of the heads of emergency authorities in CA countries. The Forum approved the Strategy for development of cooperation between the CA countries in DRR for 2022-2030, the Regulation on the Regional mechanism for coordination of emergency response, the Action plan for implementation of the above Strategy, and other documents (November 4-5, Tashkent). The next Regional Forum is to be held in Dushanbe in 2022.

Events. Representatives of Uzbekistan took part in (1) the 1st Steering Committee meeting under the Strengthening Financial Resilience & Accelerating Risk Reduction in Central Asia Program (June 3, online); (2) XXXIII meeting of the Interstate Council for Natural and Anthropogenic Emergencies (July 2, Cholpon-Ata, Kyrgyzstan); (3) IX International Scientific-

[83] Within the framework of the UNDRR Initiative "Strengthening disaster resilience and accelerating implementation of Sendai Framework for Disaster Risk Reduction in Central Asia" financed by EU

Practical Conference (September 29-30, Minsk, Belarus).

Foreign Policy and International Cooperation

In 2021, the President of Uzbekistan paid official and working visits to Turkmenistan (April, August, November), Tajikistan (June, September), Turkey (November), the Russian Federation (November, December), Kazakhstan (December), and South Korea (December).

The country was visited by: the Presidents of Kyrgyzstan (March), Republic of Tatarstan (June), Afghanistan (July), Turkmenistan (October); the delegations from Saudi Arabia (January, July), Russian Federation (April, June), Parliament of South Korea (April), Qatar (June), Turkey (March, July); the Prime Ministers from Hungary (March), Tajikistan (May), Pakistan (July), Azerbaijan (July); the Foreign Ministers from Iran (April), PRC (July), Russian Federation (July), Tajikistan (July), Turkmenistan (July), Kazakhstan (July), India (July), Kuwait (July), Bangladesh (July); the Chairman of the 75th UNGA session (July), the UNECE Executive Secretary (July), WB delegation (September).

Key developments in the foreign policy of Uzbekistan in 2021

The aim of the republican foreign policy is to ensure dynamic and sustainable political, socio-economic, secular and democratic development of Uzbekistan. The most important objective is enhancing good-neighborly relations and strategic partnerships, first, with the CA countries.

Development of alliances and strategic partnerships. The country continues building cooperation with the CIS and CA countries in political, trade and economic, transport and logistics, cultural, humanitarian and other spheres. The President of Uzbekistan speaking at the **Consultative Meetings of the Heads of CA States** underlined that: (1) regional energy security becomes especially important and particular attention should be paid to green energy and energy efficient technologies. He proposed to enhance the work of the Coordination Energy Council of the CA countries by extending its mandate and powers and increasing the representation of the countries; (2) regional environmental challenges should be in the focus and all measures should be taken to mitigate the Aral Sea catastrophe. Sh. Mirziyoyev also proposed to elaborate a Green Agenda program for the region to promote adaptation and adoption of resource-saving technologies.

As a member of **CIS**, Uzbekistan took part in the meetings of the Council of Heads of CIS States (October 15, online), Council of the Heads of Government (May 28 and November 12, Minsk), Council of Foreign Ministers (April 2, Moscow; October 14, Minsk), Economic Council (March 12, June 18, September 24, December 2), and in informal summit of CIS Heads of State (December 28, St. Petersburg).

The President of Uzbekistan took part as an invited guest in the **CSTO extraordinary session** devoted to the situation in Afghanistan. Finally, an agreement was reached to continue joint consultations and regular exchange of information on the situation in the region (August 23, videoconference).

Uzbekistan was represented as an **observer country** in a meeting of **EAEU**. Sh. Mirziyoyev expressed readiness of Uzbekistan to take part in the High-level Working Group and proposed to approve an Action Plan for green development (December 10).

Chairmanship in international organizations. SCO. At the high-level anniversary meeting of the SCO Council of Heads of State, **the presidency of the organization for 2021-2022 was passed to Uzbekistan**. In his report, Mirziyoyev drew attention to urgent tasks on the SCO agenda, expressed concern over the current situation in Afghanistan, proposed to hold regular high-level meetings in the "SCO-Afghanistan" format and announced readiness to organize the first such meeting in Tashkent. He also put forward an initiative to "...jointly prepare a long-term infrastructure development program in the SCO region, which could include cross-border projects in the field of energy, communications and green development"... (September 17).

Uzbekistan participated in (1) the regular meeting of the Council of National Coordinators of SCO Member States (April 27-30, Tashkent); (2) the 16th Meeting of Secretaries of SCO Security Council (June 23); (3) the meeting of the Council of Foreign Ministers of SCO Member States (July 13-14).

Promotion of the national interests and reinforcement of the country's image. Uzbekistan enhances cooperation efforts and strengthens its positions in regional and international organizations.

ECO. Uzbekistan took part in (1) 14th ECO Summit (March 4, online); (2) 4th Business forum of the ECO member-states (November 26, Ashkhabad); (3) 25th meeting of the Council of Ministers (COM) of ECO (November 27, Ashkhabad); (4) 15th Summit of the Leaders of the ECO member states. The President of Uzbekistan in his speech proposed to establish a permanent Council for high-level dialogue, with the involvement of international scholars and experts in the field of natural environment. The chairmanship in ECO will be passed to Uzbekistan in 2022.

Turkic Council. The President of Uzbekistan at the informal summit proposed to develop a strategy of economic cooperation for the short- and medium-term, improve the transport and transit potential of the region, etc. (March 31, online). At the 8th Summit of the Cooperation Council of Turkic Speaking States

Sh. Mirziyoyev proposed to create a permanent Platform of experts and IT-specialists and hold a conference of experts in 2022. He also proposed to found an organization in cooperation with the UN to protect the natural environment of Turkic countries. Heads of State adopted Istanbul Declaration and agreed to convene 9th Summit in Uzbekistan in 2022 (November 12, Istanbul).

UN. Uzbekistan initiated a special resolution on declaring the Aral Sea region a zone of ecological innovations and technologies, which was adopted by the UN General Assembly on 18 May 2021.

Uzbekistan was elected to the Human Rights Council for 2021-2023. As a Council's member; Uzbekistan ratified the Convention on the Rights of Persons with Disabilities[84] (on 07.06.2021), initiated the resolution on "Human rights implications of the COVID-19 pandemic on young people" (A/HRC/48/L.26/Rev.1 of 06.10.2021), and hosted the World Conference on Youth Rights (August 12-13) and the Regional Forum with the participation of civil society women's organizations under the auspices of Central Asia Women Leaders Caucus (December 20).

Uzbekistan is represented in the HRC Bureau[85] for the first time. The country's permanent representative in Geneva became deputy chair of the HRC for 2022.

Uzbekistan hosted: International Conference "New trends in foreign policy of Uzbekistan: status and prospects in relationships with the Central Asia countries and Afghanistan" (January 21); International Conference "Central and South Asia: regional interconnectedness. Challenges and opportunities" (July 15-16); Forum "Central Asia: at the crossroads of civilizations" (September 15-16); International week of innovation ideas "InnoWeek.Uz-2021" (November 22-27).

Sources:

Official sites of the:

President of Uzbekistan, https://president.uz/en;

Legislative chamber of Oliy Majlis, https://parliament.gov.uz/en;

МИД, https://mfa.uz/en;

Ministry of Investment and Foreign Trade, https://miit.uz/en;

Ministry of Water Management, http://www.water.gov.uz/en;

Ministry of Energy, https://minenergy.uz/en;

Goskomecologiya, http://eco.gov.uz/en;

Ministry of Agriculture, http://www.agro/uz/en;

National law database, http://www.lex.uz;

Institute of Strategic and Inter-regional Studies, http://isrs.uz/en/;

http://cis.minsk.by/news;

http://e-cis.info

Information agencies and sites:

http://www/uzdaily/uz/;

http://norma.uz;

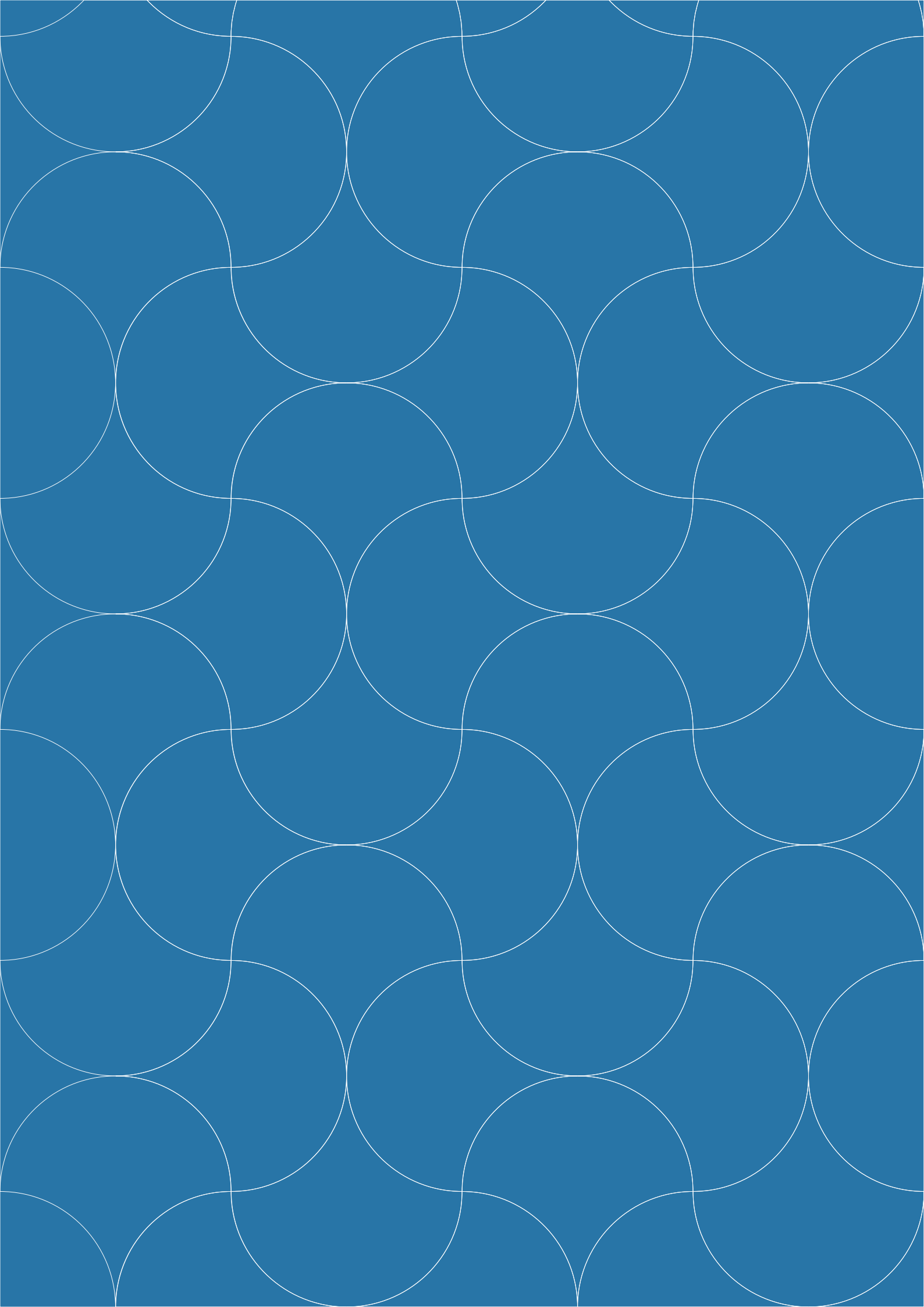
https://dunyo.info/en;

http://ru.sputniknews.ru;

http://kun.uz

[84] Convention on the Rights of Persons with Disabilities was adopted by resolution 61/106 GA of 13.12.2006

[85] The Bureau of the Council consists of five people – one President and four Vice-presidents – representing the five regional groups. Uzbekistan will represent the Asia-Pacific region



Section 6

United Nations and its Specialized Agencies

6.1. General Assembly

The 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 meets on September each year.

The 76th Session of the UN General Assembly opened on the theme "Building Resilience through hope to recover from COVID-19, rebuild sustainably, respond to the needs of the planet, respect the rights of people, and revitalize the United Nations".

Discussions in this 76th Session were focused on collective challenges the world must tackle, including political and security crises and global issues such as the fight against climate change, biodiversity protection, health, the defense of human rights, international humanitarian law, gender equality and access to free, pluralistic and reliable information. The Session took place in a hybrid format due to the COVID-19 pandemic with in-person meetings and videoconferences.

Statements from Central Asian countries at the general debate of the UNGA 76th Session

Address by the President of the Republic of Kazakhstan

"In many ways, the pandemic has exposed our vulnerability…"

Kassym-Jomart Tokayev focused on the triple threat humankind faces today: COVID-19 recovery; the climate crisis; and the humanitarian situation in Afghanistan.

Pandemic and inequality. The President of Kazakhstan reminded that in the last year, the COVID-19 pandemic had exploded from 32 million to 225 million confirmed cases and the economic and social repercussions remained very difficult. Unemployment has risen sharply and hundreds of millions of people are losing their livelihoods. More than 130 million people are now living in extreme poverty. Decades of development progress are being lost.

Climate change. […] "Carbon dioxide levels are at record highs. Wildfires, cyclones, floods and droughts have become the new normal, devastating populations and causing much preventable human suffering. As a large landlocked country, Kazakhstan's climate is warming faster than the global average and threatening our population and economy. The median annual temperature has increased 2°C in the last 75 years with serious droughts now striking twice every five years. In response, Kazakhstan intends to achieve carbon neutrality by 2060. We are launching a national 2050 low carbon development strategy next month to reduce GDP energy intensity by 50% from 2008 levels. Since almost 70% of Kazakhstan's electricity generation depends on coal, the energy transition presents significant challenges. Access to green financing and green technologies will be critical to this transition, and we look to the upcoming COP26 conference in Glasgow for clear commitment on these issues. Without ambitious green financing, ambitious climate action is empty. We also give great importance to the COP15 of the Convention on Biological Diversity in Kunming in October 2021." […]

Aid to Afghanistan. Turning to Afghanistan, the President of Kazakhstan endorsed the UN Security Council's call for the establishment, through negotiations, of a new Government that is inclusive. "A consensus-based system must be put in place where groups of different values, or ethnic, religious and gender background can coexist in the same country. In general, Kazakhstan envisions Afghanistan as a truly independent, sovereign nation living at peace with itself and its neighbors."

SDGs. […] "Implementation of the 2030 Agenda and SDGs has suffered a considerable setback. Least Developed countries, Landlocked Developing Countries and Small Island Developing States – some 91 countries in total – are disproportionately affected by the pandemic given their limited means to respond to shocks and vulnerability to a debt crisis. As the Global Chair of the LLDCs, Kazakhstan appeals to

all UN agencies to work together to deliver on the 2024 Roadmap for Accelerated Implementation of the Vienna Program of Action. The 2030 Agenda will remain unattainable until all countries have the financial capacity to invest in a sustainable and inclusive future. In this regard, we specifically call on all development partners to jointly address international liquidity and debt vulnerabilities." […]

Full version of the statement:
https://www.akorda.kz/en/kazakhstan-president-kassym-jomart-tokayevs-video-statement-at-the-general-debate-of-the-76th-session-of-the-un-general-assembly-228202

Address by the President of the Kyrgyz Republic

Given the situation in Afghanistan, the question of the security of Central Asia was once again on the forefront, stated the President of the Kyrgyz Republic Sadyr Zhaparov. In his video-address to participants of the 76th Session, he proposed holding in 2022 a Central Asia-UN Summit and establishing a Center to combat international organized crime in Bishkek.

Afghanistan. "We cannot fail to mention our concern regarding recent events in Afghanistan. We are in a position to provide five hundred young Afghans with an opportunity to study in our universities and also to provide humanitarian assistance to those in needs, first of all, these would be ethnic Kirghiz living in little and big Pamir area of Afghanistan," said the President. He stated that Kyrgyzstan is ready to temporary relocate the UN agencies from Afghanistan in Bishkek.

Pandemic and external debt. Speaking on fighting against COVID-19, Sadyr Zhaparov thanked China, Russia, Kazakhstan and Switzerland for provision of vaccines to his country. "The coronavirus pandemic was also a reason for the fact that achieving SDGs in Kyrgyzstan was not possible on time and fully. We have had to re-channel finances earmarked for the SDGs to combat the pandemic and to service external debt," noted the President. He urged creditors to support the initiatives on debt relief to back very important sustainable development projects in Kyrgyzstan. The President reminded that Kyrgyzstan celebrated on the 31st of August 30 years of country independence and next year the 2nd of March would mark a 30th anniversary of Kyrgyzstan joining the United Nations Organization as a fully-fledged member. Given this historical event, Kyrgyzstan has put forward its candidacy to the UN Human Rights Council for 2023-2025 and its candidacy as a non-permanent member to the UN Security Council for 2027-2028. "We urge all UN member states to support us in the elections," said the Head of State. By stating that Kyrgyzstan stays on the way of democracy and strong civil society, Mr. Zhaparov noted that general elections were awaited to the national parliament on the 28th of November and called for sending international observers to the elections.

Preservation of mountain ecosystems. […] "Over the past three decades Kyrgyzstan has been active advocate of the interests of mountain states that are landlocked in order to tackle the challenges of the sustainable development and climate change. On our initiative, 2002 was declared The International Year of Mountains and that year in Bishkek there was a first Global Mountains Summit, and in 2018 there

"We pay particular attention to protecting the areas of our mountain forests that … also play a very important role of preserving water resources"

was the 4th World Mountains Summit. During the Session of UN General Assembly, as a member of the Group of the friends of mountain countries, we are hoping that 2022 will be declared the International Year of Mountains, this would to confirm the five-year plan for sustainable development in mountain regions up to 2027 and then to create a Global Summit "Bishkek+25". […]

Fight against climate change. […] "In the past few years, the people and nature in our country have significantly felt the negative impact of climate change. The position and views of our country will be put forward clearly in the forthcoming COP26 in Glasgow. And I would take an opportunity of this important rostrum to make a few remarks nonetheless. For mountainous Kyrgyzstan one of the priority urgent areas is climate change adaptation. We pay particular attention to the protecting the areas of our mountain forests. Along with playing a natural function of absorbing carbon, they also play a very important role of preserving water resources. In this context, we are in favor of developing and adopting under aegis of the UN a special target program on mountainous forests to protect, reclaim and afforest mountain slopes. As I previously mentioned, age-old glaciers, rivers and mountain biodiversity are under threat in Kyrgyzstan. This year in UNESCO we are initiating a resolution to protect mountain glaciers and, at the same time, to continue working with international partners to implement provisions of the resolution "Nature knows no borders" put forward by Kyrgyzstan and recently approved by the UNGA.

Some significant achievements have already been made. For example, thanks to the work with different countries and international organizations, we have managed to protect such a precious animal as snow leopard. Furthermore, by 2050, Kyrgyzstan will try to achieve carbon neutrality. Kyrgyzstan's economy is becoming "greener" and we are going to turn to carbon-free energy sources, and I think this involve, first of all, hydroelectricity. In order to ensure energy security, Kyrgyzstan intends to gradually implement a number of projects to build hydroelectric stations that are ecologically clean sources of energy. Access to modern, environmentally friendly and inexpensive energy resources in developing countries is extremely important in terms of achieving global development goals of the 2030 Agenda. We believe that implementation of hydroenergy projects in Kyrgyzstan will meet the needs of Central Asian countries for hydroelectricity and this will create good conditions for sustainable development of our region. I would invite investors for mutually beneficial cooperation in the hydroenergy sector, including on base of public-private partnership principle in the spirit of the Paris Agreement. In concluding this particular topic, Kyrgyzstan trusts that the support and assistance of the world community, the UN and international financing institutions will be paid to solving the problems of ecosystems of mountainous countries especially those that are landlocked. In this regard we trust that the issue of setting up a special global fund within the UN to support the mountainous countries in achieving the several development goals and adapting to climate change will be tackled." […]

Record of video-address:
https://media.un.org/en/asset/k19/k19mus3qov

Address by the President of the Republic of Tajikistan

"As a result of climate change and unprecedented warming, more than 1,000 of 13,000 glaciers in Tajikistan's mountains have completely melted"

In his video address to participants of the 76th Session of the UNGA the President of Tajikistan Emomali Rahmon urged that an inclusive Government of Afghanistan be formed and include ethnic Tajiks. He paid particular attention to the issue of climate change, underlining that more than thousand of 13,000 glaciers in the mountains of Tajikistan had already melted.

"The already volatile situation in the current world is further complicated by geopolitical and geo-economic competition and the growing level of threats and challenges, as well as the unprecedented spread of infectious diseases," said the President.

Afghanistan. Speaking on Afghanistan, he underlined that recent developments in Afghanistan posed a serious threat to regional security and stability in the country, which shares almost 1,400 km of border with Afghanistan. "The rise to power of the Taliban, which is listed as a terrorist group by the United Nations Security Council, has further deteriorated the region's already complex geopolitical process", added Mr. Rahmon. The President expressed regret at the Taliban's failure to deliver on its earlier promises to form an inclusive government. An extensive dialogue with the involvement of all segments of the Afghan society, including ethnic Tajiks, could only lead to the lasting peace and stability in that country. "In this regard, along with other ethnic groups of this country, the Tajiks of Afghanistan, who comprise more than 46% of the population of this country, have the right to take their deserved pie in the public affairs," stressed the Head of Tajikistan. He condemned all forms of lawlessness, murder, looting and oppression against the people of Afghanistan and told about the humanitarian crisis in Panjshir Province by stating that the current situation was a humanitarian catastrophe there. By stating that Tajikistan will not interfere in the internal affairs of Afghanistan, the President proposed to set the structure of the government in that country through a referendum, taking into account positions of all citizens in the country. "During more than 40 years of war and instability, which the Afghan people are not to blame for, Afghanistan has become the ground for geopolitical games; and the world is well aware of the consequences of the horrible events of September 2001", said E. Rahmon. The President of Tajikistan expressed his concerns over the pandemic and its negative effects on economy and welcomed the UN Comprehensive Response to COVID-19 launched by the Secretary General.

Climate change. […] "Climate change challenges are also a serious obstacle to achieving the Sustainable Development Goals in various countries, including Tajikistan. Tajikistan with 93 percent of its territory covered by mountains is concerned, along with other countries in the region, about changes in the hydrological cycle leading to severe floods and droughts and causing a negative impact on water, energy and food security. Unfortunately, our country loses hundreds of millions of dollars annually as a result of waterborne disasters, and in many cases, natural disasters cause human losses and destruct the vital infrastructure. We are today on the eve of the 26th session of the

United Nations Convention on Climate Change. We believe that this meeting will significantly contribute to achieving the goals of the Paris Agreement and accelerating the efforts of the international community in the fight against climate change. One of the serious consequences of this process is the melting of glaciers. As a result of climate change and unprecedented warming, more than 1,000 of 13,000 glaciers in Tajikistan's mountains have completely melted. According to available statistics, the Fedchenko Glacier alone has shrunk to 11 square kilometers in recent decades in Tajikistan and lost 2 cubic kilometers of ice. This all is happening despite the fact that up to 60% of Central Asia's water resources originate from Tajikistan's glaciers. Our country ranks 135th in the world in terms of carbon dioxide emissions and generates 96% of its electricity at hydropower plants. As the leader of such a country, I have made concrete proposals at international conferences on several occasions to find solutions to the problems associated with climate change. In this regard, as a member of the founding group of the World Water and Climate Coalition, I proposed at its first high-level meeting to declare 2025 as the International Year for Preservation of Glaciers. It is my firm belief that this initiative will help to attract more attention of the world community to the water and climate challenges and the melting of glaciers. Establishing the International Fund for Glacier Preservation under the auspices of the United Nations is another step that could provide a basis for comprehensive research and effective solutions to this global problem. Tajikistan contributes to the process of promoting water and climate issues in the Global Development Agenda and submits relevant UN resolutions on these issues. The International Decade for Action "Water for Sustainable Development, 2018-2028" initiated by Tajikistan and declared by the United Nations, is under implementation currently. The international community is looking forward to the United Nations Conference on the Comprehensive Mid-Term Review of this Decade, to be held in New York City in 2023. Because in almost 50 years, this will be the second Special Conference of the United Nations on Water, which will once again prove the key role of water in the global development agenda and the Sustainable Development Goals. We are proud that Tajikistan, together with the Kingdom of the Netherlands, is elected as a co-chair of this important international forum. In this regard, we have already begun preparations with our partners, including the Kingdom of the Netherlands and the United Nations Department for Economic and Social Affairs, and are taking steps to organize a comprehensive and high-level conference. We would like to encourage all stakeholders to cooperate extensively in this process. Let me recall that in 2022, our country will host the International High-Level Conference on the Review of the International Decade for Action "Water for Sustainable Development". We believe that this forum will play an important role in the preparations for the 2023 Water Conference. Taking this opportunity, I reaffirm my country's readiness to advance water and climate issues at all levels, especially in cooperation with the United Nations".

Full version of the statement:
https://www.mfa.tj/en/main/view/8705/speech-by-the-president-of-the-republic-of-tajikistan-at-the-general-debates-within-the-76th-session-of-the-un-general-assembly

Address by the President of Turkmenistan

Recent years, the world has not become safer, and the global community needs to take measures to ensure more active international cooperation and enhance mutual trust. This was what the President of Turkmenistan Gurbanguly Berdimuhamedov spoke about at the 76th Session of the UNGA.

Peace and neutrality. "The past period was marked by serious problems in terms of ensuring global peace and security, exacerbating local and regional conflicts. Under such circumstances, Turkmenistan, as a responsible member of the world community will continue to consistently assist in resolving international issues by only peaceful, political, and diplomatic means based on principles and norms of the UN Charter." The President of Turkmenistan informed on the plans to summon an International conference "The policy of peace and trust as the foundation of international security, stability, and development" in December this year in Ashgabat, proposed to draft a General Assembly Resolution "Strengthening regional and international cooperation aimed at ensuring peace, stability and sustainable development in the Central Asian region", and reiterated his proposal to create the zone of peace, trust, and cooperation in "Central Asia – Caspian region."

Fight against the pandemic. Speaking about combatting COVID-19, the President of Turkmenistan

"We will continue to pay and draw the world community's unflagging attention to issues on mitigating the consequences of an ecological catastrophe of the Aral Sea"

underlined that the world community efforts in that direction were still insufficient and the pandemic had exposed serious systemic failures in the international response to such challenges. "… the World Health Organization is a major platform for multilateral dialogue to develop consolidated and mutually agreed

responses to common challenges in the field of global healthcare," stressed G. Berdimuhamedov in his statement. The President proposed to consider issues on instituting the following international and regional instruments during the 76th session: the World Health Organization Special Program for studying the genome of coronavirus; Multilateral mechanism of WHO to fight against pneumonia; Methodological center of WHO to treat and prevent acute infections; the Central Asian regional center for epidemiology, virology and bacteriology.

Situation in Afghanistan. Concerning the situation in Afghanistan, the President stressed that Turkmenistan was deeply interested in the political stability and security in Afghanistan, the well-being and unity of Afghan people. "At the same time, we are firm adherents of resolving contradictions by peaceful, political and diplomatic means. Turkmenistan, for its part, will provide comprehensive economic and humanitarian aid to Afghanistan as before."

Sustainable Development Goals. […] "During this session, Turkmenistan looks forward to continuing broad dialogue on achieving Sustainable Development Goals. In our view, effective collaboration and practical compatibility of the global, regional, and national instruments for SDG implementation have become a major priority today. We stand for the active promotion of adequate financing of the 2030 Agenda for Sustainable Development. In this regard, we think it necessary to organize another international conference on development financing very soon. We will continue to pay and draw the world community's unflagging attention to issues on mitigating the consequences of an ecological catastrophe of the Aral Sea. Turkmenistan plans to achieve the goal of establishing a UN Special Program for the Aral Sea basin with its partners from the region during the upcoming session." […]

Full version of the statement:
https://www.mfa.gov.tm/en/articles/537

Address by the President of the Republic of Uzbekistan

"We are determined to achieve the goals of the Paris Agreement"

COVID-19, Afghanistan, and ecology were among the main topics addressed by the President of Uzbekistan during the general debate of the 76th UNGA Session. In his video-address, Shavkat Mirziyoyev shared the plans to make Uzbekistan one of the countries with the above-middle income by 2030.

Pandemic. The President of Uzbekistan qualified the COVID-19 as "a global disaster" and expressed his gratitude to foreign partners, who have provided the assistance in the framework of the COVAX global platform for equitable access to vaccines. Shavkat Mirziyoyev informed that Uzbekistan had developed the Code of Voluntary Commitments of States during Pandemic and distributed as an official document of the UN General Assembly.

New Uzbekistan Strategy. The President told on the developed New Uzbekistan Strategy, which was to "strengthen the role of civil society institutions, protect human rights, reduce poverty, provide each citizen with a guaranteed source of income and achieve sustainable environmental development." Uzbekistan is to become one of the countries with above-middle income in terms of the per capita income by 2030.

Afghanistan. "Our main objective is to make Central Asia a place of prosperity and sustainable development, trust and friendship," stated President Mirziyoyev, underlining that Afghanistan is an integral part of Central Asia. He informed that the Uzbek-Afghan border had been recently opened and the supply of basic-needs and oil products, as well as electricity had been resumed to this country. "During these challenging times, Afghanistan may not be isolated and left to face a range of its problems alone."

Counter-terrorism and fight against drugs. Speaking on conflicts and terrorism, the Head of Uzbekistan reminded on the international conference to be held in November in Tashkent to present the results of the ten-year joint plan of the UN Global Counter-Terrorism Strategy in Central Asia. During the conference, Uzbekistan intends to sign a Regional Program for Central Asia for 2022-2025 with the United Nations Office on Drugs and Crime and develop a joint action plan against drugs with the participation of this UN Office, covering the countries of Central and South Asia.

Ecology and clean energy. […] "Uzbekistan pays a special attention to combatting the climate change, protecting the environment and biodiversity. This is our noble human duty not only for today, but also before the future generations. I would like to take this opportunity to express my deep gratitude to all Member States for the adoption of a Special Resolution of the UN General Assembly declaring the Aral Sea Region a zone of environmental innovation and technology. We are determined to achieve the goals of the Paris Agreement. We are taking concrete steps to move towards the renewable energy sources. In

particular, it is envisaged to double the energy efficiency of our economy by 2030, increase the share of renewable energy by 25% and develop environmentally clean transport. By 2025, it is scheduled to commission new solar and wind power plants with a total capacity of 2,900 megawatts. In 2022, we intend to hold a High-Level International Forum in cooperation with the United Nations on "green energy" in the Aral Sea Region in the city of Nukus.

We support the adoption of the Global Biodiversity Program in the near future. In addition, in the future we stand ready to host one of the meetings of the parties to the Biodiversity Convention in our country. Along with this, we propose to hold the Sixth High-Level Assembly under the auspices of the United Nations in 2023 in Uzbekistan for in-depth discussions of the priorities of global environmental policy. The participants of the Assembly will have an opportunity to learn about the difficult situation in the Aral Sea Region, which is the center of an ecological disaster caused by the drying up of the Aral Sea, and draw necessary conclusions. In addition, we intend to put forward an initiative in the Assembly to develop a Global Environment Charter aimed to lay the foundations of a new environmental policy of the United Nations." […]

Full version of the statement:
https://president.uz/en/lists/view/4632

Selected Resolutions on water, environment and development adopted by the 76th Session of the UNGA:

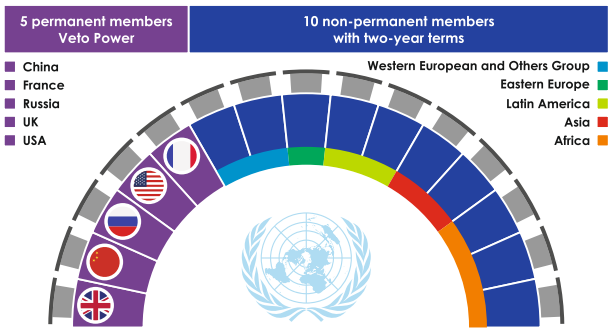
Protection of the atmosphere (A/RES/76/112); International Year of Sustainable Mountain Development, 2022 (A/RES/76/129); The human rights to safe drinking water and sanitation (A/RES/76/153); Agricultural technology for sustainable development (A/RES/76/200); Disaster risk reduction (A/RES/76/204); Protection of global climate for present and future generations of humankind (A/RES/76/205); Implementation of the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (A/RES/76/206); Implementation of the Convention on Biological Diversity and its contribution to sustainable development (A/RES/76/207); Report of the United Nations Environment Assembly of the United Nations Environment Programme (A/RES/76/208); Ensuring access to affordable, reliable, sustainable and modern energy for all (A/RES/76/210); Science, technology and innovation for sustainable development (A/RES/76/213).

6.2. Security Council

The Security Council (UNSC) 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 UNGA for two-year terms for five countries each year.

UNSC activity in 2021

Several high level open debates took place:



■ **"Addressing climate-related security risks to international peace and security through mitigation and resilience building"**. During the meeting, which was attended by heads of state and government, several Council members, including Kenya and Niger, underlined the link between climate change and conflict while others, including Russia and China, questioned this view, arguing that political and economic factors are the key drivers of tension and conflict. At the meeting, Guterres called the climate emergency "the defining issue of our time". Advocating for enhanced "preparations for the escalating implications of the climate crisis for international peace and security", he highlighted four priorities to address the crisis: (1) cutting greenhouse gas emissions; (2) increasing investment to help countries and communities adapt and develop resilience; (3) encouraging a concept of security that "puts people at its center", whereby "[p]reventing and addressing the poverty, food insecurity and displacement caused by climate disruption contribute to sustaining peace and reducing the risk of conflict"; and, (4) calling for a collaborative approach between actors within and outside the UN system to help tackle the climate crisis (February 23).

■ **"Security in the context of climate change".** António Guterres and Ilwad Elman, the chief operating officer of the Mogadishu-based Elman Peace and Human Rights Centre, briefed. During the meeting, Guterres emphasized that "climate change and environmental mismanagement are risk multipliers" and that when "coping capacities are limited and there is high dependence on shrinking natural resources and ecosystem services such as water and

fertile land, grievances and tensions can explode, complicating efforts to prevent conflict and sustain peace". Elman said that her organization had realized that their peacebuilding goals and mediation work "could not succeed or be sustained unless we addressed the broader environmental issues related to security – whether it be the locust- and drought-induced scarcity of resources that multiplies the threat of intraclan conflict, the decrease of tuna swarms that drives Somali fishing communities towards piracy, or the flooding that continues to drive regional displacement and vulnerable people to violent extremist groups". She called on the UN, including the Security Council, to be receptive to bottom-up, local efforts to build resilience to the adverse effects of climate change. (September 23).

- **"Security in the context of terrorism and climate change"** chaired by the President of Niger M. Bazoum. A. Guterres, Mr. Moussa Faki Mahamat, Chair of the African Union Commission, and Mr. Mamman Nuhu, Executive Secretary of the Lake Chad Basin Commission and Head of the Multinational Joint Task Force briefed in the meeting (December 9).

The Informal Expert Group of Members of the Security Council on Climate and Security (IEG) has held two meetings to discuss the security implications of climate change in situations on the Council's agenda. The first meeting, held on 12 March, focused on the area covered by the UN Office for West Africa and the Sahel (UNOWAS). A senior UNOWAS official briefed the IEG on the impact that climate change is having in the region and highlighted the challenges and opportunities for UNOWAS in addressing climate change-related security risks. During the second meeting of the IEG, held on 30 April, the group met with the deputy head of the UN Mission in South Sudan (UNMISS), Guang Cong. The discussion centered on what the mission is doing to integrate climate change-related security risks into its work in light of the adoption of resolution 2567 on 12 March, which included new language on climate change in the mission's mandate.

Source: www.securitycouncilreport.org/

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. In June 2021, Antonio Guterres (Portugal) was re-elected for a second term of the Secretary-General position (January 1, 2022-December 31, 2026).

"In these turbulent times, the work of the United Nations is more necessary than ever to reduce suffering, prevent crises, manage risks and build a sustainable future for all."

António Guterres, 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. 2021 Report highlights the work in the following key area: **sustainable development** (more than **240 million people** received essential services with support from UN country teams and resident coordinators; **120 million people** benefited from social schemes); **peace and security** (deployed **40+** peacekeeping, special political missions and offices to prevent conflict and support peacebuilding efforts); **development in Africa** (supported **38** countries and **3** Regional Economic Communities in developing national strategies to harness the benefit of the African Continental Free Trade Area Agreement); **human rights** (engaged with resident coordinators and country teams in **59+ countries** to place human rights at the center of COVID-19 Socio-Economic Response Plans); **humanitarian assistance** (helped mobilize $19.1B to assist **264.2M people** in **64** countries and territories); **international justice and law** (deposited **632** multilateral treaties with the Secretary-General addressing matters of worldwide interest); **disarmament** (supported the Treaty on the Prohibition of Nuclear Weapons, which entered into force on 22 January 2021, following the fiftieth ratification); **drugs, crime and terrorism** (contributed to COVID-19 preparedness in detention centers in **more than 50** Member States, resulting in improved prison conditions and basic services for detainees).

Source: https://www.un.org/annualreport/index.html

6.4. United Nations Development Program

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 Activity in the Central Asian States in 2021

UNDP in Kazakhstan

UNDP in Kazakhstan focuses its activities on SDGs implementation, water and land management, environmental protection, climate change, energy and other relevant development issues. In 2021, UNDP project portfolio in Kazakhstan included 40 projects at the total cost of US$ 21.58 million.

SDGs. The Project "Support of the Government with SDG Financing Strategy" (2020-2022) to support the Government in aligning policy and financing with SDGs towards adopting an Integrated National Financing Framework continued. Since 1st of July, the Project "Regional SDG Platform" (2021-2023) is implemented to establish a regional SDG platform that will serve as a mechanism that will accelerate countries' national efforts in wider regional strategies for the attainment of the 2030 Agenda. A regional workshop on the Development Finance Assessment in the framework of the regional platform on SDGs in Central Asia was held. The key purpose of the Regional workshop on the DFA was to provide an overview of the DFA tool which is an integral element of the Integrated National Financing Framework's first structural block "Assessment and Diagnostics".

SDG Coordination Council's 5th meeting, chaired by the First Deputy Prime Minister of the Republic of Kazakhstan, Alikhan Smailov, took place on 12 March 2021. The key objective of the meeting was to look through/assess and discuss the outcomes of the work that has been conducted on SDGs implementation throughout 2020; to set up new priority objectives for 2021 and to approve the national list of SDG targets and indicators to be mainstreamed into the State planning system documents.

Water management. The Irrigation and Drainage in Kazakhstan, Capacity Building and Awareness Raising Project (2017-2021) was completed. The Project was designed to develop the capacities of RSE "Kazvodkhoz" and its branches in Almaty and Turkestan regions by changing institutional management and improving irrigation water management. *The 2021 results:* a new national development plan for RSE Kazvodkhoz 2020-2030 was drawn up and adopted by the Water Resources Committee in June; RSE Kazvodkhoz Chairman has endorsed the concept of irrigation water automation in August; three new formulas for the irrigation water tariffing for motorized and non-motorized pumping stations have been developed and accepted by the Committee for Regulation of Natural Monopolies in August.

Nature, land resources and ecosystem management. Continued: (1) Sustainable Forest Management (2017-2021) for conservation and sustainable management of key globally important ecosystems for multiple benefits; (2) Ecological Education in Kazakhstan (2020-2025). The key outcome of the project is training of over 6 thousand teachers and creating a network of educational and model sites, preparation of educational and methodological packages in the field of environment protection, natural resource management, and environment and economic security.

The following projects have been completed: (1) Supporting Sustainable Land Management (2015-2021) to transform land use practices in critical, productive, steppe, arid and semi-arid landscapes of Kazakhstan. The 2021 results: The Integrated Land Use Plan (ILUP) has been integrated into the educational curricula of the three agricultural extension centers in the Kyzylorda, Almaty, and Kostanai regions; the new Agro-Industry Sector Development Strategy 2022-2026 was approved by the Ministry of Agriculture on February 4; (2) Small Grants Program (2017-2021) focused on improving resilience of rural and peri-urban landscapes of steppe and desert ecosystems for sustainable development and global environmental protection.

UNDP recommendations on conservation and sustainable use of biodiversity were reflected in the new Environmental Code of Kazakhstan signed by the President of Kazakhstan on January 2, 2021. The document includes legal norms aimed at the conservation and sustainable use of biological diversity, based on the principle of equitable distribution of natural benefits and access to them. They include compensation for biodiversity losses, voluntary payments for ecosystem services, principles of sustainable ecotourism and the responsibilities of the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan for the development and approval of methods for calculating greenhouse gas emissions and uptake, including for the forest sector.

Energy and climate change. Continued: (1) Low-Carbon Urban Development (2014-2021); (2) Energy Efficient Standards and Labeling (2017-2022) to transform Kazakhstan's markets to energy efficient appliances and equipment, thereby reducing electricity consumption and GHG emissions; (3) De-Risking Renewable Energy Investment (2017-2023); (4) development of Kazakhstan's Eighth National Communication and Preparation of Two (Fourth and Fifth) Biennial Reports (2019-2022): chapters on national circumstances, education, transfer technologies and financial resources, GHG projections were developed; (5) Forest Carbon Offset Mechanisms, Bitfury Initiative (2019-2024) to assist to the Republic of Kazakhstan in fulfilling international obligations to reduce greenhouse gas emissions by reducing the carbon footprint of electricity suppliers for the leading technology company Bitfury; (6) National Determined Contributions Programme in Kazakhstan (2020-2022). Attracting Investors in the Field of Energy Efficiency Project was started to advance energy efficiency of buildings, infrastructure, and other facilities by attracting investment from investors and financial institutions to small and medium-sized enterprises (2021-2026).

Kazakhstan has developed a long-term Doctrine of Carbon Neutral Development until 2060 – a framework with a clear sustainable recovery, low-carbon development pathway, and energy sector transition. The doctrine provides a set of key measures to reduce emissions and decarbonize the economy, such as the abandonment of new coal-fired generation projects and the phasing out of coal combustion (2021-2025), the implementation of a program to plant 2 billion trees (2025), doubling of the share of renewable energy sources in electricity generation (2030), 100% sorting of municipal solid waste (2040), sustainable agriculture on 75% of arable land (2045), 100% electrification of personal passenger transport (2045), the use of green hydrogen only and complete refusal to use coal-fired production from 2050 onwards.

Capacity building. Continued Supporting the Economic Empowerment of Afghan Women (2019-2025).

Sources: www.kz.undp.org and https://open.undp.org/projects

UNDP in Kyrgyzstan

In 2021, the UNDP project portfolio in Kyrgyzstan included 29 projects totaling US$26.5 million.

SDGs. Continued (1) National SDGs Acceleration Support Platform (2018-2024) – an anchor point for advancing SDG integrated approaches; (2) project of the UN Joint Sustainable Development Goals Fund (2020-2022) aimed at creating an Integrated National Financing Framework.

Environmental protection. Continued: (1) Biodiversity of Western Tian Shan (2017-2022); (2) Climate Resilience of the Batken Province (2019-2022) under the UNDP Trust Fund for Development Climate Change Window. A workshop was held to coordinate actions with the national and development partners to ensure project sustainability and get recommendations on implementation of food security and gender strategy in Batken province (September) and the "Agro-climatic reference book in Batken Province" was presented; (3) Disaster Risk Reduction and Climate Change (2016-2022) to strengthen integrated risk governance capacities and regional cooperation in CA. Results to date: completed construction of the Dolon avalanche station; held consultations at regional level (expert level and high level) to develop regional cooperation; adopted an updated joint action plan; (4) Capacity in Sustainable Development Finance (2018-2022); (5) Capacity Building in Environment (2018-2022); (6) UN Support for Strengthening Disaster Preparedness (2012-2021) to support the coordination activities of the Disaster Response Coordination Unit; (7) Pamir-Alai Project (2021-2022) for integrated community-based management of high value mountain ecosystems in Southern Kyrgyzstan for multiple benefits.

Two meetings of the Working Group on updating Kyrgyzstan's NDC were held in January and April. The members of the working group were presented with information on the process of updating the NDCs, in particular on the development of the main sections, on the international reporting and verification monitoring system, on gender aspects and on the calculation of the cost of mitigation and adaptation measures.

In June, Kyrgyzstan hosted the First Local Conference of Youth (LCOY), which consisted of a series of three events in different regions of the country. The youth conference was organized by the public association "Students of Kyrgyzstan for a Green Economy" (SKGE) together with representatives of other youth organizations and university students in the country. The event became a reality with strong support from the "Policy Action for Climate Security in Central Asia" project, the second phase of which was launched in October.

The project aimed at improving institutionalization of gender mainstreaming practices into national policies according to the Gender Equality Strategy 2018-2022 has been completed.

Source: https://open.undp.org/projects

UNDP in Tajikistan

In 2021, UNDP project portfolio in Tajikistan included 42 projects with overall budget of US$ 29.65 million.

SDGs. Continued: (1) Financing SDGs in Tajikistan (2020-2022) to support the Government of Tajikistan in achieving its national SDG targets through an integrated resource mobilization framework; (2) Monitoring the SDGs in Tajikistan (2020-2022) for exploring the needs for and expanding support to strengthening national system for monitoring of SDG national indicators in close partnership with the Agency of Statistics under the President of Tajikistan. As a result, strategies for preparation of indicators/metadata for monitoring SDGs, including draft national framework on SDG have been developed.

Land and water resources. Continued: (1) Building Climate Resilience in Agriculture and Water Sectors of Rural Tajikistan (2019-2022), with the following results achieved: 4 local communities and 2 Jamoats were trained and have practical experience to rehabilitate watersheds with high flood risk; new orchards established in 28.4 ha of land; 7 projects on irrigation water and mudflow infrastructure rehabilitation initiated; two demoplots on drip irrigation established; (2) Support to Water Initiatives of Tajikistan

(2021-2022), the objective of which is to provide support in organization of the 2nd International Conference within the framework of the International Decade for Action "Water for Sustainable Development", 2018-2028, to be held in June 2022 in Dushanbe; (3) Strengthening Communities in Khatlon Region and Rasht Valley of Tajikistan (2020-2022) to equip the residents of pilot rural areas with skills for employment, self-employment and innovations in farming and agribusiness spheres.

The Tajikistan Water Supply and Sanitation Project, Phase III (2018-2021) aimed to strengthen relevant policy and reform development at the national level has been completed. The project results in 2021 included: developed and approved new version of the law on drinking water supply and wastewater disposal; developed and approved methodology for calculating tariffs for water supply and sanitation services; developed and approved technical guidance for water supply system and wastewater management in rural areas.

Energy. The Green Energy SME Development Full-Size Project (2018-2023) aimed to facilitate the transformation of Tajikistan's energy sector, in particular the emergence of independent energy entrepreneurs, has continued. An agreement was signed with the Tajik Ministry of Energy and Water Resources in October to develop the Energy Sector Development Concept, prepare awareness-raising stuff on energy conservation, energy efficiency and RES, and develop two special green loan products.

Climate change, ecosystems. Continued: (1) Snow Leopard Protection (2016-2022) aimed at conservation and sustainable use of Pamir Alay and Tian Shan ecosystems for snow leopard protection and sustainable community livelihoods; (2) Policy Action for Climate Security in Central Asia (2020-2022); (3) Integrated Landscape Approach to Climate Resilience (2019-2025); (4) Strengthening Disaster Risk Reduction and Response Capacities (2016-2022) that supports the Government of Tajikistan to undertake a nation-wide risk assessment, establish and implement risk reduction measures and improve early warning. In particular, risk assessments results were presented and riskinfo.tj portal was launched, and 70,000 seedlings were planted in 217.5 ha of land.

The following projects have been completed: (1) Conservation and Sustainable Management of High-Value Arid Ecosystems in the Lower Amu Darya Basin (2020-2021). Results achieved in 2021: all required technical reviews and studies conducted (gender analysis, identification of project sites, financial planning, co-financing, etc.); validation workshop conducted and report developed summarizing the outcomes of the validation workshop and other consultations; (2) Climate Promise: Support to NDC Revision in Tajikistan (2020-2021). Results achieved in 2021: the NDC Implementation Plan developed (5-10 year) and submitted to the Government; three position papers for UNDP-led policy work in support of the climate action in Tajikistan developed; (3) First Biennial Update Report and Fourth National Communication under the UNFCCC (2016-2021) to establish effective institutional, legislative and policy frameworks in place to enhance the implementation of disaster and climate risk management measures at national and sub-national levels. *Results achieved in 2021:* multilateral and bilateral consultations with key national ministries and departments for the GHG emission forecast exercise conducted; training of the local experts and specialists, engaged in energy (hydropower), transport, agriculture and industry sectors, delivered to capacitate them on the GHG emission current trends and forecast as well as on potential measures their agencies might undertake to minimize the climate change impact; (4) Facilitating Climate Resilience in Tajikistan (2017-2021) aimed to contribute to building climate resilient communities and address specific threats to lives and social infrastructure posed by climate-induced natural hazards. *Results achieved in 2021:* Dekonte LLC was contracted to conduct the assessment of the cost of no-adaptation studies in forestry and water sectors. Asian Institute for Technologies was involved to conduct assessment on introduction of climate risk insurance.

Sources: https://open.undp.org/projects and www.tj.undp.org/content/tajikistan/en/home.html

UNDP in Turkmenistan

In 2021, UNDP project portfolio in Turkmenistan included 28 projects totaling US$23.46 million.

SDGs. The Partnering for SDG Acceleration, Phase II (2021-2023) has been launched: series of meetings on updating the Sustainable Development Goals matrix, reporting, clarifying the responsible ministries and departments for each indicator for analysis and reporting was held; draft periodic national reports on the progress of the SDGs have been prepared; functional database of SDG indicators was created; and, a webinar on applying public-private partnerships to achieve the SDGs was organized. UN and the Government of Turkmenistan held the first meeting of the Joint Expert Group (JEG) to study and develop proposals for introduction of an Integrated National Financing Framework (INFF) for SDG financing in Turkmenistan.

Water management. The Energy Efficiency and Renewable Energy for Sustainable Water Management in Turkmenistan Project (2015-2022) has continued. In 2021, a scientific and practical seminar for specialists of water and agricultural sectors, land users, producers of agricultural products and students of agricultural universities of the country was organized to address the issues of irrigation water use efficiency.

Land management. The Conservation and Sustainable Management of Land Resources and High Value Ecosystems in the Aral Sea Basin for Multiple Benefits Project (2020-2021) has been completed.

Climate change and environmental protection. Continued: (1) Supporting Climate Resilient Livelihoods in Agriculture (2016-2022). *Results achieved in 2021:* gender sensitive local adaptation plans for farmer associations (6) and livestock farms (2) were designed and adopted; 3,061 targeted farmers of which 25% are women-headed households – and their family members, have adopted improved climate resilient on-farm soil and water management approaches; field days dedicated to rational use of irrigation water were organized in Lebap and Dashoguz project pilot regions; a national workshop on the development of a system of measurement, reporting and verification (MRV) of adaptation measures and a roundtable for discussion of a draft Law on agricultural extension services in Turkmenistan were organized; (2) Sustainable Cities in Turkmenistan: Integrated Green Urban Development in Ashgabat and Awaza (2017-2023). In 2021, a webinar on the topic "Learning international experience in the development of regulatory technical documents for the development of renewable energy in Turkmenistan" and a training seminar "Practical use of new laboratory equipment and capacity building of the environmental monitoring and control system" were organized; a national workshop was held on preparation of the Fourth National Communication on Climate Change and Initial Biennial Update Report of Turkmenistan under the UN Framework Convention on Climate Change (UNFCCC).

Sources: www.tm.undp.org and https://open.undp.org/projects

UNDP in Uzbekistan

The directions of UNDP's work in Uzbekistan reflect the current UN Country Programme Document and the United Nations Sustainable Development Cooperation Framework for 2021-2025. They also align with the national SDGs within the 2030 Agenda, and Uzbekistan's Development Strategy for 2017-2021.

In 2021, UNDP project portfolio in Uzbekistan included 40 projects with overall budget of US$25.54 million.

SDGs. The Financing for Sustainable Development Project was continued in 2021. Overall objective of the project is to enhance dialogue, coordination, national capacities and policy measures aimed at facilitation of effective financing strategy for the achievement of national SDGs in Uzbekistan. A draft Comprehensive national financing strategy has been developed and presented to stakeholders in the course of the international roundtable "Comprehensive SDG financing strategy in Uzbekistan" (November 17).

Water management. The Sustainable Management of Water Resources in Rural Areas in Uzbekistan: Component 2 on Technical Capacity Building started in 2016 has been completed.

Land and ecosystem management. Continued: (1) Sustainable Development of Mountain Ecosystems (2017-2022). The project developed the Snow Leopard monitoring SMART application to increase the efficiency of animal survey; a training workshop was organized on the use of the application for pilot protected areas, Gissar state reserve and Chatkal state biosphere reserve. The project also introduced a computer software for protected areas that are working with the camera traps. The Cabinet of Ministers has approved an Action Plan on Snow Leopard Conservation for 2021-2030; (2) Sustainable Rural Housing and Settlements in Uzbekistan (2015-2023) to transform the rapidly growing rural housing sector in Uzbekistan towards a more sustainable and low-carbon development pathway by designing, piloting and scaling-up a green mortgage market mechanism; (3) Complete HCFC Phase-Out in Uzbekistan (2018-2024) through promotion of zero ODS and low GWP energy efficient technologies.

Climate change. As part of the National Adaptation Plan (NAP) Project (2020-2023): the composition of an Inter-Agency Working Group on climate change adaptation was set and approved; UzHydromet has drafted the Climate Action Strategy for Uzbekistan until 2030 and submitted it to the Government; and, gender sensitive indicators were developed.

The following projects have been completed: (1) Resilience of Farming to Climate Change Risks in Fergana Valley (2019-2021); (2) Developing Climate Resilience (2014-2021) of farming and pastoral communities in the drought prone parts of Uzbekistan, specifically Karakalpakstan.

A number of new projects have been launched: (1) Towards Green Recovery in Uzbekistan (2021-2022): an International online forum "Building forward better: green recovery of Uzbekistan after the COVID-19" was organized on March 3-4; (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 (2021-2028) to increase resilience of Uzbekistan communities to climate change-induced hazards.

Aral Sea. Continued: (1) Sustainable Management of Lakes and Wetlands (2020-2021) as pillars of a resilient Aral basin landscape supporting sustainable livelihoods; (2) Building the Resilience of Local Communities against Health, Environmental and Economic Insecurities in the Aral Sea Region (2020-2022); (3) 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); (4) Addressing the Urgent Human Insecurities in the Aral Sea (2019-2022) to address the environmental, social and economic insecurities in the most vulnerable communities of the Aral Sea Region (see 2020 Yearbook, Expeditions on the Exposed Bed of the Aral Sea in 2019-2020).

Sources: www.uz.undp.org and https://open.undp.org/projects

UN Multi-Partner Human Security Trust Fund 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).

The UN General Assembly adopted on 18 May the resolution declaring the Aral Sea region a zone of ecological innovations and technologies. For implementation of the resolution, a Roadmap and a list of priority innovation projects were approved by the President's Decree (PP-5202 of July 29, 2021).

The Advisory Committee on Sustainable Development of the Aral Sea Region[86] held its 2nd and 3rd meetings on 30 March and 8 July, respectively. To date, the Advisory Committee has made considerable progress. The Government of Uzbekistan presented the draft of the Integrated Roadmap for the achievement of environmental equilibrium and ensuring of socio-economic development in this region. The socio-economic trends for the last decades and 2030 forecast scenarios for Karakalpakstan have been presented by UNDP.

Resources of MPHSTF. By November 2021, US$15.5 million has been mobilized in total. The Government of Uzbekistan provided its third tranche in the amount of US$1.5 million in February, and the Alwaleed Philanthropies, a philanthropic organization in the Kingdom of Saudi Arabia, made a contribution of US$200,000 to the Fund in May.

Projects. In 2021, the below projects were implemented:

- Towards universal health coverage and security in Karakalpakstan (2021-2023): A fourth expert mission was conducted on December 13-17, 2021 to Nukus, Kungrad and Muynaq. The outputs were: (1) a functional plan developed for the Muynaq-Kungrad medical network, including links to PHC; (2) preliminary ToRs drafted for a building plan for the Muynaq and Kungrad hospitals, including blue, green and resilient infrastructure.

- 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), the objective of which is to increase the efficiency and innovations in agriculture, promoting smart and digitalized communities, with favorable infrastructure and facilitating active labor market initiatives. *Results achieved in 2021:* (1) FAO conducted six trainings (two on horticulture, two on conservative agriculture, two on fishery) with a total of 155 beneficiaries, most of them women and youth; (2) access to clean drinking water has been provided to Kungrad central Republican clinic, polyclinic, and two schools with a total number of beneficiaries of 7,208 people.

- Investing in a resilient future of Karakalpakstan by improving health, nutrition, water, sanitation, hygiene and wellbeing of adolescents and by harnessing the talents of youth during and after COVID-19 (2021-2022) aimed to address the immediate needs of vulnerable populations, in terms of safe and clean schools and health care facilities, and other health and nutrition needs and to strengthen human capital and the resilience of youth in three districts (Muynak, Kungrad, and Bozatau). *Results achieved in 2021:* process of developing a knowledge hub (https://bilim.tma.uz/), which will serve as a one-stop digital platform for communication, information sharing, and a repository of all training materials and resources on health topics for healthcare workers in the country to support telemedicine and distance learning systems; equipped 88 young people, especially the most vulnerable and marginalized with social and living skills, and supported 15 youth-led projects.

- Improving the quality of perinatal care service to most vulnerable mothers and newborns (2019-2021), objective of which is to ensure the population's access to perinatal services through infrastructure improvement and provision of essential equipment to medical facilities and increase the quality of maternal and newborn health care services. *Results achieved in 2021:* 730 healthcare providers were trained on evidence-based maternal and newborn survival practices; 70% of Karakalpakstan's population is served with modernized target inter-district perinatal centers in Kungrad and Beruniy districts and Nukus city.

- Addressing the urgent human insecurities in the Aral Sea region through promoting sustainable rural development (2019-2021), aimed to mitigate the negative environmental, social and economic consequences for region's more vulnerable communities. *Results achieved in 2021:* 5 infrastructure projects on water purification and supply of drinking water implemented in Takhtakupir district; developed training module and brochures on Water, Sanitation, and Hygiene (WASH) for the population and a total of 150 people trained in WASH rules; two research expeditions were conducted on the dried seabed of the Aral Sea, covering 1.2 million ha of land. The book "Monitoring of the Dried Seabed of the Aral Sea" was published in Russian and English.

Source: www.aral.mptf.uz, Newsletter, issue 01

[86] The Advisory Committee on sustainable development of the Aral Sea region was launched on 1 December 2020 under the MPHSTF to serve as a single platform for accelerating sustainable development in the Aral Sea region

6.5. UN Water

In 2013, 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 2021

The 34th UN-Water Meeting was convened as a virtual event on 15-17 March 2021. The participants discussed advancing SDG 6 Global Acceleration Framework, the UN Conference on Midterm Review of the Water Action Decade 2018-2028, and planning for World Water Day 2021 and the UN World Water Development Report 2021.

The UN World Water Development Report 2021 "Valuing Water" was launched. The report shows that the inability to recognize the value of water is the main cause of water waste and misuse. It seems necessary to examine water's various dimensions in order to understand the various aspects of its "value". This is especially true in times of growing scarcity and against the backdrop of population growth and climate change.

The SDG 6 Summary Progress Update 2021 report provides the latest available country, region and world data on all of the SDG 6 global indicators. It outlines how far we have come in implementing the different aspects of SDG 6 in the different parts of the world, and where we are lagging behind.

The UN-Water issued two analytical briefs: (1) Water-use efficiency; (2) The United Nations global water conventions: Fostering sustainable development and peace.

Source: www.unwater.org

6.6. UN Economic Commission for Europe

UN 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 and Water Convention

UNECE serves as the Secretariat for the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention). In 2021, during the 9th session of the Meeting of Parties to the Water Convention, the Program of Work of the Water Convention for the period 2022-2024 has been adopted. It has been developed in a consultative manner and is organized across seven program areas: awareness and inclusion, monitoring and evaluation, integrated and intersectoral approach, climate change adaptation, financing, reporting, partnerships and knowledge. In 2021 Kazakhstan chaired the Water Convention.

Activities in 2021

Under the Water Convention and the Protocol on Water and Health, UNECE organized the following events: 31st and 32nd meetings of the Bureau to the Water Convention (January 21-22, April 29-30); 5th meeting of the Global network of basins working on climate change adaptation (February 26); 25th and 26th meeting of the Bureau of the Protocol on Water and Health (March 4-5, November 18-19); 6th meeting of the Expert Group on Equitable Access to Water and Sanitation (March 24-25); Global workshop on building climate resilience by improving water management and sanitation at national and transboundary levels (March 29-31); 12th meeting of the Task Force on Water and Climate (March 31); 12th meeting of the Working Group on Water and Health (April 14-15); 3rd joint meeting of the Working Group on IWRM and Working Group on Monitoring and Assessment (April 26-28); Launch of the second Progress Report on Transboundary Water Cooperation: Global status of SDG indicator 6.5.2 and acceleration needs (September 14); 9th session of the Meeting of the Parties to the Water Convention (September 29-October 1).

Details: https://unece.org/info/events/unece-meetings-and-events/environmental-policy/water-convention

UNECE Activities in Central Asia

Transboundary cooperation. In 2021 UNECE continued to support the Secretariat of the Chu-Talas Commission and was in close contact with UNDP regarding the process of harmonization and approval of the SAP. In particular, UNECE provided guidance and advice through several transboundary and national discussions and capacity building events under the Convention. Consequently, the SAP was endorsed by

the Chu-Talas Commission on 15 April 2021. *Project results are available on:* https://unece.org/environment-policy/water/areas-work-convention/transboundary-cooperation-chu-and-talas-river-basin and in the brochure on https://unece.org/DAM/env/water/Chu-Talas/RUS_ClimateProofingChuTalas_web_10Dec2018.pdf

National Policy Dialogues. The work to support NPDs as part of the EU Water Initiative is ongoing in close cooperation with OECD within a new regional project under WECOOP program financed by EU.

The following events were organized: (1) a round-table expert meeting was held in hybrid format in Tajikistan on February 2. A new methodology for calculating water balance of water bodies was presented. There are plans for wide application of the methodology in a variety of river basins. This work will have a profound impact on advancing scientifically justified approaches for water management in Tajikistan. The methodology was transferred to the Ministry of Energy and Water Resources of the Republic of Tajikistan for adoption; (2) an expert workshop to discuss approaches for water management took place in hybrid form in the Kyrgyz Republic on June 11. The participants discussed damage compensation approaches for water resources and water facilities, indicators of water security, especially in the transboundary context, Kyrgyzstan's cooperation with its neighboring countries on the protection and use of transboundary water resources and specifically reporting on the SDG 6.5.2 on transboundary water cooperation, and priorities for the national water sector development; (3) the meeting of the Working Group in preparation to the seventh meeting of the Inter-agency Coordination Council of the National Water Policy Dialogue (NPD) took place in hybrid format. The Working Group discussed Kazakhstan's water policy agenda, including the status of hydro-technical infrastructure, the use of water-saving technologies on irrigated areas, as well as cooperation with its neighboring countries on the protection and use of water resources of transboundary rivers.

Cooperation on dam safety. UNECE continued supporting the Central Asian region in building human and institutional capacity on the safe management of dams under the project Capacity Building for Cooperation on Dam Safety in Central Asia[87]. Among other items, the virtual regional meeting (June 23) discussed a draft agreement on regional cooperation on dam safety. Meeting participants reiterated the importance of such a document, which if endorsed, would provide a legal and institutional platform for the countries to facilitate their efforts to collectively manage transboundary dams in the region, including response measures.

SPECA Program. The 24th Session of the Working Group on Water, Energy and Environment of the United Nations Special Programme for the Economies of Central Asia (SPECA WG on WEE) was held online on 10-11 November. The main objective of this Session was to discuss opportunities for intersectoral and regional cooperation on water, energy and environmental challenges in the context of climate change. Meeting participants noted that climate change poses increasingly severe risks for ecosystems, human health and the economy of the SPECA sub-region. Cross-sectoral and regional cooperation on the energy, water, and natural resources has potential to provide economic gains, improve the environment and increase the wellbeing of citizens. Cooperation can also support the region's adaptation to climate change, including response to natural disasters. See also "Economic and Social Commission for Asia and the Pacific".

Project "Regional mechanisms for the low-carbon, climate-resilient transformation of the energy-water-land Nexus in Central Asia", funded by Germany's International Climate Initiative (IKI) from the German Federal Ministry for Environment[88]. In partnership with OECD, SIC ICWC, EBRD and FAO, UNECE will implement a project funded by IKI to improve the management of water, energy, land, and environmental resources in Central Asia in the face of climate change, through analytical work and support to policy development and cooperation. The project has three main objectives: to mainstream the nexus principles into development planning process, to finance pilot projects to demonstrate benefits of investments in the "nexus", and to organize regional policy dialogues and facilitate capacity development. In particular, the UNECE will provide substantive input on nexus and transboundary cooperation, and brings political convening power to the consortium. The project will deliver a regional strategy and related national policy packages, the regional and country level dialogues, supported respectively by meetings of SPECA and National Policy Dialogues (NPDs) on Integrated Water resources Management.

Source: UNECE, www.unece.org/env/water.htm

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.

[87] The Project has come to an end on 30 June 2021 and an evaluation report could be obtained on https://unece.org/sites/default/files/2021-09/ENV_EV~2.PDF

[88] The five years project is expected to start in Autumn 2022

Activities in 2021

The IWAC team presented the electronic brochure[89] on "Water resources allocation in a transboundary context to strengthen water cooperation between the countries of Eurasia". The publication provides an overview of the existing regional cooperation in the basins of transboundary rivers of the Eurasian countries, a brief description of the legal and institutional framework for such cooperation and the distribution of water resources in transboundary basins. It also examines the existing problems of interaction in the allocation of water resources and offers recommendations for their resolution.

The Working Group on Kazakhstan's chairmanship in the Bureau of the Water Convention held its meetings in Nur-Sultan: (1) 3rd meeting, which approved the draft IWAC Program of work for 2022-2024, took note of the information on the 32nd meeting of the Bureau of the Water Convention, and the IWAC was invited to create a roadmap for the activities of the National Water Policy Dialogue for 2022-2024; (2) 4th meeting, which decided on the members of a delegation of Kazakhstan to participate in the Ninth Session of the Parties to the Water Convention, as well as on the candidacy from the Republic of Kazakhstan, to the Bureau of the Water Convention; (3) 5th meeting, which decided to prepare proposals for the implementation of decisions made at the Ninth Session of the Meeting of the Parties, as well as prepare cost estimations for representatives of Kazakhstan in the activities planned under the Water Convention in 2022.

During the 9th Session of the Meeting of the Parties to the Water Convention Kazakhstan declared on completion of its chairmanship in the Bureau of the Convention. The representative of Estonia was elected as the Chair of the Bureau of the Convention, while the representative of Kazakhstan was elected as the Deputy Chair of the Bureau (September 29-October 1, Geneva).

On June 17, the Director of IWAC Serik Akhmetov had a meeting with representatives of the USAID Regional Office. During the meeting USAID representatives were introduced with the activities of the IWAC and possible areas of cooperation within the framework of the USAID Water and Environment Project were identified.

IWAC in cooperation with the WECOOP Project organized an online training workshop to facilitate the exchange of experience between the Slovak Republic and the CA countries in the field of hydrometeorological services (November 10-11).

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 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. In 2021, under SPECA, the following online events were held in Tashkent: (1) 24th session of the Working Group (WG) on Water, Energy and Environment (November 10-11); (2) SPECA Economic Forum "Sustainable transport and trade for a green and inclusive economy after the pandemic" (November 17-18); (3) 16th session of the SPECA Governing Council which adopted the Tashkent Statement, listened to progress reports of the SPECA Thematic Working Groups, presented a draft SPECA Work Plan for 2022-2023 and adopted it (November 19). The Governing Council has decided that SPECA Chair country for 2022, the exact dates and venue of the 2022 SPECA Economic Forum and the 17th session of the SPECA Governing Council would be agreed upon through diplomatic channels.

Two e-learning courses have been developed: Integrated Action on Biodiversity/Ecosystems, Health and Climate; and, Water, the Ocean and the Sustainable Development Goals.

The CA countries have been assisted in the implementation of the Paris Agreement, in particular: (1) the ToR on application of carbon market tools in CA was developed; (2) the Regional dialogue on carbon pricing was organized for the CA countries on 25-26 February; (3) a regional training workshop was held for CA specialists, focused on inventory of greenhouse gas emissions and requirements for transparency reporting as part of the Paris Agreement (May

[89] Developed within the framework of the regional project

1-20); (4) the Practical Handbook on Methodologies for GHG Emissions Inventories and Paris Agreement Reporting was drafted.

Two policy briefs have been published: SDG 6 & COVID-19: Accelerating Progress Towards SDG 6 in the Asia-Pacific Region in the Context of COVID-19 Recovery; and, Mending the Broken Relationship with Nature: Tackling the Biodiversity, Ecosystems, Health and Climate Change Nexus Post-COVID-19.

Sources: www.unescap.org, www.unece.org

6.8. United Nations Regional Centre for Preventive Diplomacy for Central Asia

The United Nations Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA) was established on the initiative of the five Governments of Central Asia 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.

UNRCCA Activities in 2021

Work was continued on the three-year Project in support of regional transboundary water cooperation in Central Asia over 2019-2021; work contacts and coordination were maintained with EC IFAS, SIC ICWC, SIWI, SDC, CAREC, VNIIGiM named by A. Kostyakov, as well as with UN agencies, such as UNESCO, UNECE, UNDP, etc. UNRCCA representatives, first of all, the Special Representative of the Secretary General, Head of UNRCCA took part in regional events organized both by CA governments and partner organizations.

UNRCCA organized: (1) an online capacity-building workshop dedicated to water and health nexus as well as gender equality for effective management of water resources in the region: "Challenges and Opportunities in Central Asia and Afghanistan in the post-COVID World", together with the Government of Canada. At the outcome of the event, some practical recommendations were formulated with the view to follow-up and spur this important work in the region aimed at empowerment of women in all spheres of societal life (March 15-16); (2) online capacity building seminar and the meeting of experts from Central Asia and Afghanistan, dedicated to cooperation in the field of water and energy in the Central Asian region. Participants were able to familiarize themselves with the application of environmental and social frameworks to enable development projects on international watercourses. The seminar was also focused on addressing the promotion of mutually beneficial cooperation on transboundary water resources management in Central Asia through applying legal instruments governing common and sustainable exploitation of transboundary watercourses. The experts continued their work on inventory of regional agreements and other normative acts related to water and energy cooperation in the Aral Sea Basin. In addition, the participants exchanged and updated each other on the state-of-play in bilateral and multilateral cooperation between the neighboring countries in the water-energy and environmental fields (June 15-16); (3) online meeting of national experts from the Central Asian states, to discuss issues pertaining to support of the regional cooperation in the field of water, energy, and climate. The participants expressed their initial views on the draft of the renewed UNRCCA project to support regional cooperation in Central Asia on water, energy and climate for 2022-2025. The experts provided their feedback as regards future work aimed at enhancing cooperation on the UNRCCA platform (October 27); (4) two meetings of national experts. Delegations had an opportunity to discuss and present their views and suggestions on the draft text of the renewed UNRCCA strategy in support of water, energy and environmental cooperation among the states of Central Asia for 2022-2025. Finally, the renewed strategy was approved and adopted by national experts (November 26, December 21-22).

In cooperation with SIC ICWC, four Aral Sea Basin transboundary water early warning bulletins were issued and the fourth issue of 2020 Water Yearbook: Central Asia and Around the Globe was published. The Center also supports activities of the regional knowledge management e-platform "Water Unites", https://waterunites-ca.org.

Source: UNRCCA

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 Activities in 2021

The following events were organized in 2021: (1) a webinar on COVID-19, air quality and meteorological factor (January 12); (2) virtual session of WMO's Executive Council, to discuss a major update to WMO's data policy, closing the gap in the global observing system and a plan of action for hydrology (June 14-25); (3) the World Meteorological Congress, as a result of which the three initiatives were endorsed - WMO Unified Data Policy, the Global Basic Observing Network, and the Systematic Observations Financing Facility (October 11-22).

WMO spearheaded the new Water and Climate Coalition – a voluntary effort to close the information gap in the water, food and energy nexus and tackle the growing water and climate-related impacts. The Coalition supports the implementation of the UN Water Action Decade through the UN-Water Global Accelerator Framework for SDG 6 with a concrete action mechanism.

Projects in CA and Afghanistan. Continued: (1) Afghanistan Early Warning System Project (US$ 2.4 million); (2) Afghanistan: Hydromet & Early Warning Services for Resilience (US$ 3.7 million); (3) Uzbekistan Climate Data Restoration Project.

Publications. WMO Bulletin Vol. 70 (1) – The Ocean, Our Climate and Weather and Vol. 70 (2) WMO Unified Data Policy; WMO Air Quality and Climate Bulletin; report United In Science 2021; report The State of Climate Services 2021: Water. Other publications – on https://library.wmo.int/.

Source: 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.

IFAD Activities in 2021

Kyrgyzstan

Since 1996, IFAD has invested US$ 97.8 million in rural development in Kyrgyzstan. IFAD activities in the Republic are based on the Kyrgyz Republic Country strategic opportunities programme 2018-2022. The goal is to support inclusive rural transformation that enables smallholders to reduce poverty and strengthen livelihood resilience. This goal will be achieved through two interrelated strategic objectives: (1) increase smallholders' equitable and sustainable returns through the improvement of services and development of livestock product value chains that enable rural producers to capitalize on market opportunities; and (2) enhance smallholders' resilience to climate change through the implementation of innovative approaches that strengthen resilience and ensure sustainable incomes from diversified livelihoods systems.

The implementation of the Access to Markets Project continued. A new Regional Resilient Pastoral Communities Project was approved for 2021-2027. The Project will reduce rural poverty and food insecurity in Kyrgyzstan by increasing resilience, income, and economic growth in farming communities. The nationwide project is expected to reach at least 557,000 rural households.

Tajikistan

IFAD has been investing in the rural poor in Tajikistan since 2008, by strengthening local institutions and grassroots organizations, and expanding their access to land, productive technologies and resources. Key activities include: natural resource management; implementing land reforms; strengthening local institutions and grass-roots organizations.

The Community-Based Agricultural Support Project continued in 2021. A new Community-based Agricultural Support Project 'plus' was approved for the period of 2021-2028. IFAD financing will amount to US$ 13.5 million.

Uzbekistan

Uzbekistan joined to IFAD in 2011. Since 2014, IFAD has been financing three investment projects totaling more than US$ 435.3 million (IFAD's contribution – US$ 128.7 million) and directly targeting about 105,000 rural families. IFAD projects work to enable sustainable income growth for rural people through viable

small-scale agricultural production and rural enterprise systems, with a specific focus on dekhan farmers, rural women and youth.

Implementation of Dairy Value Chains Development Program and Agriculture Diversification and Modernization Project continued in 2021. It was decided also in 2021 to open a representative office of IFAD in Tashkent.

Source: www.ifad.org

6.11. United Nations 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.

UNESCO Activities in 2021

UNESCO Cluster Office in Almaty

Project Activities. Under the "Governance of Groundwater Resources in Transboundary Aquifers" project, funded by Swiss Agency for Development and Cooperation (SDC), and implemented by UNESCO, the Almaty Office (1) supported participation of experts on the modeling of Pretashkent Transboundary Aquifer to take part in the 48th IAH Congress "Inspiring Groundwater". Project experts from Kazakhstan and Uzbekistan made a presentation on the "Regional groundwater systems and transboundary aquifers", based on the preliminary results of the numerical modeling for the Pretashkent Transboundary Aquifer (Brussels, September 6-10); (2) organized a technical working group meeting to facilitate the exchange of knowledge and cooperation between Kazakhstan and Uzbekistan experts on groundwater and discuss the joint model of Pretashkent Transboundary Aquifer and its finalization (Tashkent, November 17); (3) organized a workshop on groundwater governance at the TIIAME aiming at students and young professionals in groundwater (Tashkent, November 18-19).

Conducted assessments (1) of the current state of groundwater-related higher educational programs in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. The assessment identifies gaps, needs, and challenges professionals in this field face in the educational system, and assesses the linkages between the requirements of the employees and current educational programs; (2) on the status of cooperation on transboundary aquifers (with focus on groundwater) in Central Asia. The assessment provides with recommendations from experts on facilitation of countries' collaboration and strengthening the capacities in groundwater management; (3) of water management in Batken Region for more data on water from the perspective of water availability and management, and focusing on groundwater. The assessment proposes novel potential measures focusing on groundwater in the region, as the mechanism for reducing tensions on water issues.

Events. The Almaty Office (1) in cooperation with Center for Sustainable Development, CARAWAN network and SIWI, organized a workshop for Central Asian countries' experts in preparation of NDCs to the Paris Agreement, in order to build capacities on how to better mainstream water related issues and climate change in the context of the NDCs (September 14-15); (2) co-organized workshop on "Water resources management and climate security in Central Asia", in order to train the future decision makers on legislative aspects of water resources management, with a special focus on groundwater governance and demonstration of best practices in climate change adaptation measures (September 27-29); (3) organized a training workshop to develop capacities of experts working in the government organizations and scientific institutions in Central Asia, for effective use of modern remote sensing approaches for precipitation estimation (September 27-30); (4) conducted a meeting for teachers with a purpose to present the preliminary results of educational modules developed in cooperation with the Center for Sustainable Development for middle school students on water resources and its importance in combating COVID-19, and consult with teachers on how to further elaborate them (December 9); (5) organized a roundtable with the representatives of UNESCO Water Family in Central Asia: national committees of the Intergovernmental Hydrological Programme of UNESCO (UNESCO-IHP), UNESCO Chairs on water, the regional and international centers in water under the auspices UNESCO, with the aim to facilitate discussion and propose an action for cooperation under the new IHP Strategy 2022-2030 (December 10).

UNESCO Office in Tashkent

Assessment of water education in higher educational institutions in Uzbekistan. The survey conducted in HEIs showed that the number of water-related educational programs had increased twofold, and the number of graduating students per 100,000 dwellers had grown from 2 (one professional per 48,878 people) in 2016 to 3.4 (one professional per 29,090 people) in 2021. The results were analyzed additionally to get insight into quality of the education and find duplications in order to improve the educational programs based on market demands.

SIC ICWC has started work on the review of water security in Uzbekistan. This is the first quantitative and qualitative assessment of water management at the level of administrative territories. First, a model for the water security concept will be developed and then assessment will be conducted for Khorezm province.

Source: UNESCO Cluster Office in Almaty, UNESCO Office in Tashkent, SIC ICWC, www.en.unesco.kz, www.unesco.org

6.12. Food and Agriculture Organization

Food and Agriculture Organization of the United Nations (FAO) was established in 1945. Nutrition, climate change, gender equality, social protection, and decent rural employment are cross-cutting issues of FAO activity in the Central Asian region.

FAO Activities in CA States in 2021

Kazakhstan

Agriculture. Ongoing projects: (1) "Elaboration of the State Program 2022-2026 (including the Concept) of Agro-Industrial Development" (2020-2022, US$370,000); (2) "Supporting investments in smallholders inclusive agrifood value chain development in Kazakhstan" (2020-2022, US$474,429).

Planned projects: (1) "Promoting the development of land market and supporting the development of small family farms" (2022-2023, US$ 275,000); (2) "Technical support to the development of an International Agri-food Hub" (2022, US$ 95,000); (3) "Preparation of GCF project CN on sustainable and CC resilient development" (2022, US$ 60,000).

Kyrgyzstan

FAO's assistance in Kyrgyzstan is shaped by the 2018-2022 FAO's CPF.

Agriculture and food. Ongoing projects: (1) "Support for development of sustainable value chains for climate-smart agriculture" (2021-2023, US$ 350,000); (2) "Promoting accelerated green investment in agriculture through capacity building of national financial institutions" (2021-2023, US$ 300,000); (3) "Assessment and improvement of institutional capacities on food control, food safety management systems and international standards" (2021-2022, US$ 75,000); (4) "Enhancing capacity for food safety management in the Kyrgyz fruit and vegetable industry" (2020-2022, US$ 570,000); (5) "Supporting the implementation of organic agriculture policies and increasing the capacities of farmers in the Kyrgyz Republic – Component 1: Support to establish the legal and institutional framework for organic farming in the Kyrgyz Republic" (2019-2022, US$ 500,000).

Tajikistan

FAO's assistance in Tajikistan is shaped by the 2019-2021 FAO's CPF.

Agriculture and fisheries. Ongoing projects: (1) "Support of warm-water fishery sector" (2021-2022, US$ 95,000); (2) "Introduce innovative approaches for adopting best technologies for apricot production in Sughd" (2021-2022, US$ 92,000); (3) "Provision of Technical Assistance on E-agriculture to the Ministry of Agriculture" (2021-2022, US$ 90,000); (4) "Agrobiodiversity conservation for food security and livelihood improvement" (2021-2022, US$ 91,000); (5) "Assessing the Impact of COVID-19 on the Food Systems and Food Security" (2020-2022, US$ 95,000); (6) "Support to improve sustainable potato production and management" (2020-2022, US$ 95,000); (7) "Enabling market access for Tajik agricultural products through improved food safety systems" (2018-2022, US$ 197,000).

Turkmenistan

The Country Programming Framework – a document framing the partnership for the period 2021-2025 was signed in December. FAO is ready to support Turkmenistan in three areas: (1) collecting and analyzing data related, among others, to SDGs; (2) contributing to a more productive, effective, and digital agriculture sector with an increased export potential; and, (3) helping disaster prevention and response, as well as sustainable management of natural resources.

An Agreement was signed between FAO and the Ministry of Agriculture and Forestry of the Republic of Turkey on the provision of services for the development of a national strategy of Turkmenistan to improve production and mechanization of cotton picking.

Deputy Chairman of the Cabinet of Ministers, Minister of Foreign Affairs of Turkmenistan Rashid Meredov and FAO Subregional Coordinator for Central Asia Viorel Gutsu discussed a draft agreement on the opening of FAO's representative office in Turkmenistan.

Uzbekistan

The FAO-Uzbekistan Country Programming Framework (CPF) for 2021-2025 was officially launched. The framework agreement foresees the transformation of the production, aggregation, processing, distribution, consumption, and disposal of food products originating from agriculture, forestry, and fisheries towards more sustainability, taking into consideration the wider economic, social, and natural environment. The total resource budget for implementation of the CPF is expected to be approximately US$ 17 million.

Agriculture and natural resource management. Ongoing projects: (1) "Recovery and development of the potato sector in response to COVID-19" (2021-2023, US$ 195,000); (2) "Strengthening sustainable food systems through geographical indications" (2021-2022, US$ 250,000); (3) "Rice Crop Production and Management Support" (2020-2022, US$ 100,000); (4) "Support in implementation of inclusive agricultural policies" (2020-2022, US$ 100,000.

A new FAO four-year project "Smart farming for the future generation" was launched. The project with the total budget of US$ 3.4 million will be implemented in Uzbekistan and Vietnam. In Uzbekistan, 3 demonstration plots will be organized for development of capacity, provision of opportunities in agribusiness and technical support.

Under the regional project "Integrated natural resources management in drought-prone and salt affected agricultural production systems in Central Asia and Turkey" (CACILM-2), a new laboratory for GIS was opened at the TSAU. The laboratory will serve as a tool for monitoring land use changes, mapping land degradation trends in Uzbekistan and will facilitate the

implementation of the projects on land degradation neutrality (LDN).

Forest management. Ongoing projects: (1) "Sustainable management of forests in Mountain and Valley areas in Uzbekistan" (2018-2025, US$ 3.2 million).

Aral Sea. Continued project "Unleashing young people`s and vulnerable citizens` creativity and innovation of the Aral Sea region" (2020-2023, US$ 180,000).

FAO at the regional level

In 2021, the following projects were continued:

- Developing capacity for strengthening food security and nutrition in Caucasus and Central Asia;

- Programme to improve national and regional locust management in Caucasus and Central Asia in order to safeguard rural population food security and livelihoods. The following events were held in 2021: (1) e-training on locust monitoring and information management, including on automated system for data collection (ASDC) and Caucasus and Central Asia locust monitoring (CCALM) system (May); (2) online technical workshop on locusts in CCA, which addressed such matters as implementation of work program in 2021 and the work plan for 2022, CCALM, and risk reduction of locust control operations (November 23-25); (3) second regional workshop on locust data collection, analysis, forecast and reporting in CCA. The workshop allowed discussing a number of topics, including: the use of ASDC during the 2020 locust campaign; the use of GIS that can be complemented by QGIS as additional instrument for analysis of data from different sources (March 16-18); (4) the second Project Steering Committee, which approved the 2022 locust campaign (December 7);

- Integrated natural resources management in drought-phone and salt-affected agricultural production landscapes in Central Asia and Turkey (CACILM-2). The extraordinary Regional Project Steering Committee decided to extend the project till November 2024. Crop growers and livestock breeders in Turkmenistan took part in the workshops of the Farmer Field School in October;

- Lifecycle Management of Pesticides and Disposal of POPs Pesticides in Central Asian Countries and Turkey, with the GEF support;

- Strengthening regional collaboration and national capacities for management of wheat rust diseases and resistance breeding in Central Asia and the Caucasus;

- Central Asian Desert Initiative (CADI). The FAO Farmer Field School (FFS) concept continued to be developed in Uzbekistan. The following events were organized: (1) a series of FFS sessions on improved crop production on two pilot sites in Uzbekistan (January); (2) a workshop on income-generating activities for rural women of Bukhara and Navoi provinces (October 26); (3) First International Conference on Cold Winter Deserts. Researchers and experts presented their papers on biodiversity conservation, sustainable land management, ecosystem services, food security, and water use in cold winter deserts in CA (December 2-3).

Source: www.fao.org

6.13. International Law Commission

The International Law Committee (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 seventy-session of ILC in 2021, reports were presented on the following topics: protection of the atmosphere, provisional application of treaties, immunity of State officials from foreign criminal jurisdiction, succession of States in respect of State responsibility, general principles of law, etc.

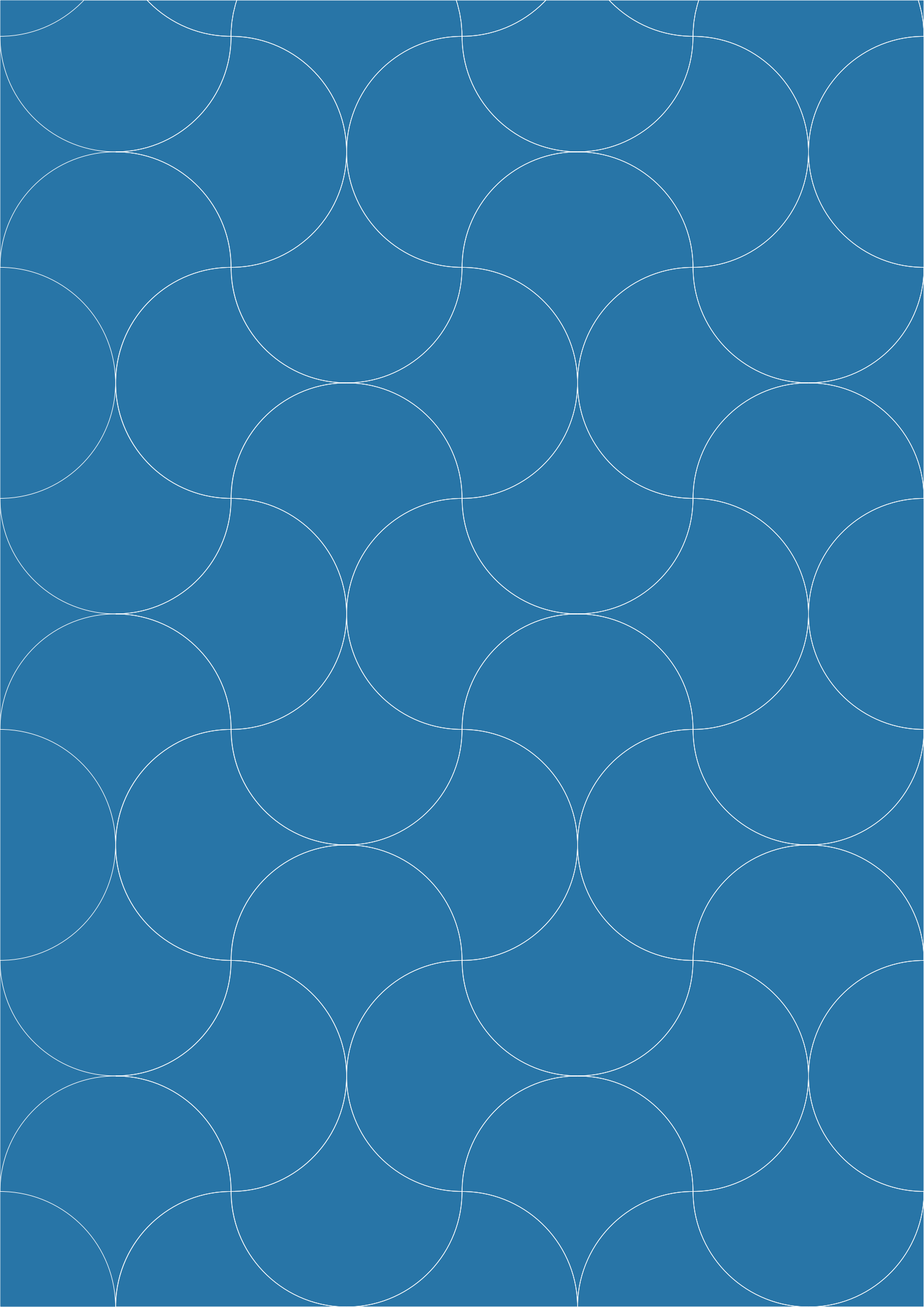
The Commission had before it the sixth report of the Special Rapporteur on the topic "Protection of the atmosphere" (A/CN.4/736), comments and observations received from Governments and international organizations (A/CN.4/735) on the draft preamble and guidelines, as adopted on first reading. The Commission adopted, on second reading, the entire set of draft guidelines on the protection of the atmosphere, comprising a draft preamble and 12 draft guidelines, together with commentaries to this set.

Source: ILC Report, 2021

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 2020, the Court's list of cases included only one case directly related to water – dispute over the status and use of the waters of the Silala (Chile v. Bolivia). For the nature of the case and proceedings, see the ICJ report.

Source: ICJ report at the 76th Session of UNGA, 2021



Section 7

International Water Organizations and Initiatives

7.1. Asia Water Council

The Asia Water Council (AWC) is a global network focused on providing tangible solutions on Asian water challenges and facilitating multilateral discussions among stakeholders. It was established at the initiative of South Korea during the 7th World Water Forum in March 2015. AWC is composed of 147 organizations from 27 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 2021

Asia International Water Week. The 2nd Asia International Water Week/2-AIWW under the theme "Sufficient and Sustainable Water for All" to be held in Indonesia has been postponed from 2021 to March 14-16, 2022. The AIWW program will include 24 thematic sessions, the Asia to World Statement Ceremony and Water Project Business Forum, as well as special sessions and an exhibition. The AWC Board of Council approved the composition and topics of the sessions: (1) Security and sustainable growth; (2) IWRM planning/pilot projects to introduce smart technologies and build capacity; (3) Water management policy and technology in the context of climate change; (4) Water-Energy-Food-Ecosystem Nexus; (5) Water Security: responses to local, regional and global challenges; (6) Asian Dynamic Water Center – power of knowledge and information.

A series of virtual conferences – the AIWW On-Air - was organized as a preliminary event to raise global interest and encourage participation in the 2nd AIWW (kicked off on February 24). In the course of the year, a number of events were held, including: (1) 13th and 14th AWC Board of Council meetings (online, March 31 and November 30); (2) a webinar to discuss the draft Asia to World Statement as one of the main policy outcomes of 2-AIWW (April 27); (3) series of online webinars as part of preparation to 2-AIWW; preparatory conference before the 2nd AIWW (hybrid format, December 13).

Source: Agency of IFAS, 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.

Activity in 2021

Collaboration between UNDP-Iraq and the Geneva Water Hub. The Platform for International Water Law of the Geneva Water Hub completed a UNDP-Iraq project on "Possible areas of cooperation between the riparian countries in managing shared water resources to guarantee the water rights of the downstream countries in quantity and quality" in August 2021. This project included two components: (1) an analytical report on the legal frameworks applicable to the Tigris and Euphrates basin with key recommendations; (2) an online training for Iraqi senior officials in June-July 2021. The activities carried out by the Platform were successful and have put the basis for further cooperation with UNDP-Iraq and the Ministry of Water Resources of Iraq. UNDP-Iraq is implementing some of the recommendations made by the Geneva Water Hub such as the visit to the Sava River Basin Commission as well as the participation of an Iraqi delegation at the World Water Forum in Dakar.

The Geneva Water Hub has also collaborated with IUCN in the context of the project "Water flows regulations in a fragmented world". The first output of this joint initiative is the development of an assessment of the legal tools applicable to dams planning, developing and monitoring. This assessment includes a compendium of references grouping and analyzing the main frameworks and principles to be considered when addressing the challenges of dams in general and large dams in particular. This first output should be viewed as a "living document" which will be further developed and completed with additional practice. This document was presented in a side event to the Ninth session of the Meeting of the Parties to the UNECE Water Convention on 27 September 2021. Moreover, this initiative was also presented in the session on "Ensuring benefit sharing and joint management of dams: the role of international water law" organized during the World Water Congress in

Daegu on the 1st of December 2021 and the conference on "International Cooperation & Experiences Exchange, Base & Starting Point for Enhancing Dams Safety in Iraq" on 14 November 2021.

Follow up of the Geneva Principles on the Protection of Water Infrastructure during Armed Conflicts. The Platform for International Water Law of the Geneva Water Hub has also continued its work on the Geneva Principles on the Protection of Water Infrastructure with the publication of an Annex on Cyber-operations and the protection of water. Moreover, the Platform has also drafted a preliminary report on the national frameworks protecting water and water infrastructure during armed conflicts. The Geneva Water Hub organized together with UNICEF an online session on "Water and Stability: Towards a Resilient World" during the Stockholm World Water Week.

Senegalese-Mauritanian Aquifer Basin. The Geneva Water Hub and its partners from UNECE Water Convention Secretariat and IGRAC center continued to facilitate the strategic dialogue on the Senegalese-Mauritanian aquifer basin (SMAB) aimed at establishing transboundary cooperation on this shared water resource. This dialogue is carried out in close collaboration with river basin organizations (RBOs), namely the OMVG and OMVS. As part of this cooperation, a Regional Working Group (RWG) was setup, supported by the four ministers in charge of water management, as well as the two high commissioners of river basin organizations. Its mandate is to induce transboundary cooperation and advise the SMAB states and the RBOs towards the establishment of a sustainable cross-border concerted management mechanism on the SMAB.

Events. The Geneva Water Hub participated in a number of events: "Water and International Humanitarian Law" on 15 November 2021. The Permanent Mission of Slovenia to the UN Office and other international organizations organized this event at the Delegation of the European Union in Geneva; the EU Working Group on Humanitarian Aid and Food Aid (COHAFA) also organized an event on the 10th of November 2021 where several humanitarian organizations participated, including ICRC and the Geneva Water Hub; "Water Scarcity: A Challenge to Sustainable Development in the Arab Region" on the 17th November 2021 in Cairo. This event was part of the 13th session of the Arab Ministerial Water Council in Cairo, with the participation of ministers of water resources from the Arab States.

Capacity building. The Geneva Water Hub carried out the online course on "International Water Law and the Law on Transboundary Aquifers" from October 11 to December 12, 2021. Eighteen participants attended the course. Fifteen participants were from least developing countries and non-OCDE countries and most of them were representatives from national governments. Two webinars have been organized during the online course. The first webinar was co-organized with DiploFoundation and UNECE on "Insights on the 9th MOP of the Water Convention" on the 8th of November 2021. The speakers included the Director of DiploFoundation, Dr Jovan Kurbalija, and the Executive Secretary of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), Ms. Sonja Koeppel and Prof. Alistair Rieu-Clarke from Northumbria University. The webinar was attended by around 70 participants and the recording is available here: https://www.youtube.com/watch?v=3PMa4ZhUdeA. A second webinar was organized on "Business, Human Rights and the Right to Water" on the 9th of December 2021. The speakers included Prof. Angelica Bonfanti from the University of Milano and Prof. Roberta Greco from LUMSA University in Rome. The webinar was attended by around 50 participants and the recording is available here: https://www.youtube.com/watch?v=opiSVla-tjs.

Tailor made module developed in collaboration with SDC for the German-Kazakh University (DKU). On November 15-26, 2021, the Geneva Water Hub organized the second edition of the tailor-made module on Water Diplomacy for the DKU MSc in Integrated Water Resources Management. This module aims to provide students with some key understandings of water resources' co-existing conflictual and cooperation dimensions.

In 2021, OSCE selected the Geneva Water Hub for the development of an e-learning course on water diplomacy. This course aims to increase awareness of water practitioners, professional negotiators and university students in the field of water management on the importance of integrating sustainable water norms in peacebuilding processes.

Platform for International Water Law (PIWL)

The Platform for International Water Law also carries out a research project "Water, private companies and the furtherance of the public good" founded by a private foundation. The aim is to develop a code of good practices on water protection and management for private companies. The proposal of a code of good practices relies on a recommendation of the Global High-Level on Water and Peace. Laurence Boisson de Chazoournes and Haoua Savadogo presented a first draft of the code of good practices during the 2021 Seminar on Business and Human Rights organized by the Human Rights Commission of the "Ordre des avocats de Genève".

Publications. In the context of its work on international water law, some members of the Platform have contributed to the publication "Practical Guide for the Development of Agreements or Other Arrangements for Transboundary Water Cooperation" developed by the Secretariat of the Water Convention. This document was presented during the 9th Meeting of the parties to the water convention that took place between 29th September and 1st of October 2021.

A White Paper will be launched on the 50th anniversary of the Stockholm Declaration in 2022. The document serves to fuel reflections at the political level on the role of the environment in peacebuilding. The Platform also contributed together with the University

of Helsinki with a chapter to the White Paper entitled "Strengthening the Thin Green Line: A call for an international monitoring mechanism for environmental peacebuilding law".

Capacity building. The Platform also collaborates with the Faculty of Law of Yerevan State University on the research project on "The ecosystem services of forests and specially protected areas and the effectiveness of local self-governance in Armenia. Interdisciplinary perspectives". A visit of the Armenian research team is planned during the spring of 2022.

Moreover, the Platform also supported the Capstone project of a group of Master students of the Graduate Institute of International and Development Studies on the topic "Financialization of Water, Human Rights and Environmental Protection: What are the issues at stake?". To support the work of these students, the Geneva Water Hub also facilitated an online safe space on the 11th of November 2021 to meet with key experts on the human right to water and international economic law. This report investigates what threats the financialization of water may pose to the human right to water and offers policy recommendations regarding how to safeguard this fundamental right. The report concludes there remains a pressing need for water to remain a public resource and within the confines of democratic processes.

Global Observatory on Water and Peace (GOWP)

Following its launch, the GOWP program "Digital transformation, water, peace and basin agencies for the 21st century" is well under way with the realization of six round tables / webinars and 15 virtual working meetings bringing together more than 1000 participants. The relevance of the program has increased in view of the effects of the COVID-19 pandemic. The lessons of this program will enrich a strategic reflection document prepared under the aegis of the Global Observatory for Water and Peace.

Publications. The GOWP will be producing an annual analytic report on the developments and trends in relation to the global water architecture of the 21st century. The report will be compiled by the Geneva Water Hub, as Global International node, from the individual reports provided by the partners.

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 179 countries. GWP is comprised of 13 Regional Water Partnerships (RWPs) and 69 National Water Partnerships (NWPs), with the mission to advance governance and management of water resources for sustainable and equitable development.

Activities in 2021

GWP's 25th anniversary. 2021 marks 25 years since GWP was founded. On this occasion, more than 470 participants, from 73 countries, joined the GWP Network Meeting 2021 under the theme "Leading Change and Innovation through our Partners" (online, December 1-2). Being innovative in the face of an ever-changing world, delivering GWP's strategy despite the challenges of COVID, and connecting water communities across the globe – these were some of the key messages during this year's GWP Network Meeting.

One of the highlights of GWP's 25th anniversary year came with the 'family' launch of the revitalized GWP ToolBox – IWRM Action Hub – a combined product of the efforts, ideas, and input from the whole GWP network. The new GWP ToolBox features 87 tools, 222 case studies and 1,500 resources. It also includes a new Connect area, where people can become members and connect with each other. It will allow users to form their own online communities of practice – finding answers to questions, gaining support from those with experience in implementation, and sharing lessons learned from projects.

As part of the anniversary celebrations, GWP organized Regional Days (online, May 31-June 3) focused on concrete tasks of the new GWP's strategy, especially in the context of COVID-19.

Transboundary cooperation. Despite the limitations of COVID-19, GWP continued facilitating regional dialogues which focused on policy and technical instruments to address transboundary water management. Five regional organizations and more than 10 transboundary water management institutions were supported by GWP, including the Volta Basin Authority, the International Commission for the Protection of the Danube River (ICPDR), the Central American Commission for Environment and Development (CCAD).

As part of its work on this component, GWP: provided technical support to the Lake Chad Basin Commission (LCBC) and UNDP in the framework of a training of trainers on the implementation of IWRM at transboundary level; advanced cooperation between the two riparian countries, Mozambique, and Zimbabwe for the elaboration of the hosting agreement for the tri-basin management, the completion of the data sharing protocol and the design of the transboundary hydrometric network for the three basins; coordinated the development process of the Lake Ohrid Transboundary Management Plan,

approved by the responsible authorities of Albania and North Macedonia in 2021.

GWP was a drafting member of UNECE's Practical Guide for International Water Law, with a contribution on the chapter related to conservation of marine environment focused on the incorporation of the source to sea aspect in the development of international freshwater agreements.

Caucasus and Central Asia. The Regional Water Partnership for Central Asia and Caucasus (GWP CACENA) organized the competition under the motto "Partnership as a driving force for achieving water security." The aim of the competition is to popularize partnerships in water resources management in Central Asia and Caucasus at the regional, interstate and national level and, in particular, promote activities of GWP CACENA

GWP and Cap-Net UNDP under the guidance of UNEP have made significant progress in 2021 on the pilot project "Integrating freshwater data into sector-wide decision making to improve the protection and restoration of freshwater ecosystems." The partners completed the first component of the project, training over 250 people in three countries, and are now engaging in the development of action plans to protect and restore freshwater ecosystems with stakeholders. The pilot project supports and promotes the integration of environmental data into relevant decision-making processes through multi-stakeholder engagement to improve the preservation, management, and restoration of freshwater ecosystems. The objectives are being met through the implementation of pilot projects in Argentina, Kazakhstan, and Kenya. Moving to Kazakhstan, approximately 120 people attended the online course in November 2021. After a public awareness event in September 2021, the project will be presented to the governmental high-level Working Group Panel in December 2021. The Balkhash-Alakol Water Basin Council is engaged in the action planning process and the plan is expected to be finalized in January 2022.

In May 3-10, 2021, GWP-Georgia and GWP-Kyrgyzstan held a meetings round to exchange experience on two topics: SDG 6.5.1 implementation and transboundary rivers management. The Kyrgyz partners shared their experience in creating joint commissions for water management, which is of particular importance for GWP-Georgia involved in the water law improvement. For GWP-Georgia part, representatives briefed in detail on the experience of conducting assessments on IWRM implementation in terms of SDG 6.5.1 and 6.5.2 indicators started in 2017, given the start of similar assessments in Kyrgyzstan in 2020.

The High-level Experts and Leaders Panel on Water and Disasters (HELP) with the support from the Government of Japan, has developed and is promoting a Guideline for addressing water-related disaster risk reduction under the COVID-19 pandemic. The HELP Group through the GWP network launched an initiative to hold consultations on those Guidelines in three CACENA countries (Uzbekistan, Georgia and Kyrgyzstan).

Capacity building. The Massive Open Online Course (MOOC) on transboundary freshwater security, which was launched in 2020, continued to expand in 2021 – attracting over 2,300 participants from 150 countries. The course is confirmed for another year on the same platform – with more language versions in the making to reach an even greater audience, and with more interactive events to engage participants. Following up on the post-course survey, which showed that the monthly interactive online sessions were the key to attract participation in the MOOC, a series of nine events called 'transboundary freshwater security governance train' were organised in collaboration with the Wuhan International Water Law Academy (IWLA), as well as SIWI who collaborated on the last event. See MOOC report that summarizes key achievements and impacts from this MOOC.

Source: GWP, Agency of IFAS

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, Kyrgyzstan, Tajikistan, and Uzbekistan are the members of ICID.

ICID•CIID

Activities in 2021

ICID has held its international activities physically and online this year.

The 5th African Regional Conference and 72nd Meeting of the International Executive Council took place in Marrakech, Morocco from 23 to 28 November. Morocco is a permanent member of ICID since 1959 in the face of ANAFIDE, non-governmental organization founded in 1970.

The 5th African Regional Conference themed "Sustainable Management of Irrigation for an Improved Resilience of Agriculture in Africa" covered a range of irrigation issues faced by the countries in Africa. The Conference opening ceremony was chaired by the Minister of Agriculture, Maritime Fisheries, Rural Development and Water and Forests Dr. Sadiki in the presence of ICID President Dr. Ragab Ragab and ANAFIDE President A. Fertahi. Multiple people were

able to follow the Conference's sessions because of hybrid format of the event.

Dr. Sadiki in his opening speech underlined the importance of such a Conference for Africa by saying that the Conference's theme was extremely relevant for the African continent and outside it in the context of Africa's adaptation efforts in agriculture. Mr. Fertahi in his turn said that the selected theme has been nurtured for a long period of time and rather was trivial. First, many African countries are facing similar problems in the agricultural sector, though in varying degrees. Irrigation offers a big room for greater agricultural sustainability in Africa and contributes to agricultural development. The 5th African Regional Conference will provide an opportunity to discuss this important theme, as well as associated topics.

ANAFIDE also organized side events, including the "Water-Energy-Food Nexus" in partnership with FAO and the "Management and technology for sustainable water-agriculture nexus in the context of climate change" together with WB.

A training program for young African professionals on micro irrigation systems was organized before the Conference. The training is an important contribution of the Moroccan National Committee to irrigation capacity building in African countries.

72nd Meeting of the International Executive Council[90]. The event, which gathered together more than 150 delegates, was comprised of meetings of Permanent Committees and Working Groups. Relevant decisions were made based on activities of the work bodies, the results of election of new ICID office-bearers were announced, and the system of KHETTARAS[91] was recognized by the World Irrigation Heritage. Several events were postponed. Bestowing of the awards was as follows: Technology Award to Dr. Abdrabbo Abdel-Azim Abdrabbo Shehata (Egypt) for his work "Hybrid Irrigation Method for Water Saving in Irrigated Agriculture"; Innovative Water Management Award to Mr. EL Bouari Ahmed (Morocco) for his work "First PPP Irrigation Project in the World (El GUERDANE Scheme) in South of Morocco"[92]; Young Professional Award to Dr. Alison McCarthy (Australia) for her work "Automated site-specific irrigation optimization using 'VARIwise'".

Additionally: (1) Dr. Tsugihiro Watanabe (Japan), Mr. Aziz Fertahi (Morocco) and Mr. Ali Reza Salamat (Iran) were elected as Vice Presidents of ICID, for the term 2021-2024; (2) Vice-President Marco Arcieri (Italy) was elected as Chairman of the Permanent Finance Committee; (3) number of individual members of ICID was increased.

A new Working Group on Land Drainage under the Scheme Strategy Theme will be established to facilitate drainage development as part of IWRM, and a Working Group on Water-Food-Energy Nexus will be formed under the Basin Strategy Theme to exchange information, knowledge, and experience, as well as networking on the Water-Food-Energy Nexus topic in order to be up to date with new developments, methods and approaches.

In the course of the year, ICID organized multiple webinars, in particular on: (1) General Challenges of Irrigation Schemes Management Under Different Scales: With Special Consideration on Institutional and Organizational Aspects of System Management (January 21); (2) Learning from Historic Irrigation and Drainage Structures (February 19); (3) Irrigation and Drainage Developments in Canada to Expand Food Production and Achieve Water Security (March 3); (4) Role of ICT technologies for sustainable irrigation management and scheduling (April 7); (5) Dividing the Waters: A History of Litigation in the Truckee River Basin and the Hope for the Future (May 28); (6) Suitable water, crops and land management for water stressed regions (June 17); (7) COSMOS, Scintillometer & Eddy Cov new technologies to save irrigation water (June 23); (8) Sustainability of Agricultural Water Management under Difficult Circumstances (June 24); (9) Rainwater Harvesting vs Traditional Catchment Storage (July 15); (10) Organization of Irrigation Automation Systems (July 22); (11) Enhancing water security through improved agricultural water productivity: new knowledge, innovations and applications (August 4); (12) Climate Smart Agricultural Water Management Best Practices, Policy Framework and Way Forward (August 6); (13) Conservation Agriculture in the Context of Rice-Wheat Cropping System (November 1); (14) Geosynthetics to Reduce Seepage Losses and Improve Structural Integrity of Canals (November 15-17); (15) Introduction of Water Conservation Technologies in the Modern Agriculture and Digitization of Water Management in Uzbekistan (December 22).

Source: Mrs. Irena G. Bondarik, ICID Honorable Vice-President

[90] 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

[91] Khettaras are a succession of wells linked by underground canals going to the fields

[92] Morocco has become the first country in the world to initiate a public-private partnership in the irrigation sector in 2005

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.

INBO member organizations belonging to the same geographic region created 8 regional networks of INBO.

Activities in 2021

Projects. The Permanent Technical Secretariat of INBO signed a cooperation agreement with Amazon Cooperation Treaty Organization (ACTO) in February 2021 to strengthen water data tools and water data acquisition, sharing and exploitation practices.

On 5th of November 2021, during COP26, the signing ceremony of the Memorandum of Understanding (MoU) between the Mississippi River Cities & Towns Initiative (MRCTI) and the International Network of Basin Organizations (INBO) took place. It aims to multiply and sustain actions between MRCTI and INBO, and to engage them in joint climate change adaptation projects, in particular through the mobilization of nature-based solutions, and through a better dialogue between cities and their basin.

Events. The following events were held: (1) a webinar on the theme "City-basin dialogue for adapting to climate change: French and Mexican approaches" (January 28); webinar "Enforcing regulations in the water sector: the necessity and functions of a water law enforcement" (March 25); webinar "How to strengthen the sharing and pooling of data produced by the multiple actors of the water sector?" (June 24); webinar "Capacity building: Vocational training to improve water management" (July 6); (2) 19th International EURO-INBO Conference (online, December 8-10); (3) the XXIII National Meeting of Basin Committees of Brazil (October 4-7).

INBO actively participated in its partners' activities, including: 5th working meeting of the Global Network of Basins, about twenty pilot basins shared their experiences on adaptation to climate change in transboundary basins, co-organized with the UNECE (February 26); webinar organized by CONAGUA and UNESCO, the Secretary General of the International Network of Basin Organisations (INBO) was invited as an international expert to give a testimony on the challenges related to planning at the river basin level (March 16); co-organized the European River Symposium 2021 (May 26-27); organized several events on the management of aquatic ecosystems and biodiversity, as well as on the dissemination of SFNs and adaptation to climate change during IUCN – World Conservation Congress 2021 (September 3-11); 9th session of the Meeting of the Parties to the Water Convention; COP26 (November 1-12); 17th IWRA Congress (November 29-December 3), etc.

The World Water Council, INBO, OiEau and the Nature Conservancy launched a call for signatures on the Declaration "No water security without ecological security / No ecological security without water security" at the IUCN World Conservation Congress in Marseille (September 4) for better integration of ecosystems and biodiversity into water sector activities.

Preparation to the 9th World Water Forum. 2021 also marked the acceleration of the preparation to the World Water Forum planned in Dakar in March 2022. INBO is leading the priority n°3 of the Forum on the topic of "Cooperation" (which covers IWRM) in partnership with a wide range of partners (Korea Water Forum, Swiss Agency for Development and Cooperation, World Youth Parliament for Water, etc.). It also leads or co-manages several "action groups" on adaptation to climate change, data sharing and capacity building. Above all, INBO is piloting (in partnership with the Organization for the Development of the Senegal River, the Organization for the Development of the Gambia River and the United Nations Economic Commission for Europe) a new high-level segment dedicated to basins.

Publications. "Water Law Enforcement" – a manual on water policing, based on examples collected around the world (November 2021); INBO Newsletter (No. 29, January 2022).

Source: www.inbo-news.org/en, INBO Newsletter No. 29, INBO Activity Report 2019-2021

The Eastern Europe, Caucasus, and Central Asia Network of Water Management Organizations (EECCA NWO)

EECCA NWO is one of the eighth regional networks of INBO. It was established in 2010 to exchange views, experiences, and information on various aspects of water management. The Network is administered by SIC ICWC, with the support of the Government of Russian Federation and the UNECE, and Network's activities are coordinated with those of INBO.

For the first time the EECCA Network of Water Management Organizations held its conference on "Transboundary Water Cooperation in the EECCA countries: Lessons Learned and Future Directions" in the format of a videoconference on March 2-3. The key conference topics were: (1) Water cooperation between Central Asian and neighboring countries; (2) Water cooperation between the Eastern Europe and neighboring countries; (3) EECCA NWO contribution to cooperation between Eastern Europe, Central Asia and neighboring countries. A new EECCA NWO collection of scientific papers "Lessons from transboundary cooperation development in the EECCA countries" and the collection of best practices "Selected IWRM and transboundary water cooperation practices from the EECCA countries" were issued following the Conference.

The assessments of "Statements made by the Central Asian countries at the UN General Assembly in 1992-2020: Key highlights and priorities" and "Environment and Transboundary Cooperation in the Statements made by the EECCA countries at the UN General Assembly in 1992-2020" were conducted with the contributions from the Network's members.

Effective scientific cooperation is needed to find solutions for current problems before the countries, and as stated by President Shavkat Mirziyoyev at the IFAS Summit in 2018, joint interdisciplinary research should be conducted, including on the platform of scientific information centers of Interstate Commission for Water Coordination and Interstate Commission for Sustainable Development. In this context, EECCA NWO, Water Partner Foundation (Netherlands) and SIC ICWC proposed to create a Central Asia Expert Platform on Water Security, Sustainable Development, and Future Studies. In early 2021, the Platform's website and experts' base were developed on www.cawater-info.net/expert-platform/index.htm.

Source: EECCA NWO Secretariat

7.6. International Water Management Institute

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 2021

After a ten-year journey, the IWMI-led CGIAR Research Program on Water, Land and Ecosystems (WLE) came to an end in 2021. WLE was a global research-for-development program with over 200 projects in more than 60 countries, significantly contributing to enhancing our natural resources and directly benefitting millions of lives across the Global South.

IWMI continued to engage in the transition to One CGIAR. The formulation of One CGIAR'S portfolio of new research initiatives has strengthened collaboration and coordination among CGIAR centers. IWMI is closely involved in 32 initiative design teams across five impact areas that will support CGIAR to transform food, land and water systems.

Global research projects: Global Partnership for Sustainable Cooperation on Shared Waters (2021-2023/ US Dept. of State). The program will develop an inclusive global 'Transboundary Waters Cooperation Facility' at the inter-governmental level. The Facility will support the coordination, prioritization, design, preparation and funding of cooperation initiatives for transboundary water management and partnership development at basin level.

Research projects involving Central Asian countries: Assessment of Transboundary Water and Land Resources in the Amu Darya Basin (2019-2022, Uzbekistan and Tajikistan/ EU-ISTC), H2020: Hydropower For You (2021-2026, Central Asia/EU), Increasing water use efficiency in the Aral Sea region (2021-2022, Kazakhstan, Uzbekistan/GIZ), Implementation and conducting of trainings on water efficiency technologies by cotton production in Uzbekistan (2021-2022, Uzbekistan/ BMZ).

New big projects. The Water Resource Accountability in Pakistan (WRAP) project (FCDO); Monitoring land and water productivity by Remote Sensing (WaPOR Phase 2) (Govt. of Netherlands); AL MURANA – Building climate resilience through enhanced water security in MENA (FCDO).

Work with partners. IWMI continues to work with many partners globally, regionally and at national level, with diverse public, private and civil society partners. These include research, implementation and outreach partners.

Awards. Two IWMI researchers Nafn Amdar and Arif Anwar were awarded the World Food Forum Transformative Research – Innovation Lab Award in line with IWMI's work carried out under the Water Innovation Technologies project in Jordan. This award recognizes researchers and aspiring researchers who are committed to transforming agri-food systems.

Publications. Storing Water: A new integrated approach for resilient development; Scaling up Index-based Flood Insurance (IBFI) for agricultural resilience and flood-proofing livelihoods in developing countries; Transformation of water systems for climate change adaptation and resilience; Gender dimensions of solid and liquid waste management for reuse in agriculture in Asia and Africa.

Source: IWMI Office in Uzbekistan, https://www.iwmi.cgiar.org/

7.7. International Water Resources Association and World Water Congress

The International Water Resources Association (IWRA) is a global knowledge network of water experts. Since 1971, the Association has grown to become a preeminent key actor working internationally for the sustainable use and management of the world's water resources.

Activities in 2021

World Water Congress. Since 1973, IWRA holds a World Water Congress every three years in various locations around the world. Together with the Korean Ministry of Environment and K-water, IWRA held the **XVII World Water Congress** in Daegu, Republic of Korea from November 29 to December 3, 2021. A key main outcome was IWRA's Daegu Declaration. The Declaration called for improved cooperation for coherent responses around water issues and recognized this resource as a fundamental element of building resilience and long-term sustainable development. This document was also acknowledged in the Dakar Declaration in the following 9th World Water Forum and in the road to the UN 2023 Water Conference. In partnership with the Chinese Ministry of Water Resources, IWRA started organization of the XVIII World Water Congress to be held in Beijing, People's Republic of China, from September 11 to September 15, 2023. It will identify major global issues concerning the water agenda under the overarching theme of "Water for All: Harmony between Humans and Nature".

Projects and programs. The IWRA Mongolia Chapter was set-up to convey knowledge about urban water security in all sectors and across levels to facilitate open dialogue and engage in a series of activities about economic, environmental and social challenges seeking to promote solutions and best practices for the water community

The IWRA's World Water Envoys Programme was launched officially during the XVII World Water Congress (November 29-December 3, 2021, Daegu, Korea) with five representatives from Africa, Asia, the Middle East and the Americas. The "World Water Envoys" are early career and young water professionals, and local ambassadors for the issues they and their communities face when it comes to water security and the related environmental, social and economic impacts. The Envoys are actively involved in IWRA's Early Career and Young Professionals Task Force today, will contribute to Water International issues, and become peer mentors to the next round of World Water Envoys to be selected for the upcoming XVIII World Water Congress.

Working groups. A number of Task Forces are active under IWRA's umbrella, including on: Early Career & Young Professionals, Groundwater, Land4Flood, Smart Water Management, Water & Climate Change, Water Quality, and Water Security. Provided the 2022 UN-Water theme focusing on Groundwater, the Association's dedicated Task Force on this topic was very active in 2021 and the beginning of 2022 on multiple activities, including the publication of selected articles in Water International, a puzzle game, groundwater success stories webinar series, intergenerational conversations between experts, organization of webinars for World Water Day (March 22) and World Toilet Day (November 19), to help make visible the invisible and address the sustainability aspects of water.

Events. (1) preparation to the 9th World Water Forum, leading the sub-theme on water quality and waste management with four dedicated sessions with the support of the French Development Agency (AFD), the Institute for Global Environmental Strategies (IGES) of Japan, the OECD, etc. The XVII Congress of IWRA was officially announced as key milestone to the 9th WWF; (2) a special session on Water Re-use together with UNESCO i-WSSM, and a thematic session on "Water & Ecosystems" jointly with UNESCO-IHP and the United Kingdom's Environmental Agency as part of the 2nd Asia International Water Week; (3) online conference "Water, Food & Public Health" in partnership with FAO (June 7-9); (4) Water Pavilion together with SIWI, as well as two dedicated sessions at the 26th COP (Glasgow, Scotland, October 31- November 13); (5) 12 webinars on themes of timely interest on water and the sustainability impacts also aligned with the international water and development agendas, and in close collaboration with key partners (i.e. SIWI, UN-Water, Women for Water Partnership, etc.).

IWRA representatives participated in: each of the UN-Water Regional Level Coordination Discussion Groups for UN's General Assembly initiative on the Water Action Decade to mobilize action to transform water management for sustainable development in five regions (Africa, Arab States, Asia and the Pacific, Europe and Central Asia, and Latin America and the Caribbean); (2) UNESCO-IHP's Second International Conference on "Transboundary Aquifers" – ISARM 2021 (December 6-9, online); (3) UN Water SDG 6 Global Acceleration Framework meeting discussions and document exchanges; (4) UN Water bi-annual meetings and UNESCO-IHP's Intergovernmental Council meetings.

10 online master-classes series on Water Cooperation & Diplomacy were launched in collaboration with the Universities Partnership for Water Cooperation and Diplomacy (July 1-October 7).

Publications. Publication of eight issues of IWRA's Water International, including on "Measuring the Impacts of Water Governance" in collaboration with the OECD. Publication of the first report of IWRA's 2021-2023 Smart Water Cities project focused on the identification of Smart Water Cities case-studies in partnership with the Asia Water Council and K-water. Release of more than 12 Policy Briefs providing high quality analysis and practical recommendations for policy makers on important sustainable development issues. Support to the publication of the UNESCO Headquarters and UNESCO i-WSSM (International Centre for Water Security and Sustainable Management) Global Water Security Issues Paper Series on Groundwater, and Water Security and Cities. Contributions to UN's World Water Development Reports (UNESCO-WWAP) 2022 on Groundwater, and the 2023 on Partnerships.

Source: IWRA

7.8. 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 convenor, 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 2021 was a truly global event that brought the international community together to work towards a more water-wise world. World Water Week 2021 was SIWI's biggest and most diverse event ever. Held as an online event on August 23-27, it brought knowledge about the global water crisis to all parts of the world, and it opened for an inclusive discussion on urgently needed solutions. Thanks to the generosity of the 566 session organizers, SIWI was able to make almost all the 418 sessions and other content available online for free. A record 13,000 participants from 188 countries participated, demonstrating not only the great concern for the world's water, but also a determination to change things for the better. The sessions were organized around five water-related challenges: Building more resilient and fair societies, Working with nature, Transforming our value chains, Rethinking our cities, and Investing in systemic change. Read the detailed report on outcomes and important actions here.

Activities in Central Asia and Afghanistan in 2021

Programs. SIWI's Shared Water Partnership program engaged in several key activities in Central Asia and Afghanistan supporting multi-track riparian dialogues, targeted capacity building, and networking opportunities to elevate regional water cooperation. SIWI, in partnership with the Office of the Co-ordinator of OSCE Economic and Environmental Activities (OCEEA) and the CAREC, launched the "Women in Water Management in Central Asia and Afghanistan" network in September 2021 as a part of the OSCE project Women, Water Management and Conflict Prevention – Phase II. Through the Network, women water experts from Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan engage in joint capacity building, experience sharing, knowledge exchange, and skills building activities, supporting development of women water experts in the region and enhanced regional water cooperation.

The initiative "Water as a Driver of Sustainable Recovery: economic, institutional and strategic aspects of water resources management in Central Asia", in partnership with SDC, the University of Corvinus Budapest, and CAREC, within the framework of the Blue Peace Central Asia, continued in 2021.

Events. The following events were held: (1) Online negotiation simulation of transboundary river basin agreement, targeted at country representatives interested in establishing new transboundary water agreements, with participants from 14 countries, including Afghanistan, Kazakhstan Kyrgyzstan Tajikistan, and Turkmenistan (February); (2) Virtual Meeting on Climate Change Impacts on Conflicts, where SIWI contributed on climate-related security risks with focus on Afghanistan, highlighted the role of water as an entry point for regional cooperation (February); (3) Presentation of the SIWI's working paper "Making Waves: Youth engagement in water diplomacy" elevating case studies, best practices, and recommendations for elevating youth perspectives in water diplomacy, featuring case studies from SWP, CAREC, EcoPeace Middle East (April); (4) A focused session on water diplomacy within annual Central Asian

Leadership Program on Environment for Sustainable Development (September).

Publications. SIWI published the working paper "Making waves: Youth engagement in water diplomacy" that explores youth engagement in water diplomacy processes as a key aspect of fostering sustainable and long-lasting transboundary water cooperation. The paper explores several case studies, including the Central Asia Leadership Programme.

Source: SIWI, https://www.siwi.org

7.9. 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.

9th World Water Forum "Water Security for Peace and Development"

Loïc Fauchon, President of the World Water Council, in the first week of March went on an official trip to Morocco to meet the Head of the Moroccan Government, various Ministers and the Minister of Equipment, Transport, Logistics and Water, who were actively preparing Morocco's participation in this event. Among the discussion topics was the preparation of the Grand Prix International Hassan II, one of the biggest awards at the Forum.

At the beginning of June, a delegation of the World Water Council led by its President Loïc Fauchon visited Dakar, where the next World Water Forum will be held from 21 to 26 March 2022. Various meetings were held during this official trip, with a focus on the active preparation of the 9th Forum. Objectives: promote the event, intensify its preparation and share on the progress and challenges.

The 2nd stakeholders meeting of the 9th World Water Forum in Diamniadio, Senegal (October 14-15) was marked by a good level of participation, both in person and virtually. It allowed for the stabilization of the thematic process, an update on the Dakar 2022 initiative and the sharing of logistical information. International partners also took the opportunity to reiterate their commitment to the success of Dakar 2022. 42 countries were represented according to the World Water Forum Executive Secretariat.

Activities in 2021

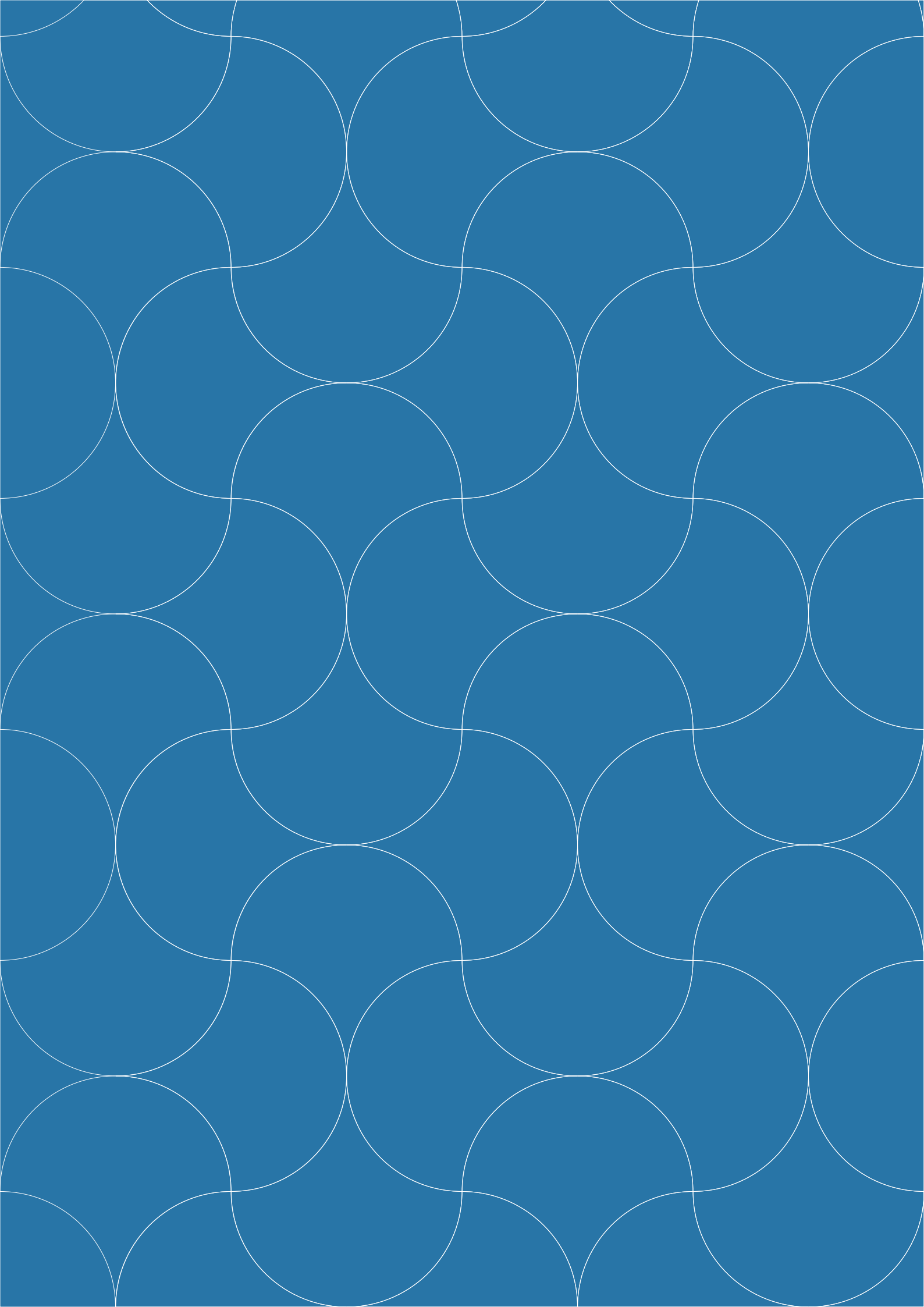
Events. The WWC's Board of Governors met three times virtually in 2021 to provide guidance on Council activities: (1) early April, 73rd Board of Governors meeting, to discuss various topics related to institutional matters, including advancement of the selection process for the 10th World Water Forum; (2) 74th Board of Governors meeting at the end of June, where the 2020 Activities Report was presented with a special focus on the strong mobilization of WWC during the pandemic period; (2) 75th Board of Governors meeting held in October was mainly divided in two parts: institutional and Forum matters.

WWC offered water an international platform through its booth and various events at the World Conservation Congress (September 3-11, Marseille). Loïc Fauchon was invited to opening and closing of the plenary on Freshwater: "Our Freshwater Global Risk-Taking Actions to Reverse the Trend". On the occasion of the Congress, which brought together more than 1,400 governmental, civil society and indigenous people organizations, WWC, IOWater, the Nature Conservancy (TNC) and INBO officially launched a call for the signing of the declaration "No water security without ecological security / No ecological security without water security". The World Water Council, GWP and the Foreign, Commonwealth & Development Office of Great Britain organized a hybrid side event at the COP 26 (November 6).

Representatives of WWC participated in a number of events (both physically and online): 4th Cairo Water Week (October 24-28), where WWC co-organized with the Senegalese Secretariat a special session on the 9th World Water Forum; 5th Arab Water Forum (September 21-23) focused on water security for peace and sustainable development, a common theme with the upcoming World Water Forum; Central Asian Sub-regional Preparatory Conference for the 9th World Water Forum (October 19-20); 4th Mediterranean Water Forum (December 6-8); ENEG conference in Portugal (November 23-26); XVII World Water Congress & World Water Cities Forum (November 29 - December 3); XXIV Brazil Symposium on Water Resources (November).

Publications. Water Security for World Health – 2020 Annual Report

Source: https://www.worldwatercouncil.org/en



Section 8

Activities of International Partners in Central Asia

8.1. 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, include flood management, irrigation and drainage, clean water supply, sanitation, hydropower, institutional reforms, and knowledge and capacity building support.

Projects in Central Asia in 2021

ADB has supported the Central Asia Regional Economic (CAREC) Program for regional cooperation and integration. A partnership of 11 countries supported by six multilateral institutions[93] promotes development through cooperation, leading to accelerated growth and poverty reduction. In 2017, CAREC introduced agriculture and water as a key pillar under the CAREC 2030 strategy. In 2020, ADB approved a technical assistance (TA) to support the development of the CAREC water pillar, emphasizing economic aspects and sustainable financing of water resources management. The TA prepared a scoping study focusing on five Central Asian republics that largely share the water resources in the Amu Darya and Syr Darya river basins. The report presented the framework of the water pillar comprising three blocks (i) climate-resilient and productive systems, (ii) sustainable water resources and water services, and (iii) nexus solutions and cross-sector learning.

ADB investments in 2021 were still impacted by the coronavirus disease (COVID-19), which restricted mobility and travel. Investment approvals in 2021 include a US$ 30 million grant for Tajikistan, the Climate- and Disaster-Resilient Irrigation and Drainage Modernization in the Vakhsh River Basin project. The project aims to increase climate and disaster resilience, water productivity, and income of farmers in selected areas of the Yovon irrigation and drainage system. It has a high focus on gender inclusiveness, recognizing the significant role women play in agriculture and water resources management. It is ADB's first gender equity project in irrigation in the Central Asia region, placing **Tajikistan** as a leading gender champion. About 6,700 farmers of whom 12% are female, and 4,200 homestead (kitchen) gardens, which are mostly managed by women, will benefit from improved water service delivery.

For the **Kyrgyz Republic**, a US$ 23.5 million loan and US$ 11.5 million grant for the Landslide Risk Management Sector Project were approved. This is ADB's first integrated preemptive landslide risk reduction investment to safeguard rural communities in the country. Climate change is expected to increase landslide frequency because of earlier snowmelt, melting permafrost, and more intense precipitation events. This innovative project will embed international best practices and advanced technologies for improved risk reduction and monitoring. It will combine engineering and nature-based solutions with community-based planning and capacity building for sustainable long-term landslide safety.

A wind power plant project in Zerafshan in **Uzbekistan** is at the approval stage. Before approval and implementation, a study and assessment of socio-environmental impacts from the project have been conducted to inform decision makers.

Efforts continue to improve water supply and sanitation (WSS) infrastructure and services. In Georgia, the Sustainable Water Supply and Sanitation Sector Development Program comprising two loans was approved by ADB Board in 2021: the policy-based loan (PBL) of €115.31 million (US$ 130 million equivalent) and a project loan of €17.74 million (US$ 20 million equivalent). The program was designed to improve water supply and sanitation (WSS) services delivery through upstream policy and institutional reforms and downstream strengthening of United Water Supply Company of Georgia (UWSCG), the sole state-owned enterprise (SOE) remaining in the country's WSS sector. PBL supports establishment of comprehensive, high-impact sector and SOE reform measures, including various policy actions, while the project loan complements the policy actions by (i) strengthening the operation and maintenance capacity of UWSCG. The two PBL tranches (€70.96 million and €44.35 million) were released in December 2021, respectively. All trench policy conditions were completed by the government less than one year after the loan became effective. The timely achievement of two trench conditions reflects good implementation progress and the government's strong commitment to the proposed reforms. The desired policy impact and outcomes under the program will be accomplished as planned. The project team is closely monitoring the policy action implementation progress, results and impacts.

Source: Asian Development Bank, https://www.adb.org/

[93] 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 by the end of 2020 have grown to 100 approved members worldwide.

The United Arab Emirates hosted the Sixth Annual Meeting of the Board of Governors by electronic means on October 26-28. With the theme "Investing Today, Transforming Tomorrow," the Meeting enabled AIIB to engage via webinars with a wide range of stakeholders in the Middle East and beyond, exchanging ideas and creating opportunities in line with AIIB's mission to finance the Infrastructure for Tomorrow (i4t).

Many believe that multilateral financial institutions such as the AIIB play a vital role in developing better environmental, social and governance standards. This was a topic the AIIB planned to discuss at the annual meeting. Meanwhile, after three years of use, the bank has amended its Environmental and Social Framework (ESF), with a new version having gone into effect in October. Recent investigations and studies, however, have called into question the impact of the AIIB's investments and whether they are in line with its core values. They believe that AIIB's new green-lighted ESF measures would reduce transparency and accountability since the framework has many exemptions where the list of documents and time bound requirements are not applied. Further, ESF provisions allow the AIIB to delegate disclosure responsibility to its clients in some circumstances.

The Bank also announced that it will align its operations with the goals of the Paris Agreement by July 1, 2023. The Bank currently estimates its cumulative climate finance approvals to be US$ 50 billion by 2030. This amount would represent a fourfold increase in annual climate finance commitments.

Projects in Central Asia in 2021

AIIB has approved a US$100-million loan to ACWA Power Syrdarya LLC to support the construction of the Syrdarya 1,500 MW Combined Cycle Gas Turbines (CCGT) Power Project in the Republic of Uzbekistan. It has also approved a loan to Medium-size Cities Integrated Urban Development Project to address the challenges of rapid urbanization of secondary cities.

Source: 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 2021

In **Kazakhstan**, EBRD focuses on balancing the role of state and market, development of local capital markets, green economy transition, and sustainable energy. To date, the cumulative EBRD investments in 296 projects in Kazakhstan amount to €9,145 million. Current portfolio of projects is €2,815 million.

In 2021, EBRD and the Government of Kazakhstan have agreed a five-year Enhanced Partnership Framework Arrangement (EPFA) to boost the resilience, modernization, digitalization and regional integration of the national economy, with a view to speeding its recovery following the COVID-19 pandemic.

A senior loan of up to US$ 44.83 million was provided under KAZREF II – Borey Wind to finance the development, construction, and operation of a wind power plant in central Kazakhstan, with a total installed capacity of 100 MW. The EBRD loan of US$ 80 million will help the Atyrau oil refinery, Kazakhstan's leading vertically integrated oil and gas company, modernize industrial wastewater treatment facilities, and overhaul 860 hectares of evaporation ponds. Once implemented, the project will increase water reuse and reduce the withdrawal of freshwater from the Ural River.

In the **Kyrgyz Republic**, EBRD focuses on fostering sustainable growth; enabling SMEs to scale up; promoting the sustainability of public utilities; strengthening the financial sector; and supporting critical infrastructure. To date, the cumulative EBRD investments in 207 projects in the Kyrgyz Republic amount to €822 million. Current portfolio of projects is €165 million.

€4.8 million financing package includes a loan from the EBRD and a grant support by European Union and Japan under the latest water-supply improvement

project, which will improve the water infrastructure of the Nookat city; specialised vehicles and maintenance equipment worth over €2.4 million delivered to six municipalities to improve water and wastewater services.

In **Tajikistan**, EBRD focuses on all sectors, including energy, infrastructure, financial sector, corporate sector, and SMEs. To date, the cumulative EBRD investments in 149 projects in Tajikistan amount to €857 million. Current portfolio of projects is €526 million.

EBRD has organized a financing package of US$ 4 million to Tajikistan's largest private lender Bank Eskhata under its Green Economy Financing Facility (GEFF) to support green financing for households and small private-sector companies investing in green technology solutions. A sovereign loan of up to €1.8 million to the Republic of Tajikistan to be on-lent to the State Unitary Enterprise "Khojagii Manziliyu Kommunali of Fayzobod Region", which is responsible for the provision of water supply and solid waste services in the city of Fayzobod, the capital of the Region. €35 million are allocated for the modernization of the power distribution network in the Khatlon region of the country and will also help introducing billing and metering infrastructure.

In **Turkmenistan**, EBRD focuses on expanding private sector operations in the corporate and financial institutions sectors, targeted policy dialogue and fostering coordination among IFIs and donor organizations. To date, the cumulative EBRD investments in 88 projects in Turkmenistan amount to €323 million. Current portfolio of projects is €49 million.

The loans allocated to the agro-industry included: US$ 2.5 million to the country's leading juice and dairy products producer Parahat to acquire specialized equipment for packaging fruit, vegetable purees and concentrates, as well as a new PET packaging line to bottle soft drinks; up to US$ 3 million to ES Biyat, to finance a new production line, which will help process spent grain into animal/fish feed, help diversify product range and improve distribution.

In **Uzbekistan**, the EBRD's Country Strategy for 2018-2023 identifies: enhancement of competitiveness by strengthening the role of the private sector's role in the economy; promotion of green energy and resource solutions across sectors; support of increased regional and international cooperation and integration. To date, the cumulative EBRD investments in 110 projects in Uzbekistan amount to €3,092 million. Current portfolio of projects is €1,766 million.

The Bank disbursed up to €125 million for modernization of water and wastewater infrastructure in Khorezm province, city of Tashkent, and Namangan province; signed about €100 million for modernization of solid waste infrastructure in Karakalpastan and Khorezm province; approved up to US$70 million to FE Indorama Agro LLC, an established cotton industry player, for introduction of good agronomic and crop management practices.

In 2021, Samarkand became the first city in Uzbekistan to boost its urban sustainability planning by joining the EBRD's €3-billion flagship programme, EBRD Green Cities.

Source: www.ebrd.com

8.4. European Union

On 17 June 2019, the Council adopted a new EU Strategy on Central Asia. The new-generation bilateral Enhanced Partnership and Cooperation Agreements (EPCAs) is a cornerstone of EU engagement.

In 2021, the EU and the five Central Asian states celebrate the 30th anniversary of the establishment of their diplomatic relations. EU engagement with the region has significantly expanded since that moment.

EU programming in Central Asia for the period 2021-2027 provides funding for a Multi-annual Indicative Programme (MIP). As **Kazakhstan** is an Upper Middle-Income country, this MIP is limited to a cooperation facility (€16 million) focusing on two priority areas: Sustainable Economic Growth and Rule of Law. As to the **Kyrgyz Republic**, the new MIP (with allocation of €62 million for the initial period) is expected to respond to the Kyrgyz National Development Strategy 2040 (NDS), adopted in November 2018. MIP for **Tajikistan** is expected to run in parallel with the Tajik National Development Strategy 2016-2030, which has the over-arching goal of improving living standards through sustainable economic development (€91 million for the initial period). **Turkmenistan** will benefit from a cooperation facility (€18 million), focusing on green aspects of the economy and improving the business climate, with an emphasis on agriculture/rural development and support to trade development. The EU's priority areas for cooperation with **Uzbekistan** will be support to democratic governance and digital transformation; inclusive, digital, and green growth; and the development of a smart and eco-friendly agro-food sector (€83 million for 2021-2024 (initial stage)).

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)"

The WECOOP project (third phase from October 2019 to October 2022) aims to enhance environment, climate change and water policies at national levels in Central Asia through approximation to EU standards and to promote investments in relevant sectors with the aim of contributing to measurable reductions in man-made pollution, including CO_2 emission. The project activities include support to the EU-CA Platform for Environment and Water Cooperation and its Working Group on Environment and Climate Change (WGECC), as well as implementation of the EU Green Deal's international dimension in Central Asia to advance climate action.

Activities in 2021

The 10th WGECC meeting was held on October 4-5. The discussion at the first gathering after the start of the COVID-19 pandemic was built around the following four items: biological diversity, climate change, decoupling economic growth from the increase of pollution, and toolbox for sustainable recovery. EU-CA WGECC Coordination Committee had its second (February 10) and third (July 22) meetings in 2021.

The following online trainings and webinars were organized: (1) EU-CA Academic School on Environmental Economics for university teachers of Central Asia (April 12-30); (2) WECOOP–IGTIPC Webinar: Best Available Techniques (BAT), new Environmental Code of Kazakhstan and the EU experience (August 2-October 29); (4) WECOOP-IWAC workshop: Exchange of experience in hydrometeorological services (November 10-11); (5) WECOOP basic training: Preparation of the investment projects (November 29-December 9); (6) WECOOP webinar on newly developed regulations of Turkmenistan on air quality management and EIA (December 3).

In total, 37 journalists took part in the contest "Restoring Biodiversity – our shared responsibility". 6 winners were announced during an online Award Ceremony in July.

Source: https://ec.europa.eu, https://wecoop.eu

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

Green Central Asia: Transboundary Dialogue on climate, environment and security in Central Asia and Afghanistan

Since over a decade, Germany is actively engaged in supporting regional cooperation in Central Asia. The Berlin Process mainly focused on transboundary water management among the five Central Asian countries. Improving access to food security, water availability, a healthy habitat for humans, flora and fauna is only possible with enhanced stability in the region and mitigated impact of climate change on glaciers and natural resources such as water, land, and soil.

In the context of German engagement on climate change and security within the UN and support to the new EU-Central Asia Strategy of June 2019, the German Foreign Office launched the Initiative 'Green Central Asia' – Enhancing environment, climate and water resilience' with a ministerial conference in Berlin. The existing Berlin Process was enlarged by additional aspects of transboundary cooperation concerning climate, environment and security.

To support the political dialogue a regional working group was established and developed a Regional Action Plan under the Green Central Asia Initiative, which was approved by all five Central Asian countries in November. Four priorities were defined for joint action: climate sensitive water and land management, cooperation on international environment instruments and waste management with a focus on e-waste.

Scientific support and capacity building measures were provided by the Potsdam Institute for Climate Impact Research (PIK), the Helmholtz Centre Potsdam – German Research Centre for Geosciences (GFZ), the Martin Luther University Halle Wittenberg and the German-Kazakhstan University (DKU).

Other Regional Programs and Projects. Continued (1) Project "Technology-based climate change adaptation in Tajikistan and Kyrgyzstan" (2019-2022/ BMZ, DKTI), which aims to assist the responsible authorities in the countries to improve the plans for climate adaptation in rural regions with the aid of modern information technology and geodata management;

(2) Project "Ecologically oriented regional development in the Aral Sea region" (2020-2024/ BMZ), to help the governments of Uzbekistan and Kazakhstan to improve cross-border, ecologically sustainable and economic development of the Aral Sea region; (3) Project "Integrative and Climate-sensitive Land Use in Central Asia" (2021-2024/BMZ/ CA countries). The objective is better incorporating integrative land use approaches at national and regional levels in Central Asia.

National Projects on Water, Environment, and Development

A number of projects continued its activity in 2021: (1) "Policy Advice for Climate-Resilient Economic Development" (2019-2022/BMU), implemented in Kazakhstan along with Viet Nam and Georgia; (2) "Rural development in Southern Kyrgyzstan" under the Integrated Rural Development Programme (2018-2023/BMZ). The Project aims to increase income opportunities in agriculture and tourism in the Jalal-Abad region and build capabilities of local governments to create better social and economic conditions; (3) Biodiversity conservation and poverty reduction through community-based management of walnut forests and pastures" (2018-2023/BMZ). The project is implemented in Bazar-Korgon and Aksy districts of the Jalal-Abad region to increase incomes of woodland-dependent communities and improve their adaptation to climate change by conserving biodiversity; (4) "Biodiversity and ecosystem services in agrarian landscapes" (2016-2022, BMU). Objective of this global project is to strengthen individual and institutional capacities and boost knowledge on increasing biodiversity and sustainable use of ecosystem services in agrarian landscapes.

Source: GIZ Green Central Asia Program, https://www.giz.de

8.6. Organization for Economic Cooperation and Development

The Organization for Economic Cooperation and Development (OECD) is a multidisciplinary intergovernmental organization comprising 38 member countries that 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.

OECD is working to help developed and developing countries meet the water challenge, with focus on economic and financial dimensions of water management and improving governance. In addition to analytical work, OECD works with selected regions and countries to facilitate the reform of water policies. 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 was a key partner with the Asian Development Bank (ADB) and the Asia-Pacific Water Forum for the 2020 edition of the Asian Water Development Outlook.

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.

OECD work in Eastern Europe, the Caucasus and Central Asia in 2021

In Central Asia, the OECD works with partner countries through its GREEN Action Task Force. The GREEN Action Task Force annual meeting in 2021 was held in virtual form on 12-13 October 2021 with an agenda that reviewed progress with implementation of the programme of work for 2021-2022 and a substantive focus on the environmental aspects of the policy responses to the COVID-19 outbreak in EECCA, mineral resources and the development of water policy outlooks.

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 multi stakeholder 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).

In Central Asia, recent work has included analysis of energy, water and food security as part of a new programme of work on "nexus". This work included a high-level policy dialogue in Tashkent, Uzbekistan on 15 October 2021 where Central Asian officials met to discuss the benefits of cooperation to promote resource security.

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.

OSCE Activities in 2021

The OSCE Program Office in Dushanbe (POiD) supported IFAS with technical equipment to strengthen regional co-operation on science and practice. The Office facilitated IFAS in organizing the Regional Conference for the 9th World Water Forum held in Dushanbe (October 19-20), and organized a Gender and Water side event at the conference for informing and experience sharing, with contribution from the OCEEA. Furthermore, the Office organized the Science for Diplomacy workshop targeting young professionals from the region to facilitate long-term water related science networks. The Office, in cooperation with the Agency for Land Reclamation and Irrigation (ALRI), organized a review of the Water Code and the development of two byelaws, which will strengthen the institutional framework and spell out responsibilities of key stakeholders. The Office in co-operation with ALRI also contributed to knowledge creation in the irrigation sector by conducting a survey on gender and water. Further building on 2020 achievements of the development of a byelaw on defining water management boundaries, the Office in cooperation with the Ministry of Energy and Water Resources organized a pilot to operationalize the methodology of setting basin boundaries considering IWRM principles in the Kofarnihon basin. POiD also supported the implementation of the National Water Strategy 2030 through an intervention on decentralized energy security in remote areas.

The OSCE Project Co-ordinator in Uzbekistan (PCUz) continued its collaboration with the State Committee of the Republic of Uzbekistan on Ecology and Environmental Protection in the monitoring of pollution in the Syr Darya River Basin and in the assessment of the transboundary impact of toxic wastes. With the aim to support the government of Uzbekistan in the implementation of efficient Disaster Risk Reduction mechanisms and with adequate safety precautions, the composition of various pollutants in water resources was monitored (settlements of Vuadil, Madaniyat and Baymak along the Shakhimardan, Mayluu-Suu, and Sumsar Rivers). PCUz continued its support to ICWC by publishing 120 copies of the 2020 Water Yearbook "Central Asia and Around the Globe", drafted and compiled by SIC ICWC.

The OSCE Centre in Ashgabat (CiA), in August 2021, organized a seminar "International Experience in the Implementation of Digital Technologies in Water Industry". The event was tailored based on the interests and priorities of the national stakeholders. The seminar attracted the main national actors of water sector of Turkmenistan such as the State Committee on Water Economy, Ministry of Agriculture and Environmental Protection, Institute of Deserts, Flora and Fauna, as well as representatives of international organizations and SIC ICSD. International experts from Switzerland (Hydrosolutions GmbH) and Morocco (ICARDA) presented the international perspective and advanced experience in implementation of innovative solutions and digital technologies for sustainable water management, with a particular focus on water availability and supply, irrigation and water conservation. The outcome document of the event included recommendations for the national beneficiaries on the implementation and adaptation of advanced water technologies given the country context.

The OSCE Programme Offce in Nur-Sultan (POiN) in cooperation with the OSCE Program Office in Bishkek facilitated the activities of the Chu-Talas Water Commission by carrying out surface water samples collection and analysis of water quality as well as conducting a study on needs assessment for the conservation of wetlands in the Chu River Basin. POiN supported a tour for young water specialists to major hydraulic structures in Kazakhstan's southern regions, where participants learned about the water facilities' technical characteristics, purpose of use and operational safety aspects. POiN also contributed to the national discussion and review of the main provisions of the draft concept paper of the new Water Code. As part of its long-standing efforts to engage youth and promote environmental leadership, the POiN in partnership with DKU supported a training seminar for young civil servants, students and representatives of government organizations from Central Asia and Afghanistan. The training focused on water governance and climate security in Central Asia, as well as risks countries in the region may face due to climate change impacts on water resources.

The OSCE Programme office in Bishkek (POiB) continued its support to the water resources management in Kyrgyzstan by supporting the activities of the Chu-Talas Water Commission to carry out surface water sampling collection and analysis of water quality in the trans-

boundary Chu-Talas river basin. The POiB contracted an expert to support the Commission in analysis of sampling data and preparation of a report on the state of water quality in the Chu-Talas river basin. The analytical report with recommendations on improvement of the environmental situation on the river basin was presented in the annual concluding meeting of the Commission held in Almaty in November 2021.

The POiB and the Aarhus Center in Cholpon-Ata supported the organization of a clean-up activity of the Issyk-Kul Lake coastal area, contributing to the global environmental campaign "Cleaning the Planet from Garbage". The event was conducted in Cholpon-Ata city with participation of 16 professional divers and more than 70 activists, local residents, representatives of the local authorities, municipal entities, environmental services, as well as public organizations of Cholpon-Ata town. More than 1 ton of solid waste, plastic, fishing nets and other litter were extracted from the lake and shoreline by divers and participants. The clean-up campaigns in Issyk-Kul region are conducted annually since 2018 to raise awareness on waste management and preservation of Issyk-Kul Lake.

The Office of the Co-ordinator of OSCE Economic and Environmental Activities (OCEEA) continued its contribution to the organization of the "Water Day" of the 12th Central Asia Leadership Programme organized by CAREC. During the event, OSCE project staff contributed to the sessions: "Water Diplomacy: Regional Cooperation on Water Management" and "The Important Role of Gender Mainstreaming in Water Governance", including the launch of the e-learning course "Gender Mainstreaming in Water Governance".

As part of the project "Women, Water Management and Conflict Prevention – phase II", the OCEEA also launched the Mentoring and Career Development Programme for Women Water Professionals in Central Asia and Afghanistan: the Programme is implemented in partnership with CAREC and SIWI. Each month, 18 women from Central Asia and Afghanistan meet online with experts and mentors to discuss challenges women face in the water sector and take part in capacity building activities. The Programme will be further represented in the 2022 Stockholm World Water Week as part of the Women in Water Diplomacy Network Forum organized in partnership with SIWI. Among other activities, the project also involved the launch of a photo competition on "Women in Water Management", and the development of a series of podcasts dedicated to female role models sharing their experience in the water sector in partnership with the Central Asia Youth for Water Network (CAT4W).

The OCEEA and POiD are supporting the Government of Tajikistan in organization of the Second International High-Level Conference on the International Decade for Action "Water for Sustainable Development", 2018-2028 in June 2022 and will contribute to the program sessions and events.

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

Switzeralnd has embarked on its new **Cooperation Programme for Central Asia** (2022-2025), which continues to have a strong focus on water, infrastructure and climate change. The Programme 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*. The new Swiss programme will build on past interventions in the region to support sustainable and equitable management of (sub-)river basins at regional and transboundary levels. The programme will work coherently at local, national and regional levels through multi-track diplomacy (including engagement with Central Asian youth) to encourage decision-makers to pursue necessary reforms. Improvement of water governance at the sub-basin level will provide the building blocks to achieve more robust IWRM in each country and across borders and to improve access to safely managed drinking water. Finally, the programme will aim to increase the resilience of rural and urban communities, to enhance their ability to manage the impact of climate change, and to improve access to affordable and reliable public infrastructure services. The previous Cooperation Programme (2017-2021) yielded promising results, at both national and regional levels.

In the **Kyrgyz Republic**, Switzerland supports the Kyrgyz authorities in their efforts to implement their own Water Code that is based on aspects of IWRM and introduced an improved system for monitoring water flow in transboundary Chu and Talas river basins. This support also resulted in the establishment of the State Water Agency, pilot basin administrations, councils and draft basin plans. The Swiss-funded efforts have enhanced irrigation efficiency by strengthening the capacity of over 80% of all the water user associations, as well as by rehabilitating water supply and sanitation infrastructure and strengthening the drinking water service providers in targeted cities, benefiting 1.5 million people in urban settings.

In **Tajikistan**, Switzerland continued its support to the water sector reform in the Tajik Syr Darya Basin and continued its multiple activities in the water supply and sanitation sector. In addition, Switzerland suppor-

ted the city of Khorog to put in place the institutions, knowledge base and systems required as a precursor to the resilient implementation of infrastructure investments in Khorog as a basis for sustainable economic development. Switzerland also supports the provision of efficient weather, water and climate services for the rural population of Tajikistan, especially those highly vulnerable to climate change. With that it contributes to improved livelihoods and resilience of people through the provision of accurate/timely forecasts to improve agricultural productivity, hence guarantee food security, effectively manage irrigation water and reduce vulnerability to hazards.

In **Uzbekistan**, Switzerland supported the Ministry of Water Resources in the development of the Water Sector Development Concept 2020-2030 (Water Concept) and the Road Map to implement its main elements in 2021-2023, which is to serve as a basis for the strategic and regulatory IWRM framework. Building on Switzerland's engagement in the water sector reform in Uzbekistan, the Program promotes climate resilient integrated water resources management in the Zarafshan River Basin to enhance people's livelihoods and inform water sector reform processes and climate change policies at national and regional level.

In addition to the works in these three focus countries, Switzerland is also active at the **transboundary and regional level**, including through its program on water and peace, the Blue Peace Central Asia initiative (BPCA), which aims at supporting the countries in reaching a mutual understanding and agreement in terms of regional water resources management. Under the Blue Peace Central Asia Dialogue Platform (policy pillar) a series of webinars were conducted to foster techno-political exchange and establish a "community of practice" around the economic narrative of joint water management in the region. Knowledge products (Water Footprint and the Blue Peace Index for Syr Darya and Amu Darya) were presented during various bilateral, regional, and global events, including the Central Asia Climate Change Conference, the Stockholm World Water Week, and the preparatory meeting for the Dakar World Water Forum. Moreover, several technical exchanges were facilitated, one of which included the Kazakh-Kyrgyz working group on water quality. Under the youth pillar of the Initiative, the CAY4W enhanced member engagement. A parallel work stream to provide support for improved water education in Central Asia is moving steadily, and a more solid network of universities that jointly drive the improvement of provision of education in multi-sectoral water issues could be instrumental. A BPCA capitalisation reviewed the past seven years of activity and provided important inputs for the design of the initiative's second phase. Switzeralnd will continue this diplomatic initiative and a follow-up BPCA 2.0 program is being developed and reconfirms its commitment to the work for another 10 years. The following publications were released: Online course book developed by Hydrosolutions as part of the Blue Peace Youth Pillar Programme; and, Blue Peace Index for Syr Darya and Amu Darya developed by the Economics Impact Unit in the frame of the BPCA initiative.

Switzerland (SECO funding) contributes to the **CAWEP Program** (see "World Bank"). Furthermore, Switzerland strengthens the glacier, snow and permafrost monitoring systems and capacities in Central Asia through its **Cryospheric Observation and Modelling for improved Adaptation in Central Asia (CROMO-ADAPT)** project. It 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. Finally, Switzerland also supports the **Governance of Groundwater Resources in Transboundary Aquifers (GGRETA)** project, a global project with the Pre-Tashkent aquifer as one of three pilot areas, implemented by UNESCO.

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.

USAID Activities in 2021

Kazakhstan

Tetra Tech ES, Inc., implementer of the USAID Power Central Asia activity, signed a Memorandum of Understanding (MOU) with Samruk-Energy, Kazakhstan's largest diversified energy holding company. Under the MOU, the USAID Power Central Asia activity will help Samruk-Energy develop a low carbon strategy with the overall aim to reduce their carbon footprint by 2060, in parallel with Kazakhstan's plans to reach carbon neutrality by the same year as part of the nation's updated national climate plan.

Kyrgyz Republic

USAID partners with government, civil society and the private sector to improve governance, promote economic growth and enhance the quality of health care and education. The Agency continued projects in agriculture, food security, economic growth and tra-

de: "Farmer-to-farmer" (September 2013-September 2023); and, "Agro Trade" (2020-2025).

Tajikistan

USAID in Tajikistan (1) continues to improve the incomes of smallholder farmers, catalyze women's economic empowerment, and increase the production and consumption of nutritious foods while supporting the diversification of livelihoods for increased household and community resilience to shocks and stressors; (2) helped 741 women secure land tenure rights and increased awareness and legal literacy in land use rights and land reform for 5.5 thousand women farmers; (3) in partnership with local entrepreneurs, established 20 new agricultural businesses including cold-storage, canning, drying, juicing, and animal feed processing facilities, leveraging $1.5 million in private sector investment and leading to 293 new part-time and seasonal jobs; (4) helps the local government deliver water services to its constituents, works with farmers to better manage irrigation water through water user associations; (5) rehabilitated 76 water systems, giving more than 242,000 people access to safe drinking water, including under the Program "Thrive Tajikistan: Partnership for socio-economic development" (2018-2023) aimed to improve the quality of life for people in 16 districts of Tajikistan.

Uzbekistan

Since 1993, USAID has provided over US$ 500 million in assistance to diversify the country's economy and increase regional trade, advance judicial reform, strengthen civil society, and modernize the basic educational system.

At the regional level, USAID:

- announced on the launch of the Central Asia Investment Partnership between the United states, Kazakhstan and Uzbekistan to promote regional economic partnership and prosperity. The Partnership will advance private sector led projects that exemplify international standards for quality infrastructure and promote inclusive, transparent, and sustainable investments. In doing so, partners will maximize the success and positive impact of the projects and mobilize additional private investment to the region;

- started the five-year Regional Water and Vulnerable Environment Activity, worth US$ 24.5 million, to strengthens regional capacity to manage shared water resources and mitigate environmental risks in the Syr Darya and Amu Darya River basins. The project aims to achieve the following: (1) well-trained human capital and strengthened educational institutions that address both IWRM and the water-energy-food-environment (WEFE) nexus; (2) sustainable river basin councils that promote cooperation over transboundary rivers for mutual economic benefit; (3) enhanced national and regional initiatives that address transboundary water cooperation with focus on benefit sharing;

- launched a new five-year, US$ 39 million regional energy program – the USAID Power Central Asia Activity in Tajikistan. The program will assist the five Central Asian countries to meet their national energy priorities, reap economic benefits from cross-border energy trading, and improve energy security through greater regional connectivity.

Source: www.usaid.gov; https://tj.usembassy.gov; https://uz.usembassy.gov/

8.10. World Bank

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

World Bank Activities in 2021

Central Asian Water and Energy Program

The Central Asia Water and Energy Program (CAWEP) continued implementation of its phase III in 2021. CAWEP is a multi-donor trust fund with a total budget of US$ 12.9 million financed by the European Union, Switzerland and the United Kingdom. The program development objective is to strengthen the enabling environment to promote water and energy security at regional level and in the beneficiary countries (five Central Asian countries and Afghanistan), aligning with the World Bank's regional engagement framework that aims at strengthening connectivity and increasing the economic value of water and energy resources in the region. The long-term vision of the program is to promote sustainable development and livelihood security within the region. The activities fall into three thematic pillars: (1) Water Security; (2) Energy Security; and (3) Water-Energy Linkages. CAWEP-funded activities have strong links with the ongoing and pipeline World Bank investment operations and have contributed to the design of more than US$ 660 million worth of investments through analytical work and technical studies. The program finances three project preparation grants in Kazakhstan, Tajikistan and Uzbekistan. The program also informed the design of a major regional program RESILAND CA+ currently in the pipeline across four countries on landscape resilience.

Ongoing water activities focus on the following key issues: (1) improving management of sub-basins with transboundary significance; (2) modernizing irrigated agriculture to improve water productivity with a focus on increased awareness; (3) national water management by focusing on policy, advisory and technical support to benefit regional water security; (4) regional water management to strengthen the capacity of national hydrometeorological services to im-

prove national hydrometeorological information services to key sectors including water, energy, disaster risk management, and agriculture; and (5) capacity building and pilot initiatives to improve cross-country cooperation and explore innovative solutions for water-related challenges.

CAWEP provides support to the work of the IFAS Regional Working Group who are deliberating on reforms options for IFAS institutions. A hybrid format meeting of the RWG was held in October in Dushanbe with participation of the World Bank staff and consultants who are supporting this process. At this meeting the RWG agreed to an improved IFAS structure and legal framework. Following the RWG meeting, EC-IFAS met with international development partners to discuss potential support to the 4th Aral Sea Basin Program (ASBP-4). Following this event, a Joint Statement of the EC-IFAS and International Development Partners on the Implementation of the ASBP-4 was issued. Participants agreed to strengthen donor coordination, establish a platform for dialogue, and share information on ongoing activities and plans to synergize implementation of regional projects and programs.

A diagnostic framework has been developed to assess the performance of irrigation and drainage service providers in Central Asia. The assessment will use data from a field survey implemented in Uzbekistan, Kazakhstan, Kyrgyz Republic, and Tajikistan at the level of regional and district irrigation service providers and water user associations. Additionally, a remote-sensing based assessment of irrigation performance (including productivity and efficiency) has been conducted, that combines RS imagery from multiple sources and using machine learning algorithms for drive classifications. Data from these assessments have been used to inform the design of a new EU-funded irrigation project in Tajikistan.

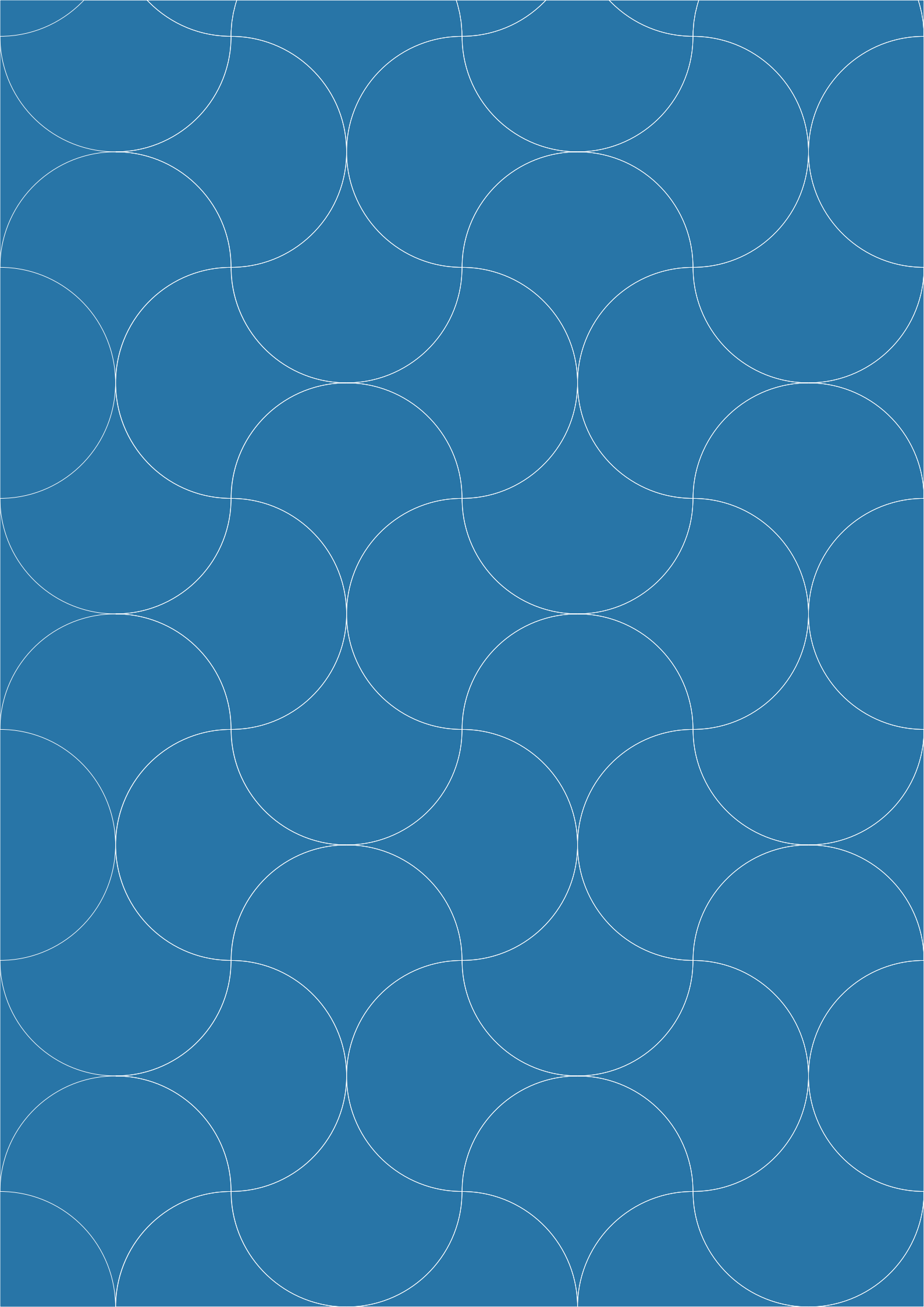
In the Kyrgyz Republic, a new water supply and wastewater law is being finalized by EcoAudit LLC under the World Bank-funded Sustainable Rural Water Supply and Sanitation Development Project implemented by ARIS. CAWEP engaged international experts in water law and WSS regulations to provide advisory support on the concept of the law. CAWEP is also providing expert support to revise and optimize design norms and standards for water supply and wastewater systems.

The focus of energy activities is to contribute to national and regional building blocks for energy production and trade. At the regional level, CAWEP assessed opportunities for intra- and inter-regional energy market integration and trade and the economic benefits of regional electricity trade for 2019-2030 under business-as-usual, trade and existing infrastructure, trade and CASA-1000, and trade and CASA-1000 and TUTAP scenarios. In Uzbekistan, CAWEP is supporting a feasibility study for procurement of SCADA/EMS and telecommunication upgrade that will inform the Electricity Sector Transformation and Resilient Transmission (ESTART) Project. In Tajikistan, CAWEP helped to design the Program of Financial Recovery of Barki Tojik for 2019-2025 approved by the Government in April 2019, and informed design of the Power Utility Financial Recovery Program, Sebzor Hydropower Project, the Khorog-Qozideh Transmission Line Project, and the Rural Electrification Project. In December, CAWEP supported the governments of the Kyrgyz Republic and Tajikistan in organizing a workshop in Bishkek on development of renewable energy and private sector investment followed by a study tour to Uzbekistan to see the outcomes of energy sector reforms, including increased renewable energy generation and its integration into the national grid. These two events have contributed to an enhanced knowledge base for green energy development that builds on the favorable legislative framework and actively engages the private sector.

CAWEP's Central Asia Knowledge Network (CAKN) continues to enhance regional knowledge and professional capacity in the areas of water resource management, energy and climate change in the Central Asia region. On March 3-4, CAKN convened a regional virtual conference to discuss challenges and opportunities faced by researchers and practitioners in Central Asia and how to stimulate knowledge sharing and cross-border partnerships on water issues. In October, CAKN was integrated under the Facilitation of the Regional Dialogue activity with a focus on institutional strengthening of CAREC for long-term sustainability and capacity building on water-energy nexus and gender mainstreaming. Technical studies of integrated landscape restoration and catchment management are ongoing in the Kyrgyz Republic and Tajikistan to inform the governments on erosion and sedimentation processes for sustainable hydropower. A disruptive technology challenge to identify cutting-edge environmental solutions to address land degradation and desertification challenges in the Aral Sea region was concluded in April. Out of 159 proposals from 28 countries, the panel of experts selected 4 proposals and 4 rising star awards in agriculture and land management, sustainable forestry, socio-economic development, and information and knowledge.

Afghanistan is one of beneficiary countries for the third phase of CAWEP. The activity on strengthening collaboration between Afghanistan and Tajikistan on hydromet and flood risk management advanced inclusion of Afghanistan in the wider Central Asia Flood Early Warning System (CAFEWS) and supported development of the Afghanistan Hydromet Atlas, which complements the Central Asia Hydromet Atlas with detailed information on Afghanistan. The second activity on synchronization of operations of Afghanistan and Central Asia Power Systems did not advance and consultations with Central Asian countries planned for the fall 2021 were canceled due to the change of the regime in August 2021.

Source: World Bank, "CAWEP"



Section 9

Water Education

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

9.1.1. Kazakhstan

Al-Farabi Kazakh National University

The Al-Farabi Kazakh National University (Al-Farabi KazNU) is the leading multidisciplinary institution of higher education in the country. The multilevel system of education includes higher basic education, master's and doctoral studies program. The University has 16 faculties. Experts for the water sector are trained at the Geography and Nature Management Faculty, Meteorology and Hydrology Department. The faculty also has the UNESCO Chair for Sustainable Development.

Major Events and Activities in 2021

Research at the Meteorology and Hydrology Department. The Department's staff carries out research in the following areas: (1) "Water resources of the transboundary Syr Darya River Basin"; (2) Geoecological monitoring of deposit environment of Ile River Delta and Ile-Balkash State Natural Reserve; (3) "Development of Kazakhstan small lakes profiles" by the Institute of Geography and Water Security".

Capacity building. The training course for journalists on "Ecological Journalism within the Goals of Sustainable Development" was conducted on March 15-19.

Students of the **Meteorology and Hydrology Department** participated in the International Olympiad on "Hydrology" for the students from Kazakhstan, Russia, Belarus, and Uzbekistan. The teaching staff and graduate students made presentations at (1) the workshop "Towards a regionally-consistent exposure database for Central Asia: characterizing buildings, crops and infrastructure in Kazakhstan" (May 11-14); (2) the roundtable "30 years of independence: current issues in education, land science and the environment"; (3) training course "Building capacities for protection and restoration of freshwater ecosystems in Kazakhstan" (November 15-26).

UNESCO Chair for Sustainable Development took part in the roundtable "UNESCO Water Family: Cooperation in the field of education and science in Central Asia" (December 10, KazNU, UNESCO Almaty Office).

Events. The following events were held: (1) the roundtable "Tasks of the Nevada-Semey movement associated with the cardinal need to restore the ecology of the Republic of Kazakhstan" (February 28); (2) international scientific conference of students and young scientists "Farabi әlemi" (April 6-8); roundtables "Assessment of changes in runoff characteristics and transformation of the hydrographic network in Almaty using GIS technology" (April 7) and "The ocean, our climate and weather" (April 7); (3) XII Republican Student Olympiad (April 26-29); (4) international conference "National Initiatives to Achieve Sustainable Development Goals" as part of the "UN – New Silk Road Model" (May 27); (5) international roundtable "EU Strategy in Central Asia: Opportunities and Prospects" (9 June); (6) roundtable dedicated to the World Environment Day (June 10); (7) presentation "Following the Effective Ways to Achieve the UN Global SDGs" under the project "3.2.1. Start" (October 14); (8) international scientific and practical conference "Global Challenges of the 21st Century and the Environment" dedicated to the 10th anniversary of the UNESCO Chair on Sustainable Development (December 2-3).

Cooperation. Al-Farabi KazNU as the Global Hub of the UN Program "Academic Impact on Sustainability" actively participates in UN activities. The following events were held: (1) the international roundtable "The role of youth in the implementation of the SDGs within the framework of the UN Agenda "Decade of Action" (March 3); (2) III Summit of Future Leaders "The Role of Youth in the Implementation of the Sustainable Development Goals within the Decade of Action" (March 26).

The results of joint work and new ways of strengthening cooperation were considered during the meeting with the Head of UNICEF in Kazakhstan, Arthur van Diesen (April 20). Sustainable development projects were discussed during the meeting with UN Resident Coordinator in Kazakhstan, Michaela Friberg-Storey (June 1).

The Al-Farabi Kazakh National University signed Memorandums of Cooperation with (1) the State Institution "Kazselezashchita" of the Ministry of Emergency Situations of the Republic of Kazakhstan (June 23); (2) the Kyrgyz National University named after J. Balasagun (July 1).

Achievements and awards. The KazNU entered the world's top university rankings: (1) took the 16th place in the British QS EECA 2022; (2) took 201-250 positions in QS – Graduate Employability Rankings and became the first to receive "5 Stars" of Excellence in Central Asia by QS Stars Rating System; (3) recognized as the first by the independent agency for accreditation and rating "IAAR Eurasian University Ranking" (IAAR EUR) 2021; (4) entered the top 200 in the QS WUR institutional ranking and took the 175th place; (5) as a leader, in the category of multidisciplinary universities of the country by IQAA Ranking; (6) recognized as the best in SDGs by Times Higher Education University Impact Rankings-2021. The University was recognized as the winner of the International Competition "University of the Year 2021" held by the Canadian Committee for the International Achievement Research and the Regional Center for Eastern Europe and Asia. Al-Farabi KazNU participates annually in the UI Green Metric World University Rankings in terms of "ecological" development. A separate section of the rating questionnaire is devoted to water conserva-

tion. According to these indicators the University takes a good position because it uses the water-saving technologies (modern sensor faucets, etc.).

Rector Zh.K. Tuymebayev received the award "Rector of the Year". 13 research scientists were elected as the winners of the state science award and scholarship. Students were recognized as winners of a series of webinars of the International Center for Green Technologies and Investment Projects four times. The contest results (1) "Best in Profession 2021" is available on https://www.kaznu.kz/en/3/news/one/27310/; (2) Students Research Papers in Meteorology and Hydrology for 2020-2021 is available on https://www.kaznu.kz/en/16977/adverts/9168.

The list of awards for teachers of the Meteorology and Hydrology Department is available on https://www.kaznu.kz/ru/16977/adverts/10344 and that for students of the UNESCO Chair on https://www.kaznu.kz/ru/20210/news/, https://www.kaznu.kz/ru/20210/news/one/22238/.

Publications. The scientific journal "International Journal of Mathematics and Physics" of the University was included in the Scopus database; series of the Bulletin was included in the Russian Science Citation Index on the Web of Science platform. A monograph was published in the Rivers of Almaty megapolis / A. Chygrynets, K. Duskaev, L. Mazur – Almaty, Kazakh University, 2021. – 310 p. (ISBN 978-601-04-5247-3).

Other publications included: (1) M. Musahanova, B. Tusupova, L. Kurbanova. Implementation of a storm water management system in Almaty based on U.S. experience // QazBSQA Хабаршысы. Инженерлік жүйелер және экология, 2021. – No. 2 (80). pp. 293-300; (2) K. Khamitova, D. Ismailov, K. Kasymjanova. Алматы облысының жер үсті су ресурстары сапасының мониторингі // Vestnik of KazGASA, 2020. – No. 4. – pp. 303-311; (3) A. Erdvaliyeva, T. Tajibayeva. Ecosystem approaches in integrated water resources management of the RK// Vestnik of KazGASA. – 2021. – No. 2. – pp. 275-285; (4) A. Erdvaliyeva, T. Tajibayeva. The role of integrated water resources management in sustainable water supply of natural and economic systems in Kazakhstan// Proceedings of the international scientific-practical conference "Water Resources Management in the Context of Globalization", March 11-12, 2021 (KazNARU). p.123-129.

The list of publications for 2021 is available on
https://www.kaznu.kz/ru/22947/page/,
http://journal.kaznu.kz/,
https://pps.kaznu.kz/ru/Main/ChairPublications/101/2/0/0,
https://pps.kaznu.kz/ru/Main/ChairPublications/101/3/0/2021,
https://www.kaznu.kz/ru/22319/page/,
https://pps.kaznu.kz/ru/Main/ChairPublications/131/1/0/2021,
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Source: Meteorology and Hydrology Department and the UNESCO Chair for Sustainable Development, www.kaznu.kz/ru/, www.facebook.com/KazakhNationalUniversity

Kazakh National Agrarian Research University

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

Major Events and Activities in 2021

Research. The following projects are implemented: (1) "Selection of non-traditional crops for intensive use of irrigated land and creation of a green conveyor depending on bioclimatic potential of cultivation zones" (2021-2023); (2) "Development of technology for rehabilitation of anthropogenically degraded mobile 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: SES Dynamics within the Syr Darya River Basin"[94] (2021-2023, PEER, USAID); (5) "Interdependent Dynamics of Food, Energy and Water in Kazakhstan and Mongolia (FEWKaZMG): Connecting LULCC to the Transitional SocioEcological Systems"[95].

The University jointly with the Valmont Industries is creating a Kazakh-American Center "Smart Water", which will house a demonstration site for innovative Valley-type sprinkler machines and other types of irrigation equipment. The Farmers High School provides consulting and training services for managers and employees of farms according to the "Extension" international model.

Capacity building. The following events and activities were organized: (1) XI International Winter School "Problems of assessment and management of natural resources in Kazakhstan". Classes were conducted by 133 foreign scientists for students from 33 countries in 16 areas. The contest of start-up projects was held

[94] Jointly with the University of Michigan and the University of South Dakota
[95] Jointly with the University of Michigan, the Humanities University of Mongolia, and the Mongolian Academy of Sciences

together with the International Scientific and Practical Conference of Young Scientists (February 15-27, online); (2) workshops "Key training programs on ecology and environmental sciences in academic institutions of Kazakhstan and Central Asia" (May 24-June 11, online); (3) meeting of KazNARU scientists and doctoral students with the leadership of the Executive Directorate of IFAS to discuss cooperation in educational and research areas (September 9, IRC "Water Hub"); (4) the final workshop "Key training programs on ecology and environmental sciences in academic institutions of Kazakhstan and Central Asia" (September 28).

Events. The following events were held: (1) International scientific and practical conference "Water resources management in the context of globalization" dedicated to the 105th anniversary of Prof. L. Tazhibayev (March 11-12); (2) International Conference "Experience and Technologies of Water Hub for OIC Countries from Africa and the CIS" organized jointly with the Islamic Organization for Food Security (IOFS) (August 31-September 1).

Achievements and awards. KazNARU in the world and national ratings

Source: https://www.kaznaru.edu.kz/page/abaut/?link=universitettin_missiiasy_179&lang=ru

Rector of KazNARU T.I. Yespolov was awarded with the honorary order "BARYS" of the first degree. For the awarding of the University staff, please, see the following link www.kaznaru.edu.kz/page/news/?link=kazuazuda_uzdik_kyzmetkerler_marapattaldy_2783&lang=ru.

Publications. Scientific journal "Research and Results", Almaty 2021. Proceedings of international scientific and practical conferences (1) "Water resources management in the context of globalization". Almaty: KazNARU, 2021; (2) young scientists within the XI "International winter school 2021". – Almaty: KazNARU, 2021.

Source: www.kaznaru.edu.kz/?lang=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 which is to create a full range of engineering and applied science programs in land, water, energy, and ecology. NU's 2018-2030 strategy is available on https://nu.edu.kz/wp-content/uploads/2016/07/1_NU-Strategy_RUS_2030-1.pdf

Major Events and Activities in 2021

Research. The implementation of the Sustainability Living Lab Program has been continued in cooperation with the "National Conservation Initiative" Corporate Fund, with the support of "Chevron" company. The Program is aimed at supporting green research and innovation projects. The green projects implemented in higher educational institutions of Kazakhstan were presented at a conference on sustainable development in NU (October 16).

The 2021 international expedition to Korgalzhyn Lakes was organized in cooperation with the scientists of the Korgalzhyn National Park.

The University became a member of the UN Sustainable Development Solutions Network (UN SDSN) in 2020 to promote research and educational activities aimed at achieving the SDGs in Kazakhstan and Central Asia. The Network Strategy Council of the SDSN has approved the appointment of the Nazarbayev University as a host of the SDSN National Network for Kazakhstan (www.unsdsn.org/kazakh stan).

Events. GSSP Conference "Policy Change and Sectoral Reforms in Eurasia", with 10 panel sessions and roundtables, including session 2 "Policy processes and structural policy changes in Eurasia" and roundtable 1 "Environmental policy of corporate social responsibility in the context of sustainable development in Kazakhstan"; session 3 "Policy change and challenges for the energy sector: regional perspectives and visions to 2050"; session 7 "Environmental challenges in Central Asia"; and roundtable 3 "Sustainable land use and food systems in Kazakhstan"; session 9 "Water desiccation and water resources decline in Eurasia"; roundtable 4 "Youth and students initiatives on sustainable development in Kazakhstan" (October 15-16).

Publications

S. Xenarios "What is wrong with water. Discussion on water security in Kazakhstan and Central Asia".

D. Malashenkov, V. Dashkova, K. Zhakupova, I. Vorobjev, N. Barteneva. Comparative analysis of freshwater phytoplankton communities in two lakes of Burabay National Park using morphological and molecular approaches. Scientific Reports (Nature Publishing, IF=4,379) 11, 16130. https://doi.org/10.1038/s41598-021-95223-z.

Y. Mirasbekov, A. Abdimanova, K. Sarkytbayev, K. Samarkhanov, A. Abilkas, D. Potashnikova, G. Arbuz, Z. Issayev, I. Vorobjev, D. Malashenkov, N. Barteneva. Combining imaging flow cytometry and molecular biological methods to reveal presence of potentially toxic algae in the Ural River, Kazakhstan. Frontiers in Marine Biology (IF=4,435) 8 (680482):1-16 DOI: 10.3389/fmars.2021.680482.

S. Xenarios, M. Laldjebaev, D. Schmidt-Vogt, J. Buurman, E. Araral (2021) Powering the uplands: controversies of developing hydropower in upstream Central and Mainland South East Asia. In: Tsani, S. and Overland, I (eds) Handbook on the Sustainable Politics and Economics of Natural Resources, Edward Elgar Publ. pp. 152-185, DOI: https://doi.org/10.4337/9781789908770.00020.

M. Lim, S. Xenarios (2021) Economic assessment of urban space and blue-green infrastructure in Singapore, Journal of Urban Ecology, Volume 7, Issue 1, juab020, https://doi.org/10.1093/jue/juab020.

S. Xenarios, A. Assubayeva, X. Lei et al (2020) A bibliometric review of water security concept in Central Asia, Environmental Research Letters, https://doi.org/10.1088/1748-9326/abc717079.

Source: Nazarbayev University, https://nu.edu.kz/ru/

Taraz Regional University named after M. Kh. Dulati

Taraz Regional University named after M. Kh. Dulati (TarRU) was established by the Order of the Kazakh President No. 752 of October 11, 2019 and on the basis of the order of the Ministry of Finance of the Republic of Kazakhstan No. 346 of June 3, 2020. Specialists for the water sector are prepared at the Institute of Water Management and Environmental Engineering[96]. The Institute has 8 departments, including for Land Reclamation and Agronomy; Water Resources; Ecology; Life Safety. There is a Dissertation Council for the award of the Degree of Doctor of Philosophy (PhD) in the following specialization: (1) 8D074 – Water Management (specialization 6D074400 – "Hydrotechnical construction and structure"); (2) 8D086 – Water resources and water use (specialization 6D081000 – "Land reclamation, recultivation and protection").

Major Events and Activities in 2021

Capacity Building. TarRU signed the Memorandum of cooperation with SOE "Nurinsk group water pipeline" (North-Kazakhstan branch "Esil su") to organize training for the staff of the North zone of IPK "Toza-su" in Petropavlosk city (July-November).

Students of the third course took part in the XIII Republican Olympiad on 5B080500 – "Water resources and water use" (April 22-23, online). The first round of the XXIV student scientific and practical conference was held. The issues of water use of the Nura River Basin, the water management model for water conservation in Taraz, the problems of transboundary rivers, etc. were addressed at the Conference (October 25-30).

Professor of the Michigan University, Zhanai Sagin held classes for teaching staff, undergraduates, doctoral students and students and seminars "International scientific projects under the program of the American Council UniCEN and USDTA" for teaching staff (November 2-30).

Events. The following events and activities were held: (1) job fair "Young professional 2021" (March 3); (2) the international scientific and practical conference "Water resources management in the context of globalization" jointly with KazNARU (March 11-12); (3) webinar within the framework of the UniCEN International Grant Theme "Groundwater sustainability in Central Asia: building institutional capacity in Karakalpakstan, a former Aral Sea Region in Uzbekistan" (November 3-4); (4) roundtable "Problems and prospects of interstate cooperation among the Central Asian states and Kazakhstan in transboundary water use" (November 24).

Publications. A.T. Aimen, D.O. Atasheva, D.M. Khazhgalieva, G.A. Sarbasova, M.A. Kaldygozova. Greening water and land use in agriculture. Vestnik of Dulati Universitet, 2021, No 3, pp. 17-34.

Source: https://dulaty.edu.kz/ru/

German-Kazakh University

The German-Kazakh University (GKU) was founded in 1999 with the aim of training students in line with the German standards. GKU has been the only German university in Kazakhstan and Central Asia up to present time. The World Politics Faculty of GKU has developed and carries out the training program "Integrated Water Resources Management"; the Economics and Business Faculty holds the "Strategic Management of Renewable Energy and Energy Efficiency" Program. Within GKU, the Natural Resources Institute was the first one in Central Asia that received the status of the UNESCO Chair for Water Resources Management in Central Asia; GKU offers the Central Asia Youth for Water Network (CAY4W) and the Central Asian Journal of Water Research (CAJWR). CAJWR is indexed in DOAJ, EBSCO, IndexCopernicus, RSCI[97], Cite Factor and Google Scholar and included in the list of recommended publications by the Ministry of Education and Science of RK (Order No. 623 of July 29, 2021).

Major Events and Activities in 2021

Research. The following projects are implemented: (1) The International project "Global Disruptive Tech Challenge 2021 – Restoring Landscapes in the Aral Sea Region" (Kazakhstan, Uzbekistan, August 2020-June 2021): a webinar (January 8) was organized; live broadcasting "How can we restore the Aral Sea?" was organized on March 2; the results of the contest were summarized and the winning projects were identified (April 9); (2) ESERA/"Ecosystems, Society and Economics of the Aral Sea Region: the current year research has been aimed at studying the water-

[96] The Institute of Water Management and Environmental Engineering was created as a result of combining both Institute of Water Management, Ecology and Construction and the Oil and Gas Engineering faculty

[97] Russian Science Citation Index

courses of the Kokaral dam to the Western part of the sea. The Aral Sea Summer School "Young Leader for a Change" was organized (August 10-21); (3) "Interdependent dynamics of food, energy and water (FEW) related to land use and land cover change with transitional socio-ecologic systems on the example of Almaty region"; (4) "Involvement of youth in solving environmental problems in Almaty": a discussion platform was provided for youth to engage in environmental activities (February 2022- February 2023).

The contest' results for the best research on climate change in Central Asia will be published in CAJWR.

Capacity Building. A course on Applied Modeling of Hydrological Systems in Central Asia was delivered for IWRM Master's students, with the support of Blue Peace CA. Student Olympiad on SDGs was held at the national level in Turkmenistan (March 30-31), Uzbekistan (April 13), Tajikistan (April 19), Kyrgyzstan (April 23) and Kazakhstan (April 27) on the following sections: IWRM (SDG 6); Climate change and clean energy (SDG 7 and 13); Industrialization, innovation and infrastructure (SDG 9).

The following events were held: online webinars on the impact of climate change on governance and security in the Kyrgyz Republic (January 6) and the Republic of Tajikistan (January 15); (2) virtual internship program on climate change in Central Asia for young professionals and PhD students (January-March); (3) online course EU-CA Academic School on Environmental Economics for University Teachers of Central Asia: cooperation on water, environment and climate change (WECOOP) (April 12-30); (4) virtual roundtables "Capacity building programs on clean energy" for students and young professionals of Tajikistan (May 26), Kazakhstan (June 11), Turkmenistan (June 14), Afghanistan (June 16), Kyrgyzstan (June 25), and Uzbekistan (June 17) as a part of the Master's program "Strategic Management of Renewable Energy and Energy Efficiency" (SMREEE); (5) the 7th Summer School "Water in the Aral Sea Basin under climate change – management and policy challenges from data and knowledge perspectives" (June 14-25, online); (6) training workshops on RS-based assessment of precipitation and related applications (September 27-30); (7) roundtable and study tour "Renewable Energy Trip 2021" to study best practices in the use of renewable energy sources. The students visited 10 RES facilities (October 4-10); (8) online-webinar "The role of innovative technologies in the sustainable development of agricultural sector in Kazakhstan" together with the International Center for Green Technologies and Investment Projects (ICCTiIP) on the educational platform GREEN WEBINAR (December 22-23).

Representatives of the University took part in a training series of the 12th Central Asian Leadership Program on Environment for Sustainable Development (since September 20).

The results of the annual International School of Green Business "Eco-Talk 2021" were summed up (December 13-14).

Events. The following events were held: (1) roundtable "Energy saving, energy efficiency, renewable energy sources: status, problems and prospects" (May 5); (2) seminar "Water management and climate security in Central Asia", jointly with OSCE and UNESCO (September 27-29); (3) pre-conference events – youth session "Youth of Central Asia and the Puzzle of Climate Action and poster session on innovation for development (December 9) within the framework of the international online conference "The Silk Road of Knowledge: Science Meets Green Policy" (February 23-25, 2022).

Representatives of the University took part in (1) international scientific and practical conference "Water Resources Management in the Context of Globalization" (March 11-12); (2) interactive online session "River Basin Organizations and Implementation of Treaty Commitments" (March 16); (3) international scientific conference on "Civil Engineering, Hydraulics and Water Resources Engineering"/CONMECHYDRO 2021 (April 1-3); (4) interactive online session "International Water Law and Climate Change" (April 20); (5) online discussion "Water Assessment for Faster Recovery from the Pandemic", which was organized by the UNESCO office in Jakarta (April 20); (6) UNFSS Regional Dialogue on approaches to promoting the water-energy-food nexus in Central Asia (June 14).

Publications

Collective monograph. Tomorrow was late. Environmental risks of Kazakhstan. Almaty, 2021. – 300 p.

V. Salnikov, T. Bobushev, Z. Makhmudov, D. Dzhumaguliev, S. Yanchuk. The impact of climate change on governance and security in Central Asia Book (first version), Almaty, Kazakhstan, 225 pp.

For CAJWR publications see the link https://water-ca.org/issues.

Source: https://dku.kz/, www.academic-waters.org/ru/, www.academic-waters.org/ru/proekty/poleznye-ssylki/

South Kazakhstan State University named after M. Auezov

The South Kazakhstan State University named after M. Auezov (SKSU) is a state multidisciplinary higher education institution. The University is comprised of 7 faculties, Distance Learning Institute, six higher schools and a college. The Agrarian faculty has 9 departments, including "Water resources and water use" and "Water Supply, Sewage and Water Protection". The University ratings is as follows: (1) 482 position, taking the 3rd place among 14 participating universities in Kazakhstan by Quacquarelli Symonds; (2) the 3rd place by Independent Quality Assurance Agency in Education (IQAA); (3) for the first time entered the top 401-500 universities by Worldwide Professional University Rankings / Rank Pro – 2021.

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

9.1.2. Kyrgyz Republic

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

The Kyrgyz-Russian Slavic University named after B.N. Yeltsin (KRSU) was established in 1993. Education at the University is delivered in 24 fields and specializations. Water specialists are trained at the Architecture, Design and Construction Faculty on Water Resources and Engineering Disciplines Department (WREDD) and the Natural Engineering Faculty including the Meteorology, ecology and environmental protection; Ecology and meteorology; Non-traditional and renewable energy sources departments. KRSU has the Dissertation Councils of the Higher Attestation Commission of KR, including on specialization 06.01.02 – "Land reclamation, recultivation and protection". The Inter-branch Scientific Research Center for High-Altitude Dam Monitoring at the University studies the effects of earthquakes, microseisms on hydraulic structures and forecasts their conditions to prevent disaster situations.

Major Events and Activities in 2021

Events. The following events were held: (1) Interuniversity scientific and practical conference of young researchers "Problems of sustainable economic development in the context of contemporary challenges" (May 20); (2) VI International scientific-practical online conference "Improving the system of forecasting, reducing and mitigating damage from hazards" (December 15).

Cooperation. KRSU, the Soviet Peace Foundation, the Public Chamber on Environmental issues of the Deputy of the State Duma of RF, and the Peace Foundation of the Kyrgyz Republic signed a Memorandum of Cooperation within the framework of the "Ecology and Sustainable Development" project. A number of activities are planned. Those include a youth camp, a conference on greening Bishkek and other environmental initiatives to be implemented by teachers and students of the University.

The University administration and teaching staff participated in (1) II Eurasian Analytical Forum (9 November); (2) scientific and methodological symposium on partnership of educational institutions "30 years of the CIS: educational partnership as an indispensable factor in the development of the humanitarian space of the Commonwealth of Independent States" (November 9-10, Moscow); (3) III Forum of Scientists of the CIS Member States – 2021 (November 24-27, Minsk).

Source: www.krsu.edu.kg/

Kyrgyz National Agrarian University named after K. I. Skryabin

The Kyrgyz National Agrarian University named after K.I. Skryabin (KNAU) was established on the 30th of January 1933. The University consists of 6 faculties, including Hydromelioration, Ecology and Land Management Faculty which trains bachelors in the following fields: "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".

Major Events and Activities in 2021

Capacity Building. The following events were organized by KNAU: (1) "OPEN DAY" on the occasion of opening business incubators for the purpose of youth entrepreneurship development (April 13); (2) seminar "Green Innovations 2021" (April 30); (3) International scientific and practical conference "Development of cooperation – the basis of sustainable economic development" (May 26-27); (4) Central Asia Sustainable Development Forum – 2021 (November 11-12); (5) career guidance event for 9-11 grade students of school named after A. Zhaparov (December 10); (6) practical training for Hydromelioration, Ecology and Land Management Faculty students at the water intake of the Sokuluk River (December 11).

University students took part in the Inclusive Youth Conference "Three Whales", which is intended to involve young people in the process of development of the country and to unite efforts in the fight against environmental problems that negatively affect the sustainable development of the state (October 29).

Cooperation. The academic staff of the University participated in: (1) opening ceremony of the SCO Agriculture Universities Alliance, as a result, the MoU was signed (17 HEIs from 9 countries); (2) meeting of Advisory Committee for Agro-Industrial Complex under Department of EEC Agro-industrial Policy "Scientific and technical cooperation" (June 15); (3) Meeting of the Council of Rectors of Leading Agricultural Universities of the CIS Member States "Prospects of agricultural education development and science in the post-epidemiological period" (June 15) (4) International scientific and practical conference "Development of international technologies and interaction mechanisms of Russian and foreign educational, scientific and public organizations under current conditions of education export" (October 25); (5) 1st International Forum of University Rectors of Kyrgyzstan and Kazakhstan "Transformation of modern higher education: key trends and directions of integration" (November 22).

Publications. The University publishes a bulletin "Vestnik KNAU". Four issues were published in 2021.

Source: https://knau.kg/

American University of Central Asia

The American University of Central Asia (AUCA) founded in 1993 is an international, multi-disciplinary community. Its curriculum includes the Preparatory Prog-

ram (New Generation Academy), 15 undergraduate majors and 10 graduate degree programs. AUCA consists of Technical School of Innovation, which offers seven specialization areas, including Ecology and Energy Efficiency, the Tian Shan Analytical Center (TSPC) and the Center for Environment and Development (CED).

Major Events and Activities in 2021

Research. TSPC AUCA (1) took part in the preparation of the analytical note "Restoring the country's natural capital to achieve the SDGs: pilot land accounts and sustainable pasture management in Kyrgyzstan" based on the project carried out jointly by the National Statistical Committee, the State Agency for Land Resources and the Society of Soil Scientists of Kyrgyzstan; (2) conducted research on the current state of environmental education and legislation of the KR, with FAO support; (3) has developed a National Action Plan for Countering hurricanes and dust and sand storms in the Kyrgyz Republic for 2021-2023 through CAREC assistance under the project Regional approaches for combating sand and dust storms and drought.[98]

Events. The Conference "Air quality in Bishkek and ways for solution" was held within the framework of the Green Economy Days in KR – 2021 in partnership with two AUCA research centers – the Tian Shan Analytical Center (TSPC) and the Center for Environment and Development (CED), with the support of the Kyrgyz-German-Swiss program "Green Economy and Sustainable Development of the Private Sector in the Kyrgyz Republic" (October 20).

Source: https://auca.kg/

9.1.3. Tajikistan

Tajik Agrarian University named after Shirinsho Shotemur

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

Major Events and Activities in 2021

Events. The following events were organized: (1) International scientific and practical conferences "Adaptation of agricultural sector to climate change: problems and solutions" (October 23) and "Water Resources of Tajikistan, the current state during the International Decade of Action "Water for Sustainable Development, 2018-2028" on occasion of the President Day (November 16); (2) National scientific and practical conference "GIS as an important factor of data management in the national agricultural sector (November 18); (3) training workshops (September 17, November 17).

Cooperation. A Cooperation Agreement was signed with the Tajik Research Institute of Hydraulic Engineering and Land Reclamation.

Publications. TAU is the founder of the theoretical and applied science journal "Kishovarz". Four issues were published in 2021.

Other publications included: Proceedings of the Republican scientific and practical conference "Current achievements and problems in the agroindustry" for young scientists, master's students and doctoral students. TAU, Dushanbe 2021, p.598; Proceedings of the International scientific and practical conference "Industry and agricultural production: state and prospects of development". TAU, Dushanbe 2021, p.512.

Source: www.tajagroun.tj/

9.1.4. Turkmenistan

Turkmen Agricultural University named after S.A. Niyazov

The Turkmen Agricultural University of S.A. Niyazov (TAU) was founded in 1930. The University consists of 8 faculties, including the Hydromelioration faculty, which trains specialists in "hydromelioration" and "land construction and cadastre".

Major Events and Activities in 2021

Cooperation. A meeting was held between the Rector of the University and the Rector of the Russian State Agrarian University of the Moscow Agricultural Academy named after K.A. Timiryazev, the Director General of "Shchelkovo Agrokhim", and the President of "Seeds" Association. They discussed prospects for cooperation in the field of agricultural science and education, prospects for implementation of joint projects, and the aspects of scientific and technical cooperation on environmental protection, effective use of agricultural land, land inventory, etc. The Memorandum on scientific cooperation and training of agricultural specialists between the Turkmen Agricultural University and the "Seeds" Association (Moscow) was signed (April, Moscow).

[98] Implemented by CAREC with the financial support of the Secretariat of the UN Convention to Combat Desertification

As a result of the meeting between Rectors of the Turkmen Agricultural University of S.A. Niyazov and the Kazan State Agrarian University, a Memorandum of Cooperation is in process of development (October 27, online).

A group of teachers and students of the University and researchers at the Institute of Chemistry of the Academy of Sciences of Turkmenistan have got a patent for a new method of producing environmentally friendly fertilizers.

Source: https://tohu.edu.tm/

Turkmen Agricultural Institute

The Turkmen Agricultural Institute (TAI) was established in 2010 at the Ministry of Agriculture and Environmental Protection of Turkmenistan. The Institute prepares water specialists at the Hydromelioration and Agricultural Mechanization Faculty in the following fields: operation of irrigation and drainage systems, hydromelioration. The Institute has the Research and Production Center and Training and Production Facility.

Major Events and Activities in 2021

Research. As a part of the Erasmus+ program, the project "New and Innovative Courses in Precision Agriculture" (NICOPA) is implemented to update the training programs. The teaching staff of the Institute participated in master classes (January 11-16, January 13-21, April).

Events. Teachers and students of the Institute took part in (1) conference "Integrated management of natural resources and sustainable land management" (February 10); (2) seminar "RS-based monitoring of agriculture" (February 10-12); (3) seminar on the EU's ERASMUS+ (January); International and interregional video conference "Improving higher education: tools and their application in the education system" (September 16-18).

Achievements and awards. TAU students won 50 prizes, including 11 gold, 11 silver, and 14 bronze medals, as well as diplomas at international online olympiads.

Source: https://tohi.edu.tm/ru/index.ph

9.1.5. Uzbekistan

Samarkand State University

The Samarkand State University (SamSU) was founded in 1927. The University consists of 18 faculties. The Geography and Ecology Faculty trains personnel in ecology, hydrometeorology (Bachelor's degree) and ecology, soil science, hydrology (Master's degree).

Major Events and Activities in 2021

Research. The following projects are implemented: (1) Erasmus + International Credit Mobility (EU) for the exchange of knowledge and skills of teachers, masters and students with European universities; (2) Guidance on the development and familiarization with the 561742-EPP-2015-1-PT-EPPKA2-CBHE-SP Program.

Publications. The Institute publishes Research and methodological journal "Scientific Bulletin of Samarkand State University". Three issues of the journal were published in 2021.

Source: www.samdu.uz/ru/

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

The National Research University "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" (NRU TIIAME[99]) began its work in 1923. Nowadays, the University is comprised of seven faculties, where students are trained in 18 directions (Bachelor's Decree) and 15 specializations (Master's Decree). The Research Center for Geoinformatics was opened on October 15.

Major Events and Activities in 2021

Capacity building. On-job practical training in Akaltyn district of Syrdarya province (June); (2) field training "Salar sewage treatment plants"(October 23); (3) workshop on the results of "Governance of groundwater resources in transboundary aquifers" (GGRETA) project, jointly with UNESCO and GIDROINGEO (November 18); (4) training on "Legal foundations of land reforms, their role and tasks in improving land relations" (December 13); (5) training at UzHydromet (December 16); (6) training workshop on renewable energy sources by teaching staff from foreign universities (November 30) and practical training on technical and hydraulic liquids in machineries (December 4).

Students took part in (1) Student Olympiad on SDGs at the national level conducted by KNU (April 13); (2) marathon of technological development "TECHNOWAYS" (November 15-24); (3) Republican contest "100 ideas for Uzbekistan"; (4) "Demo day" of the 5th cycle of the Youth innovative idea and start-up project support program.

[99] TIIAME was renamed into the National Research University "TIIAME" according to the Resolution of the President 42 of December10, 2021 "On measures to radically improve the system of training of engineering personnel for industries based on innovation and digitalization". The proposal to establish the Bukhara Institute of Natural Resource Management and the Karshi Institute of Irrigation and Agricultural Technologies, respectively, on the basis of the branches in Bukhara and Karshi and organize the Institute for Basic and Applied Research under NRU was approved. The NRU will be transferred to the self-financing system from January 1, 2022.

Events. The following conferences were held: (1) International scientific conference "Construction Mechanics, Hydraulics and Water Resources Engineering" (CONMECHYDRO-2021) (April 1-3) and CONMECHYDRO-2021 AUTUMN SEASON (September 7-9); (2) XX – Scientific and practical conference for young scientists, Masters and talented students (May 25-26).

Cooperation. MoUs were signed (1) with the Chinese company "China Gezhouba Group International Engineering" Co. Ltd (June 10); (2) with Hungarian universities – Obuda University, Sopron University and Budapest University of Technology and Economics on the sidelines of the Forum of Rectors of Uzbekistan and Hungary, on exchange of academic staff, joint preparation of scientific publications (June 24). Meetings were held with Mr. Alexandros Makarigakis, UNESCO Representative a.i. in Uzbekistan (November 27) and the delegation of the Belarusian National Technical University (December 15).

TIIAME and Huawei have concluded a Memorandum of Understanding as a part of "smart" agriculture project. The project is developed and implemented by TIIAME specialists with the expert and technical support of Huawei, UZTELECOM and MWM (May). The presentation of the pilot project took place at the opening of the showroom in TIIAME (September 28).

As part of the partnership with LCC "ECO DRIP LUX", a manufacturer of drip irrigation systems in Uzbekistan, the company opened a training room at the department of hydromeliorative system operation at Hydromelioration Faculty (November 24).

Awards. Employees of the University received the badge "Mekhnat fahrisi" of the 1st degree and the order "Dostlik".

Source: https://tiiame.uz/ru

National University of Uzbekistan named after Mirzo Ulugbek

The National University of Uzbekistan named after Mirzo Ulugbek (NUUz) was officially established on the 12th of May 1918. The University has in its structure 15 faculties, including Geography and Natural Resources Faculty, Ecology, Geology and Geoinformation system, Hydrometeorology[100]. Specialists for the water sector are trained at the Land Hydrology Department of the Hydrometeorology Faculty. There are also PhD and DSc programs on "Land Hydrology. Water Resources. Hydrochemistry".

Major events and activities of the Hydrometeorology Faculty in 2021

Research. The teaching staff of the University carries out research on the following topics: "Current state of hydrological regime and water availability in the lower reaches of the Amu Darya River" (B. Adenbayev); "Hydrological regime of rivers in urbanized areas" (F. Artikova); "Physiographic conditions of water formation and hydrological regime of low-mountain small rivers in Uzbekistan" (N. Sagdeyev); "Modeling hydrological regime of river waters and stable isotope-based studies" (G. Umirzakov).

The following projects are implemented: (1) "Assessment of dam and climate change impacts on water scarcity and drought in arid and semi-arid river basins in India and Uzbekistan" within the framework of Uzbek-Indian cooperation; (2) "Development of monitoring system of mountain glaciers mass balance change and scenarios characterizing their future state in the context of global climate change", jointly with the Scientific Research Hydrometeorological Institute of Uzhydromet and the Institute of Geology and Geophysics named after Kh. Abdullayev, Academy of Sciences of the Ruz.

The academic staff of the Department is also engaged in the following international projects: (1) Climate Change Adaptation and Mitigation Program for the Aral Sea Basin (CAMP4ASB); (2) Central Asia Research and Adaptation Water Network – CARAWAN; (3) Reducing Vulnerabilities of Populations in the Central Asia Region from Glacier Lake Outburst Floods in a Changing Climate (GLOFCA).

Capacity Building. Doctoral dissertations were defended by: (1) P. Ziyayev (PhD) Shifts of water regime phases in the Zerafshan River Basin in the context of climate change on 11.00.03 "Land Hydrology. Water Resources. Hydrochemistry"; (2) Y. Ergasheva and T. Sabitov on 11.00.05 "Environmental protection and rational use of natural resources". The Faculty students participated in the II International Student Olympiad in "Hydrology" dedicated to the 25th anniversary of the Eurasian National University named after L.N. Gumilev, and won prizes (April 26-27, online).

[100] The Hydrometeorology Department was established at NUUz in 2021/2022 academic year according to the Decree of the President of the Republic of Uzbekistan "On measures to further improve the hydrometeorological service of the Republic of Uzbekistan" (No. 4896 of November 17, 2020).

The Distance Learning in "Meteorology and climatology" on 3+2 program with the Russian State Hydrometeorological University was established since 2021-2022. Dr. Thomas Sachs from University of Fribourg delivered lectures for bachelors and masters on "Glaciology and Cryosphere" (November 18 and December 2).

Cooperation. Hydrometeorology Faculty cooperates with the Lomonosov Moscow State University, the University of Fribourg, Potsdam Institute for Climate Impact Research, Indian Institute of Technology Kharagpur, University of Reading, Institute of Geographic Sciences and Natural Resources Research of Chinese Academy of Sciences, CAREC, SIC ICWC, etc.

Publications. (1) textbook – F. Hikmatov, S Haydarov, G. Khalimova, R. Ziyayev, B. Rapikov. Ko'lshunoslik; (2) teaching guide – B. Adenbayev, Z. Khakimova, M. Mirkholikova. Gidrokimyo; (3) methodological manual – S. Haydarov, F. Khikmatov, G. Valiyeva. Gidrologik prognozlar fanidan amaliy mashg'ulotlar – Samarkand, 2021. – 74 p. (4) Monographs – K. Rakhmonov, F. Khikmatov. Assessment of soil leaching rates in Uzbekistan mountain rivers and their basins. – Tashkent: "Publishing and printing house of innovation development", 2021. – 148 p.; B. Adenbayev, F. Khikmatov. Assessment of the current state of hydrological regime and water availability in the lower reaches of the Amu Darya River – Tashkent: INFO CAPITAL BOOKS, 2021. – 172 p. Also, 78 scientific articles were published, including 10 articles in international journals and 18 articles in national journals.

Source: Hydrometeorology Faculty, https://nuu.uz/rus-tili-rossiya-ozbekiston-muloqotning-rivojlanish-omili-sifatida/

9.2. Regional HEIs and Professional Development Centers

9.2.1. Regional Training Center at SIC ICWC

Water sector professional development courses in Central Asia were established at SIC by the ICWC decision (ICWC Protocol No.24 of 23.10.1999). The courses were founded by the ministries of agriculture and water resources of five CA states, SIC ICWC, BWO Amu Darya and BWO Syr Darya. Later, these vocational training courses were transformed into the Regional Training Center (RTC) at SIC ICWC.

Major events and activities in 2021

SIC ICWC experts delivered: (1) lectures and practical classes at **NRU TIIAME for the 1st and 2nd year master's students** on the topic "Hydraulics and hydrology engineering" and "GIS in hydraulics and hydrology engineering research" at the Hydraulics and Hydroinformatics Department and for **students** on "Integrated water resources management", "Rural water supply" and "Water quality management" at the Ecology and Water Management Department; (2) lecture "Transboundary water systems and water security" **for master's students of the Nazarbayev University** (September 28); (3) trainings[101] on the topic "Operation of irrigation systems: Measures preventing from water losses in irrigation canals"; "Collector-drainage networks: specifics of operation of different trenches" **for farmers and WUA staff** in Surkhandarya province and for managers of irrigation systems (March 29-May 1, June, Professional Development Center at TIIAME); (4) training "Application of geoinformation technologies (GIS) and global positioning system (GPS) in practice" **for specialists and researchers of the Republic of Karakalpakstan** under the Memorandum of Cooperation between IICAS and SIC ICWC (online, September 8-10); trainings for hydraulic engineers /**irrigation water managers** on "Development and adoption of a water use plan" and "Organization of water accounting to control the actual distribution of water" under the contract with the TST Cluster of Kuyi-Chirchik district.

D.R. Ziganshina delivered lectures at the (1) interactive online session on "Transboundary Water Agreements" organized by GWP and the International Water Law Academy of Wuhan University (January 19); (2) meeting dedicated to the World Water Day organized by the Universities Partnership for Water Cooperation and Diplomacy/UPWCD (March 22) and the "5th General Assembly of the World Youth Parliament for Water" at the session "Youth Committee for Water and Peace (March 23); (3) course on water diplomacy organized jointly with UNECE for specialists from Iraq on "Water Diplomacy Mechanisms: role of the Implementation Committee of the Water Convention" (June 17); (4) Dialogue on Innovative Water Diplomacy and Effective Water Resources Management as part of the presentation of the collection "The Drama of Water in a Time of Global Transformation"[102] (June 22). The podcast "Water Diplomacy in Central Asia – Institutions, Culture, and the Role of the EU" was recorded by the request of the Konrad-Adenauera-Stiftung Fund (February 18).

[101] Under the project "Improvement of water resources management in Surkhandarya province / Reconstruction of Khazarbagh – Akkapchigai canal system"

[102] Prepared with the participation of 36 Russian and foreign experts in cooperation with the International Association of the Lake Regions

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

The University of Central Asia (UCA) was founded in 2000 to promote the social and economic development of Central Asia, particularly its mountain communities, by offering an internationally recognized standard of higher education. UCA is comprised of: (1) School of Arts and Sciences, offering a five-year undergraduate program in six majors, including Earth and Environmental Sciences; (2) Graduate School of Development (GSD) has several divisions including Mountain Societies Research Institute (MSRI); (3) School of Professional and Continuing Education (SPCE). UCA has established the Green Community/UCA Green Community Club – a student initiative aimed at raising awareness of environmental issues and fostering environmentally sustainable practices.

Major events in 2021

Events. The Mountain Societies Research Institute (MSRI) of UCA (1) in collaboration with UNEP, arranged study tour to Panj-Amu Darya Basin for experts from Afghanistan and Tajikistan. The tour was concluded with a workshop at the UCA's Khorog campus, where participants developed a joint Action Plan for Climate Change Adaptation and Biodiversity Conservation; (2) organized a three-day course on "Climate Change and Adaptation to Climate Change: Challenges in Rural Areas of Kyrgyzstan" for 10 participants of the Mountain Societies Development Program in Bishkek; (3) participated at Dubai Expo (October), COP26 (November, online).

As a part of preparations for the climate change COP26 summit, a film series "Voices from the Roof of the World" – a joint initiative of the Aga Khan University, Aga Khan Agency for Habitat, Aga Khan Foundation and University of Central Asia, was produced. The Student Club specialized in "The Earth and Environmental Sciences" organized the Global Climate Change Week.

Cooperation. Memorandums of Understanding were signed with (1) the Tien Shan Highland Research Center at the Institute of Water Problems and Hydropower, National Academy of Sciences of the KR; (2) Agency on Hydrometeorology of the State Committee on Ecology and Climate (KyrgyzHydromet); (3) Ministry of Emergencies of KR to develop cooperation on major scientific issues in the field of global warming and climate change, water security, energy, glacier degradation, etc. (November 12).

Source: https://ucentralasia.org/

9.3. Professional Development Courses and Trainings

9.3.1. Professional Development Courses and Trainings in 2021

January 6 – Webinar "Impact of climate change on governance and security in the Kyrgyz Republic"

January 15 – Webinar "Impact of climate change on governance and security in the Republic of Tajikistan"

January 28 – Webinar on remote sensing for irrigation water management "Water management for enhanced productivity (WMfEP) activity"

February 25, **4**, **11**, **18** and **March 25** – MASHAV International Webinars "Implementing pressure irrigation systems for intensive agriculture"

April 12-30 – Online course "EC-CA Academic School on environmental economics for University teachers of Central Asia".

March 11-30 – Online training on "Climate Diplomacy for Kyrgyzstan, Tajikistan and Uzbekistan".

March 18 – Webinar "Ensuring Water Security in India".

April 8, **12**, **14** – workshop series "Water and Peace; "Data and perspectives of their use for development"; "Infrastructure, information, and tools of trust building"; "Knowledge, power, and tools of trust building".

April 29 – Webinar "Women's leadership in water sector".

May 25 – Webinar "Best practices for repeatability in field practices".

June 9, **10**, **17** – Series of roundtables "Capacity building programs on clean energy" for Tajikistan, Kazakhstan and Uzbekistan.

July 1, **8**, **15**, **22**, **29**; **September 2**, **9**, **23**, **30**; **October 7** – IWRA 2021 Master Classes on "Water Cooperation and Diplomacy".

September 20-24 – online learning series as part of the 12th Central Asian Leadership Program on Environment for Sustainable Development: "Promoting sustainable consumption and production for Green Economy development and transition to low carbon and resource-efficient circular economy in Central Asia and Afghanistan".

September 27-29, Almaty – Workshop "Water governance and climate security in Central Asia".

October 4-10, Kazakhstan – Roundtable discussion and study tour "Renewable Energy Trip 2021".

October 11-December 12 – Distance Learning Course on International Water Law and the Law of Transboundary Aquifers (Geneva Water Hub).

October 14-15 – Online training "Applying a new MODIS data processing software to monitor snow cover".

December 7-8 – Webinar "The role of innovative technologies in the sustainable development of the agricultural sector in Kazakhstan".

NASA Applied Remote Sensing Program Trainings (ARSET): trainings on "Mapping and monitoring lakes and reservoirs with satellite observations" (**February**, **16**, **23**); webinars on "Using Google earth engine for land monitoring" (**June 16**, **23**, **30**); training courses on "Monitoring coastal and estuarine water quality: transitioning from MODIS to VIIRS" (**September 14**, **16**, **21**).

9.3.2. Professional Development Courses and trainings in 2022

February 21-22, Bishkek and **March 3-4**, Dushanbe – training series on application of the water-energy-food nexus approach within the framework of the EU project "Nexus Dialogue in Central Asia"

February 21, **22**, **24**; **March 1-3** – Online training courses on "Water evaluation and planning system (WEAP) and low emissions analysis platform (LEAP) as part of the USAID Regional Water and Environment Project

February 21-March 4 – Central Asia Training Course on "Weather and climate services for the Energy Sector"

March 9-10, Hague – workshop from "Water and Peace" series – The affective dimensions of water conflict and cooperation

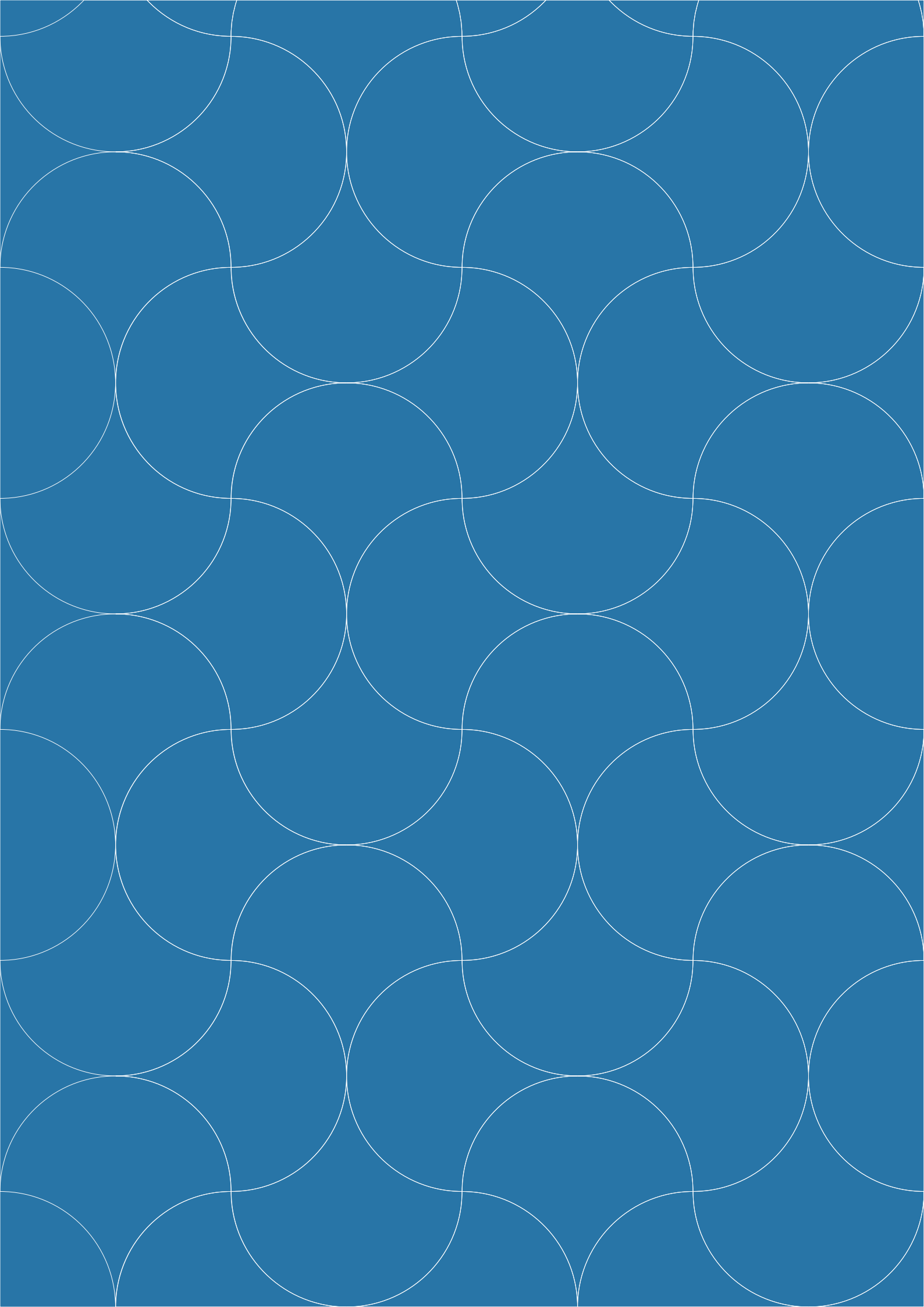
March 21-25, Bishkek – workshop "Science for Diplomacy" for young professionals in water policy research.

April 12-May 3 – ARSET Online training "Mapping crops and their biophysical characteristics with polarimetric SAR and optical remote sensing"

June 6-17 – Online course "Water security for policy makers and practitioners" (Geneva Water Hub)

August – Central Asia Summer School "Knowledge transfer and data sharing".
http://iwp.kg/?cat=56&paged=3

Programs at the University of Geneva: Course Water Resources Management and Policy (**since March 14**); Course Water Governance: Frameworks and Negotiations (**July 4-15**).



Section 10

Science and Innovations

10.1. Innovations in 2021

Innovations in Agriculture

Agriculture is among the most advanced and innovation-driven sectors. Currently, the key modern technologies applied by the agrarians include:

- **Machine learning.** AI on the base of neural networks collects and analyzes different data to make specific conclusions. This technology helps to speed up breeding of new crop varieties, identify crop diseases at early stages, and select good quality seeds;

- **IoT-sensors** collect various data and indicators for making forecasts. The sensors collect weather and soil data in the fields, while in greenhouses they can regulate temperature, moisture and irrigation. The sensors also predict the production volume helping farmers to better plan selling;

- **Automation.** Automated machines are used for weeding, harvesting (including such crops as strawberries and tomato), and controlling air temperature in grain bins and moisture content of harvested fruits;

- **E-document flow** greatly facilitates and improves operations of agricultural enterprises: documents are timely approved through reduced preparation and approval processes; administrative and logistical inputs are reduced; continuous access to documents is provided;

- **Drones.** Drones can survey agricultural fields, find dry areas, irrigate fields, assess conditions of crops, find and analyze places of better or worse growing. Drones are used for aero- and photo-surveying, imaging, 3D-modeling, thermal imaging and scanning. Robot tractors are used for tillage, sowing and harvesting.

Source: https://propozitsiya.com/agrarnaya-sfera-glavnye-innovacii-poslednih-let

Examples of innovative solutions

Researchers at Eindhoven University of Technology (the Netherlands) have **developed a plasma-powered mini-plant that produces cheap fertilizer using only sun, water and air**. It uses a small-scale reactor to make liquid nitrogen-based fertilizer that can be used by any farmer who has access to sunlight and water. Test operations were completed successfully in Uganda. Next step is to bring the mini-plant to market.

A project integrating solar technology and microalgae cultivation to be launched at the ENEA Center in Portici (Naples) as part of an agreement signed between Enel Green Power and ENEA. A scalability analysis will be carried out also for applications on larger photovoltaic plants. The trial involves cultivating microalgae with a high commercial value (between 100 and 200 euros per kilogram) with a crop system fully integrated within the photovoltaic plant.

The **multipurpose robotic system GRoW** has been developed by Israeli agtech company MetoMotion and successfully tested at the De Ruiter Experience Center. In October, an official milestone measurement was taken and showed that GRoW harvested a complete row of tomatoes with a 90% success rate and no human intervention. GRoW is designed to harvest different crops, prune, monitor and de-leaf. GRoW also allows the grower to continuously collect crop data to better forecast total yield.

Rantizo (USA) has developed **the technology of drone-delivered applications of fungicides**. The solution includes specific software, drones, auxiliary equipment, licensing and technical support. The precision of applications is achieved through artificial intelligence (AI).

Small Robot Company (SRC), a British agritech start-up for sustainable farming, has developed **AI-enabled robots** – named Tom, Dick and Harry – **that identify and kill individual weeds with electricity**. These agricultural robots could reduce the use of harmful chemicals and heavy machinery. Robot Tom can scan 20 hectares (49 acres) a day, collecting data which is then used by Dick, a "crop-care" robot, to zap weeds. Then robot Harry's turn to plant seeds in the weed-free soil. Using the full system, once it is up and running, farmers could reduce costs by 40% and chemical usage by up to 95%.

The Dutch Ridder introduces innovative indoor positioning system CoRanger. CoRanger is a unique patented system that can pinpoint the positions of plants, people, and objects in the greenhouse to within 10 cm. The data from logistical systems, crops, drones, sensors or even picking robots and data platforms are integrated in a single information platform. By applying the CoRanger concept in the Productive labor registration system, no time is lost on entering and checking harvest and production data. All registration takes automatically place in the background, without errors and is fully accurate and secure. This saves a lot of time and labor.

Water Quality Monitoring

Robot DraBot collects data on water quality. The unique soft robot developed by researchers at Duke University (USA) is electronics-free and uses self-healing hydrogels to watch for changes in pH within seconds. The body plan of a dragonfly is equipped with microchannels to supply air to wings and allow air to exit in the backward direction. This enables efficient skimming over water surface and responding to ambient conditions, such as pH, temperature or presence of oil.

Water Treatment and Desalination

Studiomobile and Pnat (Italy) developed **the autonomous floating Jellyfish Barge for water purification**

on the base of solar energy. There are 7 desalination units planted around the perimeter to purify brackish, salt or contaminated water. The desalination units are able to produce 150 liters (39.6 gallons) of clean fresh water every day from the existing water body. The simple materials, easy self-construction, and low-cost technologies make it accessible to many communities that may not have a big fund. The module has a wooden base that floats on 96 recycled plastic drums and supports a glass greenhouse where the crops grow. Inside it, there is a high-efficiency hydroponic cultivation method that helps increase water savings by 70% compared to traditional hydroponic systems. The Jellyfish Barge grows about 1,200 plants per month.

The Korean scientists made a **seawater desalination filter**. They used a membrane distillation process that resulted in 99.9 percent salt rejection for one month. They used poly vinylidene fluoride-co-hexafluoropropylene as the core and silica aerogel mixed with a low concentration of the polymer as the sheath to produce a composite membrane with a superhydrophobic surface without suffering from wetting issues. The new desalination technique can make sea water fit to drink in minutes.

Water from Air

A team of researchers from the National University of Singapore (NUS) has recently created **a solar-powered, fully automated device called 'SmartFarm'**. The SmartFarm consists of a transparent acrylic container with the soil inside it. The extremely absorbent hydrogel is placed under the motorized top cover with solar panels. At night, the top cover opens to allow the hydrogel to attract atmospheric moisture. In the day, at a pre-set timing, the top cover closes to confine the water vapor allowing it to be condensed on the enclosure's surface, particularly on the top cover. Water droplets will be gradually formed and when the moisture stored in the copper-based hydrogel is completely released, the top cover automatically opens and water droplets which are wiped off by the parallel wipers fall onto the soil to irrigate the plants. The remaining water droplets on the walls of the device continue to provide a humid environment for healthy plant growth. The hydrogel takes in moisture up to three times its weight. It also releases water quickly under natural sunlight – one gram of the hydrogel releases 2.24 gram of water per hour. The water released meets the WHO's standards for drinking water.

New material could harvest water all day long. The micro-architected hydrogel membrane can produce water through both solar steam-water generation and fog collection – two independent processes that typically require two separate devices. In an operation test conducted during the night, samples of the materials ranging from 55-125 square centimeters in the area were able to collect about 35 milliliters of water from fog. In tests during the day, the material was capable of collecting about 125 milliliters from solar steam.

An ultraporous compound "Portable Oasis" can extract water molecules from dry desert air, store them as tiny "icicles" and then release them as clean drinking water. The technology relies on an aluminum-based compound called MOF-303, one of more than 20,000 designer materials known as metal-organic frameworks. These substances are made up of both inorganic and organic molecules, which link together to form open lattice structures that resemble Tinkertoy stick-and-node play set. MOF-303 is particularly good at squeezing traces of humidity from the air. The material's nanoscale pockets readily fill up with water vapor. These captured water molecules rapidly form hydrogen bonds with other passing water molecules, seeding dense ice crystals. Once the MOF has filled its pores with these minuscule icicles, applying a little extra heat is enough to release the molecules as potable drinking water.

Alternative Energy

A team of researchers from Pusan National University (PNU) in South Korea have created a prototype of **ultrathin foldable solar cells**. For their research work, they synthesized single-walled carbon nanotubes (CNTs)–polyimide (PI) composite film with a thickness of 7 μm and used it as a foldable transparent conductor in perovskite solar cells (PSCs). The resulting material was doped using MoOx to increase its conductivity with the aim to ensure maximum performance. The foldable solar cells can withstand more than 10,000 folding cycles with a folding radius of 0.5 mm. This prototype offered 80% transparency and a power conversion efficiency of 15.2%.

Spanish firm pioneered **bladeless wind turbines**. The 3m-high cylindrical turbines are designed to oscillate within the wind range, generating electricity from the vibration. Such turbines are lightweight, noiseless and cheaper than traditional wind turbines and are able to adapt to the changes of the wind direction in a faster manner. In addition, this system also eliminates the mechanical elements that wear down due to friction, reducing maintenance costs and prolonging their useful life. The bladeless turbines are also able to reduce the visual as well as environmental and ecological impact, since they are not configured with blades that impose a safety risk for birds and bats.

Scientists from the Martin Luther University Halle-Wittenberg (MLU) have discovered that by **alternating the layers of ferroelectric solar cells with different materials, they can increase the electrical current by a factor of a thousand**. They embedded the barium titanate between strontium titanate and calcium titanate. This was achieved by vaporizing the crystals with a high-power laser and redepositing them on carrier substrates. This produced a material made of 500 layers that is about 200 nanometers (0.00000078-inches) thick. This enabled the otherwise not very reactive barium titanate to produce 1,000 times its original energy.

Space-based solar panels. The California Institute of Technology (CalTech) within the framework of the Space-based Solar Power Project (SSPP) is developing technology capable of generating solar power in space and beaming it back to Earth. Collecting solar power in space and transmitting the energy wirelessly to Earth through microwaves enables terrestrial power availability unaffected by weather or time of day. The project's first test will occur in early 2023.

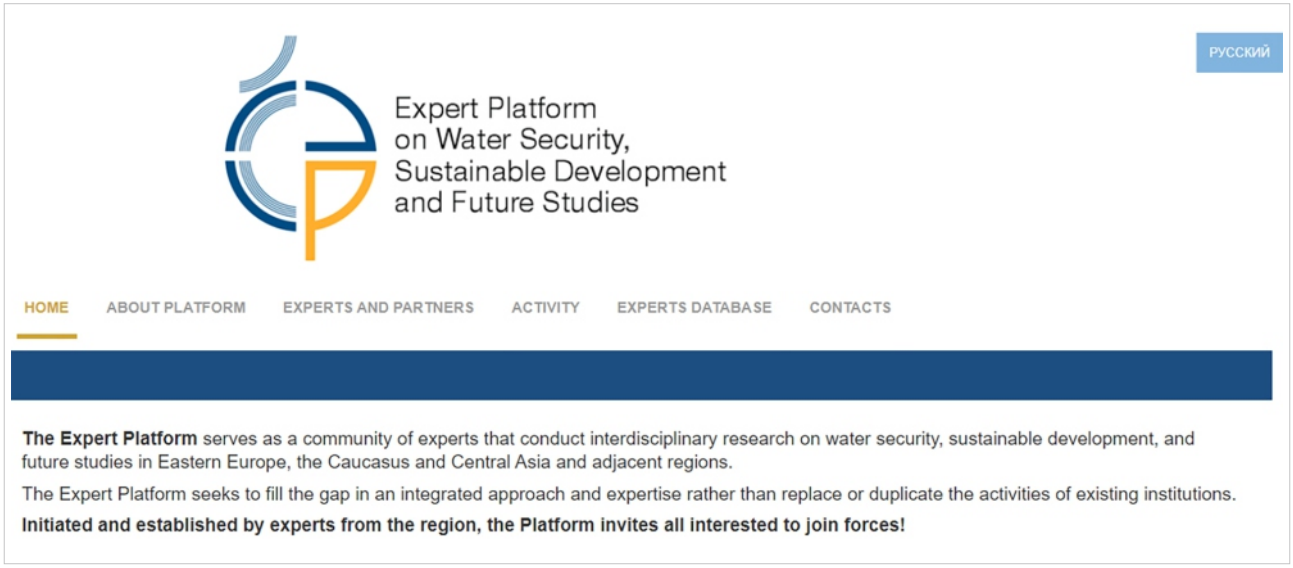
TerraBox turns sand and electricity into solar panels. The Maana Electric startup develops TerraBox, a fully automated factory that takes sand and produces solar panels. The TerraBox fits within shipping containers, allowing the mini-factories to be transported to deserts across the globe and produce clean, renewable energy.

10.2. Central Asia Expert Platform on Water Security, Sustainable Development, and Future Studies

In 2021, the work on the formation of the Expert Platform on Water Security, Sustainable Development and Future Studies (EP) was continued. The EP site was opened on the portal www.cawater-info.net/.

As part of the contract with the UNECE Project "Support to the Network of Russian Speaking Water Management Organizations" and with the involvement of national experts from the region (1) the International EECCA NWO Conference "Transboundary Water Cooperation in the EECCA countries: Lessons Learned and Future Directions" was held on March 2-3, 2021 and followed by adoption of the Resolution and publication of the EECCA NWO collection of papers "Lessons of transboundary cooperation in EECCA countries"; (2) the database of international experts was created. It includes experts in different spheres in the region (water, agriculture, land, environment and ecology, energy, etc.). The database is open; (3) the analysis of statements of the EECCA countries at UNGA was carried out: "Key highlights in the statements made at the general debate of the UN General Assembly by the countries of Central Asia in 1992-2020" (http://www.cawater-info.net/expert-platform/un-ga-1992-2020_e.htm) and "Highlights on the environmental matters and international cooperation in the statements made at the general debate of the UN General Assembly by the Countries from Eastern Europe, Caucasus and Central Asia in 1992-2020" (http://www.cawater-info.net/expert-platform/eecca-un-ga-1992-2020_e.htm); (4) thematic study of best practices in IWRM and transboundary water cooperation in the EECCA countries was carried out and the collection of papers "Selected practices of IWRM and transboundary water cooperation in EECCA countries" was published.

The aspects of EP development are also included in the Project "Regional mechanisms for the low-carbon, climate-resilient transformation of the energy-water-land nexus in Central Asia" (German Government, International Climate Initiative 2020, partners – OECD, EBRD, UNECE, SIC ICWC), which is under development. The work under the Project is to be started in autumn 2022.



10.3. Leading Research Institutes of EECCA Countries

Belarus. Republican Unitary Enterprise "Central Research Institute for Complex Use of Water Resources" (CRICUWR)

RUE CRICUWR was established in 1961. It is a back-up organization of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus (since 1994) for development of river basin management plans, inventory of national surface water bodies, schemes and projects of water protection zones and coastal strips of waterways and reservoirs, zones of sanitary protection of surface and groundwater intakes. It performs the functions of the head organization for maintaining the State Water Cadaster (SWC), provides information services to the economic sectors offering data on water bodies, water resources, regime, quality, water use and wastewater discharge; exchanges data with neighboring states (on transboundary watercourses) and prepares information materials on water resources and their use for international organizations.

Activities in 2021

Research. The Institute's Surface Water Division:

(1) made an inventory of surface water bodies in the Pripyat River basin based on available RS-data, drone images, and the forest surveying data. Field expeditions were undertaken. GIS layers were developed for 4,214 sites in WGS84. The results are available in the information system of the State Water Cadaster.

(2) made rating of regional environmental development (for provincial centers and Minsk) for the first time in Belarus as part of preparation of annual report "State of Environment in Belarus" for 2020.

(3) develops the information-analytical system "Water-protection areas" in part of control and analysis of activities in water-protection areas, including monitoring of violations. For this purpose, the RS data is used.

Events. The following events were organized: (1) VI International Water Forum "Springs of Belarus" (June 3-5, Minsk); (2) a workshop as part of the EU Water Initiative for Eastern Partnership (EUWI+) – components 2 and 3, where progress achieved in Belarus and further prospects were discussed (March 4, Minsk).

Mass media. The results of research efforts were covered by the BELTA press center: (1) roundtable "Summarizing the environmental campaign – Let's improve our home area" (January 14); (2) comments by Ye.I. Gromadskaya on the theme "A book on 1,183 springs issued in Belarus" (January 14).

Publications. Ye.I. Gromadskaya, D.S. Bakanova. On the key outcomes of the inventory of Belarus' springs, first cycle // Journal "Science and Innovations", Minsk, 2021 – Issue 8. – pp. 79-83.

Monograph – Recommendations for identification, restoration and use of springs in Belarus – Minsk: UP "Enciklopediks", 2021 – 40 pp.

Source: RUE CRICUWR, www.cricuwr.by

Kyrgyzstan. Institute of Water Problems and Hydropower at the National Academy of Sciences of the Kyrgyz Republic (IVP&GE NAN KR)

IVP&GE 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** and the **Ala-Archa Polygon** for studies of hazardous hydrological processes operate at the Institute.

Activities in 2021

Based on the 2021-2023 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", **research efforts** are carried out on the following themes: (1) Assessment of river runoff in Kyrgyzstan in the context of climate change; (2) Study of hydropower potential in the basins of Issyk-kul Lake and the Chu River under conditions of climate change; (3) Development and justification of groundwater management plans for the eastern part of the Chu Valley on the base of non-stationary geo-filtration models; (4) Study of hazardous exogenic hydrogeological processes in Tien Shan; (5) Environmental and geographic characteristics of sustainable river basin development in Kyrgyzstan in the context of climate change and anthropogenic load; (6) Creation of RS-based geoinformation system for monitoring water and land in Kyrgyzstan.

The Tien Shan Highland Research Center conducts research on the theme "Comprehensive study of dynamics of physical and geographic processes in highland zones of Kyrgyz Tien Shan and Pamir-Alai".

The main research results for 2021 are as follows: (1) using the meteorological data of KyrgyzHydromet, assessed climate changes and calculated linear trends of mean annual temperature and rainfall; (2) analyzed long-term river runoff variations, identified flow cycles, and calculated trends of runoff changes; (3) formalized problems of groundwater optimization and management in eastern part of the Chu Valley.

The developed approach may be used by design and production organizations and applied in other intermontane valleys, with endemic hydrological conditions; (4) predicted outburst of Lake Akpay that enabled minimization of negative consequences; (5) continued work on studying the structure and composition of concealed ice that contributes largely to river runoff; (6) calculated motor transport emissions of polluting substances into the atmosphere of Bishkek; (7) ongoing modeling and study of parameters of designed Kambarata-1 to enable reliable hydrological regimes in the future for safe and effective operation; (8) submitted annual mass balances of key glaciers in Kyrgyz Tien Shan and Pamir-Alai to the World Glacier Monitoring Service (observation period 2013/2014-2020/21).

Events. The following events were held: (1) International scientific workshop dedicated to the World Water Day (March 22); (2) International summer school for young scientists, professionals, Master students and postgraduates in glaciology, hydrology and ecology (August 20-25); (3) scientific workshop on the results of the expedition to Kara-Batkak glacier (October 1); expedition jointly with French and Swedish scientists to Issyk-Kul Lake (October 3-8); (4) International scientific-practical conference "Challenges in forecasting water and energy resources in Central Asia in the context of climate change, glacier degradation and anthropogenic load" dedicated to the Day of Science in memory of Acad. D.Mamatkanov (November 5); (5) meeting with the Russian Academy of Sciences on the matters of water use and ecology (online, December 21).

Representatives of the Institute took part in: the expedition to Kara-Batkak glacier, weather station in Chon-Kyzyl-Suu river basin and Kara-Bulun peninsula

(September 28-30); the III Forum of CIS scientists, the I Congress of scientif councils of the International Association of Academies of Sciences, and the IX meeting of the Council for Fundamental Scientific Cooperation of CIS countries (Minsk, November 24-27).

Publications. (1) T.K. Arbayev, B.K. Kaldybayev, R.K. Kasymbekov. "Tin content in mountain ecosystems of the Issyk-Kul region", Vestnik MUK, Bishkek 2021, No.2, 40 p.; (2) D.T. Chontoyev, R.K. Kasymbekov, K.B. Bakirov. "Long-term variations of atmospheric precipitation in the Naryn River Basin", Vestnik MUK, Bishkek 2021, No.2, 446 p.; (3) E.S. Sharsheyev, B.M. Zhakeyev, A.A. Toleyev. "Analysis of continuous GPS measurements", Vestnik MUK, Bishkek 2021, No.2, 456 p.; (4) S.A. Yerokhin, K.K. Shukurbekov, V.V. Zaginayev. "Peculiarities of groundwater flows in mountain massifs (case-study of the northern slope of the Kyrgyz ridge)", Vestnik MUK, Bishkek 2021, No.2, 468 p.

Source: IVP&GE NAN KR, http://iwp.kg/, https://naskr.kg/ru/2019/06/24/institut-vodnyx-problem-i-gidroenergetiki/

Russia. Russian Research Institute for Integrated Water Management and Protection (RosNIIVKh)

RosNIIVKh was founded in 1969. It consists of the lead institute (Yekaterinburg) and branches: Eastern ("VostokNIIVKh", Chita), Far Eastern ("DalNIIVKh", Vladivostok), Kamsky ("KamNIIVKh", Perm), and Bashkir ("BashNIIVKh", Ufa). The Institute includes the Expert Center for the expertise of safety declarations included in the List of organizations forming expert centers and offering expertise on specific issues, the dissertation committee on geoecology, the Water Sector Professional Development Center, and the Water Museum.

Activities in 2021

Research. The Institute carries out the state assignment "Studying possibilities to recharge groundwater in the Republic of Kalmykia through accumulation of surface runoff." The Institute's researchers visited Troitskoye aquifer in Elista, Verkhny Yashkul village of the Republic of Kalmykia to select a site for experimental work (August 10-13).

Capacity building. The Water Sector Professional Development Center held: e-learning course on integrated water resources management (September 13-25) and a workshop "Implementation of relevant mechanisms of integrated water resources management" (September 25); (2) several courses "Organization of state monitoring of water bodies, specifics of implementation" followed by the workshop "Analysis of monitoring practices."

Events. The following events were held: (1) XVI International symposium and exhibition "Clean Water of Russia" (online, May 17-20); (2) roundtable in memory of V.A. Dukhovniy "Water security in the Central Asian countries" (November 25) jointly with SIC ICWC and EECCA NWO within the framework of the International Scientific and Education Forum "Strategic development targets in Central Asia: history, trends and prospects" (November 23-25).

Representatives of the Institute took part in (1) the video-conference on implementation of principles of

river continuity in national policies of European countries as part of international cooperation with ECRR (January 26); (2) International EECCA NWO Conference "Transboundary Water Cooperation in the EECCA countries: Lessons Learned and Future Directions" (online, March 2-3); (3) visiting meeting at the Olkhovka dam (July 26); (4) 4th International UNESCO Conference "World's Great Rivers" (August 3-6); (5) annual meeting of ECRR organizations (online, November 10); (6) extended meeting of Rosvodresursy (December 2-3).

Publications. Monograph – N.A. Valek. Russain water science in scientific bibliographies, Yekaterinburg: FGBU RosNIIVKh, 2021. – 82 p.

In 2021, six issues of the Journal "Water economy of Russia: challenges, technologies, governance" were issued. Those also included scientific papers of Institute's researchers: (1) Bogomolov A.V., Lepikhin A.P., Lyakhin Y.S., Beloborodov A.V., Tiunov A.A. To the question of assessment of water quality in Argazinskoe reservoir // Water economy of Russia: challenges, technologies, governance. 2021. №1. pp. 6-23; (2) N.A. Valek. On representation of water-related journals in scientific bibliographies // Water economy of Russia: challenges, technologies, governance. 2021. №1. pp. 113-136; (3) A.P. Lepikhin. The history of development of the systems for regulation of anthropogenic impacts on water bodies // Water economy of Russia: challenges, technologies, governance. 2021. №2. pp. 59-71; (4) Kurganovich K.A., Shalikovsky A.V., Bosov M.A., Kochev D.V. Artificial Intelligence algorithms for control of flood-prone areas // Water economy of Russia: challenges, technologies, governance. 2021. №3. pp. 6-24; (5) Lepikhin A.P., Lyakhin Y.S., Tiunov A.A., Voznyak A.A., Luchnikov A.I., Perepelitsa D.I., Bogomolov A.V. Analysis of potential consequences of large-scale extraction of sand-gravel mixture in the lower reaches of large hydroschemes using hydrodynamic modeling (case-study of Votkinsk HPP) // Water economy of Russia: challenges, technologies, governance. 2021. №4. pp. 86-104; (6) A.S. Kutergin, T.A. Nedobukh, A.F. Nikiforov, K.I. Zenkova, T.V. Tarasovskikh. Sorption extraction of strontium radionuclides from surface waters by natural aluminosilicate // Water economy of Russia: challenges, technologies, governance. 2021. №4. pp. 118-134; (7) D.I. Perepelitsa, A.P. Lepikhin, S.A. Lepeshkin. Using the effect of accompanying flocculation in wastewater treatment of fine suspended particles // Water economy of Russia: challenges, technologies, governance. 2021. №6. pp. 126-141.

Source: https://wrm.ru/

Tajikistan. State Enterprise "Tajik Research Institute of Water Engineering and Amelioration" (GU "TajikNIIGiM")

GU "TajikNIIGiM" was established in 1978 as a branch of VNIIGIM named after A.N. Kostyakov. Currently, the Institute has been functioning under the auspices of the Ministry of Energy and Water Resources of Tajikistan. Currently, the Institute carries out research and innovation development in the area of land reclamation and irrigation. 55 researchers, including 6 Doctors of Sciences, 5 Candidates of Sciences, and 14 support staff members work at the Institute.

Activities in 2021

Research is carried out on the following themes: (1) Efficient water use and energy saving in maintaining irrigation canals (2017-2021); (2) Development of effective bank-protection methods to protect population and utilize adjacent land in the middle reaches of the Kafirnigan River (2019-2023); (3) Monitoring and assessment of the conditions of irrigated land and ways for reclamation through innovative approaches in the Beshkent Valley in Tajikistan (2021-2025). The research efforts on the development of effective mechanism for financing water use to achieve national strategic goals and the development of new scientifically-grounded methods to improve operation of irrigation infrastructure in WUAs passed expert review at the Tajik Academy of Sciences and the Tajik Academy of Agricultural Science and were submitted to ministries of economy and finance for financing in 2022-2026.

Events. The following events were held: (1) round-table "Prospective areas to achieve water, energy and food security" (June 30); (2) training in modern methods of water measurement and innovative technologies of water use (September 1-3, Kulyab, Khatlon province); (3) scientific meeting on Hissar Experimental Polygon dedicated to the Day of Irrigators (December 1); (4) Republican scientific-practical workshop "Water management: challenges and ways for sustainable development to ensure energy self-sufficiency and food security in Tajikistan" (October 6).

Cooperation. The Institute signed agreements with (1) the FAO office in Tajikistan on technical assistance in "Building national capacities to estimate crop water requirements under different climate change scenarios"; (2) TAU named after Shotemur on cooperation.

Awards. Four employees of the Institute were awarded with the Diploma of the Parliament (Majlisi Namoyandagon Majlisi Oli) of Tajikistan and diplomas and letter of gratitude of the Ministry of Energy and Water Resources of Tajikistan for their services and scientific activities.

Publications. (1) Collection of scientific papers "Water management: challenges and ways for sustainable development", volume IV, dedicated to the 30th anniversary of state independence of Tajikistan; (2) "Recommendations for the use of saline irrigated land in the South-East of Tajikistan", Dushanbe, ChDMM "Khochi Hasan", 2021, 32 p.; (3) "Recommendations on innovative technologies of crop irrigation under conditions of climatic change in Tajikistan", Dushanbe, Khoji Hasan Publishing House, 2021, 40 pp.; (4) "Methodological recommendations on developing comprehensive measures for reducing water use and energy consumption when designing new and modernizing existing pumping irrigation systems in Tajikistan", Dushanbe, Khoji Hasan Publishing House, 2021, 34 pp.

Scientific papers of the Institute's researchers were published in IOP Publishing, IOP Conf. Series: Earth and Environmental Science, *Izvestiya Akademiyi Nauk Respubliki Tadjikistan* (News of the Academy of Sciences of Tajikistan), *Bonuvon, Inson va Tabiat*, etc.

Source: GU "TajikNIIGiM", https://niigim.tj/

Ukraine. Institute of Water Problems and Land Reclamation (IWPLR)

The IWPLR Institute 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.

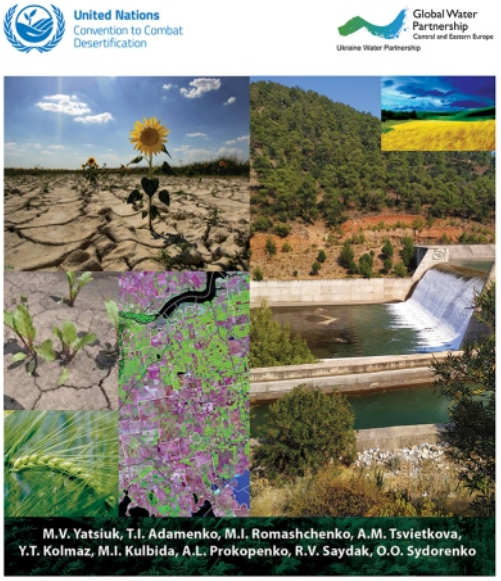
Activities in 2021

Research. The Institute's researchers work on the Concept of Western group water supply development, considering the connection of settlements in Berdyansk region, and are the members of the Interdepartmental Coordination Council on Water Resources.

Events. The Institute held: (1) International scientific-practical workshop "Sustainable nature use and green economy from a perspective of transboundary cooperation" (online, April 9); (2) training courses "Modern technologies and technique in irrigation" (online, June 8-9); (3) Regional forum "Irrigation 2021: modernization and innovations" (August 12); (4) Field day "No-till crop growing in the dry steppe zone" (August 18).

Institute's researchers took part in (1) the hearings of the Verkhovna Rada Committee on Environmental Policy and Nature Management "35 years since the Chernobyl catastrophe: challenges and prospects of development in the exclusion zone" (April 8); (2) a meeting on implementation of land irrigation projects (June 9); (3) a meeting "Monitoring of natural environment in Volynsk province in the potential impact zone of Khotislavsk quarry, Republic of Belarus" (June 29); (4) visiting conference "Status of Shatsk lakes and undertaken measures for improvement" (June 30); (5) webinar "Rainwater harvesting against traditional water collection" (July 15); (6) All-Ukrainian Day of Potato "Potato blockchain" (August 26-27); (7) meeting of the land reclamation staff (August 30); (8) 3rd International congress on environmental chemistry (Turkey, November 1-4); (9) session of the Bureau of the Ukrainian National Academy of Sciences Presidium on "Application of geoinformation systems and technologies in irrigated agriculture in the south of Ukraine" (November 17); (10) discussion "Agricultural land productivity in the context of state policy" organized by FAO (December 2); and, (11) meeting on provision of safe drinking water supply and irrigation in Zaporozhie region (December 15).

Publications. Joint publication of the Institute and the Hydrometeorological Center of Ukraine "Conceptual basis of drought management plan in Ukraine", https://drive.google.com/file/d/1t07bVU_Bu6F7C97_eyPSpdbiisE_gRfa/view



Mass media. Director of the Institute, M.I. Romaschenko spoke in: (1) "Morning on the Public"[103] on water supply, climate change impact on Ukrainian wetlands and the challenge of minimizing the negative impact on aquatic ecosystems (February 2); (2) "Imperative", Radio Kultura on the World Water Day (March 22); (3) "News of Azov Region", Radio Liberty on water supply in southern Ukraine (December 16).

Source: http://igim.org.ua/

10.4. International Research Institutes Working on Water Issues in Central Asia

In this section, we present foreign research institutions working on water issues in CA.

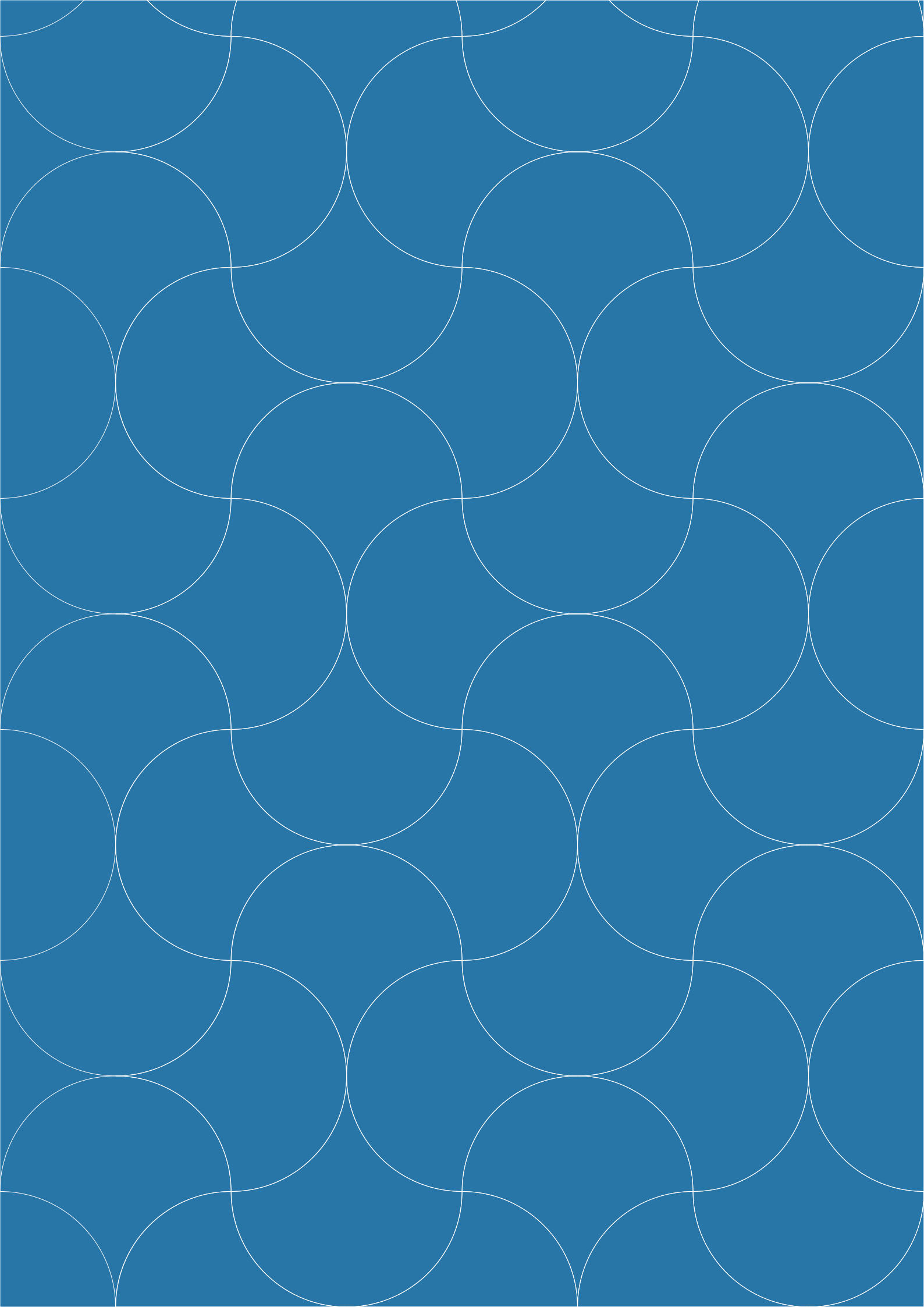
Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences (IGSNRR) is a multidisciplinary research institute focusing on physical geography and global change, human geography and regional development, natural resources and the environment, geographical information systems and surface simulation, the terrestrial water cycle and water resources, ecosystem network observation and modeling, and Chinese agricultural policy. Through research in these domains, the Institute aims to figure out challenges that are related to national sustainable development on natural resource and the environment, as well as improving its own innovative capacity.

In recent years, numerous rewarding progresses have been achieved by the cooperation between IGSNRR and countries in Central Asia, mainly in scientific research, personnel cultivation and collaborations. These advances are all supported by the strategic priority research program of Pan-Third Pole Environment Study for a Green Silk Road (Pan-TPE) of the Chinese Academy of Sciences (CAS), and the Belt and Road Alliance of International Scientific Organizations (ANSO) international cooperation platform. IGSNRR has accomplished a lot of work on water resources in Central Asia. Water resources evolution of key river basins in five Central Asian countries have been simulated and analyzed, which reveals temporal variation characteristics of agricultural water-use and future evolution trend of agricultural water demand in Central Asia under changing scenarios for 20 years. A quantitative evaluation of water resources carrying capacity of the five Central Asian countries and water-energy-overall grain security have also been assessed.

In 2019, IGSNRR signed a memorandum with the SIC ICWC, they jointly applied for The Sino-Uzbekistan cooperation project "The E-Rules Development of Flow Regulation in the Amu Darya River Basin", which was co-funded by bilateral governments. In terms of talent cultivation and academic exchange, a young scientist from the SIC ICWC has cooperated and exchanged in IGSNRR for two years. Other scholars from Central Asian countries have studied and exchanged in IGSNRR as post-doctoral fellows and visiting scholars.

Source: IGSNRR

[103] UA First TV-channel



Section 11

Key Water Developments in the World

11.1. Africa

Construction of the Grand Ethiopian Renaissance Dam on the Nile River in Ethiopia. On July 19, Ethiopia announced the completion of the second filling of the dam's reservoir, without the agreement of Egypt and Sudan. According to Ethiopia, the $5 billion dam, whose construction reached 80% completion, is important to its economic development and power generation. But Egypt considers the dam as a serious threat to its water supply from the Nile on which it relies almost entirely to meet its freshwater needs. Sudan is also concerned about the dam's safety and impact on its own dams and water stations. The dispute between Sudan and Ethiopia over the dam escalated in 2021 and culminated in April in Egyptian threats of carrying out a military action if Addis Ababa took the step, which the two downstream countries regard as a threat to their national and water security. In June, the Arab League issued a resolution rejecting any measures that undermine Egypt's and Sudan's share of Nile water and called on the United Nations Security Council (UNSC) to intervene to resolve the crisis which threatened peace and security in the region. On 8 July 2021, the U.N. Security Council held a session to discuss the dispute over the dam filling. The UNSC issued a statement, which said that negotiations should resume at the invitation of the African Union's (AU) chairman "to finalize expeditiously the text of mutually acceptable and binding agreement on the filling and operation of the GERD, within a reasonable time frame," without specifying a deadline. The Democratic Republic of the Congo, current chair of the AU, has since sought to urge the three countries to resume negotiations, but without making any progress. The possibility of resuming negotiations was further complicated by the turmoil in Sudan, as Sudanese Gen. Abdel Fattah al-Burhan led a military coup on October 25. This prompted the AU to suspend Sudan's membership and freeze its participation in all AU activities. Ethiopia is accused of pushing for the freezing of Sudan's AU membership to find a logical reason for the international community to postpone the GERD negotiations for a later time.

Source: https://www.al-monitor.com/originals/2021/11/new-egyptian-ethiopian-escalation-over-nile-dam

The dam is 80 percent complete and is expected to reach full generating capacity in 2023 [Photo: Tiksa Negeri/Reuters]

Egypt Inaugurates the world's largest wastewater plant. The Bahr El-Baqar wastewater treatment plant, located in the northern governorate of Port Said, was inaugurated on 27 September 2021. With a treatment capacity of five million cubic meters per day, the wastewater treatment plant consists of four water treatment lines with a daily processing capacity of 1,250,000 cubic meters each. It will triple-treat and optimize water quality for irrigating local crops, to reclaim and cultivate approximately 400,000 feddans of farmland east of the Suez Canal. The plant holds three Guinness World Records: it is the largest structure of its kind as well as the world's biggest solar-powered sludge drying system comprising 250,000 square meters. This is a part of Egypt's efforts on maximizing all its water resources to meet the growing domestic needs amid the stalled negotiations over GERD. The government has drafted a US$ 50 billion water resources strategy that extends until 2050 and may climb to US$ 100 billion. A four-point plan to cope with the water crisis: rationing water use, improving water quality, providing additional water sources and creating a suitable climate for optimal water management.

Hundreds of people have fled its northern border with Chad after an **ongoing conflict over water between cattle ranchers and fishermen** killed 18 people and wounded 70. Frequent conflicts occur between the Mousgoum fishermen and Arab Choua cattle ranchers over water from the Logone River separating Cameroon from Chad. The Logone and Chari Division is part of the Lake Chad Basin. Nigeria, Cameroon, Chad, the Central African Republic, Niger and Benin, member countries of the Lake Chad Basin Commission, say the lake's water resources have diminished by 70% within the past 50 years. Cameroon says the advancing desert has pushed farmers, fishermen and cattle ranchers to settle along the Logone River for survival.

Over the last few months (July-November), **intense flooding** has affected more than 850,000 people in **South Sudan**, affecting 33 out of 78 counties. The floods are taking place around in areas along the Nile and Lol rivers and in the Sudd marshlands. The United Nations has described the situation as "the worst flooding in decades".

Source: Counting the cost 2021: A year of climate breakdown, Christian Aid, December 2021

Officials in **four West African countries** signed a declaration to advance transboundary cooperation in the Senegal-Mauritanian Aquifer Basin (SMAB). The declaration signifies the willingness of ministers from Gambia, Guinea Bissau, Mauritania and Senegal to establish a legal and institutional framework for cooperation on SMAB for the first time in the region's history. The basin is the largest in the Atlantic margin of northwest Africa and supplies water to more than 24 million people.

Kenya's first wildlife census report. Kenya's black rhino, sable antelope, hirola, Tana River mangabey

and roan antelope are 'critically endangered'. The three-month survey began in April 2021 and covered over 30 species of mammals, birds and marine wildlife in various ecosystems, using the geographic information system (GIS), camera traps, helicopters, vehicles and boats. It was undertaken by the tourism and wildlife ministry, Kenya Wildlife Services and the Wildlife Research and Training Institute (WRTI) to establish a national baseline of the wildlife species. Among other iconic species, the researchers counted 41,659 buffalo, 13,530 Maasai giraffes, 121,911 common zebras, 2,649 grevy's zebras and 57,813 wildebeest. Livestock incursions, logging, charcoal burning and illegal settlements near major wildlife sanctuaries were observed during the survey period. Other threats to wildlife are habitat loss, land-use changes and exponential human population growth, according to the census report.

The **first wind turbine for Sudan's** first commercial wind-energy plant arrived from the Netherlands at the site on June 14, in a major milestone for the country and the continent. The administration has already begun the task of constructing the 100 megawatt (MW) plant, which will be completed in 15-21 days. The project has been funded by the Sudanese government and the Global Environment Facility. Dongola is one of three sites identified by the government-commissioned Sudan Wind Atlas as having the potential to host wind power projects. Sudan faces significant challenges in ensuring access to affordable, reliable, sustainable and modern energy to its citizens. Hydroelectric power has the largest share of energy generation in the country, but the potential to expand hydroelectric power to meet future needs is limited. This is because rainfall patterns affected due to climate change may also affect hydroelectric power. Sudan, Africa's third-largest country, will require 8,675 MW of additional thermal power plants by 2030. Since it has no significant oil or gas reserves, it will have to import fossil fuels. Under such circumstances, the Dongola wind project is a step in the right direction for promoting the use of wind energy in Sudan. The project is expected to serve as a role model for other African countries keen on enhancing their renewable energy capacity.

African Development Bank approved new Water Strategy for 2021-2025 on November 17. The Strategy aims to increase water security and foster sustainable, green and inclusive growth and development in Africa. The Water Strategy's four pillars underscore the importance of water and sanitation for socio-economic development; sustainability, resilience, and inclusivity; food production and nutrition; and hydropower. Since 2010, the African Development Bank has invested an estimated US$ 6.2 billion in water supply and sanitation services. At the end of October 2021, the Bank's active water sector portfolio stood at US$ 5.02 billion, comprising 104 projects implemented in 40 countries, and five multinational projects.

11.2. Asia

Afghanistan

As of 2021, the population of Afghanistan is 40.2 million, while the area is about 653 thousand km².

In November 2020, during the Conference on Afghanistan, the development partners made their commitments to allocate US$ 3.3 billion to the country in 2021. The Afghanistan National Peace and Development Framework prolonged for 5 years since 2021 till 2025 was to guide the joint efforts of the Government and international partners in developing market, sovereignty, and peace.

Political regime change, natural disasters and humanitarian aid. Since late 2020 Afghanistan has suffered from drought, which continued in 2021. The drought had a severe impact in 25 of 34 country's provinces. The situation worsened when in August 2021 Taliban took the control over the country, forcing thousands of people leave the country. Many farmers have lost their crops and animals. Afghanistan is experiencing a humanitarian crisis on an unprecedented scale, with unprecedented speed. According to UN, today in Afghanistan 22.8 million are undernourished and 8.7 million are suffering from hunger.

Since August 2021, the humanitarian aid from western countries and development partners to Afghanistan has suspended and the external assets of the Afghanistan's Central Bank have been frozen. Despite the Taliban's efforts, the economic situation remains severe. China established direct communications with Taliban's administration and was the first country to commit urgent humanitarian assistance at almost US$ 30 million. The both sides had bi- and multilateral meetings to discuss recovery in Afghanistan.

Dams. Kamal Khan Dam built on the Helmand River in Nimroz province on the border with Iran was put into operation on March 24. The hydroelectric plant produces 9 MW of electric power in addition to providing irrigation to about 175,000 ha of agricultural land. Its reservoir has the capacity to store up to 54 million m^3 of fresh water. First releases of water for irrigation were made in January 2022.

The Sokhtak power dam located near the Harirud River in central Daikundi province was put into operation in April. The dam has a capacity of producing 700kW of electricity. The construction work on another infrastructure project in western Herat province, the Pashdan Dam, has been halted. The hydroelectric dam was scheduled for completion by the end of 2021. Due to reduced precipitation in 2021 resulting in low river flows, water levels in Dahla and Kajaki reservoirs, and the Kamal Khan diversion dam has remained well below capacity.

ADB operations in Afghanistan

Since 1966, ADB has committed almost US$ 5.39 billion in grants and provided US$ 120.4 million in technical

assistance to Afghanistan. These amounts include ADB-administered co-financing. Cumulative lending totals US$ 977.1 million. The Bank financed transport, energy, irrigation and agriculture sectors among other projects. The ADB's permanent technical assistance to Afghanistan has stopped since 15 August 2021.

WB operations in Afghanistan

Since April 2002, the International Development Association (IDA) has committed over US$ 5.3 billion for development and emergency reconstruction projects, and 8 budget support operations in Afghanistan. This support comprises over US$ 4.8 billion in grants and US$ 436.4 million in no-interest loans known as "credits". As of 3 February 2021, the Bank has implemented 12 IDA-only projects (US$ 940 million) and 15 projects jointly funded with ARTF, with net commitment value of over US$ 1.2 billion from IDA.

Until August 2021, WB has supported a number of projects in **agriculture and land management** ("Afghanistan Land Administration System Project", IDA Grant – US$ 25 million/ARTF Grant – US$ 10 million; 'Emergency Agriculture and Food Supply Project", IDA Grant – US$ 55 million/ ARTF Grant - US$ 45 million) and energy (CASA-1000, US$ 526.5 million; "Herat Electrification Project", IDA Grant – US$ 60 million; "Naghlu Hydropower Rehabilitation", US$ 83 million).

Source: The World Bank Group in Afghanistan: Country Update; https://documents1.worldbank.org/curated/en/451181617171930719/pdf/The-World-Bank-Group-in-Afghanistan-Country-Update.pdf

UNDP operations in Afghanistan

In 2021, before the political regime change, the UNDP project portfolio included 58 projects at the total cost of US$ 449.97 million. The projects were focused on **SDGs** ("UNDP SDG Country Support Platform Initiation Plan", "Enhancing Integrated Financing for A-SDGs", "SDG Integration in Policy and Programming"), **agriculture** ("Community-Based Agriculture and Rural Development" in the east and west of the country and access to international markets), **climate change, ecosystems** ("Adapting Afghan Communities to Climate-Induced Disaster Risks", "Conservation of snow leopards and their critical ecosystem in Afghanistan"), **energy** ("Afghanistan Sustainable Energy for Rural Development") and **gender** ("Enhancing Gender Equality & Mainstreaming in Afghanistan").

FAO operations in Afghanistan

The Country Programming Framework (CPF 2017-2021) sets out 4 strategic pillars of expertise to guide FAO partnership with and support to the Government of Afghanistan: (1) Better governance through improved capacity for policy planning, land reform, decentralization, and management of common natural resources; (2) Fostering expansion of irrigation and field water management; (3) Intensive agriculture for surplus commercialization, value chains development, and job creation; (4) Supporting vulnerable farmers for improved food & nutrition security, resilience, and emergency response to natural and man-made disasters and climate change.

Despite the political transition, FAO continued supporting Afghanistan in order to keep agriculture, the backbone of country's economy, afloat. In the last quarter of 2021, FAO supported 1.37 million people amid a rapidly worsening humanitarian crisis. In the cold season, about 1.3 million people across 31 provinces of Afghanistan's 34 provinces received wheat packages including high-quality local crop seeds, fertilizers, and training.

USAID operations in Afghanistan

Agriculture. In 2010, USAID established an Agricultural Development Fund (US$ 100 million budget) to provide credit to small commercial farmers and agribusinesses. As of March 2021, the Fund allocated US$ 132.7 million in credits to more than 43.6 thousand Afghan farmers to buy seeds, fertilizers, equipment, and fodder.

Source: www.usaid.gov/afghanistan/agriculture

On October 28, the United States announced more than US$ 144 million in humanitarian assistance to the people affected by the ongoing humanitarian crisis in Afghanistan. This funding from USAID and the U.S. Department of State brought total U.S. humanitarian aid in Afghanistan to nearly US$ 474 million in 2021 alone. This assistance, which includes more than US$ 100 million from USAID, comes as Afghanistan faces increasing food insecurity and will flow through independent humanitarian organizations. It includes food and nutrition assistance, protection, essential health care, agriculture, and winterization assistance, as well as support to transport aid workers and critical relief supplies into Afghanistan, in response to the growing humanitarian needs exacerbated by the current economic contraction, COVID-19 pandemic, and natural disasters, including drought.

China

2021 is the first year of the 14th Five-Year Plan; 2021 is also the first year after China set the 2060 carbon neutrality target. The 14th Five-Year Plan adopted in October 2020 outlines the main ideas for China's economic and social development from 2021 to 2025. The main points outlined in the framework of the 14th five-year plan that are shaping the future of the "ecological civilization" and its environmental repercussions abroad are as follows: localization of key production chains inside China to prevent "de-industrialization" and ensure economic security amidst geopolitical competition; less emphasis on the export of industrial equipment and the transfer of "excess capacity" to other countries; legislative regulation of the selection of key projects to be implemented overseas based on such criteria as inclusiveness, affordability and resilience to risks; combining the construction of the "green" Belt and Road with cooperation in climate change, sea protection, protection of fauna and combating desertification. Also, trading

rights schemes (property, pollutant, water) & eco-compensation schemes will play a big role; no GDP growth targets set & 5/8 binding targets pertain to "green ecology", one is water. China announced that the 14FYP water usage target per unit of GDP is to be reduced by 16% by 2025 and that total water use will be capped at 670 bnm^3 in 2025.

On May 26, 2021, the Ministry of Ecology and Environment (MEE) released the **2020 State of Ecology and Environment Report**. The key highlights of the report are as follows. In 2020, key targets set in 13FYP have been met & exceeded + 39k sewage treatment facilities have been built & violation cases down, likely due to increased compliance. Groundwater & shallow groundwater still far from Water Ten targets as water that is fit for human have slightly worsened; meanwhile, surface water continues to improve. Significant improvement across the main river basins; 6/7 meet both Water Ten targets & completely eliminated Grade V+ water (meaning not suitable for any use); only Hai river needs a bit more work.

Part I of the COP-15 UN Convention on Biological Diversity (CBD) took place in Kunming, Yunnan Province, China on October 11-24. Originally to be held in 2020, the COP-15 was divided into two parts: Part I to be held online and Part II in-person in 2022. Part I of the Kunming Conference outlined the **post-2020 global biodiversity framework** and established the Kunming declaration. The key outcomes of the meeting were as follows: 1) the participating countries committed to the negotiation of adopting an effective post-2020 global biodiversity framework; 2) the government of China announced about US$ 233 million Kunming Biodiversity Fund. The government of Japan joined in with their support of about US$ 17 million; 3) GEF, UNDP, and UNEP announced they would fast-track support developing countries through preparing and updating their National Biodiversity Strategies and Action Plans (NBSAPs); 4) different groups, including financial institutions were joining the commitment of protecting biodiversity.

China Belt and Road Initiative (BRI) investments in 2021: BRI finance and investments stabilized in 2021 at US$ 59.5 billion (compared to US$ 60.5 billion in 2020); No coal projects received financing in 2021; Green energy finance and investments in the BRI slightly increased to a new high in 2021 at US$ 6.3 billion; Strong shift of engagement to African and Arab countries, as well as more construction in South America; Oil-related finance and investments in the BRI expanded from to US$ 6.4 billion in 2021 (compared to US$ 1.9 billion in all of 2020); Iraq was the largest beneficiary from China's BRI in 2021, with about US$ 10.5 billion in construction contracts; Chinese BRI financing accelerated particularly in the health and utilities sectors.

In July, **torrential rains in the Chinese province of Henan** caused massive floods and the death of 302 people. More than 1 million people had to be relocated and hundreds of thousands lost their houses. In Zhengzhou, capital city of the province, 617.1 mm of rain fell in three days, an amount similar to the annual average for the region. According to an estimate, the damage caused by the floods amounted to US$ 17.6 billion.

Source: Counting the cost 2021: A year of climate breakdown, Christian Aid, December 2021

China starts Baihetan hydro project. The giant Baihetan hydropower plant (16 GW) on the upstream branch of China's Yangtze River has begun generating electricity through two turbines in June 2021. The project will eventually consist of 16 units, making its total generation capacity second only to the Three Gorges Dam once it is completed in July next year. It was one of China's biggest and most challenging engineering projects, with a dam height of 289 metres (948 feet); it has taken only four years to build. It is part of a cascade of dams on the Jinsha River, which is the upstream section of the Yangtze. The **10.2-GW Wudongde hydro project**, built upstream on the Jinsha from Baihetan, was put into full operation in mid-June.

The Baihetan hydropower plant. Photo: China Three Gorges

The **"Green development guidelines for overseas investment and cooperation"**, issued jointly by the Ministry of Commerce (MOFCOM) and the Ministry of Ecology and Environment (MEE), encourage Chinese businesses to integrate green development throughout the overseas investment process. Where local standards are insufficient, they also suggest that companies should "follow international green rules and standards". As such, they represent a step away from China's traditional reliance on host country rules and could pave the way for the implementation of much higher standards in infrastructure projects under the Belt and Road Initiative (BRI). The guidelines call for strengthening engagement with host country environmental protection organizations. They also name non-fossil energy technologies as key areas for investment. The document is a significant upgrade. The emphases have shifted from a bare minimum of pollution control that meets host countries' standards towards the promotion of a "green development concept" and encouragement of higher standards used in host countries where appropriate. Across all three aspects of climate, pollution and biodiversity, the 2021 guidelines now include specific climate-

positive measures (e.g. support overseas clean energy investment). Furthermore, Chinese enterprises are asked to "prevent adverse impacts on biodiversity" according to host country laws or international practices. Finally, the guidance also promotes controlling the discharge of waste gas, water, noise and solid waste, and enhancing the integrated reuse of waste.

Other Asian Countries

India's groundwater level continued dropping. India is the world's second-largest producer of wheat and rice. But this production relies on groundwater irrigation. At just over 260 km^3 per year, India is said to use 25% of all groundwater extracted globally, ahead of the USA and China. The Central Ground Water Board (Government of India) states that groundwater irrigation accounts for over 60% of the total area irrigated in the country and about 85% of the rural drinking water supply. According to a study published in 2021, groundwater depletion is already having a negative impact on the production of staple grains, particularly in the winter growing season. For every 1 m of groundwater depletion, the production of winter wheat, winter maize, winter rice, and monsoon rice decreases by 2-6%. If farmers lose access to all critically depleted groundwater, India could lose up to 20% of winter cropped area.

Dozens of people have died and many are still missing after a **devastating flood** in the Himalayan area of Chamoli in Uttarakhand, northern India. The deluge left the Rishiganga hydroelectric power project almost entirely buried under mud and ice. Another dam project on the Dhauliganga River was also severely damaged. Experts say one possibility of the flood is that massive ice blocks broke off a Himalayan glacier into a river due to a temperature rise, releasing a huge amount of water.

In 2021, **India and Bangladesh have agreed to expand cooperation** across the entire gamut of water resources issues, including framework for sharing of river waters, mitigation of pollution, river bank protection, flood management, basin management. Noting that India and Bangladesh share 54 common rivers, both sides commended the close cooperation that exists between them in the matter. Particular attention will be paid to flood forecasting.

In September 2021, a **Thailand**'s project was approved that will divert an average of 1.8 thousand m^3 of water annually to irrigate the central plains. This 30-year-old project will be the first to dam the Yuam River on Thailand's northwestern border with Myanmar – tributary of the Salween, one of the last free-flowing rivers left in the world. The project cuts through five national forest reserves and the forthcoming Mae Ngao National Park. It will clear a total of 582 ha of forest, 206 of which are classified as crucial for ensuring the continuity of the watershed. Construction materials and the debris from creating the tunnel will be dumped in six mounds along the way, covering 71 ha, most of which are the ancestral lands of indigenous communities. Civil society groups are rushing to mobilize communities whose homes and livelihoods will be affected.

Singapore turns sewage into clean, drinkable water. The tiny island nation has little in the way of natural water sources and has long had to rely principally on supplies from neighboring Malaysia. To boost self-sufficiency, the government has developed an advanced system for treating sewage involving a network of tunnels and high-tech plants. Recycled wastewater can now meet 40% of Singapore's water demand, a figure that is expected to rise to 55% by 2060. While most is used for industrial purposes, some of it is added to drinking water supplies in reservoirs in the city-state of 5.7 million people. And the system helps reduce maritime pollution, as only a small amount of the treated water is discharged into the sea. This is a contrast to most other countries: 80% of the world's wastewater flows back into the ecosystem without being treated or reused. At the heart of the recycling system is the high-tech Changi Water Reclamation Plant on the city's eastern coast. Parts of the facility in land-scarce Singapore are underground, some as deep as 25 stories, and it is fed by wastewater that flows through a massive, 48-kilometer (30-mile) tunnel, linked to sewers. The site houses a maze of steel pipes, tubes, tanks, filtration systems and other machinery, and can treat up to 900 million liters of wastewater a day – enough to fill an Olympic-sized swimming pool every 24 hours for a year. The end product, dubbed NEWater, is mainly used in microchip manufacturing plants, which require high-quality water, and for cooling systems in buildings. During the dry season, it is sent to top up several man-made reservoirs and, following further treatment, flows to people's taps.

Japan announced in April it will release more than 1Mt of contaminated water from the wrecked Fukushima nuclear power plant into the sea, a decision that has angered neighboring countries, including China, and local fishers. Work to release the diluted water will begin in about two years, with the entire process expected to take decades. About 1.25 Mt of water has accumulated at the site of the nuclear plant, which was crippled after going into meltdown following a tsunami in 2011. It includes water used to cool the plant, as well as rain and groundwater that seeps in daily. The water needs to be filtered again to remove harmful isotopes and will be diluted to meet international standards before any release. The radioactive water, which increases in quantity by about 140 t a day, is now being stored in more than 1,000 tanks, and space at the site is expected to run out around next autumn.

Since May till August, tropical cyclones of different severity – Tauktae, Yaas and Typhoon In-fa – affected **India**, **Maldives**, **Sri Lanka**, **Bangladesh**, **Japan**, **the Philippines** and **China**. More than 200 people died and over 1 million people had to be evacuated from their homes. The total economic losses were estimated at about US$ 6.5 billion.

Source: Counting the cost 2021: A year of climate breakdown, Christian Aid, December 2021

In early August, **Mongolia** halted construction of a dam on the Ulz River flowing to the Torey Lakes within the Russian territory. This was due to a decision adop-

ted at 44th extended session of the UNESCO World Heritage Committee in the second half of July. The project will directly affect biosphere, agriculture, fisheries, and socio-economic situation in the southeast of Transbaikalia. The project also will have a long-term negative impact on the Landscapes of Dauria and the adjacent Torey Lakes. The Russian Ministry of Nature supported the decision on the assessments of impacts from the dam and called Ulan-Bator to conduct a joint environmental expertise of the project. Such an expertise is particularly relevant given that Mongolia has commenced the project in 2020 without prior notification to the Russian side.

Source: https://www.ritmeurasia.org/news--2021-08-22--transgranichnaja-biosfernaja-zona-zabajkalja-mongolskoj-plotine-zapret-56081 (in Russian)

Large River Basins in South Asia

Mekong River Basin

The **Mekong River Commission (MRC)'s situation report** covering the period of the driest season, from November 2020 to May 2021, said that water levels on the Mekong in Laos and Thailand fluctuated, while water levels in Cambodia's Great Lake, which expands and contracts in rhythm with the flow of the Mekong, were lower than usual. Flows in the Mekong in the first five months of 2021 were higher than the long-term average due to releases from storage dams. While increased flows during dry months had some benefits for farmers along the lower Mekong, and could help stave off seawater intrusion in the Mekong Delta, the MRC stated that the recent erratic flow has affected navigation, river ecosystems, and riverbank stability on the lower Mekong. As a result, the MRC urged China and its four members – Cambodia, Laos, Thailand and Vietnam – to share more data on hydropower operations that are contributing to the increasingly wild fluctuation in water levels of the river. Although the region has experienced a string of droughts, and also faces the long-run effects of climate change, there is increasing evidence that China's dam-building spree has exacerbated these problems. In early January, shortly after a sudden sharp drop in water levels, Beijing did notify its downstream neighbors that its dams were filling reservoirs and flow would soon be restored to "normal operation status" – but only after the damage had been done.

In November, Germany was allocating a further €1.45 million to the MRC. The extra funding will bolster technical cooperation in implementing the MRC Strategic Plan 2021-2025 and is in addition to Germany's contribution of €3 million first announced in June 2021. This support focuses on capacity building for the MRC Core River Monitoring Network, an essential step towards getting more timely data and information about impacts of water infrastructure projects not only on the Mekong mainstream but also tributaries.

A Chinese contractor for the planned Sanakham Dam in Laos submitted a revised technical report to the Thai National Mekong River Committee, in the hopes of reducing concerns over the environmental effects of the dam. **Thailand did not accept the revisions**, claiming that the new report was still not sufficient and that more study is required. Thailand, being Laos's biggest purchaser of hydroelectricity exports, has already threatened to refuse to purchase power generated by the dam. Extensive damming has become a significant source of anxiety for Thailand and other downstream communities. In January 2020, Thailand filed a complaint with the MRC, about China's Mekong dams, after documenting community complaints about economic hardships suffered as a result of changes to river flows. Laos, meanwhile, has engaged in a dam-building spree in recent years, as it attempts to become the "battery" of South-East Asia. The country has built more than 50 dams in 15 years and another 50 are currently under construction.

Interactive content of Basin Development Strategy, Strategic Plan released in March to ease access. Hosted under the MRC website, the web content "Basin Development Strategy 2021-2030 and MRC Strategic Plan 2021-2025" covers 11 interactive sections, ranging from basin issues, challenges and risks to sustainable development opportunities, and strategy implementation. For the first time, the BDS 2021-2030 is prepared for a ten-year period and emphasizes on the changing role of the MRC – from one primarily focused on cooperation for knowledge acquisition and sharing, towards comprehensive cooperation on water resources development and management across the entire Mekong River Basin.

The water-related situation in Tonle Sap has become even worse than previous years, with water levels around three metres lower than in 2018 by mid-October. Tonle Sap, the largest lake in Southeast Asia, was long known as one of the most productive fisheries in the world. But climate change, unsustainable and illegal fishing and the proliferation of hydropower dams on rivers that feed Tonle Sap threaten the livelihoods of over one million Cambodians who depend on the lake.

The year 2021 marked the **fifth anniversary of the Lancang-Mekong Cooperation (LMC)**. In March 2016, the LMC was officially launched by leaders of China, Thailand, Cambodia, Laos, Myanmar and Vietnam. This mechanism is the China's answer to the Western-initiated and funded MRC. At the Sixth LMC Foreign Ministers' Meeting held on 8 June 2021, the Ministers reaffirmed the commitment of Lancang-Mekong Cooperation, which is to deepen good-neighbourliness and pragmatic cooperation among the six countries, contribute collective efforts to the socio-economic development of the LMC countries and enhance the well-being of their people, narrow the development gap among countries, advance South-South cooperation and enhance the implementation of the UN 2030 Agenda for Sustainable Development. The LMC countries in their Joint Statement on Enhancing Sustainable Development Cooperation committed to steadily implement the Five-Year Action Plan on Lancang-Mekong Water Resources Cooperation (2018-2022), exchange of hydrological information of the Lancang River, support green development efforts,

and deepen cooperation in agriculture, tourism, sports, media, gender equality, etc.

Brahmaputra and Indus River Basins

Indus Water Talks Resolve Little, But Raise Hope For Dialogue. On March 23-24, the Permanent Indus Commissioners (PIC) of India and Pakistan met in New Delhi. Under the 1960 Indus Waters Treaty (IWT) between the two countries, the PICs are supposed to meet at least once a year. But India cancelled the 2019 meeting in the wake of a terrorist attack in Kashmir. The 2020 meeting could not be held due to the COVID-19 pandemic. In previous meetings of the PICs, Pakistan had objected to the designs of the 1,000 MW Pakal Dul and Lower Kalnai projects on the Chenab River. Once again, the Indian delegation is reported to have said that the details would be provided later. But this was an important signal that the two governments have started to talk. According to provisions of the Indus Waters Treaty, all the waters of the Eastern Rivers (Sutlej, Beas, and Ravi) is allocated to India for unrestricted use and the waters of the Western rivers (Indus, Jhelum, and Chenab) largely to Pakistan. Under the treaty, India has been given the right to generate hydroelectricity through run-of-the-river projects on the western rivers, subject to specific criteria for design and operation. It also gives the right to Pakistan to raise concerns on the design of Indian hydroelectric projects on western rivers.

In 2021, India was working on exercising its rights to stop excess water flowing to Pakistan under the Treaty to irrigate its own lands. This is also of strategic importance to India, given that control over river water flow acts as a force multiplier during times of aggression. India's plans to fully utilize its share of water under the treaty assume strategic importance against the backdrop of China developing the controversial China-Pakistan Economic Corridor in the region.

The 14th Five-Year Plan approved by China's National People's Congress (NPC) in March elevated renewable energy to an even more prominent position and included **hydropower development at the lower reaches of the Yarlung Tsangpo – the upper stream of the Brahmaputra River**. This has generated widespread speculation that China might soon start the construction of a super-dam at Medog which is on the Great Bend of the Brahmaputra. Here the river plunges from the roof of the world, curling down towards the plains of India and Bangladesh. The idea is to build a 50-meter-high dam at an altitude of 3,000 meters and harness the river's energy as it falls 2,000 meters – at a rate of 15 meters of altitude dropped per kilometer traveled – along the world's longest and steepest canyon. Even though no official statement was made on the Medog dam, there is evidence suggesting that preparation works are underway. For instance, an agreement has been signed by the state-owned Power Construction Corporation of China and the government of the Tibet Autonomous Region to build the historic hydropower project in Tibet. This project is said to be able to generate 60 million kW of hydropower, which is more than three times the amount of electricity produced by the Three Gorges Dam. Given the importance of the Brahmaputra River to India's water and energy security (it accounts for nearly 30 percent of the country's freshwater resources and about 44 percent of its total hydropower potential) and the link to ongoing territorial disputes between India and China in the eastern Himalayas, India is wary of China's development plans for the river.

11.3. America

The newly elected constitutional assembly in **Chile** will begin a nine-month process of drafting a new constitution. As reported, the new document could enshrine environmental protections, including access to clean water. The country's current constitution explictly permits the privatization of water, which has allowed businesses to buy water resources in a country where 350,000 people currently do not have access to water.

Brazil's government agencies warned of droughts in late May as the country faces its worst dry spell in 91 years. The lack of rain across much of **Brazil** has negative implications for grain cultivation, livestock and electricity generation, as Brazil relies heavily on hydro dams for its power. The dry weather could lead to severe fires in the Amazon rainforest and Pantanal wetlands. Drier-than-normal weather has hurt production of sugar and coffee in Brazil, the world's largest supplier of those products, pushing up future prices for the commodities.

On November 22, in the case of **Mississippi v. Tennessee**, the Supreme Court of the United States issued its first ever decision in a dispute between two U.S. states over a transboundary aquifer. The U.S. State of Mississippi sued the U.S. State of Tennessee (and the City of Memphis) in 2014, claiming that Memphis had stolen billions of gallons of Mississippi's groundwater. Tennessee asserted that transboundary groundwater resources in the United States should be subject to the same doctrine as transboundary surface waters, namely, the doctrine of equitable apportionment. The Justices' decision was unanimous with the Court dismissing Mississippi's case and holding that "the waters contained in the Middle Claiborne Aquifer are subject to equitable apportionment," and that U.S. states may not "exercise exclusive ownership or control" over interstate waters flowing within their borders. While the case involved an entirely domestic U.S. dispute, it is nonetheless an interstate dispute over cross-border groundwater resources. Thus, it could have a significant jurisprudential impact on the development of international law for transboundary groundwater resources.

On August 16, the Bureau of Reclamation announced that for the first time in the 99 years of govern-

mental record-keeping, it was **declaring a water shortage on the Colorado River**. Lake Mead, the largest reservoir in the US by volume, has drained at an alarming rate in 2021. Around 35% full, the Colorado River reservoir is at its lowest since the lake was filled after the Hoover Dam was completed in the 1930s. Lake Powell, which is also fed by the Colorado River and is the country's second-largest reservoir, recently sank to a record low and is now 32% full. Given the latest monthly projections, the agency announced mandatory water cuts were to kick in for Arizona, Nevada, and Mexico starting January 1st 2022. The shortage is a product of climate change but also human stubbornness regarding the politics of dividing up the water from the Colorado River. Despite a waning flow of water and populations becoming more and more concentrated in cities, the legal framework for sharing the Colorado River hasn't fundamentally changed since it was first written nearly 100 years ago.

Low water levels can be seen in the Hoover Dam reservoir of Lake Mead on June 9. Photo: Bridget Bennett/Reuters

Deforestation in Earth's largest rainforest surged 22% to the highest level since 2006. 13.2 thousand km^2 of rainforest – an area nearly the size the land area of the state of Maryland or the country Montenegro – was cleared in the Brazilian Amazon between August 1, 2020 and July 31, 2021. Deforestation has been on an upward trend in the Brazilian Amazon, which accounts for nearly two-thirds of the entire Amazon rainforest, since 2012. Scientists have warned that the ecosystem may be approaching a tipping point where vast areas of rainforest transition to a woody savanna.

In late August and early September, a **Category 4 hurricane called Ida** hit several parts of the United States. Ida caused landfalls, power outages and flash floods in many Northeast states. In total, Ida caused 95 casualties and damages amounting to US$ 65 billion. At the end of June and in the early days of July, an **unprecedented heatwave** brought hugely record-breaking temperatures to some parts of West North America. It set a Canadian temperature record of 49.6°C. As estimated, the total death toll is 1,037 people, 229 in the US and 808 in Canada. The **Paraná River** was at its lowest levels in the last 77 years. The river, which spans almost 5 thousand km across Brazil, Argentina and Paraguay, plays a critical role in the region as a source of hydroelectric power and a very important trading route. The low levels are associated with reduced rainfall, which in the top of the Parana have plunged from a daily average of 160 mm in the 1990s to just half that amount now. Electricity production in the dams of Yacyretá and Itaipú has been affected.

Source: Counting the cost 2021: A year of climate breakdown, Christian Aid, December 2021

In **Chile**, environmental advocates are demanding justice for Javiera Rojas, a 42-year-old land defender who was found dead in late November in the northern Chilean region of Antofagasta. In 2016, she was involved in a campaign that successfully canceled a dam that would have stolen water from local communities and harmed wildlife. Latin America is the deadliest region in the world for land defenders. Global Witness's annual report found that in 2020, 227 environmental advocates were killed for the activism-half of which were from either Columbia, Mexico, or the Philippines. The report found that of the lethal attacks, 20 were linked to activists in the water and dams sector. Although the report's findings made 2020 the deadliest year on record for environmental activists, the numbers are most likely underestimated, since many attacks go unreported. Honduras is found as one of the most dangerous countries in the world for land and environment defenders.

In 2021, **Mexico** was in the grip of a severe drought, which has hit two-thirds of the country. The strain on water reserves was exacerbated by increased domestic demand during the COVID-19 pandemic. Roughly sixty other large reservoirs, mostly in northern and central Mexico, were below 25 percent capacity.

Plans to remove four dams on the Klamath River have taken a step forward with the news that the California Public Utilities Commission has approved a request to transfer ownership of four hydroelectric dams. The decision is part of the implementation of the Klamath Hydroelectric Settlement Agreement between 48 parties including PacifiCorp, the states of Oregon and California, several Native American tribes, and many other groups and organizations. The settlement agreement provides a framework to decommission the four hydroelectric developments. When completed, the dam removal project will address declines in fish populations, improve river health, and renew Tribal communities and cultures. The plan is to commence dam removal in 2023.

Canada's Federal Court and Manitoba's Court announced a $8-billion class-action settlement had been approved for First Nations affected by years-long drinking water advisories. Thousands of people could receive compensation from the settlement, which includes any First Nations member whose land was subject to a water advisory[104] that lasted at least one year between November 8, 1995 and the present.

[104] Drinking water advisories are issued to warn people to not drink water that may be unsafe or is known to not be safe based on water quality test results. First Nations issue drinking water advisories in their communities. Provincial, territorial or local governments issue drinking water advisories off-reserve.

An Ecuadorian court rules against a mining operation in a protected rainforest in Los Cedros. The decision will force Ecuador's government to revoke mining permits to state mining company Enami and its Canadian partner, Cornerstone Capital Resources. Ecuador became the first country in the world to include the rights to nature in its constitution.

11.4. Australia and Oceania

A bold new plan to manage Australia's Murray Darling Basin was rejected by the Senate in autumn. Australian officials rejected a plan by independent Senator Rex Patrick that would have put responsibility for managing the Murray Darling Basin in the hands of the commonwealth through a constitutional amendment. He warned the Murray Darling Basin could become Australia's version of the Aral Sea, devoid of water, fish life and heavily degraded if not managed properly. The move came after a Senate inquiry into the bill determined that states (Queensland, New South Wales, Victoria and South Australia) were better equipped to assess local needs than the commonwealth. The plan currently in place to manage the basin, in which the commonwealth, through the Murray Darling Basin Authority, has an oversight role, has been criticized for not taking a more stringent approach to ensuring the states meet their obligations.

In an attempt to mitigate prolonged drought, Australian officials approved planning for a new desalination in Belmont, New South Wales. The plant will reportedly produce up to 30 million liters of water per day. The planning approval is supported by comprehensive environmental impact investigations, which indicate that potential impacts can be mitigated through detailed design and delivery.

In March, many parts of the **Eastern Australian coast** experienced massive rains and extensive flooding, causing two deaths. In coastal New South Wales, where the city of Sydney is located, the week of the floods became the wettest ever recorded. Around 18,000 people had to be evacuated from the region, with damages totaling $2.1 billion.

Cars trapped in rising floodwaters in Windsor, New South Wales. Photo: Leah-Anne Thompson/Shutterstock

Source: Counting the cost 2021: A year of climate breakdown, Christian Aid, December 2021

2021 was **New Zealand**'s hottest year on record. The record, which is based on seven-station series, began in 1909. The previous record was set in 2016. In 2021 the nationwide average temperature was 13.56°C. Annual temperatures in 2021 were above average – 0.51°C to 1.2°C higher – for much of Aotearoa. The highest temperature that reached 39.4°C was recorded on 26 January at Ashburton. The start of 2021 also featured extended dry spells in the North Island.

The Water Services Act 2021 commenced November 15 in **New Zeland**. This Act is part of the Three Waters Reforms. It establishes drinking water standards and regulates all persons and organizations that supply drinking water. The main purpose of this Act is to ensure that drinking water suppliers provide safe drinking water to consumers. Previously only large scale water suppliers were captured by health regulations. Under the Act, any person who supplies water to another household or dwelling, which may be used for drinking water, is likely to be caught by the Act.

According to the latest summary by research agency Land Air and Water Aotearoa (Lawa), which collates data from 127 lake sites throughout **New Zealand**, 55 per cent of monitored lakes can be categorized as either poor or very poor. Less than 16 per cent of monitored lakes have water quality categorized as either very good or good, and the situation has not changed over the last decade. 75 per cent of monitored lowland lakes, often located in catchments with higher proportions of agricultural, urban or other development, were either poor or very poor. Researchers found native freshwater mussels could play a significant role in restoring the lakes' water quality by filtering the water.

Palau was hit by Typhoon Surigae in April. Surigae brought sustained winds of up to 80 km/h and gusts up to 135 km/h to Palau, causing power outages, downing water and cellular services across the island. The entire population of Palau, consisting of approximately 18,008 people, was impacted by the typhoon. The total amount of damage across health, infrastructure, education, food, communication, utilities and other sectors was assessed at US$ 4.8 million.

The **Republic of Fiji** has signed a landmark agreement with the Forest Carbon Partnership Facility (FCPF) that will unlock up to US$ 12.5 million for increasing carbon sequestration and reducing emissions from deforestation and forest degradation. Fiji is the first small island developing state to sign an Emission Reductions Payment Agreement.

Vanuatu, with a population of some 280,000 people spread across roughly 80 islands facing rising sea levels and more regular storms, asked the International Court of Justice to issue an opinion on the rights of present and future generations to be protected from

the adverse effects of climate change. In April, Tropical Cyclone Harold hit Vanuatu and demolished tourist resorts in another South Pacific island nation of Tonga. Vanuatu would route the initiative through the UNGA. Though not being legally binding, the advisory opinions of the court carry legal weight and moral authority and can inform the development of international law.

11.5. Europe

11.5.1. Western and Southern Europe

The European Commission adopted its new Strategy for Healthy Soils by 2030, announcing a dedicated legislative proposal for 2022. Part of the EU 2030 biodiversity strategy, this initiative will update the current strategy to address soil degradation and preserve land resources. The goals are to: protect soil fertility, lower erosion, increase organic matter, and define 'good ecological status' for soils.

The European Parliament and the Council of the European Union have agreed the new EU climate law, sealing the goal of climate neutrality by 2050. The new law sets a binding EU greenhouse gas reduction target of at least 55% by 2030 compared to 1990 levels. The Commission will engage with economic sectors that wish to put forward voluntary roadmaps towards climate neutrality by 2050.

Extreme rainfall hit parts of **Western Europe** from 12-15 July, with some regions around the Ahr and Erft rivers in Germany experiencing more than 90 mm of rainfall over a single day. The resulting floods killed at least 240 people and caused widespread damage, with economic losses estimated at more than US$ 43 billion.

In early April, a cold wave affecting large parts of central **France** caused great agricultural losses, in particular to vineyards. The government announced it would declare a state of agricultural disaster, a measure aimed at compensating affected farmers for their losses. In the Rhône region, farmers estimated that the cold spell may have destroyed more than 80% of their harvests. The cost of the impacts of the cold wave has been estimated at US$ 5.6 billion.

Source: Counting the cost 2021: A year of climate breakdown, Christian Aid, December 2021

The environmental movement in **Albania** is fighting against government plans to build a number of dams in the river Vjosa. It flows from Greece through southern Albania to the Adriatic Sea and is 272 km long. The dams will generate electricity with the help of hydropower plants, but threaten the Vjosa River. Albania is not a European Member State. In the European Union many dams are removed to comply with the Water Framework Directive. A lawsuit was filed against the state on behalf of dozens of residents of the Vjosa river basin. They won the case in the first instance. The construction work has now stopped. But the state has lodged an appeal.

A **new audit** from the European Court of Auditors found that agricultural policies at both the EU and Member State level do not always follow EU water policies. The report includes recommendations to the European Commission, including linking common agricultural policy payments to environmental water standards and ensuring that EU-funded projects aim to achieve the objectives of the Water Framework Directive.

Widespread water contamination in United Kingdom is highlighted in a new report, titled Troubled Waters, from several environmental charities in the United Kingdom. The report found that agricultural waste, raw sewage and pollution from abandoned mines are harming water ways across the United Kingdom. Among its recommendations, the report calls for the transition to regenerative farming practices and urges water companies to stop releasing raw sewage into waterways. At the same time, the UK doubles funding to tackle water pollution. In 2020, only 14% of the rivers in England were of good ecological health. In this context, the government is increasing funding to improve water quality to approximately €35 million a year to help farmers implement practical solutions to reduce pollution, with the aim of covering 100 per cent of farms by 2023.

The European Commission refers to **Ireland** to the European Court of Justice for failure to comply with the requirements of the Drinking Water Directive (November 12, Press Release). The Member States must ensure that water intended for human consumption is clean, and does not pose a potential danger to human health. In Ireland, the level of the chemical substance trihalomethanes in drinking water has long exceeded the parametric value established in the Drinking Water Directive. In 2016 Ireland also received a warning from the European Commission for not complying with the EU Urban Waste Water Treatment Directive that it has required towns and cities to collect their wastewater and treat it properly in order to make it safe for human consumption. Now, five years later, Ireland is again in violation.

A referendum on amendments to the Waters Act was held in **Slovenia** on July 11. In March 2021, the National Assembly passed the Waters Act, despite strong criticism from the experts and civil society. At the center of the dispute is a provision regulating the construction of buildings, including hotels, shops and restaurants, close to the sea, rivers or lakes. While the government insists it has actually tightened the rules and enabled more water and flood protection funds, opponents claim the regulations favor the interests of private investors and would limit public access to water and jeopardize its quality. The referendum was forced by a cluster of environmental organizations and civil society groups who collected more than 50,000 signatures. With one of the highest turnouts in recent history, the Act was overwhelmingly rejected by the voters.

The world's largest vertical farm will open in the **UK** in early 2022. The new multi-million pound farm will offer 148,000 m^2 of growing space and be able to supply

1,000 t of fresh produce to supermarkets across the country.

Rhine River Basin

The states in the Rhine catchment have been cooperating in the International Commission for the Protection of the Rhine (ICPR) for 70 years.

The Rhine and its tributaries are doing much better. Based on the successes achieved, further progress is needed to reach the good status. This is shown by the reports on the ecology and water quality of the Rhine adopted at the plenary session of the ICPR on July 1 and 2. The findings also flow into the International River Basin Management Plan Rhine 2022-2027. The draft plan is available for public information and consultation since April 15. Completion and publication of the final version is scheduled for 22 March 2022.

Danube River Basin

The International Commission for the Protection of the Danube River (ICPDR) is an International Organization consisting of 14 cooperating states and the EU. Since its establishment in 1998, the ICPDR deals with the whole Danube River Basin, which includes its tributaries and the groundwater resources.

In December, the ICPDR has adopted the Danube River Basin Management Plan (DRBMP) Update 2021 together with the Danube Flood Risk Management Plan (DFRMP) Update 2021. These two plans will set the course of the ICPDR's water management priorities for the Danube River Basin until 2027. The DRBMP Update 2021 sets out further aims to protect and enhance the status of all waters in the basin, and to prevent their deterioration while ensuring sustainable, long-term use of water resources. The plan also includes latest assessments on significant pressures, water status and a program of measures jointly agreed by the Danube countries for the next six years. It establishes and strengthens several integrated principles for river basin management and connections to other sectors' policies like energy, transport and adaptation to climate change. This is the second update to the DRBMP, which was first adopted in 2009.

11.5.2. Eastern Europe and Caucasus

Armenia

Water resources. By July, the five major reservoirs in Armenia have accumulated 210 Mm^3 and 350 Mm^3 less water than in 2020 and 2019, respectively. At the same time, 180 Mm^3 less water was accumulated in the reservoirs of the Araks and Akhuryan river basins, and 30 Mm^3 less in the Sevan-Razdan system. In March and April, water forecasts were quite good; however, starting from the last third of May, snow melted slowly and, consequently, water was quickly absorbed into the soil and no necessary surface runoff was formed. Thus, in June, the water level in most rivers dropped to 20-50% of the norm and even some of rivers had the flow 5 times lower than the norm.

In early November, a bidding process for the construction of the Kap reservoir on the Akhuryan River was started. The bidding process is to last until January 10, 2022. The construction was started as early as in the 80-s and has stopped after the collapse of USSR. Since project renewal in 2014, almost US$ 37.5 has been invested in irrigation rehabilitation to transfer to the gravity-flow system. After completion of the 25-Mm^3 reservoir and its capacity augmentation to 60 Mm^3, the irrigation area can be extended substantially. The current cost of the project is estimated at €60 million.

Water supply and sanitation. The Government of Armenia, together with the German Development Bank KfW, the European Investment Bank (EIB) and the EU will allocate €81 million for water supply of over 100 thousand residents in several regions of Armenia. The beneficiaries of this program are the residents of 11 cities and 37 villages. It is planned to install 66 km of water pipes, repair 20 water intakes, a pumping station, build a distribution network (490 km long), and install household water pipes (180 km long).

Amendments were made in the Administrative Offenses Code providing for administrative liability for water pollution. The added new articles set administrative liability for discharge of sewage water into the rainwater drains, receipt of storm or drainage water into the centralized water disposal system and for pollution of irrigation systems. The goal is to ensure safety of swimming water bodies, set control over use of water from Lake Sevan for industrial purposes, and take preventive measures.

Agriculture. The Land Code of Armenia was added and amended to form more effective mechanisms of agricultural land use practices (January 20). The primary goal of such amendments is to avoid unreasonable withdrawal of land from cultivation, put uncultivated land into crop production and improve land use efficiency. Armenia uses only half of its agricultural land, and the rest of land is abandoned. Currently, the government is drafting regulations to transfer about 150 thousand ha into trust management.

ACBA Bank and the Branch of the German Nature Protection Union (NABU) launched a tender for the "Organic Agriculture Development" program. The winners will get certificates of environmentally safe food producers and be able to improve their prospects for export of organic products.

Armenian farmers will get subsidies for winter crop seeds. The government allocates 329 million drams to subsidize 70 drams of 1 kg of winter wheat to solve the problem of poor quality seeds.

Energy. The Armenian government has approved the Strategic Program for Energy Development until 2040 and the related Roadmap. The key areas for energy development include: maximization of renewable energy; energy conservation; life extension of the

Armenian Nuclear Power Plant; full implementation of the North-South energy transit corridor; and, gradual liberalization of the national energy market.

Ecology. The 2021-2030 National Action Plan of the Republic of Armenia was approved on April 22. The plan is drafted in line with the "green" economy principle compatible with the SDGs reflected in the country's goals of socio-economic development. The overall goal is to reduce greenhouse gas emissions by a maximum of 2.07 t of CO_2 per capita by 2050 and achieve a 40% cut in emissions by 2030 as compared to 1990.

Green financing. As a result of cooperation between Acba bank, ACBA Leasing and the Green Economy Financing Facilities (GEFF) Program of EBRD, some US$5 million will be distributed for the development of the 'green economy' in Armenia through financing business projects in such areas as energy efficiency, climate change adaptation and renewable energy sources.

Green Climate Fund in Armenia is financing two national programs for modernization and improvement of building energy efficiency totaling US$ 30 million. Additionally, four assistance programs are under development for a total amount of US$ 4.2 million.

Azerbaijan

Water resources. The 2020-2022 Action Plan provides for the construction of new ten reservoirs in the country. Reconstruction of 22 irrigation canals has started also. At present, Azerbaijan has about 43 agro-parks on the total area of 200 thousand ha, with over 60 thousand ha of new irrigated land. Moreover, 74% of water produced in Azerbaijan is used by agriculture, where water losses reach 30%. In this context, the government is considering a proposal to subsidize farmers for more efficient water use.

Additional US$ 4.7 million were allocated for the construction of irrigation systems on 10 thousand ha in three country's regions. The irrigation systems will be created as part of the state agricultural development program in Azerbaijan.

Water supply and sanitation. Azerbaijani authorities have approved a twofold increase in water supply prices. The tariff for water for the population in the cities of Baku, Sumgait, Khyrdalan and the Apsheron District of Azerbaijan has been doubled since February 1 and is set at 0.7 manats (US$ 0.41) per 1 cubic meter of water. The water distribution company OJSC "Azersu" explained this rise in prices by a growing number of customers. Additionally, the price of wastewater disposal services has also increased twofold from 0.15 manats (US$ 0.09) to 0.3 manats (US$ 0.18) per 1 cubic meter.

Energy. The Khudaferin and Gyz Galasy hydropower plants on the Araz River on the Azerbaijan-Iran border are to be completed by 2024. By present, the dams of the total capacity over 1.6 billion m^3 have been completed. The potential generation at these stations is expected to be 280 MW, including 200 MW by Khudaferin and 80 MW by Gyz Galasy. Azerbaijan will benefit from 358 million kWh of hydropower generated yearly, improved irrigation on 252 thousand ha and new irrigation of 12 thousand ha.

A number of new power stations were put into operation in Karabakh in 2021. 23 power stations and substations of the national energy company, ZAO "Azereenergy" were built or reconstructed and put into operation. The 2018-2021 rehabilitation program ended on September 3 with the capital repair of the Sumgayit power station and commissioning of a pumping station. The Gyulebird hydropower station and Sugovushan-1 and -2 small hydropower stations have been inaugurated after reconstruction and Kelbadjar-1 small hydropower station has been completed.

Environment. In Azerbaijan, the total desertification area reaches 3.7 million ha, of which about 170 thousand ha are to be rehabilitated by 2030. In 2021, 1 million trees were planted.

In line with the decree, which amends Azerbaijan's Administrative Offence Code, import, production and use of disposable plastic dishes have been prohibited. Violators will face confiscation of goods and fines.

Three regions in the north-west region of Azerbaijan – Zagatala, Gakh and Balakan – will be selected and registered under the Globally Important Agricultural Heritage System (GIAHS) with FAO's support. GIAHS are aesthetic sites that combine agricultural biodiversity, resilient ecosystems and valuable cultural heritage. Registration of the regions as GIAHS areas underlines their great importance for protection of 42 country's ecosystems, for the food security, ensuring the livelihood of the population, as well as for rural development through eco- and agro-tourism.

International cooperation. A jubilee event on the occasion of the 50th years of sharing Araz and Mil'-Mugan reservoirs on the Araz River was held on May 31. The Azerbaijani and Irani sides underlined the importance of developing regional cooperation for sharing 1.35 billion m^3 Araz reservoir operated since 1971 and the Araz hydropower and Mil'-Mugan reservoir ensuring irrigation of 400 thousand ha within the both countries.

Representatives of the Azeri Ministry of Ecology and Natural Resources and the Turkish Ministry of Agriculture and Forestry met in March to exchange on forest protection, water management, climate change mitigation, hydrometeorology, etc. The parties also signed the two-year Work Program on implementation of the Memorandum of Cooperation in Meteorology and Forestry (2021-2023).

Georgia

Irrigation infrastructure. In 2021, the government planned to channel US$ 39.4 million to development of irrigation infrastructure, for rehabilitation of which more than US$ 121.2 million had been already invested since 2012. As part of the 2020 bailout plan, the farmers' debt for irrigation services accumulated over 2012-2019 (almost US$ 2.4 million) has been written off and about 35 thousand farms have been exempted from charges for irrigation services of up to 10 ha of their agricultural land.

With grant funding from the EU and UNDP and RDA, the agrocompany "Bioras" installed 60 solar panels and 24 batteries at its agriculture plot to supply a walnut garden and a vegetable greenhouse with renewable energy. OOO "Bioras" owns 22 ha of land in Tetritskaro municipality.

Water supply. Up to US$ 196 thousand will be allocated by the "Georgian Water and Power" and "Rustavi Water Company" for replacement and modernization of water supply infrastructure in three cities – Tbilisi, Rustavi, and Mtskheta – in 2021-2023. Meanwhile, water tariffs have risen for the residents of these cities since January 1, 2021.

Agriculture. In 2021, the Government of Georgia presented its Agricultural Development Strategy for the period until 2030. The Strategy includes an increase in agricultural good export up to US$ 3 billion a year; expansion of crop acreage up to 500 thousand ha; building of greenhouse facilities on 500 ha; construction of up to 400 livestock and poultry farms; irrigation of 227 thousand ha of agricultural land; application of best European technologies for air, water and soil pollution reduction; and, an increase in the share of protected land to 17% of the total country territory.

Energy. The construction of Namakhvani HPP in Rioni Gorge which should be the second largest hydropower plant after Inguri HPP has halted after protests of local population. The protestors said that they would protest until the government cancels the contract with the Turkish contractor "ENKA" and the Contractor leaves the gorge. Despite the government and the company have assured that the construction of such an important structure would be in line with all safety standards, local residents feared that the project would change microclimate, intensify seismic processes and, eventually, lead to environmental catastrophe in the region.

Enguri HPP in Western Georgia represents one of the most fascinating examples of civil engineering achievements of the 20th century. The arched dam has got the certificate of the Cultural Routes of the Council of Europe program. The dam, which is 271.5 m high and 728 m long, is among the world's five largest arched dams. In 2015, the dam has got the status of cultural heritage site.

Ecology. Adopted in 2021 a draft Law on Environmental Liability contains provisions for environmental damage in line with the "polluter pays" principle. According to the Law, if significant damage is caused to the environment as a result of the activities of a company, the latter will be obliged to remedy the situation. Remedial measures will primarily focus on restoring the damaged environment to its original state or close to it. The fines paid by the companies will be directed to a special Environmental Damage Fund. Georgia will become the first among the EaP countries to create such a Fund.

Source: www.newsgeorgia.ge

A new Forest Code has become effective in Georgia in 2021. The country hosts 2.7 million ha of forests accounting for 40% of the total country area. According to the Code, all forests will be registered and grouped depending on type of ownership and categories. There will be public, municipal and private forests, which will fall to one of the following categories: protected, protective, resort and economic ones. The category of forest will be determined by its function and impact on the ecosystem.

By 2030, Georgia should become the leading ecotouristic country in the region. The government signed a 10-year Ecotourism Development Strategy, which underlined the importance of ecotourism and the development of green economy. The Strategy sets goals and actions for 2021-2023 to be implemented by the National Tourism Administration together with other agencies. The developed online platform for agro-tourism (agrogate.world) brings together different agro-touristic sites of Georgia, Azerbaijan and Armenia.

International cooperation. The British company "NIAB" and the Georgian Agricultural Research Center has signed an agreement for joint research in the area of plant cultivation and food security. Activities will include organization of joint conferences and workshops, exchanges of students and agronomists, and exchange of information on crop yields and their resistance to diseases and drought.

Belarus

Water resources. In 2021, the Pripyat Basin Council approved a Pripyat Basin Management Plan (PBMA) for the period from 2021 to 2030. Among others, PBMA includes measures for environmental improvement of surface water bodies in the Pripyat River Basin.

The Council of Ministers approved a National Water Management Strategy until 2030 on February 22, 2022. The Strategy was developed for the context of climate change in line with the Belarus Socio-Economic Development Program 2021-2025. The Ministry of Natural Resources and Environmental Protection will be responsible for monitoring the implementation of the Strategy.

The first Map of Dams was developed in Belarus based on satellite images and reservoir reference book. Belarusian researchers are creating a hydrological model of the actual status of the Pripyat River within the "Middle Pripyat" nature reserve. At present stage, the researchers assess the state of river and its tributaries in different seasons to identify current problems the Polesye faces due to global warming and land reclamation. Next stage – modeling the river in case of construction of E40 waterway – will show how dams and river cut-off would impact the river and biodiversity. The collected stuff can be used for environmental impact assessment of the project.

Agriculture. In January-November 2021, the exports of Belarusian food products and agricultural raw materials increased by 16% compared to the same period in 2020 and reached more than US$ 6.03 billion. According to the Belarusian Ministry of Agriculture and Food, foreign exchange earnings increased by US$ 832 million – a record compared to annual figures

in previous years. Belarusian food products were delivered to 106 countries in January-November.

The 2021-2025 Agrarian Business State Program was approved in 2021. It aims to increase the competitiveness of agricultural products and foodstuffs, increase export potential, and develop environmentally safe agriculture. The program includes sub-programs for crop production, seed production, livestock and breeding, fishery, land reclamation, anti-flood engineering measures, small farm support, etc. Over the five-year period it is planned to improve agricultural production through the introduction of resource-saving technologies. As a result, exports of food products and agricultural raw materials in 2025 are projected to increase by 21.3% as compared to 2020.

Energy. The wind energy project implemented since 2015 by the Ministry of Nature together with UNDP and GEF was concluded in 2021. As part of the project, the Atlas of Wind Potential of Belarus and the Insolation Map showing the areas where SES can be installed have been completely re-evaluated and updated.

According to the Department of Energy Efficiency at the Belarus State Standardization Committee, the capacity of RES installations in Belarus will reach 630 MW by 2025. At the moment, there are about 500 MW of RES facilities, including 82 FES, 53 HPPs, 30 biogas complexes, over 100 electric power plants and 10 mini-CHPs on wood fuel. All this allows lowering the consumption of traditional energy sources and also reducing CO_2 emissions. By 2025, the share of RES should reach 8%.

Green economy. A 2021-2025 National Action Plan for Green Economy was approved on December 10. The priority development areas include, among others: sustainable consumption and production; circular economy; organic production; smart and energy efficient cities; green financing. Information and education campaigns and scientific grounding for transition to green economy were planned also.

Ecology. The State Environmental Protection and Sustainable Nature Use Program was approved for the period of 2021-2025 on February 19. The Program includes subprograms on hydrometeorology, persistent organic pollutant management, biological and landscape diversity conservation, environmental monitoring and protection, and the "Subsoil of Belarus". Among the tasks for the five-year period are increasing the mineral resource base, introduction of modern hydrometeorological observation technologies, climate mitigation and adaptation, preservation and restoration of ecological systems, and ensuring rational use of natural resources. It is also envisaged to develop Management Plans for the Neman and Western Dvina basins.

The Belorussian Hunting and Fishing Society organized traditional spring cleaning campaign "Clean water body", where almost 5,000 citizens participated. About 1.3 thousand km of coastal line was cleaned and over 880 m^3 of garbage was collected. The least amount of garbage was collected in water bodies of Brest and Mogilev regions, while most of all – in Grodno and Minsk regions (April 16-24).

International cooperation. Belarus and Moldova intend to expand cooperation in the agro-industrial sphere, namely increase mutual deliveries of agricultural products and food, cooperate in veterinary, phytosanitary, seed production (create hybrids of Belarusian and Moldovan seeds), organize training and professional development of Moldovan specialists in agrarian universities.

Moldova

Water resources. According to the Ministry of Environment, the Ukraine-built Dniester hydropower project is already having a devastating effect on the flow, water quality and biological diversity of the Dniester River. The Dniester is the main source of drinking water for almost 8 million people in Ukraine and Moldova. Since these conclusions are not recognized by the Ukrainian side, international experts will be invited for the project's impact assessment.

During the third meeting of the Commission on Sustainable Use and Protection of the Dniester River between Ukraine and Moldova, the parties agreed on a procedure document for developing management plans and a schedule for synchronizing national management plans for the Dniester river basin. It is planned to develop new regulations for joint monitoring and information exchange in the basin. Additionally, the parties addressed the issues related to safety of tailings ponds in the Dniester basin. The fourth meeting of the Commission is to be held in autumn 2022 in Ukraine.

Water supply. An agreement was signed between the Ministry of Finance of Moldova and the Germany Development Bank for a €10 million grant to expand water services by connecting five villages to the Chisinau-Straseni-Calarasi water pipeline.

Agriculture. The Ministry of Agriculture and Food Industry of Moldova (MAIA) has devised a draft Strategy for the Development of Agriculture and Rural Areas for 2022-2027.

In 2021, Moldova registered the highest agricultural production growth over 30 years. Production by farms of different categories has been roughly increased by 49.9% as compared to 2020. The growth comes from 75.5% rise in crop production.

FAO launched a new project on mainstreaming climate change adaptation into the country's national planning processes for reduced vulnerability to climate change at local and central levels. The US$ 685 thousand activity is to be implemented in partnership with the Ministry of Agriculture, Regional Development and Environment and financially supported by the Green Climate Fund (GCF).

Energy. The work has begun on the construction of a 2.8 MW photovoltaic park worth €3.7 million in Criuleni. The initiative is part of projects financed by the Government of China under the Agreement on Technical and Economic Cooperation between Moldova and the People's Republic of China signed in 2011.

The Center of Excellence for Energy Efficiency was opened with EU funding in the village of Festelica in Stefan Voda district. The center includes ten types of demonstration sub-projects in the field of energy efficiency and RES: smart street lighting, photovoltaic park, grid panels, biomass boilers, and solar collectors. Thus, this site has become the first "smart energy" village.

Ecology. Moldova will take part in a new WB regional program for combating marine and river pollution in the Black Sea Basin – "Blueing the Black Sea", which is to be launched in the second half of 2021. Meanwhile, relevant consultations with member countries were held on the Program.

A new US$ 1.66 million project "Enabling a policy environment for integrated natural resources management and implementation of an integrated approach to achieve land degradation neutrality in Moldova" was launched in March. Financed by the Global Environmental Facility (GEF) and implemented by FAO in partnership with the Ministry of Agriculture, Regional Development and Environment, the three-year effort will improve the provision of ecosystem services from the local landscape, elicit behavioral change and support learning in 32 northeastern villages using integrated natural resource management for pilot regions and, ultimately, paving the way to achieving land degradation neutrality and improvement to livelihoods all over the country.

Russia

Water resources. The Federal Agency for Water Resources (Rosvodresursy) launched a digital platform prototype "Water Data". The portal contains an Interactive map of water and hydrological situation in the territory of Russia. With this map it is possible to trace online the information about unfavorable natural phenomena and emergency situations.

Commissioners from Russia, Norway and Finland signed on February 17 the Protocol of water regime regulation in Finnish Lake Inari, resources of which are used by Russian and Norwegian hydropower plants in the framework of the 1959 Trilateral Agreement. The parties have discussed the issues of joint water use, defined the optimal modes of HPP operation and agreed on the schedule of water releases in 2021. To improve information exchange and precision of water regulation, the partners have launched the IBA project (cooperation in the Baltic Sea, the Barents Sea and the Arctic). The Finnish Environmental Institute with the involvement of Russian and Norwegian power engineers will develop a hydrological information bank and a hydrological model of the Paz River basin, covering the entire catchment area of the Paz River.

The scientific expedition to the Volga River organized in summer 2020 by the "One can't do without rivers" Foundation has been summed up. The members passed across almost the whole Volga – 3.5 thousand kilometers. The main conclusions are as follows: (1) water in the Volga does not meet the standards anywhere; (2) Volgograd is the dirtiest city on the Volga, increasing pollution of the river by 50%; (3) Volgograd is the leader in pollution of the river by microplastics; (4) the Volga has less microplastics than the Thames, but more than the Huang He river; (5) the main cause of the Volga pollution is human activity. The expedition's members believe that a large-scale modernization of sewage treatment plants and storm sewers in the cities is needed in order to restore the Volga.

23.9 million rubles were allocated for the construction of water sluices in the lower reaches of the Volga as part of the National Ecology Program's Federal project "Revitalization of the Volga". Thus, the construction of sluices in the Volga-Akhtuba floodplain in Volgograd region can be accelerated to pass floodwater through the whole hydrographic network of the floodplain and prevent water outflow after the end of flood. This will improve filling of rivers and lakes and increase quality of water supply to residents and agricultural producers.

On October 12, during the first meeting of the Working Group on Don River development and improvement, the participants noted that the Russian regions adjacent to the river additionally needed more than 16 billion rubles for implementation of the National Ecology Program; also the Implementation Plan to the relevant Roadmap was discussed. An extensive list of activities was prepared by the Ministry of Natural Resources of Russia and the Rosvodresursy Agency in 2021. The Agency will deal with the improvement of river water availability and of flowage in 13 Don constituent territories. A major overhaul of waterworks facilities is also planned.

Agriculture. The information on agricultural land will be aggregated in the Single State Register (according to the Draft Law adopted on December 21). The Register will become a source of information for land supervision, as well as a resource containing the data confirmed by state land monitoring on the actual use of land plots and agricultural land. Thus, the Russian Ministry of Agriculture will be provided with information on the condition and use of agricultural land.

The draft Federal Law "On Agricultural Products, Raw Materials and Foodstuffs with Improved Characteristics" has been submitted to the State Duma. Its implementation will increase the availability of food products with improved characteristics for the population and help to improve the competitiveness of domestic agro-industrial sector products. The law establishes the concept of improved characteristics and defines the criteria for both the relevant products and their producers. In particular, the document contains the basic requirements for the production, storage, transportation and sale of such products, and provides for a voluntary procedure for confirming compliance with standardization documents.

Energy. The Russian Government allocated 9 billion rubles for hydrogen energy development, in particular, for creation of competitive domestic technologies for hydrogen production, transportation and storage, development of testing grounds for hydrogen energy technologies, including those in Antarctica. In order to implement the tasks set, the Government approved the Hydrogen Energy Concept, which defines the

tasks and strategic initiatives and governs the development of the industry in the medium- and long-term.

In 2021, the share of RES in the Russia's energy system grew to 1.6% by capacity and 0.5% by generation. The installed capacity of RES increased by 1,241.79 MW (45%) amounting to 3,996 MW by January 1, 2022. During the year, 232.9 MW (+13.5%) of solar generation was added, with the total capacity of solar power plants reaching 1,960.6 MW. The wind power capacity increased by 98.3% (1,008.89 MW) reaching 2,035.4 MW.

Water supply. New requirements to the quality of drinking water have come into force since March 1. The permissible concentrations of aluminum and iron used for water clarification were cut, and the permissible content of chloroform in water was reduced threefold; the level of silicon of utility to human body was doubled. A new indicator – the total organic carbon – was introduced. And the concept of technical water suitable for irrigation and unsuitable for drinking was formalized. Meanwhile, the Russian Association of Water Supply and Sanitation believes that the water industry is not technically ready for the new norms yet.

Ecology. With a pledge to plant almost 83,000 new trees, Moscow became the first city in Russia to officially commit to the global UN campaign for greening the cities[105]. Over 20 cities from 16 countries already pledged to expand their tree cover and improve the management of their urban trees and forests. These include Ashgabat (Turkmenistan), Chisinau (Moldova), Tbilisi (Georgia).

The State Duma passed a Law on free access to environmental information. The following list of data will become open: conditions and pollution of the environment, including conditions and pollution of the atmospheric air, surface water, soil; situation with radiation; stationary sources; the level, volume/weight of emissions; discharge of pollutants; waste management; and, measures taken to reduce the negative impact on the environment.

"Green" laws in 2021. Amendments to the Law on Specially Protected Natural Areas became effective in 2021. The authorities will be able to include in the list of such natural areas the settlements, without withdrawing land plots from the rightholders (if it does not contradict with the regime of SPNAs or if it is not a state nature reserve). According to amendments to the Law on Environmental Protection, by 2024 all organizations involved in geological exploration, extraction, production, transportation, storage and sale of hydrocarbons will be required to approve plans for the prevention and elimination of oil and petroleum product spills. A new methodology for developing norms of permissible discharges into water has been introduced for water user organizations which have a negative impact on the environment. The previously ratified Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer has come into force. The Decree of the Russian Government on maximum permissible emissions into the atmosphere has come into force as well. The updated forest fire safety rules became effective in January.

International cooperation. For the first time after a five-year break, the tenth meeting of the Russian-Chinese Joint Commission for Rational Use and Protection of Transboundary Waters was held on December 23. At the meeting, the parties adopted additions and amendments to the Program of hydrological information exchange on water bodies in the Amur River basin and approved the schedule of water discharge measurement in transboundary water bodies, when state border needed to be crossed.

On November 16, during the 5th meeting of the Joint Russian-Abkhazian Commission for Protection and Rational Use of Transboundary Water Bodies, the Monitoring Program of transboundary water quality and the Plan of joint actions on prevention and elimination of dangerous consequences of floods and other negative impacts of the Psou River were approved. The riparian countries are going to develop a procedure for joint environmental impact assessment in a transboundary context when planning relevant measures.

Ukraine

Water resources. Irrigation and drainage functions were transferred from the State Water Agency (Gosvodagentstvo) to the reconstituted Ministry of Agrarian Policy and Food. The new Development Concept is to improve water resources management and make it aimed at achieving environmental goals and improving water conditions and flood protection. The State Water Agency, in turn, shall approve rules and regulate operation regimes of reservoirs and waterways and water use in the context of climate change and low-water.

The Verkhovna Rada has adopted the draft Law on amendments to the Water Code of Ukraine in part of clarification of the list of primary water users. The aims of the document are to put on legal grounds the issue of compulsory conclusion of a contract between primary water users and water suppliers; secure in the legislation the provision of paid services related to water supply to legal entities and individuals from irrigation systems and water sources for watering irrigated or drained land, for industrial and municipal needs, as well as for watering gardens, orchards and rain-fed land and filling ponds; conserve and restore state property in strategic sites of Ukraine through paid services. The amendments to the Water Code should provide revenues to the budget of water management organizations.

The Hydrometeorological Service of Ukraine celebrated its 100th anniversary on November 19. Exactly 100 years ago, the Council of People's Commissars of Ukraine established the Central Ukrainian Meteorological Service – Ukrmet. Since 2011, the functions of the hydrometeorological service have been carried out

[105] The Trees in Cities Challenge was launched during the Climate Summit in 2019. The aim is to make the world's megacities greener by planting 11 million trees.

by the Department of Hydrometeorology at the Ministry of Emergency Situations, which later became the State Emergency Service.

Almost hundred rivers have disappeared in Ukraine over the past 25 years. The country may face the acute lack of clean water as early as by 2050. According to the chairman of the State Ecological Inspectorate, not only climate change and river drying, but also violations of environmental law, such as pollution and littering of rivers and unsound water use will be the main causes of drinking water shortage. In 2021, additionally to industrial and agricultural pollution, residues of medicines used in coronavirus treatment were found in water basins in Ukraine.

Agriculture. The Resolution approving model statutes of agricultural cooperatives – the founding documents regulating their activity – was adopted on March 3. The model statutes contain, in particular, provisions that regulate legal status, rights, obligations and relations of members and associated members of a cooperative in part of establishment, governance, running business and termination of agricultural cooperatives. It was noted that the Resolution was drafted to implement the Ukrainian agricultural cooperation law, which abolished division of agricultural cooperatives into production and service categories.

The Program of agricultural development as part of the "National Economic Strategy-2030" Project was presented to the government on February 16. The Program addresses liberalization of the land market, development of irrigation systems, encouragement of production with added value, and opening of new markets. The Program also provides for developments in the area of international food security, introduction of agricultural insurance, support for irrigation, organic production, livestock breeding and sub-sectoral programs such as potato growing, horticulture, and viticulture.

For better control of soil fertility, the Ukrainian Institute of Soil Protection, a unique institution possessing the databank on the state of soils all over Ukraine, was transferred into the jurisdiction of the Gosgeokadastr. By present, the certification of 19.8 million ha of agricultural land has been completed. In the future, certificates will be available for all land plots in the country. The data on the state of soil will be included in the State Land Cadastre's geo-referenced database, which will be made public.

The state will compensate 25% of the costs of those agricultural producers who have installed or upgraded irrigation systems on their farms. Modernization of the irrigation system in the southern regions of Ukraine will provide an opportunity to increase their yields at least twice and thus contribute to GDP growth and new jobs. In 2021, the subsidies for agrarians under the relevant program were to amount 50 million UAH.

Energy. Ukrhydroenergo has put into commercial operation the fourth 324-MW unit at Dniester PSP. The total installed capacity of the Dnestrovskaya PSP reached 1,296 MW in the generator mode and 1,684 MW in the pump mode. The plant will include seven units with a total capacity of 2,268 MW. This will place it first in Europe and sixth in the world.

According to the 2021 results, the share of electricity production from RES in the Ukrainian energy system rose to 13.4%. Based on the data from the Ministry of Energy on electricity production for the first 11 months of 2021 and the operational data from NEC Ukrenergo for December 2021, the share of electricity production from RES in the energy system and at Ostrov Burshtynska TPP was 12.5 billion kWh, with the total production of 156.6 billion kWh.

Ecology. The basins of the largest rivers – Don, Dniester, and Dnieper – were screened for pollutants for the first time, and a number of pollutants, such as pesticides, industrial chemicals, stimulants, and narcotic drugs, were identified.

On January 12, the Ministry of Environmental Protection and Natural Resources approved amendments to the Methodology for assessing the damage caused by land pollution and contamination as a result of the infringement of environmental legislation. According to these amendments, the compensation will be raised 4-6 times for particularly severe and severe levels of pollution and 2-3 times for medium pollution. The collected money will be used for restoration of damaged land.

The Environmental Information Center "Environmental Space" has been opened at the Chernobyl Nature Reserve. The new center will be engaged in environmental education activities and also will become a place of environmental research initiatives.

International cooperation. The Western Bug and Sian Basin Water Authority and the Regional Water Authority in Rzeszow, Poland signed a cooperation agreement for the Sian River Basin on February 19. The key areas of cooperation included the exchange of data and information on the status of water resources and related aquatic ecosystems in the Sian basin, the coordination of joint programs, etc. The agreement also provides for joint flood risk management and drought mitigation in the basin.

An extraordinary meeting on transboundary waters among the plenipotentiaries of the governments of Ukraine and Hungary was held on May 19-20. The parties discussed the general matters of transboundary cooperation, the multifaceted environmental issues in the Tisza river basin, and the possibilities for cooperation in educational programs. The work plan for rehabilitation of the transboundary land reclamation system was approved also.

The Ukrainian State Water Agency and the World Wildlife Fund in Ukraine (WWF-Ukraine) signed a Memorandum of Understanding and Cooperation that envisaged joint activities for sustainable, integrated and science-informed water management. The priority areas of cooperation included the advancement of climate adaptation principles into water management practices, including through nature-based solutions; the enhancement of activities on implementation of sustainable IWRM; the organization of joint information events for IWRM; and, the experience sharing.

11.6. Middle East

The phytoplankton is covering Turkey's shorelines in thick, mucus-like discharges that have depleted the nearshore waters of oxygen and killed thousands of fish. Though the outbreaks have occurred periodically throughout history, scientists say their size and frequency in recent years bear the fingerprints of environmental changes that are conducive to algal growth. The buildup of heat-trapping gases in the atmosphere is warming the water as well as the air. And runoff of farm nutrients and untreated wastewater act as growth hormones.

'Sea snot' surrounds Istanbul's coast near the Maltepe, Kadikoy and Adalar districts. Photo: Anadolu Agency/Anadolu Agency via Getty Images

Iraqi water officials say they want to sue their neighbor, Iran. They allege that Iran is reducing water flows to a tributary of the Tigris River. The Tigris cuts through Iraq's capital, Baghdad, and is one of the country's main waterways. The lawsuit would be filed in international court. It also claims that Iran is endangering Iraq's agricultural sector and its drinking water supply. Dams built upstream in Iran and other neighboring countries have limited Iraq's water supply, which is further constricted by severe drought. The ongoing drought was also causing widespread hunger and forcing people to migrate. Half of families in drought-affected regions require food aid and one in five cannot feed everyone in their family. Those numbers were based on surveys of close to 3,000 households across seven provinces in Iraq. The surveys found that in the last six months, about a third of grain farmers have lost over 90 percent of their harvest. The failed harvests are a source of other losses as well. One in fifteen households in the survey had a family member who had migrated for work in the last 30 days. The refugee council warned that unless the rains return, Iraq's outlook for 2022 remains dire.

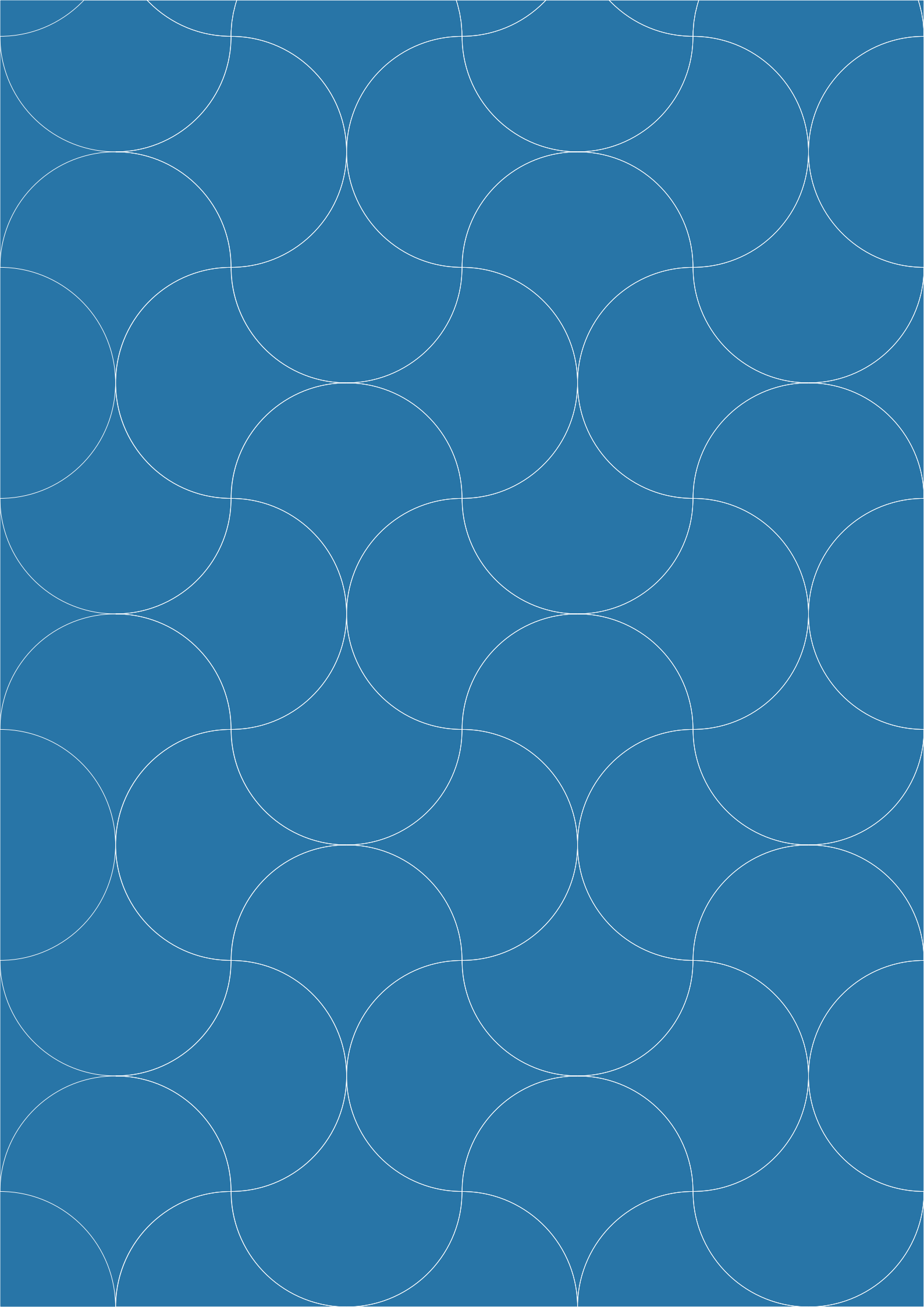
Hydro-engineering war against nature and people has further escalated in the Tigris River Basin. In 2020 Turkey completed infamous Ilisu Hydropower project, while in early 2021 Iran diverted part of Lesser Zab River to replenish Urmia Lake. Responding to these external threats the Government of Iraq has re-initiated work in May to expand **Makhoul Dam** on Tigris river to hold additional 3 km^3 of water. This threatens the Ashur and Ahwar World Heritage Properties and over one hundred cultural and archaeological sites in and around the city of Sherqat. In this context, the Save the Tigris Campaign sent a letter to the UNESCO World Heritage Center expressing civil society concerns and requests to demand the government to make public the Environmental Impact Assessment and clarify what salvage measures for the sites would be implemented.

Iran Water Crisis. Extreme water shortages across southwest Iran have prompted widespread violence from protesters, resulting in two deaths and hundreds more casualties and arrests. As Iran faces its worst drought in five decades, water shortages have left households without access to clean drinking water, devastated the agricultural sector, and led to power blackouts. Protests have been ongoing for months due to mounting discontent surrounding the government's inaction to prevent water and power shortages and the knock-on effect this has had on the economy, with the inflation rate rising to more than 50%.

Jordan and Israel Sign Countries' 'Largest Water Sale' Deal. The two countries agreed that Israel would sell 50 billion liters of water a year to Jordan, doubling what it already supplies. Jordan's cooperation with Israel on water predates their 1994 peace treaty. The additional water Israel will provide will come from the Sea of Galilee. The water deal comes after bilateral relations had cooled under Israel's former Prime Minister Benjamin Netanyahu. Prime Minister Naftali Bennett, who took over in June, has made strengthening ties with Amman a priority.

For the first time the **Syrian reservoir**, which is a major source of irrigation for thousands of area farmers, has dried up in its 27-year history. Ongoing drought seems to be the major source of water scarcity within the reservoir, although managing engineer Maher al-Hussein said damage to the reservoir's main pipeline has also led to significant leaks.

More than 70 percent of **Lebanon's population faces critical water shortages**. More than 4 million people, including 1 million refugees, risk losing access to safe water as economic crisis escalates rapidly and shortages of funding, fuel and supplies affect water pumping. In July, several water establishments announced a state of emergency and began rationing the supply of water from pumping stations and wells. Without electricity to power water pumps and money for maintenance, the public water supply system could collapse. This could increase water costs by 200% a month when securing water from alternative or private water suppliers.



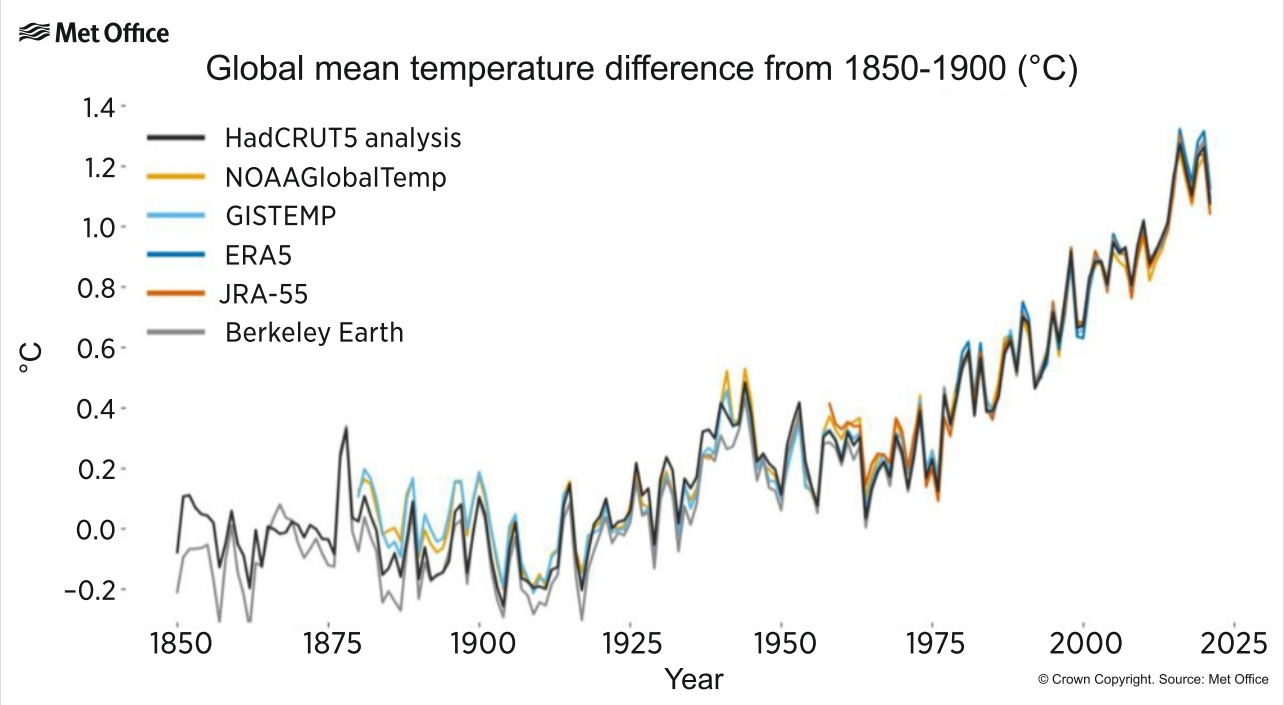
Section 12

Thematic Reviews

12.1. Climate Change

State of Climate in 2021

According to the provisional WMO Report[106] "State of the Global Climate 2021", past 7 years set to be the warmest on record. A temporary cooling "La Niña" event early in the year means that 2021 is expected to be "only" the fifth to seventh warmest year on record. But this does not negate or reverse the long-term trend of rising temperatures. Global sea level rise accelerated since 2013 to a new high in 2021, with continued ocean warming and ocean acidification.



Key messages

Greenhouse gases. In 2020, greenhouse gas concentrations reached new highs. Levels of carbon dioxide (CO_2) were 413.2 parts per million (ppm), methane (CH_4) at 1889 parts per billion (ppb) and nitrous oxide (N_2O) at 333.2 ppb, respectively, 149%, 262% and 123% of pre-industrial (1750) levels. The increase has continued in 2021.

Temperatures. The global mean temperature for 2021 (based on data from January to September) was about 1.09°C above the 1850-1900 average. Currently, the six datasets used by WMO in the analysis place 2021 as the sixth or seventh warmest year on record globally. But the ranking may change at the end of the year. It is nevertheless likely that 2021 will be between the 5th and 7th warmest year on record and that 2015 to 2021 will be the seven warmest years on record.

2021 is less warm than recent years due to the influence of a moderate La Niña at the start of the year. La Niña has a temporary cooling effect on the global mean temperature and influences regional weather and climate. The imprint of La Niña was clearly seen in the tropical Pacific in 2021. 2021 is around 0.18°C to 0.26°C warmer than 2011.

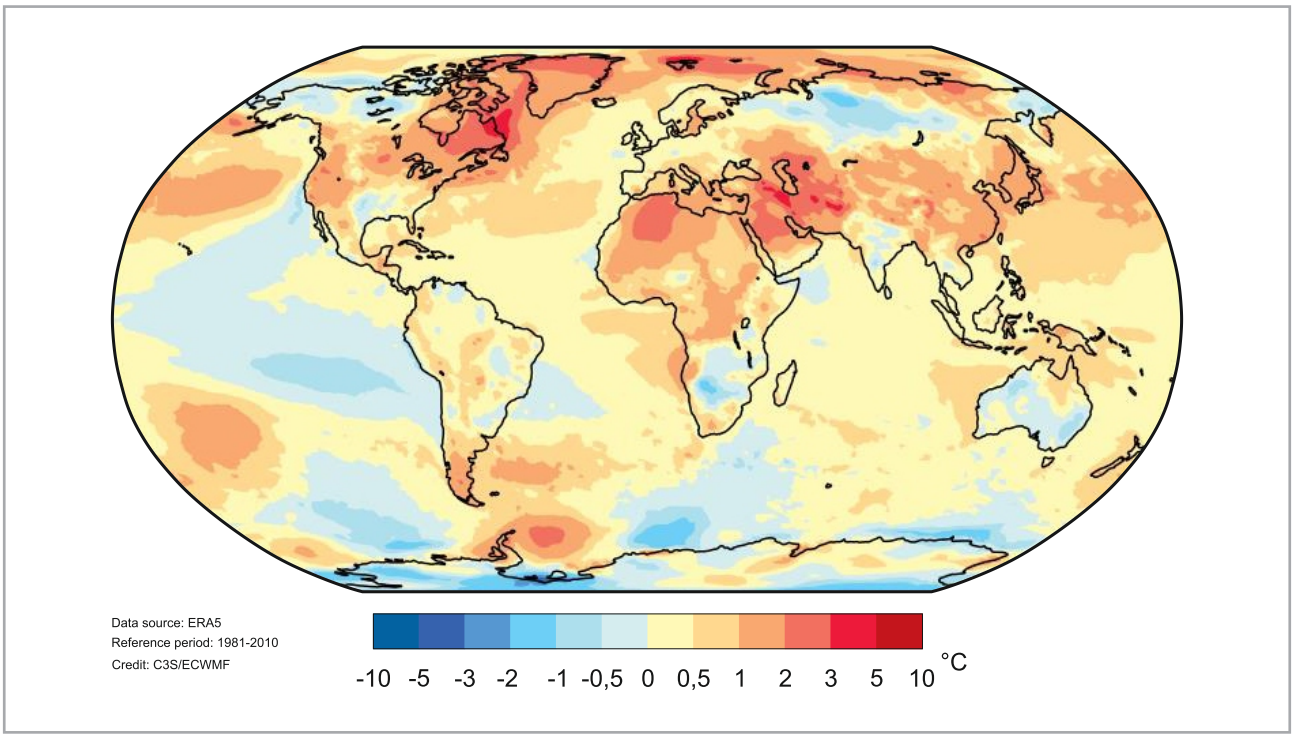
Ocean. Much of the ocean experienced at least one 'strong' Marine Heatwave at some point in 2021 – with the exception of the eastern equatorial Pacific Ocean (due to La Niña) and much of the Southern Ocean. The Laptev and Beaufort Sea in the Arctic experienced "severe" and "extreme" marine heatwaves from January to April 2021.

The ocean absorbs around 23% of the annual emissions of anthropogenic CO_2 to the atmosphere and so is becoming more acidic. Open ocean surface pH has declined globally over the last 40 years and is now the lowest it has been for at least 26,000 years. Current rates of pH change are unprecedented since at least that time. As the pH of the ocean decreases, its capacity to absorb CO_2 from the atmosphere also declines.

Sea level. Global mean sea level changes primarily result from ocean warming via thermal expansion of sea water and land ice melt. Measured since the

[106] Based on data for the first nine months of 2021

Near-surface air temperature differences from the 1981-2010 average
for January to September 2021.
The data derived from the ERA5 reanalysis product.



Source: C3S/ECMWF

early 1990s by high precision altimeter satellites, the mean global mean sea level rise was 2.1 mm per year between 1993 and 2002 and 4.4 mm per year between 2013 and 2021, an increase by a factor of 2 between the periods.

Sea ice. Arctic sea ice was below the 1981-2010 average at its maximum in March. Sea-ice extent then decreased rapidly in June and early July in the Laptev Sea and East Greenland Sea regions. As a result, the Arctic-wide sea-ice extent was record low in the first half of July. There was then a slowdown in melt in August, and the minimum September extent (after the summer season) was greater than in recent years at 4.72 million km^2. It was the 12th lowest minimum ice extent in the 43-year satellite record, well below the 1981-2010 average. Sea-ice extent in the East Greenland Sea was a record low by a large margin.

Antarctic sea ice extent was generally close to the 1981-2010 average, with an early maximum extent reached in late August.

Glaciers and ice sheets. Mass loss from North American glaciers accelerated over the last two decades, nearly doubling for the period 2015-2019 compared to 2000-2004. An exceptionally warm, dry summer in 2021 in western North America took a brutal toll on the region's mountain glaciers.

The Greenland Ice Sheet melt extent was close to the long-term average through the early summer. But temperatures and meltwater runoff were well above normal in August 2021 as a result of a major incursion of warm, humid air in mid-August.

Extreme weather. Exceptional heatwaves affected western North America during June and July, with many places breaking station records by 4°C to 6°C and causing hundreds of heat-related deaths.

There were also multiple heatwaves in the southwestern United States. Death Valley, California reached 54.4 °C on 9 July, equalling a similar 2020 value as the highest recorded in the world since at least the 1930s. It was the hottest summer on record averaged over the continental United States. There were numerous major wildfires. The Dixie fire in northern California, had burned about 390,000 hectares, the largest single fire on record in California.

Extreme heat affected the broader Mediterranean region. On 11 August, an agrometeorological station in Sicily reached 48.8 °C, a provisional European record, while Kairouan (Tunisia) reached a record 50.3 °C. Montoro (47.4 °C) set a national record for Spain on 14 August, while on the same day Madrid had its hottest day on record with 42.7 °C. On 20 July, Cizre (49.1 °C) set a Turkish national record and Tbilisi (Georgia) had its hottest day on record (40.6 °C). Major wildfires occurred across many parts of the region with Algeria, southern Turkey and Greece especially badly affected.

Abnormally cold conditions affected many parts of the central United States and northern Mexico in mid-February. The most severe impacts were in Texas, which generally experienced its lowest temperatures since at least 1989. An abnormal spring cold outbreak affected many parts of Europe in early April.

Precipitation. The city of Zhengzhou on 20 July received 201.9 mm of rainfall in one hour (a Chinese national record). Flash floods were linked to more than 302 deaths, with reported economic losses of US$17.7 billion.

Western Europe experienced some of its most severe flooding on record in mid-July. Western Germany and eastern Belgium received 100 to 150 mm over a wide area on 14-15 July over already saturated ground, causing flooding and landslides and more than 200 deaths. The highest daily rainfall was 162.4 mm at Wipperfürth-Gardenau (Germany).

Persistent above-average rainfall in the first half of the year in parts of northern South America, particularly the northern Amazon basin, led to significant and long-lived flooding in the region. The Rio Negro at Manaus (Brazil) reached its highest level on record. Floods also hit parts of East Africa, with South Sudan being particularly badly affected.

Significant drought affected much of subtropical South America for the second successive year. Rainfall was well below average over much of southern Brazil, Paraguay, Uruguay and northern Argentina. The drought led to significant agricultural losses, exacerbated by a cold outbreak at the end of July, damaging many of Brazil's coffee-growing regions. Low river levels also reduced hydroelectricity production and disrupted river transport.

Socio-economic and environmental impacts. In the last ten years, conflict, extreme weather events and economic shocks have increased in frequency and intensity. The compounded effects of these perils, further exacerbated by the COVID-19 pandemic, have led to a rise in hunger and, consequently, undermined decades of progress towards improving food security.

Following a peak in undernourishment in 2020 (768 million people), projections indicated a decline in global hunger to around 710 million in 2021 (9%). However, as of October 2021, the numbers in many countries were already higher than in 2020.

Extreme weather during the 2020/2021 La Niña altered rainfall seasons contributing to disruptions to livelihoods and agricultural campaigns across the world. Extreme weather events during the 2021 rainfall season have compounded existing shocks. Consecutive droughts across large parts of Africa, Asia, and Latin America have coincided with severe storms, cyclones and hurricanes, significantly affecting livelihoods and the ability to recover from recurrent weather shocks.

Extreme weather events and conditions, often exacerbated by climate change, have had major and diverse impacts on population displacement and on the vulnerability of people already displaced throughout the year. From Afghanistan to Central America, droughts, flooding and other extreme weather events are hitting those least equipped to recover and adapt.

Ecosystems – including terrestrial, freshwater, coastal and marine ecosystems – and the services they provide, are affected by the changing climate. In addition, ecosystems are degrading at an unprecedented rate, which is anticipated to accelerate in the coming decades. The degradation of ecosystems is limiting their ability to support human well-being and harming their adaptive capacity to build resilience.

Source: WMO, https://library.wmo.int/index.php?lvl=notice_display&id=21982#.YrN6uXZBzIV

Climate Change Agreement

All five Central Asian countries ratified the Paris Agreement and submitted their first nationally determined contributions (NDCs). The infographic below summarizes the mitigation and adaptation plans in Central Asia countries, as well as the policy frameworks that guide these plans and strategies. To meet the emission reduction targets set out, Central Asia countries need to improve energy efficiency and integrate green economy strategies, especially in agriculture and industrial processes.

Joint Statement of the C5+1 on addressing the climate crisis. Uzbekistan, Kazakhstan, Tajikistan, Turkmenistan and the USA made collective and country commitments on addressing the climate crisis. They underlined that climate change already negatively impacts the availability of water in the region, accelerates desertification and land degradation.

The C5+1 countries pledged their NDCs would include specific targets to reduce greenhouse gas emissions and concrete actions to reach those targets; acknowledged the critical need for the world to work together to advance the transition to a net-zero, clean-energy future by mid-century; noted the significant potential for regional collaboration toward advancing that objective, in areas such as the development of renewable energy and methane abatement; expressed concern about the large-scale consequences of the drying up of the Aral Sea; confirmed their interest in mitigating consequences of climate change in Central Asia through high-tech innovations, environmentally friendly, energy, and water-saving technologies, preventing further desertification and potential climate migration, as well as the development of ecotourism. The C5+1 governments will plan for the Energy and Environment Working Group to meet ahead of COP26 in Glasgow and discuss actions to combat climate change.

Commitments made by the C5+1 countries. Uzbekistan intends to submit an enhanced and ambitious NDC aligned with 1.5 degrees Celsius by COP26. Uzbekistan will include its renewable energy target of

Implementing the Paris Agreement in Central Asia

The Paris Agreement is a legally binding international agreement on climate change that was adopted within the United Nations Framework Convention on Climate Change (UNFCCC) and entered into force in 2016. Its chief aim is to limit global warming to well below 2 degrees Celsius, preferably 1.5 degrees Celsius, compared to pre-industrial levels.

Ratification timeline

2016

- Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan signed agreement.
- Kazakhstan, Turkmenistan ratified agreement.
- Agreement came into force in Turkmenistan.

2017

- Uzbekistan signed agreement.
- Tajikistan ratified agreement.
- Agreement came into force in Kazakhstan, Tajikistan.

2018

- Uzbekistan ratified agreement.
- Agreement came into force in Uzbekistan.

2020

- Kyrgyzstan ratified agreement.
- Agreement came into force in Kyrgyzstan.

Source: UNFCCC

Emission reduction targets

Base year: 1990

15% unconditional target

25% conditional target

12-14% unconditional target

29-31% conditional target

Base year: 2010

Base year: 1990

10-20% unconditional target

25-35% conditional target

lower than GDP growth* unconditional target

*GDP growth at 6.2% in 2018

0% conditional target

Base year: 2000

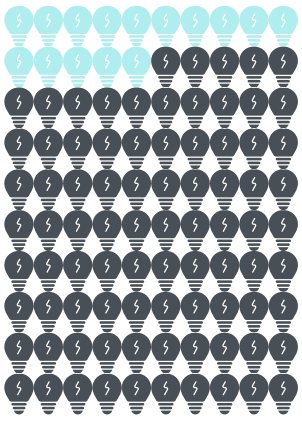
Base year: 2010

10% unconditional target

0% conditional target

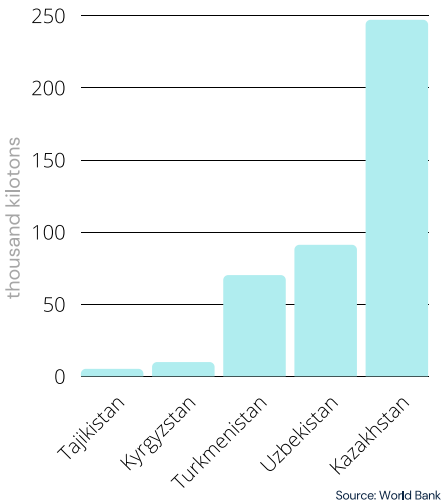
Source: UNFCCC

Renewable energy consumption



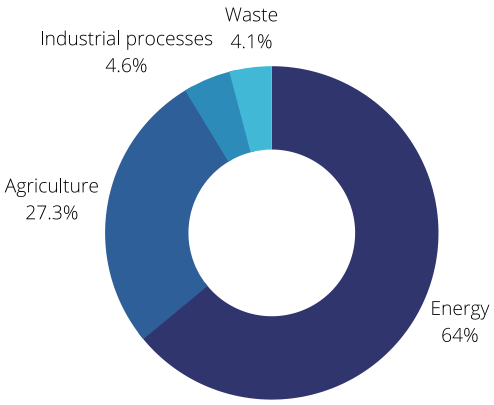
% of total final energy consumption
Source: World Bank

Carbon footprint



Source: World Bank

GHG emissions by sector



Source: UNFCCC

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Climate mitigation and adaptation policies

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Mitigation	✓ Enhance renewable energy sources. ✓ Develop clean energy technologies. ✓ Restore, conserve & enhance carbon sinks.	✓ Glacier monitoring. ✓ Hydro power rehabilitation projects. ✓ Emergency disaster risk management. ✓ Modernize hydro power plants.	✓ Build institutional & professional capacity and awareness. ✓ Monitor hydrometeor-ological survey	✓ Increase the efficiency of fuel utilization. ✓ Mitigate Aral Sea crisis. ✓ Increase the share of natural gas in energy mix.	✓ Decrease loss of natural gas in extraction, processing & transportation. ✓ Development of financial schemes. ✓ Subsidy support to energy saving measures.
Adaptation	✓ Modernize housing and communal services. ✓ Develop sustainable transport. ✓ Conserve ecosystems. Improve waste management. ✓ Enhance forest cover.	✓ Microloans for climate adaptation & energy efficiency. ✓ Consider climate impacts in water & energy, land use & mining.	✓ Use greenhouses to grow a variety of crops. ✓ Plant drought-resistant varieties of fruit trees. ✓ Provide shelter for livestock to lessen the risk of heat stress.	✓ Improve early warnings & weather forecasts. ✓ Adapt water & agriculture reforms. ✓ Conserve water. ✓ Enhance climate resilience.	✓ Diversify food crops. ✓ Enhance pasture productivity. ✓ Improve irrigated lands affected by desertification.
Policy Framework	✓ Kazakhstan 2050 Strategy. ✓ Green Economy Concept for the Republic of Kazakhstan.	✓ National Sustainable Development Strategy of Kyrgyzstan for 2013–2017. ✓ National Development Strategy of the Kyrgyzstan for 2018–2040.	✓ National Development Strategy of the Republic of Tajikistan for the period up to 2030.	✓ National Climate Change Strategy 2012. ✓ National Strategy for socio-economic development up to 2030.	✓ Program of Actions for Environmental Protection of Uzbekistan for 2013–2017. ✓ Government Decree No.841 on Measures to Implement National Goals & Targets in the Field of Sustainable Development up to 2030.

Common climate change challenges

- Rapidly rising temperature.
  Extreme heat waves.
  Droughts.
  - Diminished crop productivity.
    Negative effect on livestock.
- Shrinking glaciers.
  Water shortage.
  Increased competition over water.
  - Reduced power generation.
    Power supply interruptions.
- Increased respiratory & cardiovascular diseases.
  Malnutrition.

31 OCT - 12 NOV 2021
GLASGOW
COP26
IN PARTNERSHIP WITH ITALY

The COP26 summit will bring parties together to accelerate action towards the goals of the Paris Agreement and the UN Framework Convention on Climate Change.

Mitigation
- Phase out coal.
- Curtail deforestation.
- Invest in renewables.

Adaptation
- Protect & restore ecosystems.
- Build resilience.

Finance
- Mobilise at least $100bil in climate finance.
- Public & private sector financing required.

Collaboration
- Finalise Paris Rulebook.
- Collaboration between governments, businesses, civil society.

Acknowledgement:
This infographic was prepared in July 2021 under the overall guidance of Nikolay Pomoshchnikov, Head, Subregional Office for North and Central Asia, by Aizhan Omirzak and Patricia Wong.

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Subregional Office for North and Central Asia

25 percent by 2030, enshrined in Uzbekistan national law.[107] Kazakhstan has committed to achieve carbon neutrality by 2060 and reach 15 percent share of renewables by 2030. **Kyrgyzstan** is in the final stages of considering a revised NDC of 16 percent reduction in greenhouse gas emissions below business-as-usual levels and 44 percent reduction conditional on international support. The NDC of the **United States** is to achieve an economy-wide target of reducing its net greenhouse gas emissions by 50-52 percent below 2005 levels in 2030. The United States also aims to decarbonize its electricity system by 2035.

COP26

For two weeks, the world was riveted on all facets of climate change – the science, the solutions, the political will to act, and clear indications of action. The COP26 brought together 120 world leaders and over 40,000 registered participants.

The outcome of COP26 – the Glasgow Climate Pact – is the fruit of intense negotiations among almost 200 countries over the two weeks, strenuous formal and informal work over many months, and constant engagement both in-person and virtually for nearly two years.

Cuts in global greenhouse gas emissions are still far from where they need to be to preserve a livable climate, and support for the most vulnerable countries affected by the impacts of climate change is still falling far short. But COP26 did produce new "building blocks" to advance implementation of the Paris Agreement through actions that can get the world on a more sustainable, low-carbon pathway forward.

What was agreed?

Recognizing the emergency. Countries reaffirmed the Paris Agreement goal of limiting the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit it to 1.5°C. And they went further, expressing "alarm and utmost concern that human activities have caused around 1.1°C of warming to date, that impacts are already being felt in every region, and that carbon budgets consistent with achieving the Paris Agreement temperature goal are now small and being rapidly depleted." They recognized that the impacts of climate change will be much lower at a temperature increase of 1.5 °C compared with 2 °C.

Accelerating action. Countries stressed the urgency of action "in this critical decade," when carbon dioxide emissions must be reduced by 45 per cent to reach net zero around mid-century. But with present climate plans – the Nationally determined Contributions – falling far short on ambition, the Glasgow Climate Pact calls on all countries to present stronger national action plans next year, instead of in 2025, which was the original timeline. Countries also called on UNFCCC to do an annual NDC Synthesis Report to gauge the present level of ambition.

Moving away from fossil fuels. In perhaps the most contested decision in Glasgow, countries ultimately agreed to a provision calling for a phase-down of coal power and a phase-out of "inefficient" fossil fuel subsidies – two key issues that had never been explicitly mentioned in decisions of UN climate talks before, despite coal, oil and gas being the main drivers of global warming. Many countries, and NGOs, expressed dissatisfaction that the language on coal was significantly weakened (from phase-out to phase-down) and consequently, was not as ambitious as it needs to be.

Delivering on climate finance. Developed countries came to Glasgow falling short on their promise to deliver US$100 billion a year for developing countries. Voicing "regret," the Glasgow outcome reaffirms the pledge and urges developed countries to fully deliver on the US$100 billion goal urgently. Developed countries, in a report, expressed confidence that the target would be met in 2023.

Stepping up support for adaptation. The Glasgow Pact calls for a doubling of finance to support developing countries in adapting to the impacts of climate change and building resilience. This won't provide all the funding that poorer countries need, but it would significantly increase finance for protecting lives and livelihoods, which so far made up only about 25 per cent of all climate finance (with 75 per cent going towards green technologies to mitigate greenhouse gas emissions). Glasgow also established a work programme to define a global goal on adaptation, which will identify collective needs and solutions to the climate crisis already affecting many countries.

Completing the Paris rulebook. Countries reached agreement on the remaining issues of the so-called Paris rulebook, the operational details for the practical implementation of the Paris Agreement. Among them are the norms related to carbon markets, which will allow countries struggling to meet their emissions targets to purchase emissions reductions from other nations that have already exceeded their targets. Negotiations were also concluded on an Enhanced Transparency Framework, providing for common timeframes and agreed formats for countries to regularly report on progress, designed to build trust and confidence that all countries are contributing their share to the global effort.

[107] Envisaged by the Comprehensive Program for improvement of energy effectiveness of economic sectors and social sphere in 2019-2022, approved by the Uzbek Governmental Decree on 22 August 2019.

Focusing on loss & damage. Acknowledging that climate change is having increasing impacts on people especially in the developing world, countries agreed to strengthen a network – known as the Santiago Network – that connects vulnerable countries with providers of technical assistance, knowledge and resources to address climate risks. They also launched a new "Glasgow dialogue" to discuss arrangements for the funding of activities to avert, minimize and address loss and damage associated with the adverse effects of climate change.

New deals and announcements

There were many other significant deals and announcements – outside of the Glasgow Climate Pact – which can have major positive impacts if they are indeed implemented. These include:

Forests. 137 countries took a landmark step forward by committing to halt and reverse forest loss and land degradation by 2030. The pledge is backed by $12 bn in public and $7.2 bn in private funding. In addition, CEOs from more than 30 financial institutions with over $8.7 trillion of global assets committed to eliminate investment in activities linked to deforestation.

Methane. 103 countries, including 15 major emitters, signed up to the Global Methane Pledge, which aims to limit methane emissions by 30 per cent by 2030, compared to 2020 levels. Methane, one of the most potent greenhouse gases, is responsible for a third of current warming from human activities.

Cars. Over 30 countries, six major vehicle manufacturers and other actors, like cities, set out their determination for all new car and van sales to be zero-emission vehicles by 2040 globally and 2035 in leading markets, accelerating the decarbonization of road transport, which currently accounts for about 10 per cent of global greenhouse gas emissions.

Coal. Leaders from South Africa, the United Kingdom, the United States, France, Germany, and the European Union announced a ground-breaking partnership to support South Africa – the world's most carbon-intensive electricity producer – with $8.5 billion over the next 3-5 years to make a just transition away from coal, to a low-carbon economy.

Private finance. Private financial institutions and central banks announced moves to realign trillions of dollars towards achieving global net zero emissions. Among them is the Glasgow Financial Alliance for Net Zero, with over 450 firms across 45 countries that control $130 trillion in assets, requiring its member to set robust, science-based near-term targets.

Central Asian countries in COP26

Draft Regional Statement of CA countries. For the first time in the 26-year history of the UNFCCC, the CA countries presented themselves as a single region and voiced a draft Regional statement appealing to the international community, primarily the UN structures, to pay special attention to the critical problems of the CA region caused by climate change and exacerbated by the COVID-19 pandemic and the humanitarian crisis in Afghanistan. The document emphasizes the special geographical position of Central Asia, which has no access to the oceans and seas, which significantly increases its vulnerability to climate change. Particular attention is also paid to the importance of joining forces to combat climate change and adapt to its impacts at the regional and international levels.

Appeal by NGOs of the Central Asian countries on climate change. The main message of the Regional Appeal announced at COP26 is an appeal to the governments of Central Asia to strengthen national and regional programs to prevent the climate crisis in the region. The governments of the countries should "adopt stronger goals to reduce greenhouse gas emissions and take a more proactive position in promoting the region's interests and role in international climate commitments and processes."

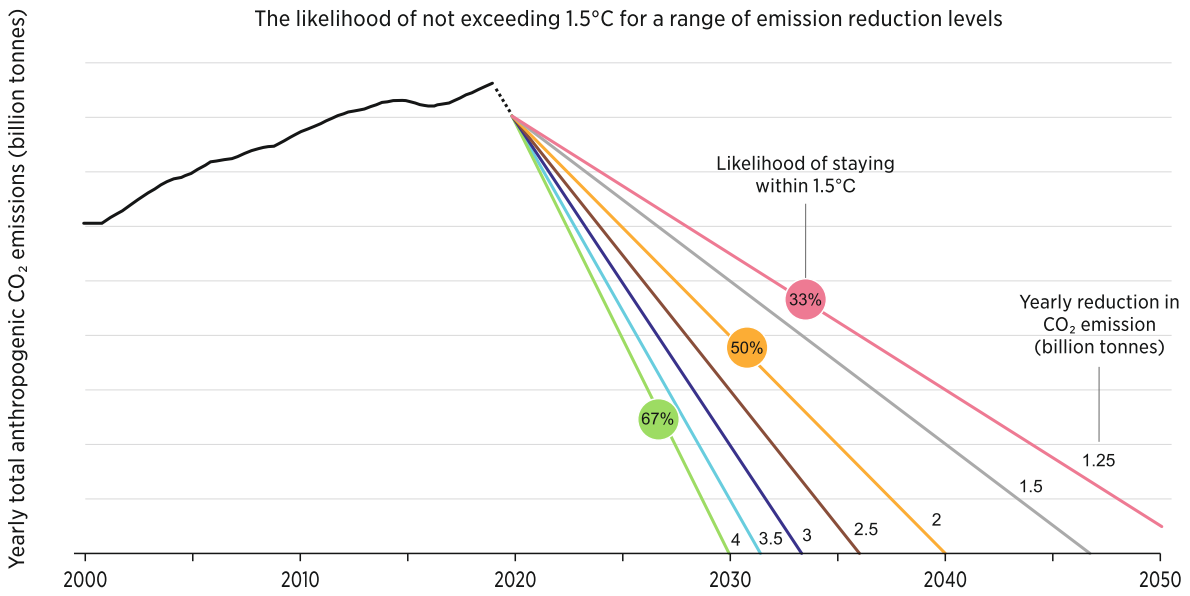
In addition, NGOs from CA countries are calling on the authorities to create non-declarative legislative conditions to support renewable energy sources, abandon the construction of nuclear power plants and fossil fuels subsidies. The civil sector sees the climate sustainability of the region in strengthening measures to restore and preserve the fertility of soil, mountain, forest, pasture and aquatic ecosystems. It considers it necessary to disseminate climate-resilient technologies at the state level. The appeal also notes the importance of taking into account the transboundary nature of water resources, environmental and climatic risks and opportunities.

Climate Change Reports

The 10 New Insights in Climate Science 2021 report is based on an assessment made by more than 60 world-leading academic experts.

1. Stabilizing at 1.5°C warming is still possible, but immediate and drastic global action is required: (1) Estimates of the remaining global carbon budget (the overall amount of CO_2 that can be emitted) indicate that rapid reductions averaging 2 gigatonnes of CO_2 ($GtCO_2$) (5% of 2020 global emissions) per year are required to keep global warming to within 1.5°C. This pace of reductions must be maintained until net emissions are zero (around 2040); (2) We may have already exceeded the carbon budget necessary to keep global temperature rise to within 1.5°C of warming; (3) If these unprecedented cuts in emissions are not made, we are likely to exceed 1.5°C warming and require carbon removal technologies on an enormous scale; (4) The short-term emissions drop during the COVID-19 pandemic had a very limited

Linear reductions in global CO_2 emissions and the corresponding probabilities that these would enable remaining within 1.5°C warming to preindustrial levels



impact on the overall decarbonization towards meeting the 1.5°C target; (5) The power sector offers the largest opportunity for near-term decarbonization, but all economic sectors need to drastically reduce greenhouse gas (GHG) emissions.

2. Rapid growth in methane and nitrous oxide emissions put us on track for 2.7°C warming: (1) Reducing methane emissions is a key lever available to slow climate change over the next 25 years: readily available, low-cost measures (see implications below) could halve methane emissions by 2030 and must go hand-in-hand with CO_2 mitigation and removal efforts to stabilize global temperature in the long term; (2) Rapid reductions in aerosol emissions during the COVID-19 pandemic caused a slight warming of the planet, highlighting the fact that cooling aerosols emitted from fossil fuel combustion to date have partly masked warming from greenhouse gas emissions. While declines in aerosol emissions will improve air quality and benefit the health of billions, this will exacerbate global warming in the short term.

3. Megafires – Climate change forces fire extremes to reach new dimensions with extreme impacts: (1) We are entering a new age of intensifying extreme fire regimes (megafires). It is likely that these are induced, and certainly exacerbated, by anthropogenic climate change; (2) Several megafires have been observed across very diverse regions from high to low latitudes, and are now impacting ecosystems; (3) Megafires can affect entire biomes with unprecedented impacts on flora and fauna, threatening also more fire-sensitive ecosystems such as the World Heritage-listed Gondwana rainforests of Australia; (4) Large smoke plumes and aerosols from megafires can impact wide areas due to long-range transport both in the troposphere and stratosphere; (5) More frequent and more intense fires come with increased risks to respiratory and cardiovascular health, birth outcomes and mental health for rural and urban communities.

4. Climate tipping elements incur high-impact risks: (1) The IPCC AR6 acknowledges that many human-caused changes, especially to the ocean, ice sheets and global sea level, are high risk and irreversible for centuries to millennia – some of them involving tipping processes – and that these changes are key to a comprehensive risk assessment; (2) Significant destabilization of several key climate tipping elements is already being observed today; (3) In many cases, the dominant driver of this destabilization is global warming. But direct human influence on land cover change, such as degradation and active deforestation of the Amazon rainforest, can play an equal or even stronger role; (4) Some tipping elements, for example melting ice sheets and changes to ocean currents, but also deforestation of rainforests, influence each other. Recent research indicates that interactions among tipping elements can ultimately cause shifts to happen at lower levels of global warming than anticipated.

5. Global climate action must be just: (1) Climate action must support just transitions, as it could otherwise slow down improvements in living standards in low- and middle-income countries and burden disadvantaged people globally; (2) Working towards just, equitable and low-carbon development for poorer countries: requires the richest 1% to cut their emissions by a factor of 30, which would enable the poorest 50% of the world's population to increase their emissions up to three-fold; (3) Justice-oriented climate action is more likely to achieve public acceptance, improving uptake of implementation.

6. Supporting household behaviour changes is a crucial but often overlooked opportunity for climate action: (1) Fighting climate change means making changes in lifestyles, particularly for the wealthy, to complement efficiency and decarbonization strategies; (2) Sticking to the status quo in terms of consumption growth puts any supply-side decarbonization achievements at risk (e.g. solar deployment); (3) For changes in individual behaviour to make a difference, they must be combined with mutually reinforcing changes by the public and business sectors; (4) Lifestyles compatible with the 1.5°C goal can result in a "good life" for all (i.e., "1.5°C lifestyles").

7. Political challenges impede effectiveness of carbon pricing: (1) Carbon pricing has not yet delivered substantial emissions reductions; (2) To be effective, carbon prices need to increase rapidly in the near term, be sector-specific and be part of larger policy packages; (3) To be publicly accepted, carbon pricing schemes need to consider equity and justice.

8. Nature-based solutions are critical for the pathway to Paris – but look at the fine print: (1) Nature-based Solutions (NbS) can offer multiple benefits to climate, ecosystems and societies, but must not replace or delay decarbonization efforts in other sectors; (2) With further warming, Earth System feedbacks may increasingly destabilize ecosystems and undermine the long-term mitigation potential of NbS; (3) Investing in NbS now to protect biodiversity will make them more climate resilient and strengthen their ability to act as long-term carbon sinks; (4) Much potential for NbS is situated in the less developed and developing countries and in areas inhabited by indigenous peoples who often have limited land rights; (5) To successfully include NbS in National Determined Contributions (NDCs) and effectively implement policies and direct funding, comprehensive metrics and monitoring, reporting and verification (MRV) are needed that include biodiversity, ecosystem services and local livelihoods, alongside carbon sequestration.

9. Building resilience of marine ecosystems is achievable by climate-adapted conservation and management, and global stewardship: (1) The oceans play a key role in regulating the Earth's climate. Protecting the oceans as a carbon sink including marine sediments and vegetation that bind substantial carbon stocks ("blue carbon") is an important climate change mitigation action; (2) Integrated, tailored and innovative solutions are needed to preserve ocean ecosystems threatened by accelerating climate change and other anthropogenic pressures; (3) There is a growing recognition of the importance of integrated governance in building ocean resilience by: involving all levels from local to global as well as the private sector; providing clear targets, strong actions and global stewardship; (4) In expanding the global network of MPAs the adaptation measures must include climate refugia, areas of high environmental change, corridors for migrating species.

10. Costs of climate change mitigation can be justified by the multiple immediate benefits to the health of humans and nature: (1) Benefits of mitigation to human health and nature accrue before the benefits of mitigation are apparent; (2) Health benefits are of higher economic value than the cost of mitigation policies; (3) Rapid emission reductions are needed across all sectors; adopting the right policies can make a big difference to health and wider environmental benefits; (4) The value of health co-benefits can justify rapid scaling up of mitigation policies and technologies, and thus accelerate progress towards a zero-emissions economy.

Source: https://10insightsclimate.science/wp-content/uploads/2021/12/Report_Climate-Science-Insights_2021_WEB.pdf

IPCC report shows that climate change is rapid, widespread and intensifying.

The IPCC finalized the first part of the Sixth Assessment Report, Climate Change 2021: The Physical Science Basis, the Working Group I contribution to the Sixth Assessment Report. It provides the clearest and most comprehensive assessment to date of warming of the atmosphere, oceans and land. The scale of recent changes is unprecedented in thousands, if not hundreds of thousands of years. Many changes due to past and future greenhouse gas emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level, says the report.

Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and the proportion of intense tropical cyclones, and, in particular, their attribution to human influence, has strengthened since the last IPCC Assessment Report in 2014.

More Extreme Weather. The IPCC report projects that in the coming decades climate changes will increase in all regions. For 1.5°C of global warming, there will be increasing heat waves, longer warm seasons and shorter cold seasons as well as changes in precipitation patterns affecting flooding and drought occurrences. At 2°C of global warming, heat extremes would more often reach critical tolerance thresholds for agriculture and health, the report shows.

The extreme heat we have witnessed in 2021 bears all the hallmarks of human-induced climate change. British Columbia in Canada recorded an incredible temperature of 49.6°C – breaking all previous records – as part of an intense and extensive heatwave in North America.

The Arctic is heating more than twice as fast as the global average. Further warming will amplify permafrost thawing, and the loss of seasonal snow cover, melting of glaciers and ice sheets, and loss of summer Arctic sea ice, according to the report. The report shows also how climate change is intensifying the water cycle. This brings more intense rainfall and associated flooding, as well as more intense drought in many regions.

1.5°C warming level. The observed average rate of heating accelerated during the period 2006-2018 compared to the period 1971-2006. The report provides new estimates of the chances of crossing the global warming level of 1.5°C in the next decades, and finds that unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.

Emissions of greenhouse gases from human activities are responsible for approximately 1.1°C during the last ten years of warming since 1850-1900. In 2020 the annual mean temperature was 1.2°C above the normal. The averaged temperature estimate over the next 20 years is expected to reach or exceed 1.5°C of warming. The Paris Agreement commits to pursue efforts to limit temperature increase to this level.

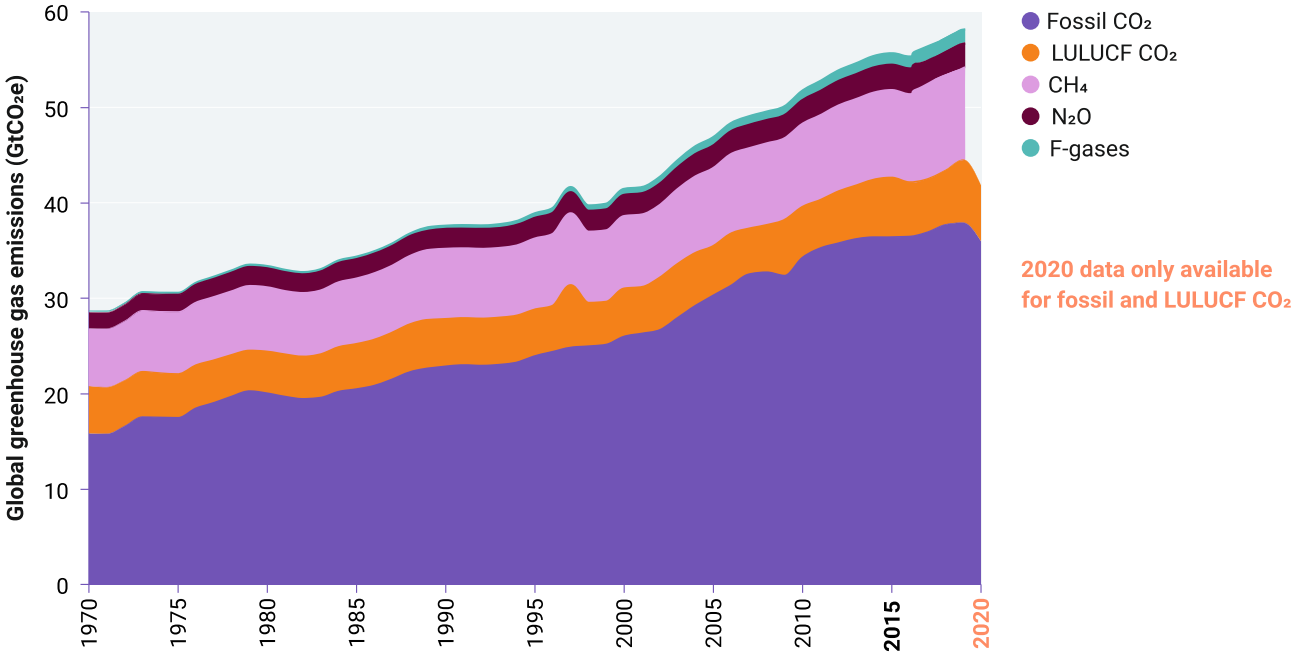
Regional emphasis. many drivers of climate impacts are projected to change in all regions of the world. Region-specific changes include intensification of tropical cyclones and extratropical storms, increases in river flooding, reductions in mean precipitation, increases in aridity and increases in fire weather.

Even at 1.5 °C of warming, heavy precipitation and associated flooding are projected to intensify and become more frequent in most regions in Africa and Asia with a high level of confidence. More frequent and severe droughts are projected in a few regions in all continents except Asia. These changes increase at 2 °C of warming. The report is available here.

The Emissions Gap Report 2021: The Heat Is On is the 12th edition in UNEP annual series that provides an overview of the difference between where greenhouse emissions are predicted to be in 2030 and where they should be to avert the worst impacts of climate change.

1. Following an unprecedented drop of 5.4 per cent in 2020, global carbon dioxide emissions are bouncing back to pre-COVID levels, and concentrations of GHGs in the atmosphere continue to rise.

Global greenhouse gas emissions from all sources, 1970-2020



2. New mitigation pledges for 2030 show some progress, but their aggregate effect on global emissions is insufficient. As at 30 September 2021, 120 countries (121 parties, including the European Union and its 27 member states) representing just over half of global GHG emissions, have communicated new or updated NDCs. This year's assessment considers the new or updated NDCs communicated to the UNFCCC as well as announcements of new mitigation pledges for 2030 by China, Japan and the Republic of Korea not submitted as NDCs by 30 September.

3. As a group, G20 members are not on track to achieve either their original or new 2030 pledges. Ten G20 members are on track to achieve their previous NDCs, while seven are off track.

4. A promising development is the announcement of long-term net-zero emissions pledges by 52 parties, covering more than half of global emissions. However, these pledges show large ambiguities.

5. Few of the G20 members' NDC targets put emissions on a clear path towards net-zero pledges. There is an urgent need to back these pledges up with near-term targets and actions that give confidence that net-zero emissions can ultimately be achieved and the remaining carbon budget kept.

6. The emissions gap remains large: compared to previous unconditional NDCs, the new pledges for 2030 reduce projected 2030 emissions by only 7.5 per

cent, whereas 30 per cent is needed for 2°C and 55 per cent is needed for 1.5°C.

7. Global warming at the end of the century is estimated at 2.7°C if all unconditional 2030 pledges are fully implemented and 2.6°C if all conditional pledges are also implemented. If the net-zero emissions pledges are additionally fully implemented, this estimate is lowered to around 2.2°C.

8. The opportunity to use COVID-19 fiscal rescue and recovery spending to stimulate the economy while fostering a low-carbon transformation has been missed in most countries so far. Poor and vulnerable countries are being left behind.

9. Reduction of methane emissions from the fossil fuel, waste and agriculture sectors can contribute significantly to closing the emissions gap and reduce warming in the short term.

10. Carbon markets can deliver real emissions abatement and drive ambition, but only when rules are clearly defined, designed to ensure that transactions reflect actual reductions in emissions, and supported by arrangements to track progress and provide transparency.

The 5th Yearbook of Global Climate Action 2021. This Yearbook of Global Climate Action reviews the work carried out under the Marrakech Partnership and the High-Level Champions since the last publication, by: (1) summarizing the state and scope of global climate action in 2021 and the challenges and opportunities around how to track and reflect these efforts, as well as the progress of the global action tools launched in the past year; (2) outlining the key messages around what is needed to accelerate sectoral systems transformation; and (3) presenting the Champions' vision on the future of the climate action framework and agenda, and how the work feeds into the global stocktake.

See the Yearbook on https://unfccc.int/sites/default/files/resource/Yearbook_GCA_2021.pdf

Significant and Major Events

Water and Climate Coalition. A new Water and Climate Coalition has been launched to achieve more effective integrated policy-making in an era when climate change, environmental degradation and population growth has exacerbated water-related hazards and scarcity. The coalition aims to achieve an integrated global Water and Climate Agenda to support more effective adaptation and resilience and speeding up progress towards SDGs 6 and 13 (climate). The coalition includes current and former government, business and civil society leaders as well as 2 youth representatives from all regions of the world. The Water and Climate Leaders will provide practical guidance on proper integration, information, cooperation and investment.

The UN Security Council held several high level open debates: (1) "Addressing climate-related security risks to international peace and security through mitigation and resilience building" (February 23); (2) "Security in the context of climate change" (September 23); (3) "Security in the context of terrorism and climate change" (Deember 9) (see "Security Council").

United States organized the **Leaders Summit on Climate**, which brought together 40 heads of state – from big Russia, Brazil and China to tiny Bhutan, Gabon and Marshall Islands. "We are at the verge of the abyss… Global temperature has already risen 1.2 degrees Celsius – racing toward the threshold of catastrophe", UN Secretary-General António Guterres said in his address to the virtual climate summit (April 22).

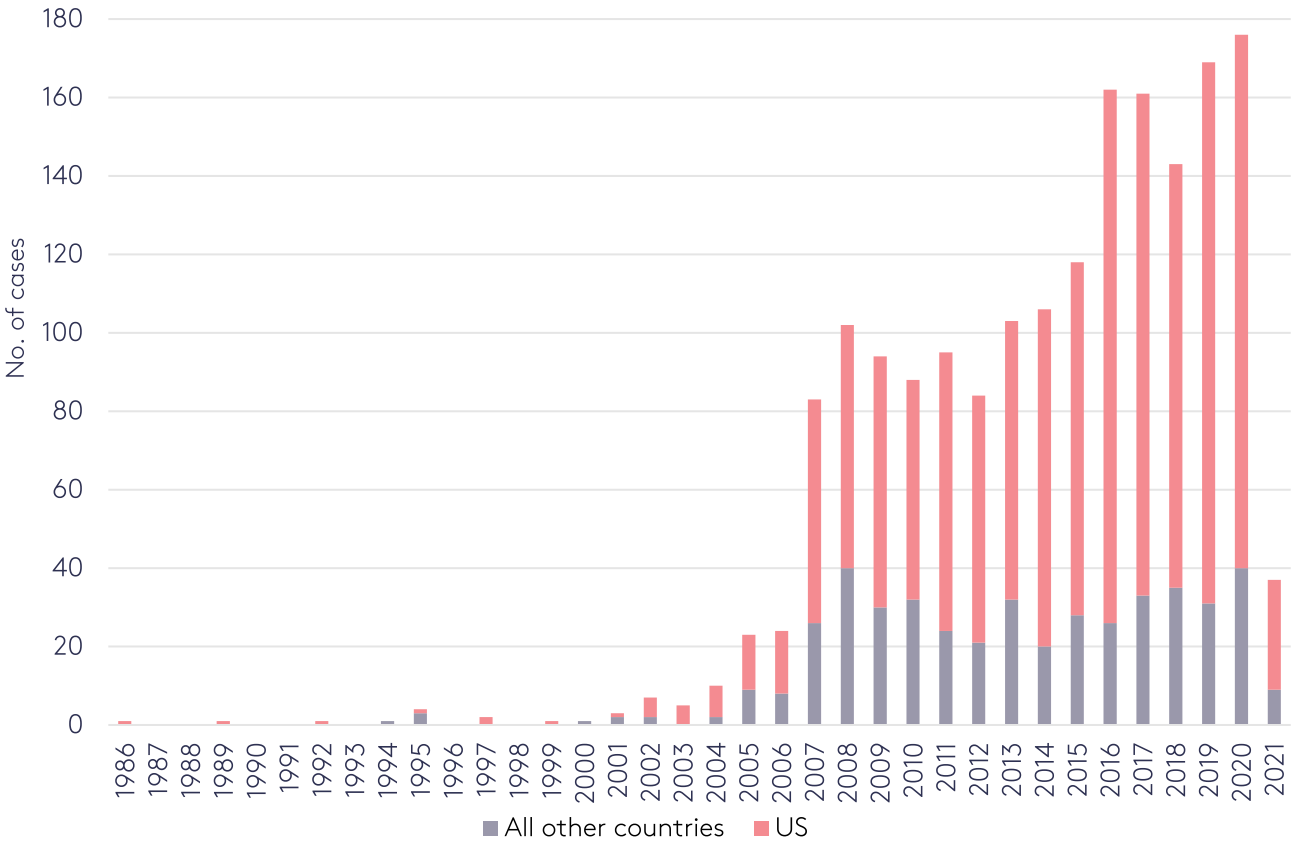
Global trends in climate change litigation in 2021. The databases contained 1,841 ongoing or concluded cases of climate change litigation from around the world, as of May 2021 (see Figure below). Of these, 1,387 were filed before courts in the United States, while the remaining 454 were filed before courts in 39 other countries and 13 international or regional courts and tribunals (including the courts of the European Union). Outside the US, Australia (115), the UK (73) and the EU (58) remain the jurisdictions with the highest volume of cases. 1,006 cases have been filed since 2015 – the year of the Paris Agreement and the land-mark case of Urgenda Foundation v. State of the Netherlands – while 834 were filed between 1986 and 2014.

New cases, 1 May 2020 to 31 May 2021. Globally, 191 new cases were filed in this period. Cases were filed for the first time in Guyana and Taiwan, as well as the East African and European Courts of Human Rights.

Source: Setzer J. and Higham C. (2021) Global trends in climate change litigation: 2021 snapshot. London: Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, Sabin Center for Climate Change Law; https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/07/Global-trends-in-climate-change-litigation_2021-snapshot.pdf

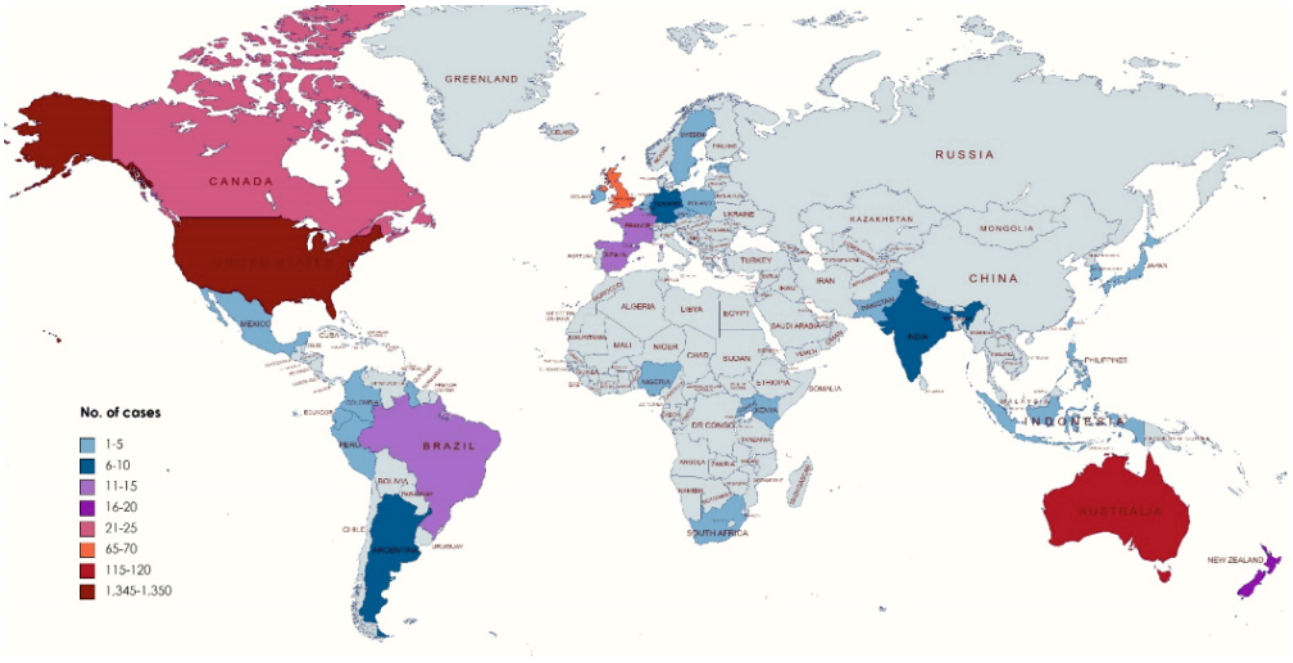
Climate change litigation is gaining momentum. The world's first courtroom battle with corporate titans took place in 2021. The Dutch environmental group "Milieudefensie" succeeded in the court in the Netherlands which ordered global energy company Royal Dutch Shell PLC (RDS) to reduce its group-wide CO_2 emissions by 45 percent by the end of 2030 alleging Shell's contributions to climate change violate human rights. In January, the environmental group demanded that 30 major corporate emitters of greenhouse gases with legal bases in the Netherlands, including BP, Shell, ExxonMobil, KLM and Unilever present concrete and feasible climate plans outlining how they would trim emissions of the heat-trapping gases by 45% from 2019 levels by 2030 during next three months.

Total cases over time, US and non-US, to 31 May 2021



Note: These data are from the databases and may be incomplete, as discussed in the Introduction.
Source: Authors based on CCLW and Sabin Center data

Number of cases around the world, per jurisdiction, to May 2021



Notes: Cumulative figures to May 2021. Map created with mapchart.net.
Source: Authors based on CCLW and Sabin Center data

On November 25, three young climate activists – Marina Tricks (19), Adetola Onamade (23) and Jerry Kobina Amokwandoh (22) – **opened the campaign "Young People vs UK Gov"** appealing to the Great Britain's Supreme Court to consider the case to influence the country climate policy. The defendants try to file a case against the Prime Minister, Boris Johnson, the Chancellor, Rishi Sunak and the Energy Minister, Kwasi Kwarteng, over the Government's failure to honour its Paris Agreement commitments.

Juliana v. United States climate change lawsuit. The first case of its kind, Juliana v. the United States continued in 2021. 21 American teenagers aged from 9 to 20 filed a lawsuit against the US Government. Their complaint asserts that, through the government's affirmative actions that cause climate change, it has violated the youngest generation's constitutional rights to life, liberty, and property, as well as failed to protect essential public trust resource.[108] *State of things:* the youth plaintiffs are awaiting a ruling on their Motion for Leave to File a Second Amended Complaint and the Motion to Intervene filed by 18 states, led by Alabama.

12.2. Sustainable Development Goals: Tracking the Progress

In this Subsection we present an overview of SDGs progress based on the ESCAP "Asia and the Pacific SDG Progress Report 2022. Widening disparities amid COVID-19".

This Report provides an analysis of progress on 17 SDGs and 169 targets in the region and in each of the five subregions, including Central Asia.

The report also provides an analysis of data gaps that prevent the monitoring of progress, and it provides an investigation of sources and priority areas for enhancing SDG data availability.

Progress towards the SDGs in the Asia-Pacific region has slowed as the COVID-19 pandemic and climate change have exacerbated development challenges.

The North and Central Asia subregion is not on track for any of the goals, but progress has been made towards most of the measurable targets under good health and well-being (Goal 3), industry, innovation and infrastructure (Goal 9) and peace, justice and strong institutions (Goal 16). Meanwhile trends on responsible consumption and production (Goal 12), climate action (Goal 13) and life below water (Goal 14) have continued to regress for the past five years. Progress has been limited for clean water and sanitation (Goal 6), sustainable cities and communities (Goal 11), and life on land (Goal 15).

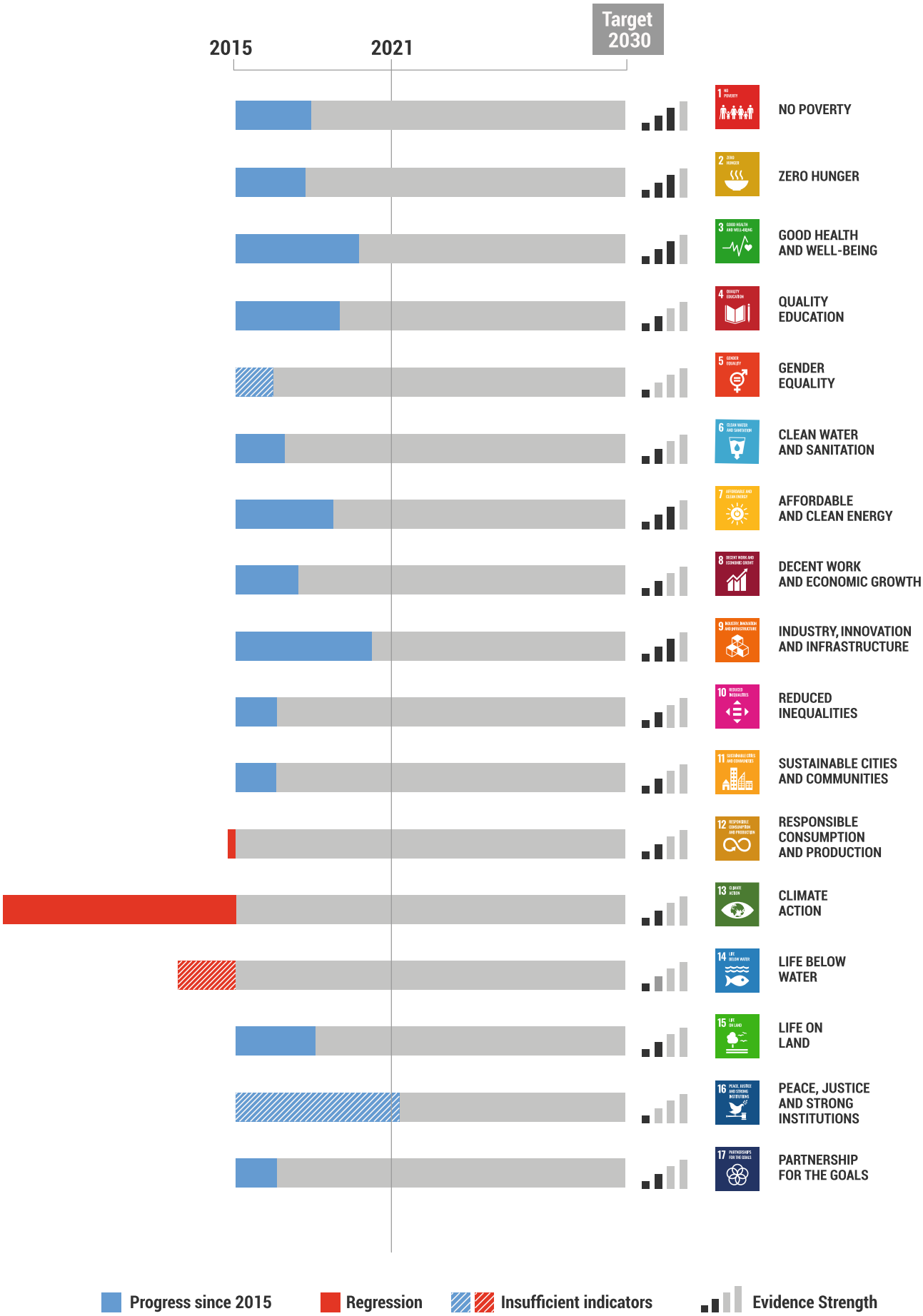
GHG emissions per capita in North and Central Asia are among the highest. Although renewable energy capacity has increased, the share of renewable energy in the total energy supply remains very low, amounting to approximately 3.4 per cent of the total energy supply.

Fossil fuel subsidies as a percentage of GDP in North and Central Asia are higher than in any other subregion, at 12.1 per cent in Kyrgyzstan, 6.9 per cent in Turkmenistan and 4.4 per cent in Uzbekistan. North and Central Asia needs to prioritize improvements in production efficiency alongside increased production capacity to ensure the sustainability of lifestyles and natural resources.

Source: https://www.unescap.org/sites/default/d8files/knowledge-products/ESCAP-2022-FG_SDG-Progress-Report.pdf#page=12

[108] https://www.ourchildrenstrust.org/juliana-v-us

Snapshot of ADG progress in North and Central Asia, 2021



Anticipated progress on SDG targets in North and Central Asia

NO POVERTY
- 1.2 National poverty
- 1.1 International poverty
- 1.3 Social protection
- 1.4 Access to basic services
- 1.5 Resilience to disasters
- 1.a Resources for poverty programs
- 1.b Poverty eradication policies

ZERO HUNGER
- 2.2 Malnutrition
- 2.3 Small-scale food producers
- 2.4 Sustainable agriculture
- 2.5 Genetic resources for agriculture
- 2.a Investment in agriculture
- 2.1 Undernourishment and food security
- 2.b Agricultural export subsidies
- 2.c Food price anomalies

GOOD HEALTH AND WELL-BEING
- 3.1 Maternal mortality
- 3.2 Child mortality
- 3.9 Health impact of pollution
- 3.3 Communicable diseases
- 3.4 NCD & mental health
- 3.5 Substance abuse
- 3.6 Road traffic accidents
- 3.7 Sexual & reproductive health
- 3.8 Universal health coverage
- 3.a Tobacco control
- 3.b R&D for health
- 3.c Health financing & workforce
- 3.d Management of health risks

QUALITY EDUCATION
- 4.4 Skills for employment
- 4.6 Adult literacy & numeracy
- 4.1 Effective learning outcomes
- 4.2 Early childhood development
- 4.3 TVET & tertiary education
- 4.a Education facilities
- 4.5 Equal access to education
- 4.c Qualified teachers
- 4.7 Sustainable development education
- 4.b Scholarships

GENDER EQUALITY
- 5.5 Women in leadership
- 5.1 Discrimination against women & girls
- 5.2 Violence against women & girls
- 5.3 Early marriage
- 5.4 Unpaid care and domestic work
- 5.6 Reproductive health access & rights
- 5.a Equal economic rights
- 5.b Technology for women empowerment
- 5.c Gender equality policies

CLEAN WATER AND SANITATION
- 6.1 Safe drinking water
- 6.2 Access to sanitation & hygiene
- 6.4 Water-use efficiency
- 6.5 Trans-boundary water cooperation
- 6.b Participatory water & sanitation management
- 6.6 Water-related ecosystems
- 6.3 Water quality
- 6.a International cooperation on water & sanitation

AFFORDABLE AND CLEAN ENERGY
- 7.3 Energy efficiency
- 7.1 Access to energy services
- 7.b Investing in energy infrastructure
- 7.2 Share of renewable energy
- 7.a International cooperation on energy

DECENT WORK AND ECONOMIC GROWTH
- 8.2 Economic productivity & innovation
- 8.3 Formalization of SMEs
- 8.6 Youth NEET
- 8.1 Per capita economic growth
- 8.5 Full employment & decent work
- 8.8 Labour rights & safe working env.
- 8.10 Access to financial services
- 8.b Strategy for youth employment
- 8.4 Material resource efficiency
- 8.7 Child & forced labour
- 8.9 Sustainable tourism
- 8.a Aid for Trade

INDUSTRY, INNOVATION AND INFRASTRUCTURE
- 9.1 Infrastructure development
- 9.c Access to ICT & the Internet
- 9.2 Sustainable/inclusive industrialization
- 9.4 Sustainable & clean industries
- 9.5 Research and development
- 9.b Domestic technology development
- 9.3 Small-scale inductries acces to finance
- 9.a Resilient infrastructure

REDUCED INEQUALITIES
- 10.2 Inclusion (social, economic & political)
- 10.4 Fiscal & social protection policies
- 10.7 Safe migration & mobility
- 10.1 Income growth (bottom 40%)
- 10.3 Eliminate discrimination
- 10.5 Regulation of financial markets
- 10.6 Inclusive global governance
- 10.a Special & differential treatment (WTO)
- 10.b Resource flows for development
- 10.c Remittance costs

SUSTAINABLE CITIES AND COMMUNITIES
- 11.2 Public transport systems
- 11.6 Urban air quality & waste management
- 11.b Disaster risk management policies
- 11.5 Resilience to disasters
- 11.1 Housing & basic services
- 11.3 Sustainable urbanization
- 11.4 Cultural & natural heritage
- 11.7 Urban green & public spaces
- 11.a Urban planning
- 11.c Sustainable & resilient buildings

RESPONSIBLE CONSUMPTION AND PRODUCTION
- 12.4 Managing chemicals & wastes
- 12.a Support for R&D capacity for SD
- 12.b Sustainable tourism monitoring
- 12.2 Sustainable use of natural resources
- 12.c Fossil-fuel subsidies
- 12.1 Programmes on SCP
- 12.3 Food waste & losses
- 12.5 Reduction in waste generation
- 12.6 Corporate sustainable practices
- 12.7 Public procurement practices
- 12.8 Sustainable development awareness

CLIMATE ACTION
- 13.1 Resilience & adaptive capacity
- 13.2 Climate change policies
- 13.3 Climate change awareness
- 13.a UNFCCC commitments
- 13.b Climate change planning & management

LIFE BELOW WATER
- 14.1 Marine pollution
- 14.2 Marine & coastal ecosystems
- 14.3 Ocean acidification
- 14.4 Sustainable fishing
- 14.5 Conservation of coastal areas
- 14.6 Fisheries subsidies
- 14.7 Marine resources for SIDS & LDC
- 14.a Research capacity & marine technology
- 14.b Small-scale artisanal fishing
- 14.c Implementing UNCLOS

LIFE ON LAND
- 15.1 Terrestrial & freshwater ecosystems
- 15.2 Sustainable forests management
- 15.4 Conservation of mountain ecosystems
- 15.5 Loss of biodiversity
- 15.8 Invasive alien species
- 15.3 Desertification and land degradation
- 15.6 Utilization of genetic resource
- 15.7 Protected species trafficking
- 15.9 Biodiversity in national & local planning
- 15.a Resources for biodiversity & ecosystems
- 15.b Resources for forest management
- 15.c Protected species trafficking (global)

PEACE, JUSTICE AND STRONG INSTITUTIONS
- 16.1 Reduction of violence & related deaths
- 16.6 Effective institutions
- 16.2 Human trafficking
- 16.3 Justice for all
- 16.4 Illicit financial and arms flows
- 16.5 Corruption and bribery
- 16.7 Inclusive decision-making
- 16.8 Inclusive global governance
- 16.9 Legal identity
- 16.10 Public access to information
- 16.a Capacity to prevent violence
- 16.b Non-discriminatory laws

PARTNERSHIP FOR THE GOALS
- 17.1 Tax & other revenue collection
- 17.4 Debt sustainability
- 17.6 Science and tech international cooperation
- 17.8 Capacity building for ICT
- 17.9 Capacity building for SDGs
- 17.10 Multilateral trading system (WTO)
- 17.18 National statistics availability
- 17.19 Statistical capacity
- 17.17 Partnerships (public, private, CSO)
- 17.2 ODA commitment by dev. countries
- 17.3 Additional financial resources
- 17.5 Investment promotion for LDCs
- 17.7 Transfer of technologies
- 17.11 Exports of developing countries
- 17.12 Duty-free market access for LDCs
- 17.13 Global macroeconomic stability
- 17.14 Policy coherence for SD
- 17.15 Respect country's policy space
- 17.16 Global partnership for SD

- MAINTAIN progress to achieve target
- ACCELERATE progress to achieve target
- REVERSE trend to achieve target
- Cannot be measured

12.3. Earth Overshoot Day 2021

Earth Overshoot Day 2021 fell on July 29. This is the point when human consumption outstrips the resources nature can regenerate in that year. Earth Overshoot Days is computed annually by the Global Footprint Network (GFN). Although the computation methodology is not quite reliable, it anyway serves as a reminder that we need to take care of nature. According to GFN, humanity consumes 1.6 Earths every year. If the ecological footprint remains the same, by 2030, humanity will be on pace to consume 2 planet's worth of resources and the Earth Overshoot Day will fall on late June.

12.4. COVID-19, Water and the Environment: Risks and Opportunities

Introduction

The COVID-19 pandemic has underscored the value of water and its connections to human health and the environment, but it has also highlighted longstanding water management and environmental governance deficiencies. For example, while hand washing is one of the most effective ways for preventing the spread of COVID-19 and other communicable diseases, 40% of the global population – three billion people – live without soap and water available at home. In the face of COVID-19, they are among the most vulnerable and most at risk of being left behind.

While this global health crisis has raised new water and environment related challenges for national governments, local communities and the private sector, it could also be an important turning point for addressing longstanding challenges, including the failure to provide safe and affordable water and sanitation for all. The surge in interest, along with potentially massive investments by the business community and government to mitigate risks and help ailing economies, could provide a rare opportunity for more effective and equitable water and environmental policies and management.

This review gathers insights from across the globe to highlight some of the most pressing questions for decision makers, practitioners and citizens alike.

Water, sanitation and hygiene: World Leaders' Call to Action on COVID-19[109]

Heads of State, Government, and leaders from United Nations agencies, International Financial Institutions, civil society, private sector and research and learning are mobilizing around a call for the prioritization of water, sanitation and hygiene in the response to COVID-19. Their joint statement:

Until there is a vaccine or treatment for COVID-19, there is no better cure than prevention.

Water, sanitation and hand hygiene, together with physical distancing, are central to preventing the spread of COVID-19, and a first line of defence against this serious threat to lives and health systems. Handwashing with water and soap kills the virus but requires access to running water in sufficient quantities.

Our response plans – at national, regional and global levels – must therefore prioritize water, sanitation and hygiene services.

Leaders that recognize the role of water, sanitation and hygiene in preventing the spread of COVID-19, will save lives. Leaders that prioritize international collaboration and support, will save lives. We are only as healthy as the most vulnerable members of society, no matter in which country they are.

[109] www.sanitationandwaterforall.org/world-leaders-call-action-COVID-19

Hence, we call on all national, regional and global leaders to join us in:

***Making water, sanitation and hygiene available to everyone, eliminating inequalities and leaving no one behind**, taking care of those who are most vulnerable to COVID-19. This includes the elderly, people with disabilities, women and girls, and those living in precarious situations, such as in informal settlements, refugee camps, detention centres, homeless people, as well as those people whose livelihoods are limited or destroyed by measures put in place to stop the spread of the virus, and women who shoulder the vast majority of unpaid care work in crisis. These measures are critical, not just to protect these vulnerable populations from COVID-19, but also to prevent other infectious diseases that can spread when water, sanitation and hygiene services are disrupted.*

***Working collaboratively with all stakeholders in a coordinated manner** to improve water and sanitation services, as each actor, whether public, private, donor or civil society has something to offer to protect populations from COVID-19. Coordinated action is more effective, including urgent immediate action to establish handwashing facilities within health care facilities and at entrance points to public or private commercial buildings and public transport facilities, Partnerships such as Sanitation and Water for All are key platforms for national, regional and international cooperation and exchange of experiences.*

***Ensuring that water and sanitation systems are resilient and sustainable** in order to protect people's health and support national health systems. Service providers for water, sanitation and hygiene including utilities and informal providers will have difficulties to maintain or expand services at a time of reduced financial flows restricted movement. This is both a short-term and a long-term requirement to save lives. Undisrupted global supply chains, including movement of goods and production capacity, for water, sanitation and hygiene commodities and services must be maintained at all costs. Water, sanitation and hygiene workers must also be grated sufficient protection to be able to provide us with such services without disruption.*

***Prioritizing the mobilization of finance to support countries in their response to this crisis.** Any financing directed at supporting emergency interventions must have long-term solutions already in mind. Access to water, sanitation and hygiene must be affordable to all, and this may require additional funding to support service providers and help those who cannot afford it. Funding envelopes need to be maintained with no diversion away from the commitments and priorities set for the water, sanitation and hygiene sector. This includes avoiding any shifts in domestic funding allocations that support WASH services and sustained support by international donors for on-going water, sanitation and hygiene humanitarian responses, and broader Grand Bargain commitments.*

***Delivering accurate information in a transparent manner.** Consistent and rational messaging based on scientific advice that is accessible to everyone will help people to understand the threat and enable everyone to act accordingly.*

COVID-19 is not the first and will not be the last epidemic that countries will face. Resilience to future crises depends on actions taken now, as well as on policies, institutions and capacity put in place during normal times. Let us ensure this threat is not a missed opportunity to achieve our vision of universal access to water, sanitation and hygiene.

As leaders, this is our chance to save lives.

Join the movement #GlobalCall4Water

COVID-19: the role of the Water Convention and the Protocol on Water and Health[110]

The Water Convention and the Protocol on Water and Health jointly serviced by WHO-Europe and UNECE help countries by promoting the availability of safe water for all within countries and across borders and sectors.

Water Convention: Supporting recovery and preparedness

The timely and sufficient availability of water of adequate quality is a prerequisite for the provision of safe water, sanitation and adequate hygiene and for tackling possible impacts of the COVID-19 crisis, including poverty, economic downturn, food and energy insecurity and political instability. 60 percent of global freshwater flow comes from transboundary basins. The Water Convention provides a unique global legal and intergovernmental framework for peaceful and cooperative management of transboundary water resources and allows preventing potential tensions between countries and avoiding adverse transboundary impacts such as pollution. For example, it includes provisions for early warning across borders, joint monitoring and assessment, mutual assistance etc. The following activities and tools under the Water Convention support recovery and prevention:

- The Water Convention supports countries to **develop or strengthen transboundary water agreements and joint institutions** as key instruments to negotiate transboundary water management, including water quantity, water quality and health aspects. Transboundary cooperation, including in particular river basin organizations can play an important role in coordinating and supporting actions by riparian countries for COVID-19 recovery and prevention of future crisis; some of them already have health and mutual assistance in their mandate and already support countries in tackling the COVID-19 pandemic.

- The Water Convention helps transboundary basins to **adapt to climate change** through capacity building activities organized at the global level and support provided to specific basins in development and implementation of transboundary adaptation strategies and plans. These activities also promote better resilience of countries, basins and people to prevent future emergencies, as they address the projected variety in water resources quantity and quality and increase linkages between transboundary water cooperation, climate change adaptation and disaster risk reduction.

- **Performant monitoring and effective information exchange** help to address emerging health concerns linked to water quality. The activities on data and information exchange and several guidance documents on monitoring and assessment developed under the Water Convention help to improve harmonized monitoring of waters (measuring, sampling, etc.) to ensure adequate and consistent information to inform decision-making in transboundary basins.

- **Financing access to water and sanitation and transboundary water cooperation** are increasingly important to prevent future crisis. The Water Convention guides the countries on funding and financing to support transboundary water cooperation processes.

- In countries of Eastern Europe, Caucasus and Central Asia, the EU Water Initiative **National Policy Dialogues on Integrated Water Resources Management and on Water Supply and Sanitation**, implemented under the programmes of work of the Water Convention and the Protocol on Water and Health, provide platforms for regular dialogue on water management, water and sanitation issues, hygiene and water-related diseases. In 2020-2021, the *National Policy Dialogue steering committees*, bringing together national water, health, environment, finance and other ministries, discuss measures needed in the water sector and beyond for COVID-19 recovery, as well as prevention of and preparedness to similar outbreaks in the future.

- The Task Force on the Water-Food-Energy-Ecosystems Nexus under the Water Convention provides a global platform to share experience on **intersectoral cooperation** in transboundary contexts, which is of particular relevance in the phase of recovery, when more than ever, Governments will be prioritizing securing supply and affordability of these resources to all citizens, including those who are vulnerable.

The Protocol on Water and Health: Supporting prevention, preparadeness and recovery

The provision of safe and sufficient water and adequate sanitation and hygiene is key to protecting human health during the infectious disease outbreaks, such as also COVID-19. Frequent handwashing according to appropriate hygiene standards require a continuous supply of safe water, and sanitation systems that are operational, including under challenging conditions, such as due to a changing climate.

In order to achieve the Protocol's objective of protecting human health and well-being through improving water management and preventing, controlling and reducing water-related disease (Article 1), countries should pursue the aim of ensuring access to drinking-water and provision of sanitation for everyone (Article 6). The fundamental requirements stemming from the above provisions are important pillars in responding to the COVID-19 pandemic and in guiding recovery efforts, while promoting the progressive realization of human rights.

Through its governance and accountability framework, the Protocol can play a vital role in "building forward better and fairer" from the pandemic by promoting safe, resilient and equitable WASH services for all in all places, including in communities, health care facilities and schools, and organizing the

[110] https://unece.org/environment-policy/water/COVID-19-role-water-convention-and-protocol-water-and-health

exchange of good practices and mutual support across pan-European countries.

The Protocol requires Parties to set national targets on water, sanitation and health, regularly review them and report upon their implementation (Articles 6 and 7). As targets shall be periodically revised, countries can use such opportunity to review and amend them to respond to the priorities and needs arisen from the COVID-19 pandemic.

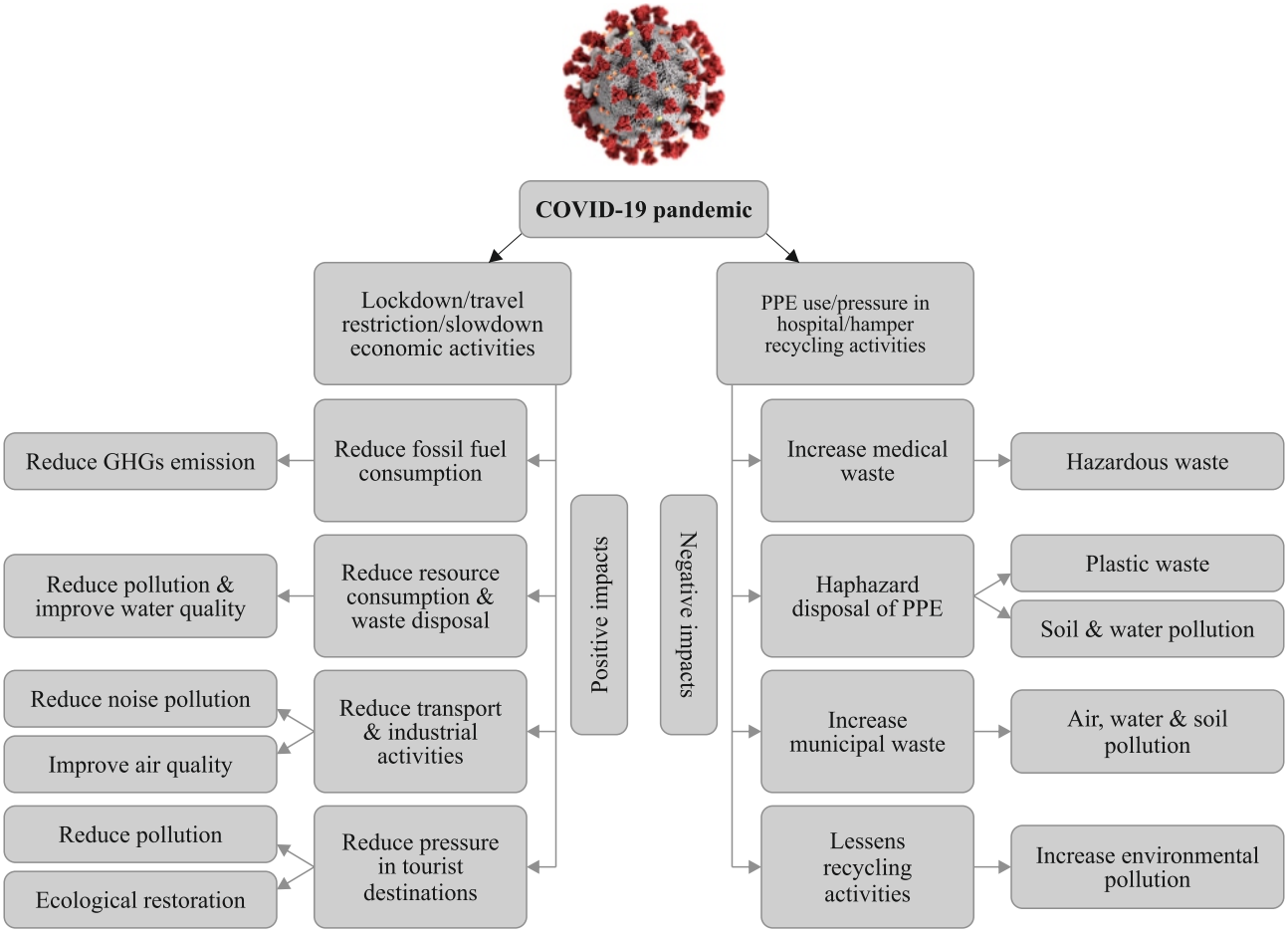
In accordance with Article 8, countries should establish, improve and maintain comprehensive national and/or local surveillance and early-warning systems, and prepare national and local contingency plans for responses to outbreaks of water-related disease, water quality incidents and risks. Although there is no evidence of waterborne transmission of SARS-CoV-2, surveillance of viral RNA in wastewater emerges as an important tool for timely and effective public health decision-making during the pandemic and can therefore be considered in further improving routine surveillance and early warning systems as defined in Article 8.

The more detailed requirements set by the Protocol and possible actions to support public health preparedness, response to and recovery from COVID-19 can be found here. These provide a conceptual framework that may support planning, financing, implementing and monitoring WASH interventions to prevent and control COVID-19 outbreaks, as well as other infectious diseases. Countries and partners may choose from the proposed action list and integrate them into national, local and setting-specific response and recovery plans.

Environmental effects of COVID-19 pandemic and potential strategies of sustainability[111]

The global outbreak of COVID-19 is affecting every part of human lives, including the physical world. A recent study on environemnatl effects of COVID indicates that the pandemic situation *significantly improves* air quality in different cities across the world, reduces GHGs emission, lessens water pollution and noise, and reduces the pressure on the tourist destinations, which may assist with the restoration of the

Positive and negative environmental effects of COVID-19 pandemic



[111] Rume, T., & Islam, S. (2020). Environmental effects of COVID-19 pandemic and potential strategies of sustainability. Heliyon, 6(9), e04965. https://doi.org/10.1016/j.heliyon.2020.e04965

ecological system. In addition, there are also some *negative consequences* of COVID-19, such as increase of medical waste, haphazard use and disposal of disinfectants, mask, and gloves; and burden of untreated wastes continuously endangering the environment. It seems that economic activities will return soon after the pandemic, and the situation might change. Hence, this study also outlines possible ways to achieve long-term environmental benefits. It is expected that the proper implementation of the proposed strategies might be helpful for the global environmental sustainability. Below a summary of this study is presented.

Environmental effects of COVID-19

The global disruption caused by the COVID-19 has brought about several effects on the environment and climate. Both positive and negative environmental impacts of COVID-19 are present in the Figure above.

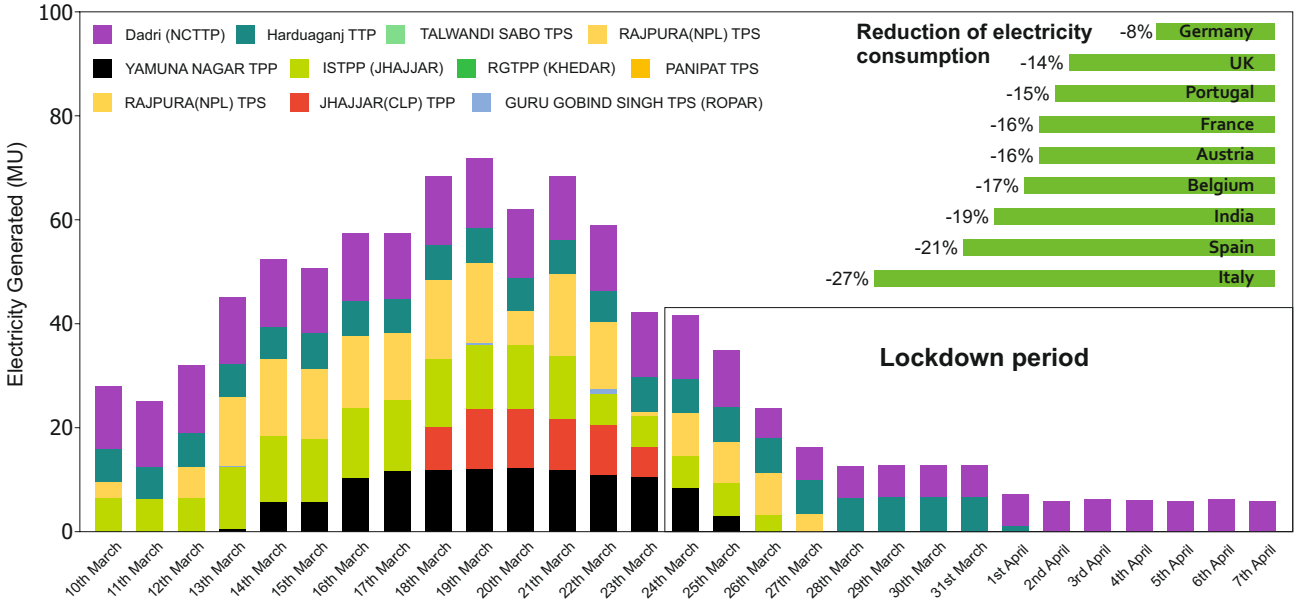
Positive environmental effects

Reduction of air pollution and GHGs emission. As industries, transportation and companies have closed down, it has brought a sudden drop of greenhouse gases (GHGs) emissions. Compared with this time of last year, levels of air pollution in Ney York has reduced by nearly 50% because of measures taken to control the virus (Henriques, 2020). It was estimated that nearly 50% reduction of N_2O and CO occurred due to the shutdown of heavy industries in China (Caine, 2020). Also, emission of NO_2 is one of the key indicators of global economic activities, which indicates a sign of reduction in many countries (e.g., US, Canada, China, India, Italy, Brazil etc.) due to the recent shutdown (Biswal et al., 2020; Ghosh, 2020; Saadat et al., 2020; Somani et al., 2020). [...]

It is assumed that vehicles and aviation are key contributors of emissions and contribute almost 72% and 11% of the transport sector's GHGs emission respectively (Henriques, 2020). The measures taken globally for the containment of the virus are also having a dramatic impact on the aviation sector. Many countries restricted international travelers from entry and departure. Due to the decreased passengers and restrictions, worldwide flights are being cancelled by commercial aircraft companies. For instance, China reduces almost 50-90% capacity of departing and 70% domestic flights due to the pandemic, compared to January 20, 2020, which ultimately deducted nearly 17% of national CO_2 emissions (Zogopoulos, 2020). Furthermore, it is reported that 96% of air travel dropped from a similar time last year globally due to the COVID-19 pandemic (Wallace, 2020), which has ultimate effects on the environment.

Overall, much less consumption of fossil fuels lessens the GHGs emission, which helps to combat against global climate change. According to the International Energy Agency (IEA), oil demand has dropped 435,000 barrels globally in the first three months of 2020, compared to the same period of last year (IEA, 2020). Besides, global coal consumption is also reduced because of less energy demand during the lockdown period (Figure below). [...]

Coal based electricity generation scenario before and after lockdown in the periphery of Delhi, India, along with total electricity consumption reduction in some selected countries



Data sources: Armstrong, 2020; CREA, 2020

Reduction of water pollution. Water pollution is a common phenomenon of a developing country like India, and Bangladesh, where domestic and industrial wastes are dumped into rivers without treatment (Islam and Azam, 2015; Islam and Huda, 2016; Bodrud-Doza et al., 2020; Yunus et al., 2020). During the lockdown period, the major industrial sources of pollution have shrunk or completely stopped, which helped to reduce the pollution load (Yunus et al., 2020). For instance, the river Ganga and Yamuna

have reached a significant level of purity due to the absence of industrial pollution on the days of lockdown in India. It is found that, among the 36 real-time monitoring stations of river Ganga, water from 27 stations met the permissible limit (Singhal and Matto, 2020). This improvement of water quality at Haridwar and Rishikesh was ascribed to the sudden drop of the number of visitors and 500% reduction of sewage and industrial effluents (Singhal and Matto, 2020; Somani et al., 2020). [...] It is reported that, due to the lockdown of COVID-19, the Grand Canal of Italy turned clear, and many aquatic species reappeared (Clifford, 2020). Water pollution is also reduced in the beach areas of Bangladesh, Malaysia, Thailand, Maldives, and Indonesia (Kundu, 2020; Rahman, 2020). Jribi et al. (2020) reported that, due to the COVID-19 lockdown, the amount of food waste is reduced in Tunisia, which ultimately reduces soil and water pollution. However, the amount of industrial water consumption is also reduced, especially from the textile sector around the globe (Cooper, 2020). Usually, huge amount of solid trashes is generated from construction and manufacturing process responsible for water and soil pollution, and it also reduced. Moreover, owing to the reduction of export-import business, the movement of merchant ship and other vessels is reduced globally, which also decreased emission as well as marine pollution.

Reduction of noise pollution. Noise pollution is the elevated levels of sound, generated from different human activities (e.g., machines, vehicles, construction work), which may lead to adverse effects on human and other living organisms (Goines and Hagler, 2007; Zambrano-Monserrate et al., 2020). Usually, noise negatively affects physiological health, along with cardiovascular disorders, hypertension, and sleep shortness of human (Kerns et al., 2018). It is reported that globally around 360 million people are prone to hearing loss due to noise pollution (Sims, 2020). World Health Organization predicted that in Europe alone, over 100 million people are exposed to high noise levels, above the recommended limit (WHO, 2012). Moreover, anthropogenic noise pollution has adverse impacts on wildlife through the changing balance in predator and prey detection and avoidance. Unwanted noise also negatively affects the invertebrates that help to control environmental processes which are vital for the balance of the ecosystem (Solan et al., 2016). However, the quarantine and lockdown measures mandate that people stay at home and reduce economic activities and communication worldwide, which ultimately reduced noise level in most cities (Zambrano-Monserrate et al., 2020). For instance, noise level of Delhi, the capital of India, is reduced drastically around 40-50% in the recent lockdown period (Somani et al., 2020). […] Moreover, due to travel restrictions, the number of flights and vehicular movements have drastically decreased around the world, which have ultimately reduced the level of noise pollution. For example, in Germany passenger air travel has been slashed by over 90%, car traffic has dropped by >50% and trains are running <25% than the usual rates (Sims, 2020). Overall, COVID-19 lockdown, and lessened economic activities reduced the noise pollution around the globe.

Ecological restoration and assimilation of tourist spots. Over the past few years, the tourism sector has witnessed a remarkable growth because of technological advancements and transport networks; which contribute significantly to global gross domestic product (GDP) (Lenzen et al., 2018). It is estimated that the tourism industry is responsible for 8% of global GHGs emission (Lenzen et al., 2018). However, the places of natural beauty (e.g., beaches, islands, national parks, mountains, desert and mangroves) usually attract the tourists, and make a huge harsh. To facilitate and accommodate them, lots of hotels, motel, restaurant, bar and market are built, which consume lots of energy and other natural resources (Pereira et al., 2017). For instance, Puig et al. (2017) calculated the carbon footprint of coastland hotel services of Spain and reported electricity and fuels consumption take a key role, and 2-star hotels have the highest carbon emissions. Moreover, visitors dump various wastes which impair natural beauty and create ecological imbalance (Islam and Bhuiyan, 2018). Due to the outbreak of COVID-19 and local restrictions, the number of tourists has dropped in the tourist spots around the world (Zambrano-Monserrate et al., 2020). For instance, Phuket, Thailand's most popular tourist's destination, with 5,452 visitors per day on average, goes into lockdown on April 9, 2020, due to the surge of COVID-19 (Cripps, 2020). Similarly, local administration imposed a ban on public gathering and tourist arrivals at Cox's Bazar sea beach, known as the longest unbroken natural sand sea beach in the world. As a result of restriction, the color of sea water is changed, which usually remain turbid because of swimming, bathing, playing and riding motorized boats (Rahman, 2020). Nature gets a time to assimilate human annoyance, and due to pollution reduction recently returning of dolphins was reported in the coast of Bay of Bengal (Bangladesh) and canals, waterways, and ports of Venice (Italy) after a long decade (Rahman, 2020; Kundu, 2020).

Negative environmental effects

Increase of biomedical waste generation. Since the outbreak of COVID-19, medical waste generation is increased globally, which is a major threat to public health and environment. For sample collection of the suspected COVID-19 patients, diagnosis, treatment of huge number of patients, and disinfection purpose lots of infectious and biomedical wastes are generated from hospitals (Somani et al., 2020; Zambrano-Monserrate et al., 2020). For instance, Wuhan in China produced more than 240 metric tons of medical wastes every day during the time of the outbreak (Saadat et al., 2020), which is almost 190 m tonnes higher than the normal time (Zambrano-Monserrate et al., 2020). Again, in the city of Ahmedabad of India, the amount of medical waste generation increased from 550-600 kg/day to around 1000 kg/day at the time of the first phase of lockdown (Somani et al., 2020). Around 206 m tonnes of medical waste are generated per day in Dhaka, the capital of Bangladesh because of COVID-19 (Rahman et al., 2020). Also other cities like Manila, Kuala Lumpur, Hanoi, and Bangkok experienced similar increases, producing 154-280 m tonnes more medical waste per day than before the pandemic (ADB, 2020). Such a sudden rise of hazardous wastes and their proper

management have become a significant challenge to the local waste management authorities. According to the recent published literature, it is reported that the SARS-CoV-2 virus can exist a day on cardboard, and up to 3 days on plastics and stainless steel (Van-Doremalen et al., 2020). So, waste generated from the hospitals (e.g., needles, syringes, bandage, mask, gloves, used tissue, and discarded medicines etc.) should be managed properly, to reduce further infection and environmental pollution, which is now a matter of concern globally.

Safety equipment use and haphazard disposal. To protect from the viral infection, presently peoples are using face mask, hand gloves and other safety equipment, which increase the amount of healthcare waste. It is reported that, in USA, trash amount has been increasing due to increased PPE use at the domestic level (Calma, 2020). Since the outbreak of COVID-19, the production and use of plastic based PPE is increased worldwide (Singh et al., 2020). For instance, China increased the daily production of medical masks to 14.8 million since February 2020, which is much higher than before (Fadare and Okoffo, 2020). However, due to lack of knowledge about infectious waste management, most people dump these (e.g., face mask, hand gloves etc.) in open places and in some cases with household wastes (Rahman et al., 2020). Such haphazard dumping of these trashes creates clogging in waterways and worsens environmental pollution (Singh et al., 2020; Zambrano-Monserrate et al., 2020). It is reported that face mask and other plastic based protective equipment are the potential source of microplastic fibers in the environment (Fadare and Okoffo, 2020). Usually, Polypropylene is used to make N-95 masks, and Tyvek for protective suits, gloves, and medical face shields, which can persist for a long time and release dioxin and toxic elements into the environment (Singh et al., 2020). Though, experts and responsible authorities suggest for the proper disposal and segregation of household organic waste and plastic based protective equipment (hazardous medical waste), but mixing up these wastes increases the risk of disease transmission, and exposure to the virus of waste workers (Ma et al., 2020; Somani et al., 2020; Singh et al., 2020).

Municipal solid waste generation, and reduction of recycling. Increase of municipal (both organic and inorganic) waste generation has direct and indirect effects on environment like air, water and soil pollution (Islam et al., 2016). Due to the pandemic, quarantine policies established in many countries have led to an increase in the demand of online shopping for home delivery, which ultimately increase the amount of household wastes from shipped package materials (Somani et al., 2020; Zambrano-Monserrate et al., 2020). However, waste recycling is an effective way to prevent pollution, save energy, and conserve natural resources (Ma et al., 2019). But, due to the pandemic many countries postponed the waste recycling activities to reduce the transmission of viral infection. For instance, USA restricted recycling programs in many cities (nearly 46%), as government worried about the risk of COVID-19 spreading in recycling facilities (Somani et al., 2020). United Kingdom, Italy, and other European countries also prohibited infected residents from sorting their waste (Zambrano-Monserrate et al., 2020). Overall, due to disruption of routine municipal waste management, waste recovery and recycling activities, the landfilling and environmental pollutants increased worldwide.

Other effects on the environment. Recently, huge amount of disinfectants has been applied onto roads, in commercial, and residential areas to exterminate SARS-CoV-2 virus. Such extensive use of disinfectants may kill non-targeted beneficial species, which may create ecological imbalance (Islam and Bhuiyan, 2016). Moreover, SARS-CoV-2 virus was detected in the COVID-19 patient's faeces and also from municipal wastewater in many countries including Australia, India, Sweden, Netherlands and USA (Ahmed et al., 2020; Nghiem et al., 2020; Mallapaty, 2020). So, additional measures in wastewater treatment are essential, which is challenging for developing countries like Bangladesh, where municipal wastewater is drained into nearby aquatic bodies and rivers without treatment (Islam and Azam, 2015; Rahman and Islam, 2016). China has already strengthened the disinfection process (increased use of chlorine) to prevent SARS-CoV-2 virus spreading through the wastewater. But, the excessive use of chlorine in water could generate harmful by-product (Zambrano-Monserrate et al., 2020).

Potential strategies of environmental sustainability

It is assumed that all of these environmental consequences are short-term. So, it is high time to make a proper strategy for long-term benefit, as well as sustainable environmental management. The COVID-19 pandemic has elicited a global response and made us united to win against the virus. Similarly, to protect the globe, the home of human beings, united efforts of the countries are imperative (Somani et al., 2020). Therefore, some strategies are proposed for global environmental sustainability.

1. Sustainable industrialization: Industrialization is crucial for economic growth; however, it's time to think about sustainability. For sustainable industrialization, it is essential to shift to less energy-intensive industries, use of cleaner fuels and technologies, and strong energy efficient policies (Pan, 2016). Moreover, industries should be built in some specific zones, keeping in mind that wastes from one industry can be used as raw materials of the other (Hysa et al., 2020). After a certain period of time, industrial zones should have been shut down in a circular way to reduce emission without hampering the national economy. Again, in industries, especially readymade garments (RMG) and others, where a huge number of people work, proper distance and hygienic environment should be maintained to reduce the spread of any infectious communicable disease.

2. Use of green and public transport: To reduce emissions, it is necessary to encourage people to use public transport, rather than private vehicles. Besides, people should be encouraged to use bicycle in a short distance, and public bike sharing (PBS) system

(like China) should be available for mass usage, which is not only environmentally friendly but also beneficial for health.

3. Use of renewable energy: Use of renewable energy can lower the demand for fossil fuels like coal, oil, and natural gas, which can play an important role in reducing the GHGs emissions (Ellabban et al., 2014; CCAC, 2019). Due to the COVID-19 pandemic, global energy demand drops down, which results in the reduction of emission and increased ambient air quality in many areas (Somani et al., 2020; Zambrano-Monserrate et al., 2020). But, to maintain the daily needs and global economic growth, it is not possible to cut-off energy demand like a pandemic situation. Hence, the use of renewable energy sources like solar, wind, hydropower, geothermal heat and biomass can meet the energy demand and reduce the GHGs emission (Ellabban et al., 2014).

4. Wastewater treatment and reuse: To face the challenges of water pollution, both industrial and municipal wastewater should be properly treated before discharge. Besides, reuse of treated wastewater in non-production processes like toilet flushing and road cleaning can reduce the burden of excess water withdrawal.

5. Waste recycling and reuse: To reduce the burden of wastes and environmental pollution, both industrial and municipal wastes should be recycled and reused. Hence, circular economy or circularity systems should be implemented in the production processes to minimize the use of raw material and waste generation (Hysa et al., 2020). Moreover, hazardous and infectious medical wastes should be properly managed by following the guidelines (WHO, 2020c). It is now clear that majority of people (especially in developing countries) lack the knowledge about waste segregation and disposal (Rahman et al., 2020). So, governments should implement extensive awareness campaigns through different mass media, regarding proper waste segregation, handling and disposal.

6. Ecological restoration and ecotourism: For ecological restoration, tourist spots should be periodically shut down. Moreover, ecotourism practices should be strengthened to promote sustainable livelihoods, cultural preservation, and biodiversity conservation (Islam and Bhuiyan, 2018).

7. Behavioral change in daily life: To reduce the carbon footprint and global carbon emission, it is necessary to change our daily behavior and optimize consumption; avoid processed and take locally grown food, make compost from food waste, switch off or unplug electronic devices when not used, and use a bicycle instead of a car for short(er) distances.

8. International cooperation: To meet the sustainable environmental goals and protect global environmental resources, such as global climate and biological diversity, combined international effort is essential (ICIMOD, 2020). Hence, the responsible international authority like the United Nations Environment Programme (UN Environment) should take effective role to prepare time-oriented policies, arrange international conventions, and ensure coordination of global leaders for appropriate implementation.

Directly or indirectly, the pandemic affects human life and the global economy, which ultimately has effects on the environment and climate. It reminds us on how we have neglected the environmental elements and enforced human induced climate change. Moreover, the global response to COVID-19 also teaches us to work together to combat threats the mankind faces. Though the impacts of COVID-19 on the environment are short-term, united and time-oriented efforts can strengthen environmental sustainability and save the Earth from the effects of global climate change.

COVID-19: lessons for sustainability?[112]

This briefing from the 'Narratives for Change' series reflects on the lessons learned from the COVID-19 pandemic and asks how these lessons can be applied to our quest for sustainability and how we can govern our societies in a way that respects planetary health as a precondition for human and economic health.

Key messages include:

- COVID-19 can be seen as a 'late lesson' from an early warning. Environmental degradation increases the risk of pandemics. COVID-19 emerged and escalated through the complex interplay between drivers of change, such as ecosystem disturbance, urbanisation, international travel and climate change.

- The pandemic has shown that our societies have immense potential for collective action and change when faced with a perceived emergency.

- Thus far, the unprecedented agency shown by governments in responding to COVID-19 does not seem to have greatly served the cause of sustainability.

- Human health and environmental integrity are intertwined. A transition to a sustainable society and economy is necessary to protect human health.

- To 'build back better', society and governments must reflect on what to do differently and what to stop doing altogether.

[112] www.eea.europa.eu/publications/covid-19-lessons-for-sustainability

Human Rights, the Environment and COVID-19[113]

The COVID-19 crisis reveals a clear truth about catastrophic risk in an increasingly globalized world: an effective response requires immediate, ambitious and evidence-based preventive action at the international level. To avert future global threats, including pandemics, we must protect rights to a safe, clean, healthy and sustainable environment upon which we all depend for our health and wellbeing. A human rights-based approach to the COVID-19 crisis is also needed to address its unequal impacts on the poor, vulnerable and marginalized and its underlying drivers, including environmental degradation. The following key messages summarized by UNEP, COVID-19 Response and UN Human Rights Office of the High Commissioner on human rights, the environment and COVID-19 highlight essential human rights obligations and responsibilities of States and others, including businesses, in addressing and responding to the COVID-19 crisis.

1. Fulfil the Right to a Healthy Environment

Environmental degradation and biodiversity loss create the conditions for an increase in the type of animal-to-human zoonosis that can result in viral epidemics. They also contribute to pre-existing medical conditions, such as asthma, that make persons more vulnerable to viral infections. More than 150 countries recognize the right to a safe, clean and healthy environment in some form. The substantive elements of this right include a safe climate, water and sanitation, clean air, healthy and sustainably produced food, non-toxic environments, healthy ecosystems and biodiversity. These elements are prerequisites for human health and resilience in the face of illness and for reducing the risk of zoonosis and expansion of existing disease vectors. According to the Human Rights Committee, environmental degradation is one of "the most pressing and serious threats to the ability of present and future generations to enjoy the right to life" and protecting the human right to life "depends on measures taken by States parties to protect the environment". The COVID-19 response should respect, protect and fulfil rights to a healthy environment.

2. Re-Think Our Interactions with Nature

The COVID-19 pandemic should push us all to rethink our interactions with nature and wildlife. Around 60 percent of all infectious diseases and 75 percent of all emerging infectious diseases in humans, including COVID-19, are zoonotic. On average, one new infectious disease emerges in humans every four months. Ecosystem integrity is the foundation of human health and development. Human-induced environmental changes modify wildlife population structure and reduce biodiversity, resulting in new conditions that favour particular hosts, vectors, and/or pathogens. Integrating the human right to a healthy environment in key environmental agreements and processes, such as the post-2020 Global Biodiversity Framework, is critical to a holistic response to COVID-19 that includes reconceptualization of the relationship between people and nature that will reduce risks and prevent future harms from environmental degradation.

3. Protect Those Living in Poverty or Subject to Discrimination

The poor and marginalized are among those worst impacted by both COVID-19 and environmental harms such as climate change, biodiversity loss and pollution that threaten full and effective enjoyment of all human rights. Environmental harms disproportionately impact individuals, groups and peoples already living in vulnerable situations – including women, children, the poor, minorities, migrants, indigenous peoples, and persons with disabilities. Crises such as COVID-19 amplify those impacts, including through adverse effects on access to food and land, water and sanitation, housing, livelihoods, decent work, healthcare and other basic necessities. Fulfilling human rights, including the human right to a healthy environment, not only reduces disproportionate impacts, it also fosters more resilient societies. The COVID-19 pandemic demonstrates that society can only be as healthy as its most vulnerable members. The COVID-19 response should address inequalities and focus on protection of persons in vulnerable situations in order to leave no one behind.

4. Strengthen Environmental Rule of Law and Protect Environmental Human Rights Defenders

The COVID-19 crisis requires us to reconsider the policies and practices that have contributed to our current situation. Rather than rolling back environmental laws and policies, it is time to step up environmental protection and enforcement in order to create resilience and reduce future pandemic risks, bearing in mind that short-term economic gains from deregulation often come at long-term costs.

States should recognize the right to a safe, clean, healthy and sustainable environment in their constitutional and legislative frameworks, with effective remedies for violations of this right. At practical level, States can, for example, strengthen efforts to combat illegal trade in wildlife – reducing potential avenues for zoonosis and promoting the rule of law while ensuring alternative and sustainable livelihoods.

Tourism fees often fund parks and conservation efforts. The COVID-19 crisis jeopardizes this revenue stream and funding against poaching, illegal wildlife trade and other forms of prohibited exploitation of natural resources, placing increased pressure on natural systems. Effective and inclusive conservation efforts are essential to protect healthy ecosystems and the communities that depend on them. Environmental human rights defenders are essential allies in efforts to protect the environment and, by extension, human health during the COVID-19 crisis. Action is needed to protect both the environment and its defenders including, in many cases, Indigenous Peoples, whose worldviews and traditional

[113] www.unep.org/resources/report/human-rights-environment-and-COVID-19-key-messages

knowledge can bring critical perspectives for sustainable and rights-based development. Limitations on civic space undermine the crucial advocacy of environmental human rights defenders, which in turn can pave the way for short-sighted and dangerous actions. Defenders should be empowered and protected from threats, reprisals, and harassment, including as relating to emergency decrees and legislation.

5. Guarantee Meaningful and Informed Participation

The International Covenant on Civil and Political Rights and other international human rights instruments establish that participation and access to information are human rights. The importance of participation and access to information in environmental matters has been frequently reaffirmed, including by Rio Principle 10, the Paris Agreement, the Aarhus Convention and the Escazù Agreement.

Governments and businesses should be transparent in sharing relevant information related to their efforts to address environmental and health crises and ensuring the informed participation of all persons in decision-making processes that affect them. During this crisis, Governments and the international community should find new ways and modalities of working.

Environmental governance should be modernized, including through inclusive and rights-based tools for digital participation and access to information, ensuring that essential environmental decision-making continues in an inclusive and effective manner regardless of the exigencies posed by COVID-19. Meaningful, informed and effective participation of all people is not just their human right, it also leads to more effective, equitable and inclusive environmental action.

Drawing on the diverse interests, needs and expertise of all people, including women and girls, local communities and indigenous peoples, offers important insights for inclusive and sustainable environmental action. The COVID-19 crisis should be a catalyst for further democratization of environmental decision-making at all levels through improved use of digital space and inclusive consultative processes.

6. Minimize the Harmful Impacts of Medical Waste

The COVID-19 response has led to increased use of medical supplies, including testing kits and protective equipment, as well as packaging/delivery supplies such as single use plastics. Effective and comprehensive waste management, including medical, household and other hazardous waste, is critical to minimize possible secondary impacts on health and the environment caused by the COVID-19 response.

The poorest, most vulnerable and marginalized communities without access to waste management or sanitation infrastructure have been, and will continue to be, hit the hardest by secondary effects on health, livelihood and rights. Preventing environmental harm and ensuring the full and effective implementation of basic human rights such as those to health, a healthy environment, and water and sanitation, is critical to prevent and minimize the risk of infectious diseases.

States and other duty-bearers should ensure the safe handling and disposal of waste as a vital component of an effective and comprehensive emergency response and treat waste management, including of medical, household and other hazardous waste, as an urgent and essential public service. Effective and equitable management of biomedical and health-care waste should be guaranteed through appropriate identification, collection, separation, storage, transportation, treatment, protection, training and disposal.

7. Build Back Better

A rights-based approach to the COVID-19 recovery and response requires that we build back better and more sustainably. Economic stimulus packages should protect and benefit the most vulnerable while advancing efforts to fulfil human rights, achieve the 2030 Agenda and the SDGs, and limit global heating to the greatest extent possible.

The response to the crisis presents an opportunity to support improved social protection measures, and a just transition to a sustainable, no-carbon economy founded on renewable energy, environmentally sound technology, sustainable resource use, community empowerment and livelihoods of dignity.

States should work jointly and individually to mobilize the maximum available resources toward building back better. Country-level socioeconomic impact analysis of COVID-19, the Common Country Analysis, UN Sustainable Development Cooperation Frameworks and the UN Secretary-General's Call to Action for Human Rights are important entry points for building back better and for operationalizing the human right to a healthy environment.

The rights of all people to benefit from science and its applications must also be safeguarded ensuring that solutions to global problems, like a vaccine for COVID-19 or environmentally sound technologies, are equitably shared by all. Over the long run, inclusive, sustainable and equitable economies are more robust.

All States have an obligation to pursue development that benefits both people and the planet and equitably distribute the benefits thereof. Businesses have a responsibility to respect human rights and it is also in their best interest to pursue sustainable development.

8. Learn from the COVID-19 Crisis

In the face of global risks, rapid, evidence-based, participatory and collective action not only produces the best results, it is also fulfilling human rights obligations. Effective responses to COVID-19 and environmental crises should be global responses grounded in solidarity, compassion, respect for human dignity and ecological integrity.

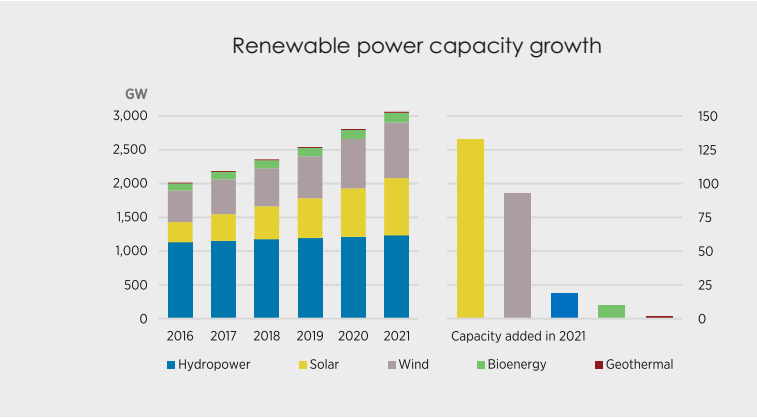
The required actions and international cooperation must build on obligations of States and other duty-bearers in international legal frameworks and instruments such as the Universal Declaration on Human Rights, the Declaration on the Right to Development, and the Rio Declaration.

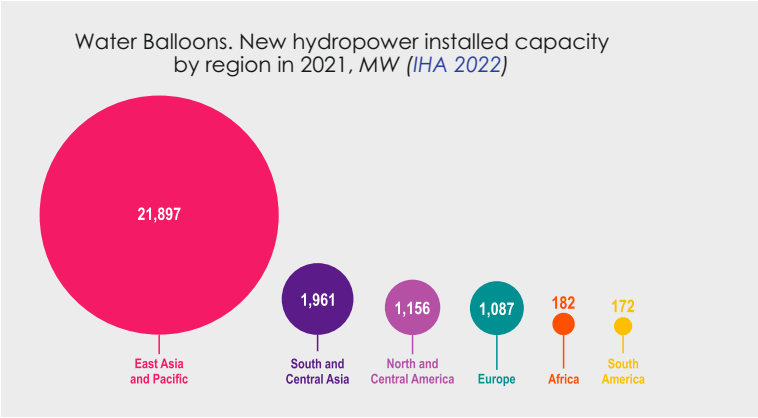
Collaboration between governments, international partners, civil society, activists, the private sector, and all individuals and peoples are needed to fulfil human

rights, including rights to a safe, clean, healthy and sustainable environment, and to achieve sustainable development that equitably meets the needs of present and future generations.

12.5. Review of Hydropower Capacity Additions in 2021

Prepared by Eugene Simonov, the Rivers without Boundaries Coalition





Source: https://www.irena.org/publications/2022/Apr/Renewable-Capacity-Statistics-2022

Hydropower built in 2021: Its role in energy revolution continues to decline, but damage to river ecosystems persists

Hydro – no longer the engine for energy transition

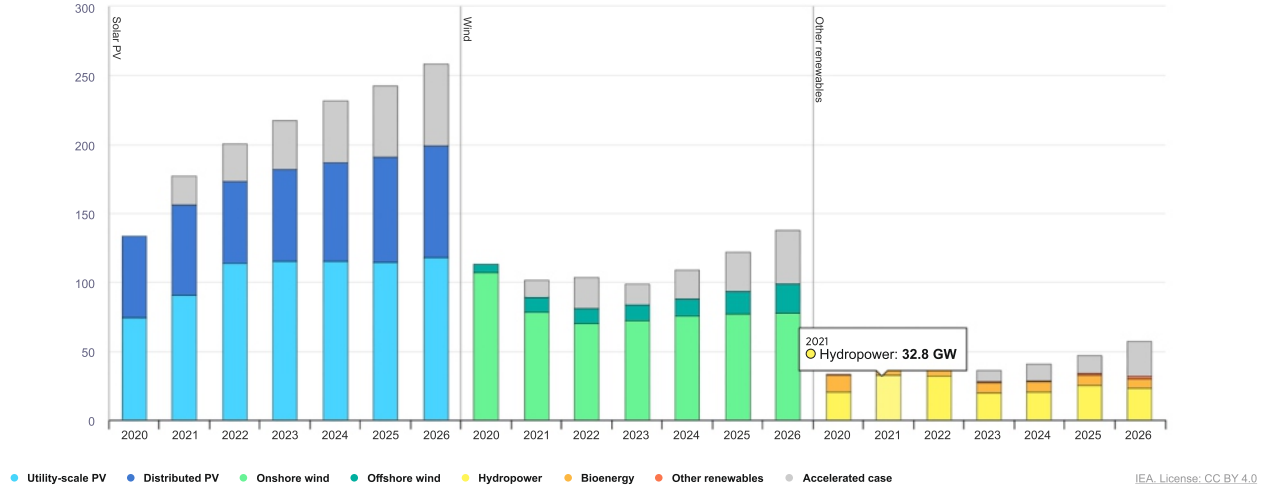
In April IRENA issued new Renewable Capacity Statistics: Hydropower net additions (without pumped storage) are preliminarily assessed in 2021 as 18.9 GW, which is only 7% of global growth in renewables estimated as 257 GW (roughly the same additions as in 2022). Hydropower has shown the slowest growth (2%) among all types of renewables (9% on average).

In June the IHA followed with the State of Hydropower Report for 2021 which reveals that 26,445 MW were added in 2021, from which 4,700MW in pumped storage.

Finally, Ren21 thinktank also issued its regular report: "Renewables 2022 Global Status Report", which has the most informative chapter on hydropower. It estimates expansion of hydropower in 2021 at 26GW and expansion of Pumped storage at 3 GW.

The International Energy Agency recently predicted that in the "main case" (without policy-driven acceleration) hydropower capacity addition will be highest in 2021-2022 (during the period before 2026) and will constitute 33 GW. If we add to 19 GW of conventional hydro the 4.7GW of pumped-storage hydro (PSH) installed in 2021 then overall addition will be still only 24 GW – one quarter or 9 GW short of the IEA forecast. If we opt to use 26.4 GW reported by the IHA or Ren21, this gap will be 6.6 GW.

Chart on RE capacity additions from the IEA Report Renewables 2021 published in December 21



Source: https://www.iea.org/data-and-statistics/charts/annual-capacity-additions-of-solar-pv-wind-and-other-renewables-main-and-accelerated-cases-2020-2026

Data from all agencies again vividly show that significance of hydropower for energy transition continues to decline, despite hectic efforts of industrial lobby to promote its "decisive role in fighting climate change". This is fully in line with IPCC report on mitigation issued in April 2022, which listed hydropower as having the least potential to reduce GHG emissions among all measures in energy industry in the period before 2030, when urgent action is needed. See chart: https://www.ipcc.ch/report/ar6/wg3/figures/summary-for-policymakers/figure-spm-7

Bad climate for hydro

According to Ren21 Report, despite growth in capacity, "*global generation from hydropower fell an estimated 3.5% in 2021 to around 4,218 terawatt-hours (TWh). This reflected changes in hydrological conditions, specifically the significant and sustained droughts that have affected major hydropower producers in the Americas and in many parts of Asia. Loss of glacial icecaps, such as in the Himalayas, is causing long-term change in output in affected areas. The large producers experiencing the greatest decline in generation in 2021 were Turkey (-28.7%), Brazil (-9.1%) and the United States (-8.8%). Other major markets with more modest contractions (although in some cases larger multi-year declines) included India (-2.2%), Canada (-1.5%) and China (-1.1%). The IHA Report also referred to similar trend in several regions*". In 2021-2022, Norway undergoes the climate-related crisis in generation and is forced to reduce power supplies to EU.

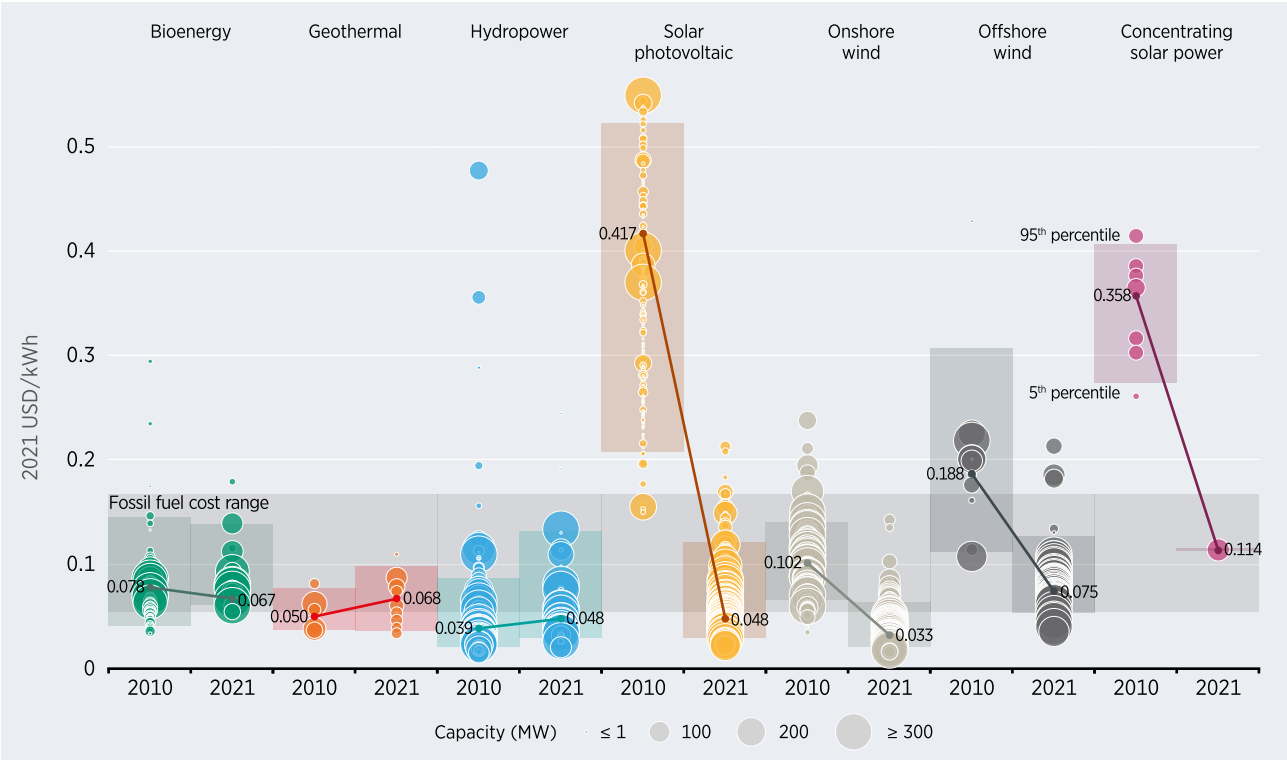
Increase of river flow may be as dangerous as decrease. Ren21 reminds that "*India's hydroelectricity generation fell slightly during 2021 (-2.2%) to 168.4 TWh, the overall trend in recent years has been a large increase in output, driven mainly by the melting of glacial icecaps. In the five years since 2016, hydropower generation rose 31% while installed capacity increased only 9.2%.Glacial melting in the Himalayas contributes to increased river flow, as the mountain range has lost an estimated half meter of ice (8 billion tons of water) on average per year over the last two decades. In early 2021, the Rishi Ganga River in Uttarakhand swelled more than 15 metres in an avalanche-induced flash flood of glacial meltwater. In additions to the many lives lost, the torrent destroyed the 13.2 MW Rishi Ganga plant and damaged the 520 MW Tapovan-Vishnugad plant under construction.*"

Despite prices of all renewables continue to decline, except for hydropower

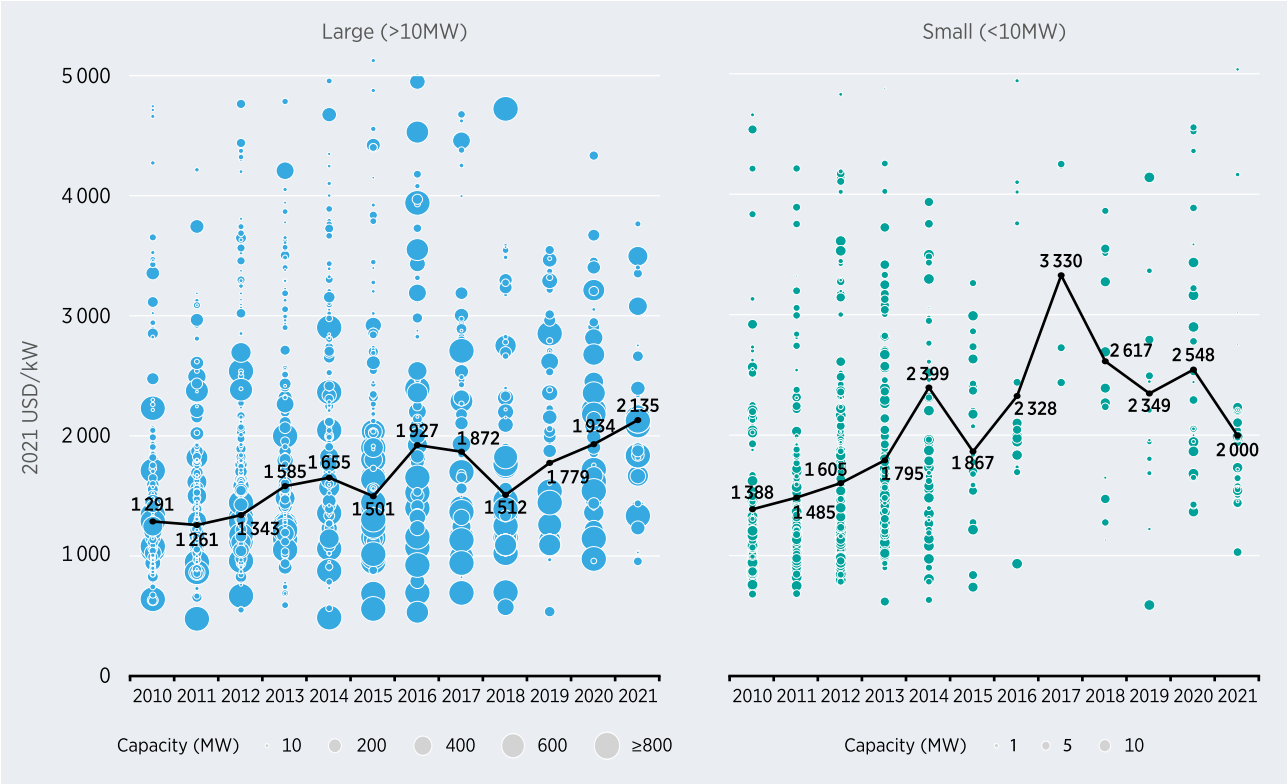
Another IRENA Report "Renewable Power Generation Costs in 2021" shows that the newly commissioned hydropower projects have lost their major competitive advantage, that is the cost of generated hydropower virtually all over the world.

The below Figure shows that in the last decade the cost of solar and wind generation (one kilowatt hour) fell by 60-80%. *The cost of one kilowatt hour of energy produced by newly commissioned hydropower projects increased by 24% and became equal for solar*. Certainly, this is the case for new hydropower projects as the earlier commissioned ones, with already repaid construction, have lower cost of generation but growing cost of modernization.

Global weighted average LCOEs from newly commissioned, utility-scale renewable power generation technologies, 2010-2021



Total installed costs for small and large hydropower projects and the global weighted average, 2010-2021



Source: IRENA Renewable Cost Database

Economically, this means that hydropower projects do not offer anymore the cost-efficient production of energy demanded. In other words, it is advisable to use maneuvering capacities of existing hydropower projects to balance variable daily generation of newly commissioned solar and wind project instead of building new hydropower.

Construction of new hydropower projects becomes challenging for a number of reasons: long lead and construction time, frequent and significant cost overrun, high cost of individual projects, and continually rising cost for adding unit hydropower capacity to new projects.

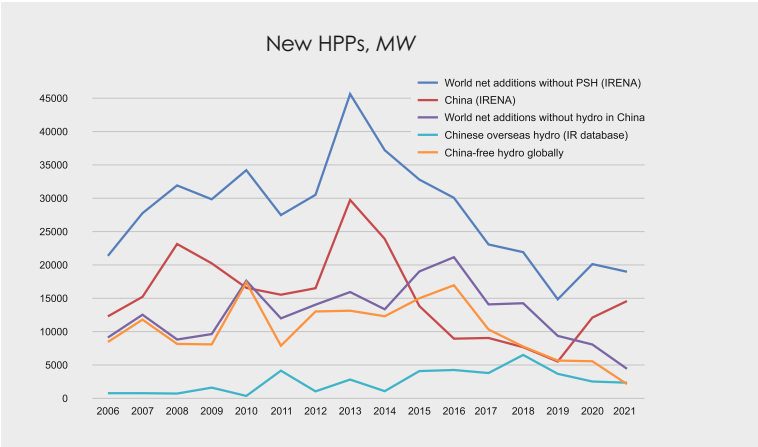
In a decade, the installed costs for hydropower rose by 64%, whereas for solar and power generation those decline rapidly. The cost of one kilowatt of energy produced is on average $2,135 for hydropower, $1,327 for onshore wind, and $857 for solar PV.

Interestingly, lower costs in the past years were determined by lower-than-average installed costs in China, which added, at least, the half of capacities in the world. The higher was the share in China, the cheaper the cost of one kilowatt of energy seemed. In 2021, for the first time China acknowledged that hydropower is very expensive to build.

Actual picture more worrying than it seems

According to IRENA, 46 countries added some hydropower capacity in 2021, while in 9 countries capacity decreased (similar numbers observed in 2020).The IHA believes that only 38 countries added some capacity.

Closer look at IRENA's statistics shows that actual newly installed conventional hydropower (at country level) accounted for 23 GW (very close to IHA figures), while reported decline in capacity have been almost 4.5 GW, most of it in USA and EU. This mysterious decline is 10 times more than country-level reductions in capacity reported in 2020. This means that despite declining "net additions", in 2021 we see at least 1.6-3 GW more of new conventional hydro put online than in 2020. Of course, we do not know what part of new capacity comes from modernization of old existing dams, but it normally under 10% and list of countries with new additions makes us think that share is even lower. This, likely, there was year to year increase in new rivers destroyed for hydropower.



Source: https://www.irena.org/publications/2022/Apr/Renewable-Capacity-Statistics-2022. Graph by RwB

Pumped storage hydropower (PSH)

PSH is considered a promising way to store energy and regulate energy systems, but its development recently experienced serious setbacks. China has upgraded its policies to incentivize PSH. According to IRENA, in 2021 China commissioned 6 GW of pumped storage, which brings overall pumped storage capacity in China to 36GW. According to the IHA, China added 4.5 GW, but any project-level evidence is presented only for 1,300MW (600 MW at Fengning pumped storage 600 and 700 MW at Jilin Dunhua PSH). Ren 21 documented 2850MW of new PSH in nine different projects.

Ukraine, who comes next, installed 324 MW of pumped storage. The United States expanded one PSH by 70 MW

Globally net PSH addition in 2021 was 5,992 MW according to IRENA and 4,700 MW according to the IHA and we cannot find proof to either of these figures at project level.

An average PSH is less destructive for river ecosystems and sometimes can be built without damming any natural streams (closed-loop design). However, built at wrong place (like Kanev PSH in Ukraine or Snowy-II in Australia) a pumped storage facility may incur as much negative impact as two conventional hydropower plants. All in all, slowing down of convention hydro development partly depends on incentives created for acquiring costly but reliable PSH technology, which is better suited for regulating energy systems.

The role of China

According to IRENA, China alone installed domestically 14.5 GW, mostly by completing several mega-dams in Yangtze Basin, which makes up 80% of net additions in 2021. This includes completion of the first high-altitude dam in Tibetan Plateau – Lianghekou, where it flooded Jinsha river valley – essential refugia both for biodiversity and indigenous people.

According to IHA, "*China continues to lead the way on new development, contributing 16,300 MW of the new capacity that came online in 2021 (besides, Pumped storage hydropower totaled 4.5 GW of the new additions in capacity, up on the 1.5 GW added in 2020).*"

According to Ren21, "*While China's net hydropower capacity grew around 5.6%, generation fell 1.1% to 1,340 TWh in 2021. Hydropower's relative contribution to the country's energy mix has declined in recent years as other generating technologies have gained market share and as capacity utilization has decreased (due likely to changing weather patterns). During the (13th five-year plan) period 2016-2021, China's overall electricity generation rose more than 36%, while hydropower output grew only around 12% (with capacity growth of 16%), causing hydropower's share of supply to drop from 19.4% to 16%.*"

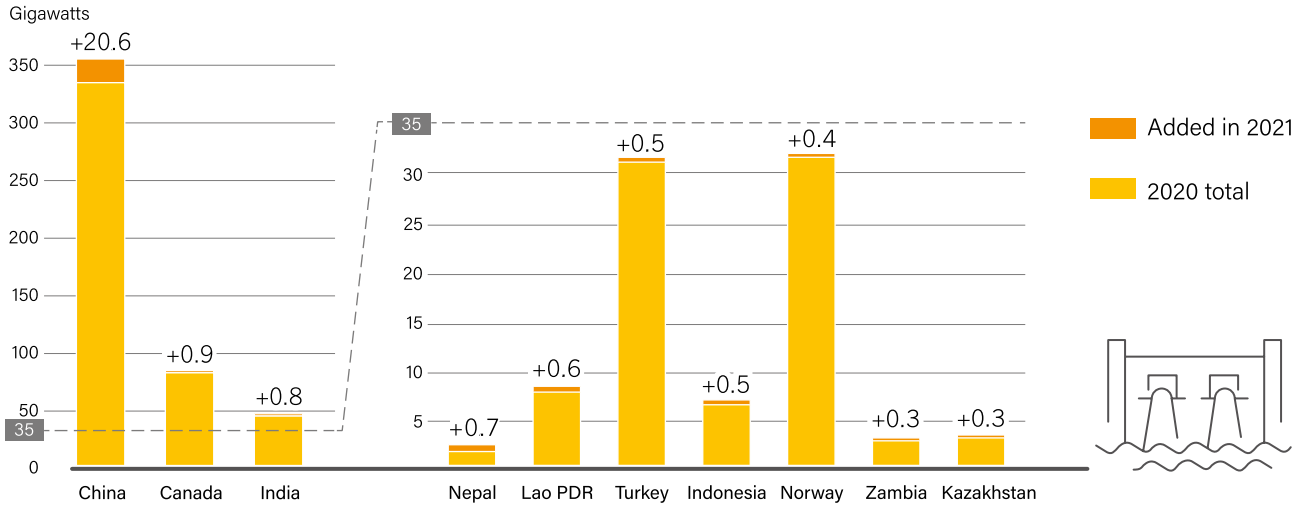
In the rest of the world approximately 6 GW of hydropower was installed in 2021 and no country besides China installed more than 1 GW. Much of those additions came with China's financing and/or hydroengineering contracts.

In our preliminary estimate Chinese companies in 2021 participated in installing at least 2,200 MW in other countries of the world. This brings participation of Chinese companies up to 90% of net hydropower capacity installed globally in 2021.

What other countries installed hydropower in 2021?

According to the IHA and Ren21 reports, globally installed hydropower in 2021 included at least 11 pumped storage units, completion of units in approximately 25 conventional dam-based large greenfield hydropower projects, more than 80 small hydropower stations (<10MW). Reports named only 6 projects of expansion through modernization of existing facilities, but this is due to less attention paid to this crucial activity by industry and governments. Accuracy of national reporting to IRENA differs from country to country and we rely on IHA/Ren21 data in case of discrepancy. We also found no explanation for exceptionally high figures of decrease in capacity in the United States (3.8 GW) reported by IRENA. Table below covers only capacity additions > 10 MW.

Hydropower Global Capacity and Additions, Shares of Top 10 Countries, 2021



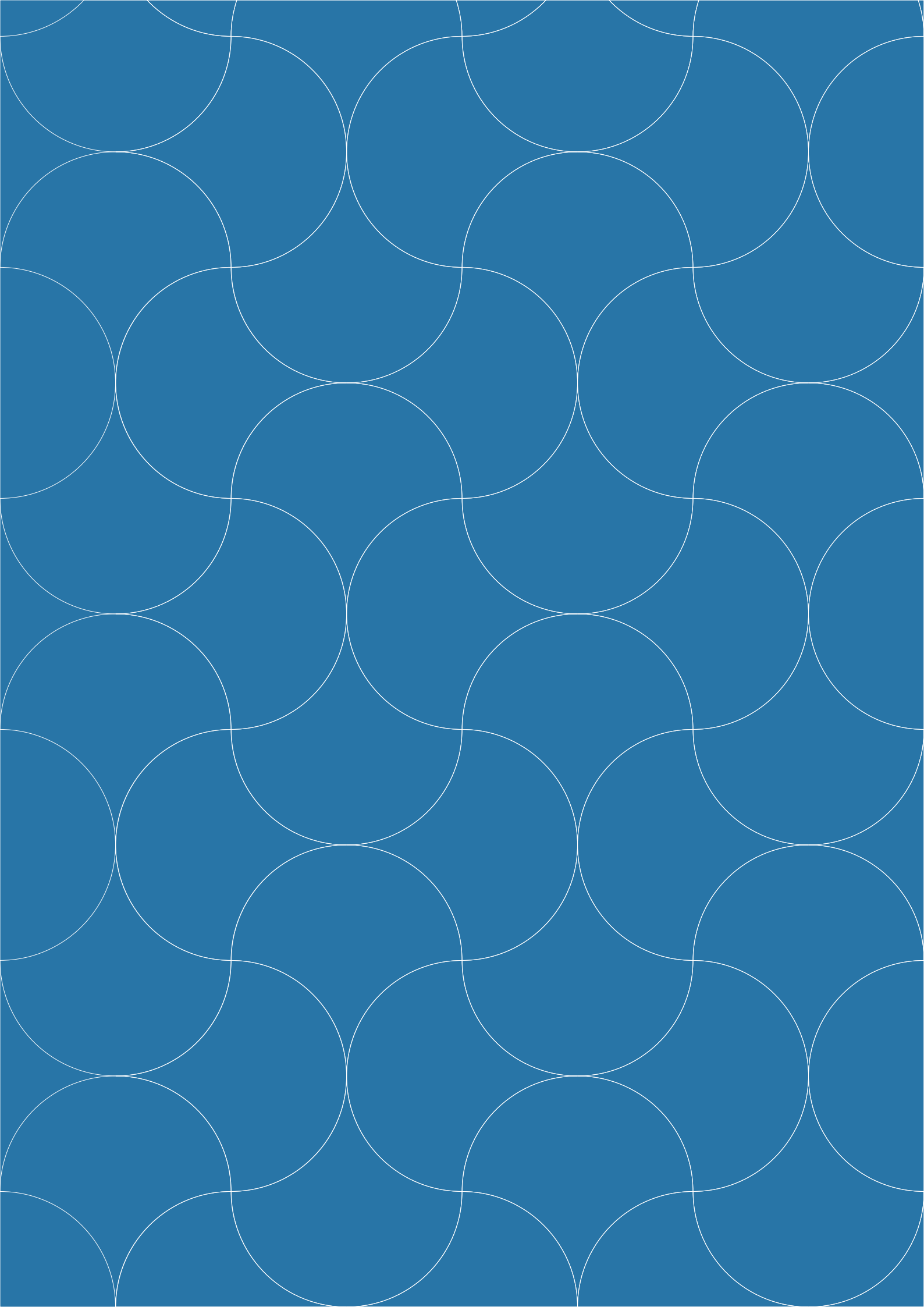
Source: Ren21 "Renewables 2022 Global Status Report".

Canada, Nepal, Lao PDR, Norway, Zambia, are countries with most of their generation coming from hydro, thus new hydropower does not improve or diversify their energy systems. Nearly half of countries which added more than 10 MW are those with more than 50% of their electricity already supplied by hydro, which makes them potentially vulnerable to climate change.

Country	All *(MW)*	Without PSH	PSH	Project-level data, mostly from IHA, Ren21 and RwB
	IHA and (Ren21)	IRENA	Ren21	Projects associated with documented serious environmental problems **highlighted**
China	20,840	14,500	2,850	Conventional HPP: 6 units 6,000 MW of Baihetan, 3,400 MW of Wudonghe, 2,500 MW at high altitude **Lianhekou** and 1,500 MW at Yangfanggou. Pumped storage: 600 MW of 3,600 MW Fengning pumped storage, 700 MW of the 1,400 MW Jilin Dunhua, and 7 other PSH units according to Ren21
Canada	924	1,333		Ren21: the 824 MW **Muskrat Falls** facility in Labrador brought into service the second half of its generating units during the year. The project suffered significant delays and budget overruns. Difficulties also remain with the transmission interlink with Newfoundland, cutting off intended customers. In Manitoba, the first five of the seven generating units making up the 695 MW Keeyask plant were placed into service in 2021
India	803	800		Last two 150 MW turbines at the 600 MW **Kameng** project in Arunachal Pradesh, two 50 MW units at Sorang, 113 MW at Rongnichu and three 60 MW units ready for service by year's end at the Bajoli Holi HPP
Nepal	684	690		450 MW **Upper Tamakoshi** finally commissioned after many years of delay and serious overspending
Laos	600	767		Part of **Nam Ou** Cascade project is operational. Power China has 29-year BOT rights to entire Ou River basin. Project is impacting local communities and Luang Prabang World Heritage property
Turkey	513	509		The remaining two 155 MW turbines were installed at the 500 MW **Lower Kaleköy on the Murat River** (Upper Euphrates). Also on the Murat River, Turkey's 280 MW Alpaslan II plant was completed by its Czech developer. Its reservoir is among the ten largest in Turkey. The 58 MW Gürsögüt scheme completed, and over 30 smaller-scale hydropower plants
Indonesia	481	461		Last 200 MW at 515 MW **Poso River project** on Sulawesi, 90 MW Malea plant on the Saddang River in South Sulawesi both by Kalla Group with support from Power China consultants. 18 small hydropower units totalling 111 MW in Sulavesi
Norway	396	1,081		Most of the 50+ new projects commissioned were small-scale hydro below 10 MW in size, in addition to the 62 MW Jølstra, 42 MW Tolga and 22 MW Herand, and 70 MW came from upgrades
Viet Nam	222	765		Bach Dang (5.3 MW) and **Thuong Kon Tum** (220 MW) on Se San River tributary of the Mekong River recognized for its rich aquatic and terrestrial ecosystems
Brazil	175	108		**Ren21: Brazil** added 13 generating units totalling 119 MW in 2021 (each less than 10 MW). Hydropower generation dropped sharply from the previous year (down 9.1%) to 378 TWh, comprising 63% of supply. In terms of both energy generated and the share of Brazil's electricity mix, hydropower has been in long-term decline since its peak in 2011 (when it reached 453 TWh and a 91% share)
USA	172	0	70	Ren21: Nine small hydropower units were added with 103 MW in 2021. Bad Creek PSH enlarged by 70MW
Russia	167	74		Continuation of **Ust-Srednekanskaya HPP**, modernization of Nizhegorodskaya, **Irkutsk**, Barsuchkovskaya, and Votkinskaya
Austria*	150	0		17.5 MW Traunleiten hydropower plant
Zambia*	150	150		Part of 750 MW Kafue Gorge Lower HPP built by Sinohydro
Kazakhstan	129	248		Only 25 MW at **Turgusun Hydro** is known to RwB (IHA mistakenly placed Uzbek Zarchob Hydro here)
Argentina	115	1		Small hydro
Peru	(84)			Ren 21: completed 84 MW La Virgen hydropower plant, after years of delays
Philippines	85	6		?? not supported by project-level data
Uzbekistan	76	38		Likely correct IHA figure
Tajikistan*	49	1		?? not supported by project-level data
Costa Rica*	48	48		?? not supported by project-level data
Chile	(39)			Ren21: brought into service two units, the 24 MW Digua and the 14.9 MW Hidromocho. Hydropower generation fell sharply in 2021 (down 20%) to represent 20% of the country's electricity supply, well below the 30% average
South Korea	35	35		?? not supported by project-level data
Sri Lanka	35	0		?? not supported by project-level data
Ecuador*	31	1		Ren21: the first of three 16.3 MW units of the 49 MW Sarapullo plant, on the Pilatón River
Uganda*	24	0		?? not supported by project-level data
Spain	16	0		?? not supported by project-level data
Honduras	12	12		?? not supported by project-level data
Switzerland	12	0		?? not supported by project-level data
Georgia*	10	116		IHA figure is more accurate
Ukraine	0	0	324	Part of 1200 MW **Dniester River PSH**

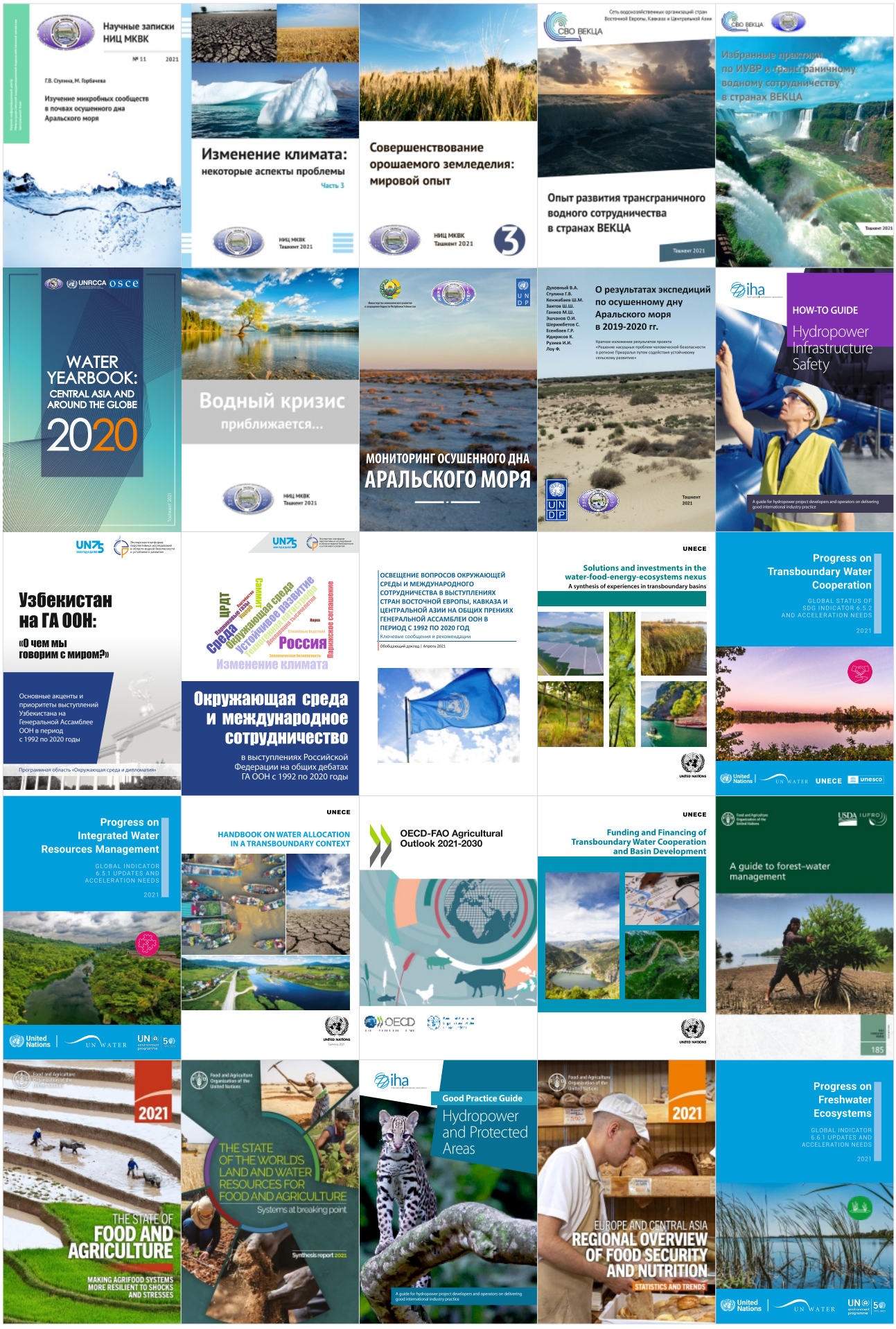
*Note:** Marking countries with more than 50% hydroelectricity in their energy systems based on 2015 statistics.

Sources: https://data.worldbank.org/indicator/EG.ELC.HYRO.ZS?most_recent_value_desc=true&view=map&year=2015, https://www.transrivers.org/2022/3663/, https://www.transrivers.org/2022/3695/



Section 13

Publications in 2021


Научные записки НИЦ МКВК
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Изменение климата: некоторые аспекты проблемы
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НИЦ МКВК Ташкент 2021
Совершенствование орошаемого земледелия: мировой опыт
НИЦ МКВК Ташкент 2021
3
СВО ВЕКЦА
Опыт развития трансграничного водного сотрудничества в странах ВЕКЦА
Ташкент 2021
СВО ВЕКЦА
Избранные практики по ИУВР и трансграничному водному сотрудничеству в странах ВЕКЦА
Ташкент 2021
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Водный кризис приближается...
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МОНИТОРИНГ ОСУШЕННОГО ДНА АРАЛЬСКОГО МОРЯ
О результатах экспедиций по осушенному дну Аральского моря в 2019-2020 гг.
Ташкент 2021
iha
HOW-TO GUIDE
Hydropower Infrastructure Safety
A guide for hydropower project developers and operators on delivering good international industry practice
Узбекистан на ГА ООН:
«О чем мы говорим с миром?»
Основные акценты и приоритеты выступлений Узбекистана на Генеральной Ассамблее ООН в период с 1992 по 2020 годы
Программная область «Окружающая среда и дипломатия»
Окружающая среда и международное сотрудничество
в выступлениях Российской Федерации на общих дебатах ГА ООН с 1992 по 2020 годы
ОСВЕЩЕНИЕ ВОПРОСОВ ОКРУЖАЮЩЕЙ СРЕДЫ И МЕЖДУНАРОДНОГО СОТРУДНИЧЕСТВА В ВЫСТУПЛЕНИЯХ СТРАН ВОСТОЧНОЙ ЕВРОПЫ, КАВКАЗА И ЦЕНТРАЛЬНОЙ АЗИИ НА ОБЩИХ ПРЕНИЯХ ГЕНЕРАЛЬНОЙ АССАМБЛЕИ ООН В ПЕРИОД С 1992 ПО 2020 ГОД
Ключевые сообщения и рекомендации
Обобщающий доклад | Апрель 2021
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Solutions and investments in the water-food-energy-ecosystems nexus
A synthesis of experiences in transboundary basins
Progress on Transboundary Water Cooperation
GLOBAL STATUS OF SDG INDICATOR 6.5.2 AND ACCELERATION NEEDS
2021
Progress on Integrated Water Resources Management
GLOBAL INDICATOR 6.5.1 UPDATES AND ACCELERATION NEEDS
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iha
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2021
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Vol. 13 Rysbekov Yu. Kh., Rysbekov A. Yu. – On definiion of "Central Asia" and its centrality

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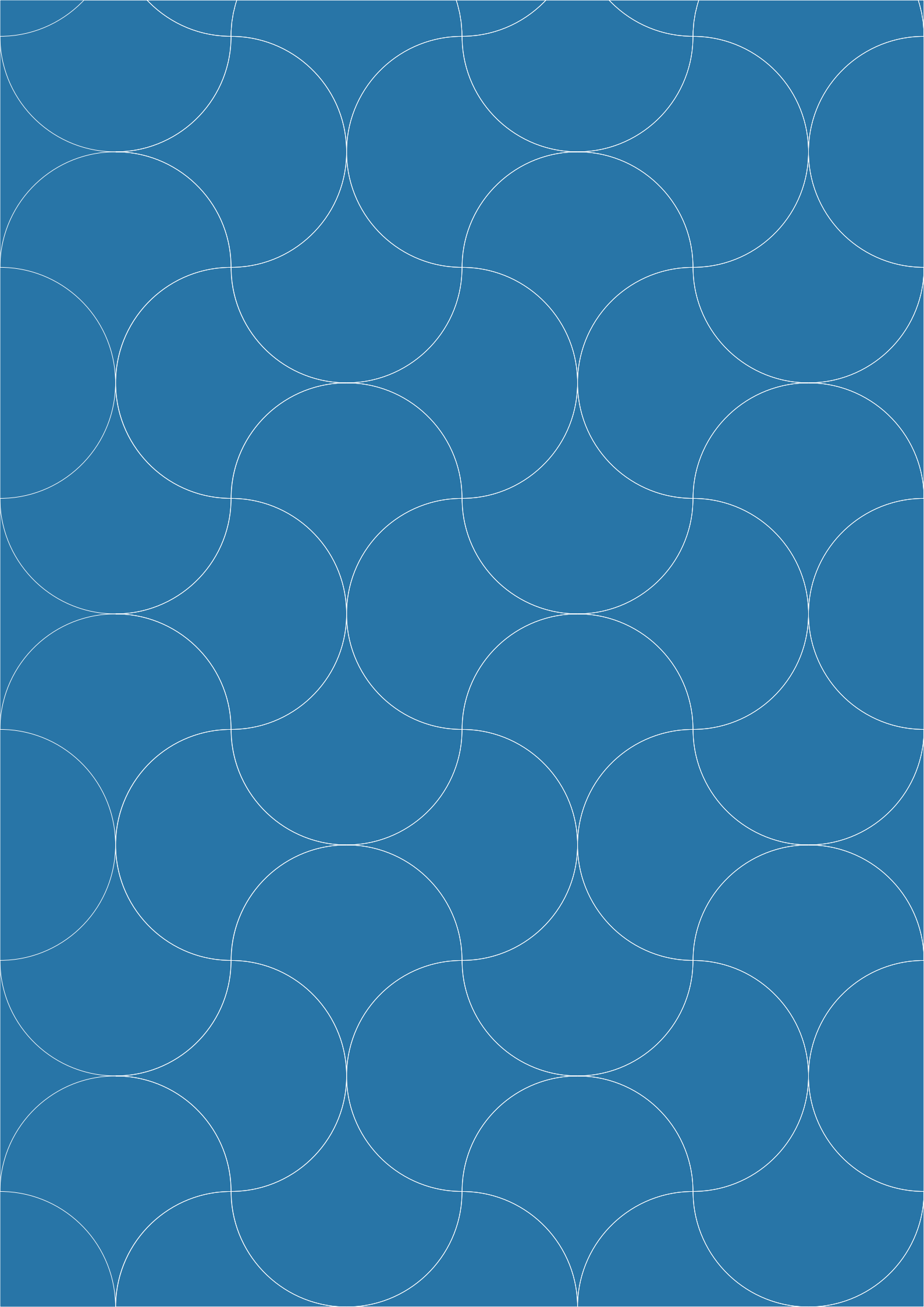


Section 14

Central Asia Awards in Water-Related Spheres

Awards of the Heads of Central Asian States

At the Third Consultative Meeting of the Heads of Central Asian States, the President of Tajikistan was awarded the **'Badge of Honor of the Heads of Central Asia States'** (August 6). **Emomali Rahmon** became the first awardee in the history.

Source: https://asiaplustj.info/ru/news/tajikistan/power/20210806/rahmonu-vruchili-pochetnii-znak-glav-gosudarstv-tsentralnoi-azii

The President of Turkmenistan, Gurbanguly Berdymukhamedov signed a Decree on awarding the President of Kazakhstan, **Kassym-Jomart Tokayev** the **Order of Bitaraplyk** (October 25).

Source: https://www.parahat.info/edict/2307

Awards in the Water Industry of Kazakhstan

On the occasion of the Day of Water Workers, a number of water professionals were awarded honorary titles **'Su sharuashylyғynyn ardageri'**, breastplates **'Su sharuashylyғynyn үzdigi'** and Certificates of Merit (July 9).

Source: https://www.gov.kz/memleket/entities/ecogeo/press/news/details/227601?lang=ru

As part of celebration of the 30th anniversary of Independence of Kazakhstan, the Director of the SIC ICWC Kazakh branch, **Nariman Kipshakbaev** was awarded the title **'Honorary Citizen'** of Kyzylorda province.

Source: https://kyzylorda-news.kz/ru/obshestvo/prisvoeno-zvanie-pochetnyj-grazhdanin-kyzylordinskoj-oblasti-134380/

Congratulation of Water Workers in Kyrgyzstan

The Chairman of the Cabinet of Ministers of the Kyrgyz Republic, Ulukbek Maripov congratulated water workers on their professional holiday (June 20).

The text of the congratulation is published on the website of the Government.

Source: https://www.gov.kg/ru/post/s/20187-ministrler-kabinetinin-tragasy-ulukbek-maripov-suu-charba-kyzmatkerlerin-kesiptik-mayramy-menen-kuttuktady

Government Awards in Tajikistan

On the occasion of the 30th anniversary of Independence of Tajikistan, by the decree of President Emomali Rakhmon government awards were given to employees of Roghun HPP (September 2), and 3 employees of the agricultural sector received medals **'Hizmati Shoista'** and honorary diplomas (September 3).

More information on awardees in available on https://khovar.tj/rus/2021/09/pozdravlyaem-s-nagradoj-priznanie-liderom-natsii-deyatelnosti-sotrudnikov-v-razlichnyh-sferah-v-chest-30-letiya-gosudarstvennoj-nezavisimosti-tadzhikistana/

Government Awards in Turkmenistan

By Decree of the President Gurbanguly Berdymukhamedov, in connection with the 30th anniversary of Independence of Turkmenistan, the Chairman of the State Committee for Water Resources **G. Baydjanov** was awarded the anniversary medal **'Türkmenistanyň Garaşsyzlygynyň 30 ýyllygyna'** (September 25).

The full list of awardees is available on https://www.parahat.info/edict/2340

On the occasion of the Harvest Festival, a group of holders of Dayhan associations received the medal **'Watana bolan söýgüsi üçin'** (November 14) by decree of the President of Turkmenistan.

The list of awardees is available on https://turkmenistan.gov.tm/ru/post/58613/ukaz-prezidenta-turkmenistana-o-nagrazhdenii-po-sluchayu-prazdnika-urozhaya-turkmenistana-medalyu-watana-bolan-soygusi-ucin

By decrees of the President of Turkmenistan the medal **'Watana bolan söýgüsi üçin'** was given to the Minister of Energy of Turkmenistan, **H.S. Redzhepmyradov** and the Minister of Agriculture and Environmental Protection of Turkmenistan **A.N. Altyev** on the occasion of the International Day of Neutrality. Also, the heads of these sectors were awarded commemorative plaques (December 11).

More information on awardees in available on https://turkmenportal.com/blog/42387/ryad-grazhdan-strany-udostoilis-gosudarstvennyh-nagrad-ot-prezidenta-turkmenistana

Awards in the Agriculture and Water Sectors of Uzbekistan

On the occasion of 30 years of independence, a group of government and sectoral employees received awards by Presidential Decree:

First Deputy Minister of Agriculture **S.J. Teshayev** was given the honorary title **'O'zbekiston Respublikasida xizmat kursatgan kishloq khujaligi khodimi'**;

the honorary title **'O'zbekiston Respublikasida xizmat kursatgan irrigator'** was given to **J.B. Razov**, excavator operator at the construction mechanization and repair base of the Ministry of Water Management of the Republic of Karakalpakstan;

Order **'Fidokorona khizmatlari uchun'** was given to Counsellor of the Minister of Water Management, **I.Kh. Djurabekov**.

The full list of awardees is available on https://uza.uz/ru/posts/o-nagrazhdenii-v-svyazi-s-tridcatiletiem-nezavisimosti-respubliki-uzbekistan-gruppy-gosudarstvennyx-sluzhaschix-i-rabotnikov-proizvodstvennoy-i-socialno-ekonomicheskoy-sfer_296163

On the occasion of the 30th anniversary of Independence of Uzbekistan, the head of theAgency for Implementation of IFAS Projects in Uzbekistan, **V.I. Sokolov** was awarded a certificate of honor by the Senate of the Oliy Majlis of the Republic of Uzbekistan (August 27).

The head of BWO Syr Darya **O.A. Kholkhujaev** was given the 'Award of Excellence in the Water Sector of Uzbekistan' by the Decree of the Minister of Water Management of Uzbekistan (December 7).

On the occasion of 30 years of Independence, a number of foreign citizens received the order **'Dustlik'**:

Suhail Al Mazrouei, Minister of Energy and Infrastructure in UAE;

Jin Liqun, President of the Asian Infrastructure Investment Bank (AIIB).

The full list of awardees is available on https://xs.uz/ru/post/o-nagrazhdenii-ryada-inostrannykh-grazhdan-v-svyazi-s-tridtsatiletiem-nezavisimosti-respubliki-uzbekistan

By the Decree of the President of Uzbekistan, **M.I. Akhmedov**, head of "Madaniyat Muhammad Ismat" farm, Bukhara province was awarded the title **'O'zbekiston qahramoni'** and the medal **'Oltin yulduz'**.

Source: https://uza.uz/ru/posts/o-prisvoenii-zvaniya-ozbekiston-qahramoni_295795

On occasion of the Day of Agricultural Workers in Uzbekistan, 231 employees of headquarters, regional and provincial divisions of the Ministry of Agriculture and representatives of subordinate organizations, including research institutes, agrarian universities and state unitary enterprises received badges and gifts. Representatives of several national organizations, who during the year contributed to the development of the industry, also received awards. Among them are employees of the Presidential Administration, the Senate of Oliy Majlis, the Ministry of Water Management, JSCB "Agrobank", the State Forestry Committee, the "Uzbekoziktzahir" Association, the Academy of Sciences and others.

Source: https://www.agro.uz/ru/qishloq-xojaligi-xodimlari-mehnati-etirof-etildi/

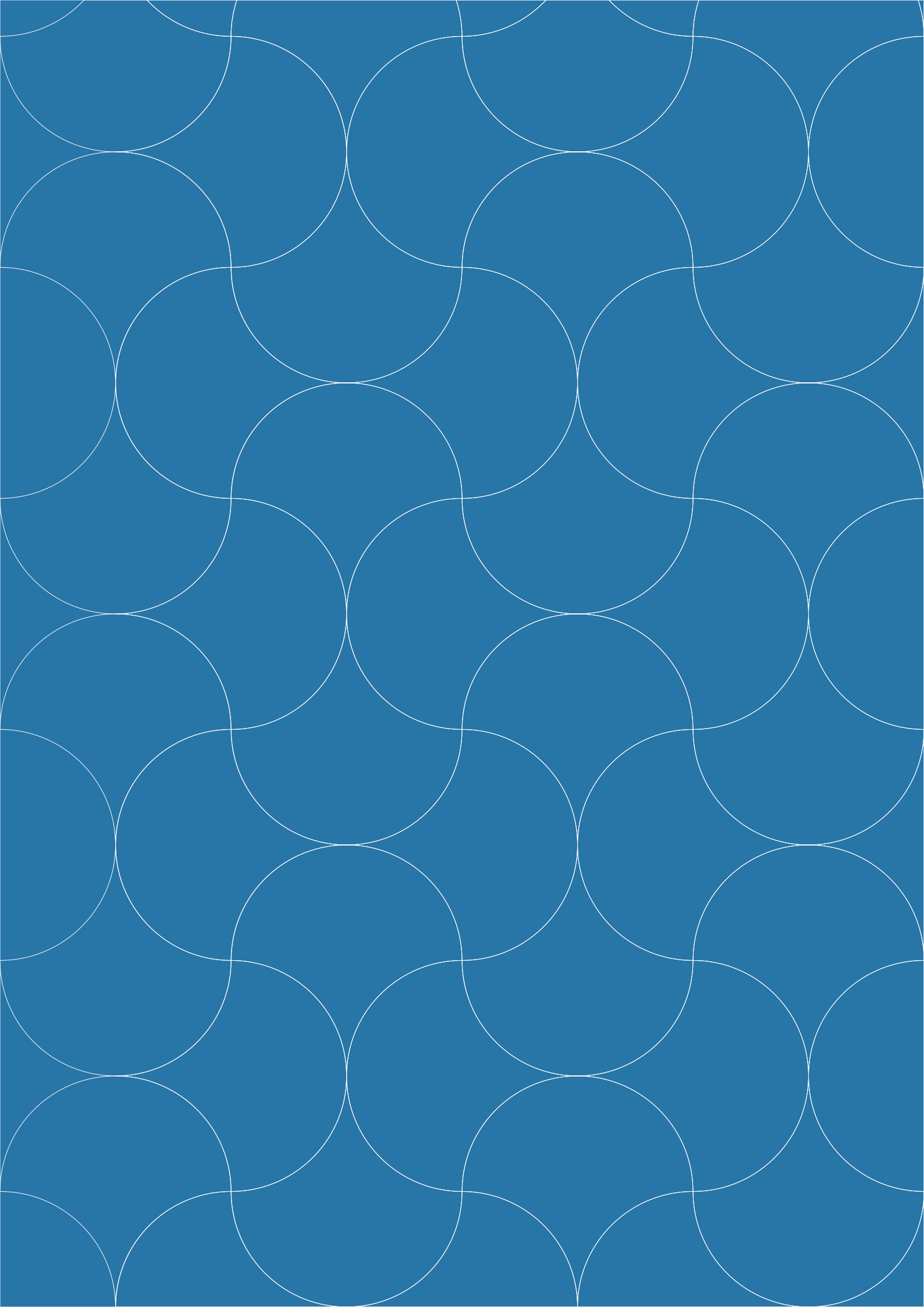
New Awards

By Resolution of the Cabinet of Ministers 356 of 9.06.2021 a new badge 'Award of Excellence in the Hydrometeorological Service' was introduced to award for substantial contribution to the development of hydrometeorology and climatology and for fruitful training of young professionals. The badge and gratuity are awarded annually on May 7 - the day of formation of "UzHydromet".

Source: https://www.norma.uz/novoe_v_zakonodatelstve/otlichnikov_gidrometslujby_jdet_voznagrajdenie

The Decree of the Cabinet of Ministers 573 of 17.09.2021 approved the relevant provision on a new badge **'Award of Excellence in the Water Sector of Uzbekistan'**.

Source: https://www.norma.uz/novoe_v_zakonodatelstve/ministerstvu_vodnogo_hozyaystva_opredelili_zadachi



Section 15

Global Risks 2022

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, the consulting company Eurasia Group, and the American private geopolitics publisher and consultancy Stratfor

15.1. Risks 2022 (World Economic Forum)

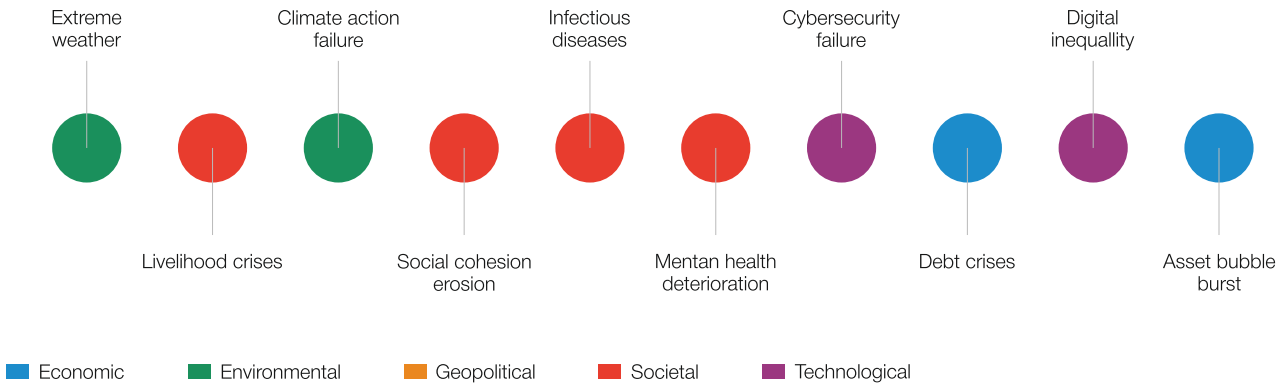
According to the WEF's Global Risks Report 2022, the main risks on a global scale are related to climate threats. "Climate action failure", "extreme weather", and "biodiversity loss" will be the most severe risks over the next 10 years. Technological risks – such as "digital inequality" and "cybersecurity failure" – are other critical short- and medium-term threats to the world. "Social cohesion erosion", "livelihood crises" and "mental health deterioration" are also included in the group of short-term risks.

Most respondents expect the next three years to be characterized by either consistent volatility and multiple surprises or fractured trajectories of global economic recovery. Just 11% believe the global recovery will accelerate by 2024, and 89% consider the near-term outlook to be volatile. 84% of respondents are fully worried about the outlook for the world. Experts are calling on world leaders to develop a policy to deal with global risks, with a clear agenda for the coming years. Growing societal concerns and tension hamper more equal and rapid recovery of economy. In this context, the world leaders must unite and adopt a coordinated multilateral approach to overcome persistent global challenges.

Top Short-Term Global Risks

WORLD ECONOMIC FORUM

Over the next 0-2 years

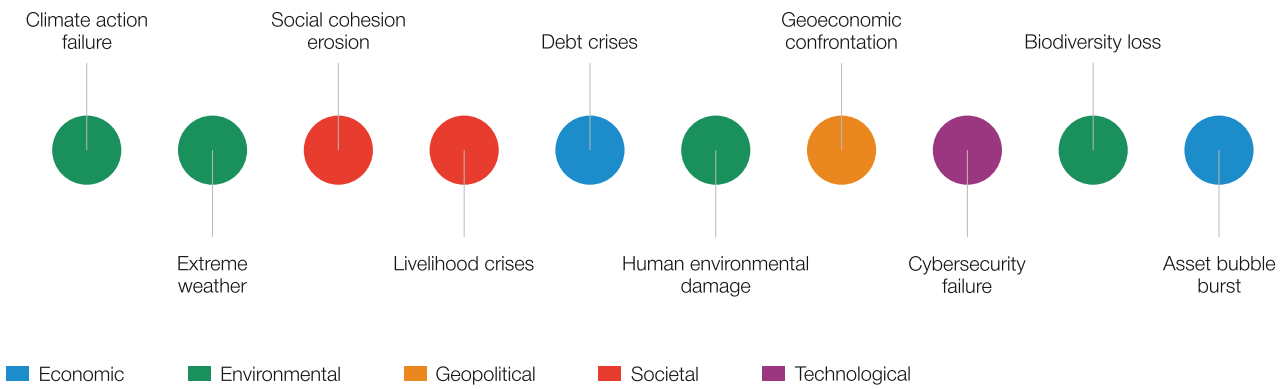


Source: World Economic Forum Global Risks Perception Survey 2021-2022

Top Medium-Term Global Risks

WORLD ECONOMIC FORUM

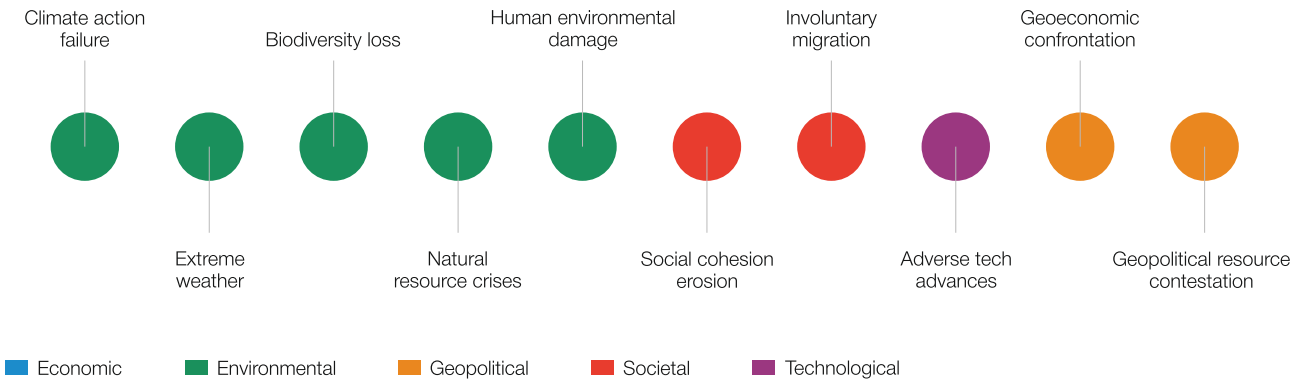
Over the next 2-5 years



Source: World Economic Forum Global Risks Perception Survey 2021-2022

Top Long-Term Global Risks

Over the next 5-10 years



Source: World Economic Forum Global Risks Perception Survey 2021-2022

Climate (in-)action

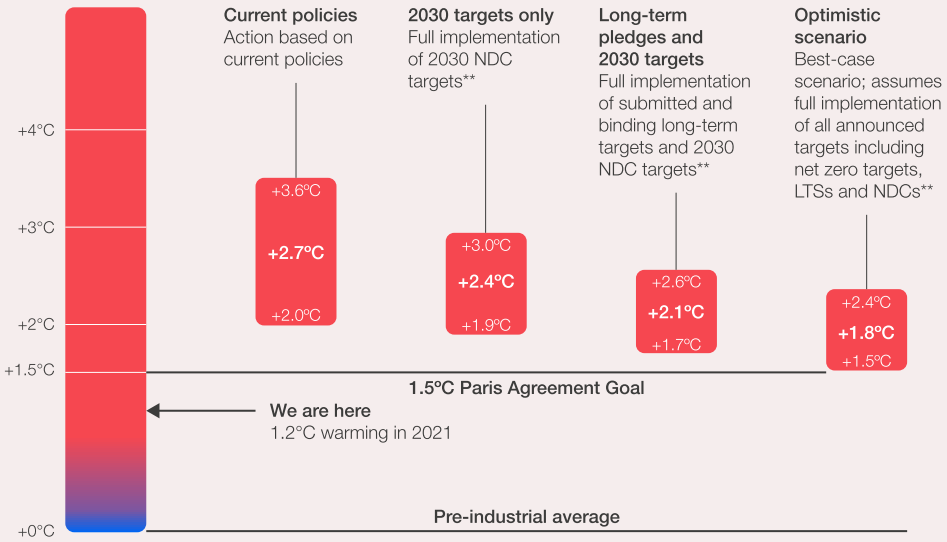
The latest nationally determined contributions (NDCs) to decarbonization made at the 2021 COP26 still fall short of the 1.5°C goal set out in the Paris Climate Agreement. The current trajectory is expected to steer the world towards a 2.4°C warming, with only the most optimistic of scenarios holding it to 1.8°C.

Without stronger action, global capacity to mitigate and adapt will be diminished, eventually leading to a "too little, too late" situation and ultimately a "hot house world scenario" with runaway climate change that makes the world all but uninhabitable. The world will face high costs if we collectively fail to achieve the net zero goal by 2050. Complete climate inaction will lead to losses projected to be between 4% and 18% of global GDP with different impacts across regions.

The transition to net zero – the state in which greenhouse gases (GHG) emitted into the atmosphere are balanced by their removal from the atmosphere – could be as transformative for economies and societies as past industrial revolutions. However, the complexities of the technological, economic and societal changes needed for decarbonization, coupled with the slow and insufficient nature of current commitments, will inevitably lead to varying degrees of disorderliness.

As climate change intensifies and some economies recover more quickly than others from COVID-19, a

Global Temperature Scenarios by 2100



** Nationally determined contributions (NDCs) are non-binding national plans for climate action, including targets for GHG emissions reductions. Long-term strategies (LTSs) are national mid-century development plans for confronting climate change. If 2030 NDC targets are weaker than projected emissions levels under current policies, then current policies are used here.

Sources: https://climateactiontracker.org/, https://globalcentre.hse.ru/news/562390029.html

disorderly transition could bifurcate societies and drive countries further apart, and a too slow transition will only beget damage and disruption across multiple dimensions over the longer term. Within countries, the disruptive potential of the transition could be amplified by disconnects between governments, businesses and households with respect to policy commitments, financial incentives, regulations and immediate needs. A sustained lack of coordination between countries would likely have profound geopolitical implications, with rising friction between strong decarbonization advocates and those who oppose quick strong action by using tactics such as stalling climate action or greenwashing[114].

How Do We Move Forward?

Based on the findings from this year's survey, WEF identified five lessons that governments, businesses, and decision-makers should utilize in order to build resilience and prepare for future challenges:

1. **Build a holistic mitigation framework:** Rather than focusing on specific risks, it's helpful to identify the big-picture worst-case scenario and work back from there. Build holistic systems that protect against adverse outcomes.

2. **Consider the entire ecosystem:** Examine third-party services and external assets, and analyze the broader ecosystem in which you operate.

3. **Embrace diversity in resilience strategies:** Not all strategies will work across the board. Complex problems will require nuanced efforts. Adaptability is key.

4. **Connect resilience efforts with other goals:** Many resilience efforts could benefit multiple aspects of society. For instance, efficient supply chains could strengthen communities and contribute to environmental goals.

5. **Think of resilience as a journey, not a destination:** Remaining agile and vigilant is vital when building out resilience programs, as these efforts are new and require reflection in order to improve.

The next few years will be riddled with complex challenges, and our best chance at mitigating these global risks is through increased collaboration and consistent reassessment.

The Global Risks Report 2022 is downloadable on www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf

15.2. Risks 2022 (Eurasia Group)

The Eurasia Group consulting company presented the top 10 global risks of 2022. A domestic focus for both the U.S. and Chinese governments lowers the odds of a big international conflict in 2022, but it leaves less potential leadership and coordination to respond to emerging crises.

1. No zero COVID. China, the primary engine for global growth, will face highly transmissible COVID-19 variants. China's policy will fail to contain infections, lead to larger outbreaks, and require more severe lockdowns. That means greater economic disruptions, lower consumption, and a more dissatisfied population at odds with the triumphalist "China defeated COVID" of the state-run media.

2. Technopolar world. Experts believe the physical world is a mess because no countries are willing or able to provide global leadership; digital space is even more poorly governed.

3. U.S. midterms. This year's vote will not itself provoke a crisis, but it represents a historic tipping point.

4. China at home. Xi's policies increase the risk of stagnation at a time when the Chinese economy is on weak footing.

5. Russia. A buildup of Russian troops near Ukraine has opened a broader confrontation over Europe's security architecture. President Vladimir Putin could send in troops and annex the occupied Donbas, but his current demand is for major NATO security concessions and a promise of no further eastward expansion.

6. Iran. The Biden administration failed to prepare for the possibility that Iran would not be interested in reviving the nuclear deal.

7. Two steps greener, one step back. In 2022, continued upward pressure on energy costs will force governments to favor policies that lower energy costs but delay climate action. Rising energy prices will raise anxiety levels for both voters and elected officials – even as climate pressures on government increase.

8. Empty lands. The United States is no longer interested in playing the role of global policeman, leading already to distraction from the situation in Afghanistan. Civil wars will create new risks in Yemen, Myanmar and Ethiopia. Venezuela and Haiti risk growing refugee crises. Destabilization of whole regions naturally threats both countries themselves and businesses operating there.

9. Corporates losing the culture wars. Multinational corporations (MNCs) with operations in the West and China will face a "two-way risk" despite record pro-

[114] The practice of making people believe that a company or authority is more environmentally friendly than it actually is

fits. Consumers and employees, empowered by "cancel culture"[115] and enabled by social media, will make new demands on multinational corporations and the governments that regulate them. Many people in developed countries are not willing to tolerate the exploitation of people in developing countries. At the same time, China tends to more sovereignization and fights against political and economic pressures from MNCs.

10. Turkey. Erdogan's foreign policy positions will remain combative to distract voters from the economic crisis.

The Eurasia Group's Top Risks for 2022 is downloadable on www.eurasiagroup.net/issues/top-risks-2022

15.3. Risks 2022 (Stratfor)

The Stratfor[116] analysts revealed the annual forecast for 2022. As the world enters the third year of the COVID-19 pandemic, the global economic recovery that began in 2021 is likely to continue in 2022 but to slow down due to factors including pervasively high energy and food prices, persistent supply chain bottlenecks and tightening credit conditions.

The analysts believe that the pandemic will continue to create economic uncertainty and take lives around the world, vaccination rates will remain uneven between rich and poor countries, and new variants of the virus could present additional challenges to governments. It is expected that most of the world is to adopt a "live-with-COVID" strategy that seeks to keep economies as open as possible and to avoid the recession-provoking policies of 2020 and parts of 2021.

Core geopolitical fault lines of 2021 will continue into 2022. Tensions between Washington and Beijing are likely to persist, as the Biden administration will maintain high tariffs on Chinese products and may recalibrate some of them to focus on strategic industries, like high tech. While the White House will keep communication channels open with the Kremlin, issues ranging from Ukraine to divergences over cybersecurity governance will prevent the U.S. and Russia from reaching significant agreements or sanctions relief. And while the European Union will seek to preserve its cordial ties with the Biden administration, internal divergences between member states will prevent the bloc from fully aligning itself with the United States and adopting more hawkish positions on either Beijing or Moscow.

For the developing world, 2022 will be a year of challenges and opportunities. In India, the softening of lockdown measures is likely to result in a robust but uneven recovery, as the pandemic exacerbated the country's inequality issues. In Turkey, unorthodox monetary decisions and a nationalist foreign policy will create the twin risks of a financial crisis and military clashes with foreign powers. In Afghanistan, the Taliban will seek to stabilize the country's internal security situation in an effort to attract foreign aid, but domestic insurgencies will continue.

Central Asia Adjusts to the Taliban

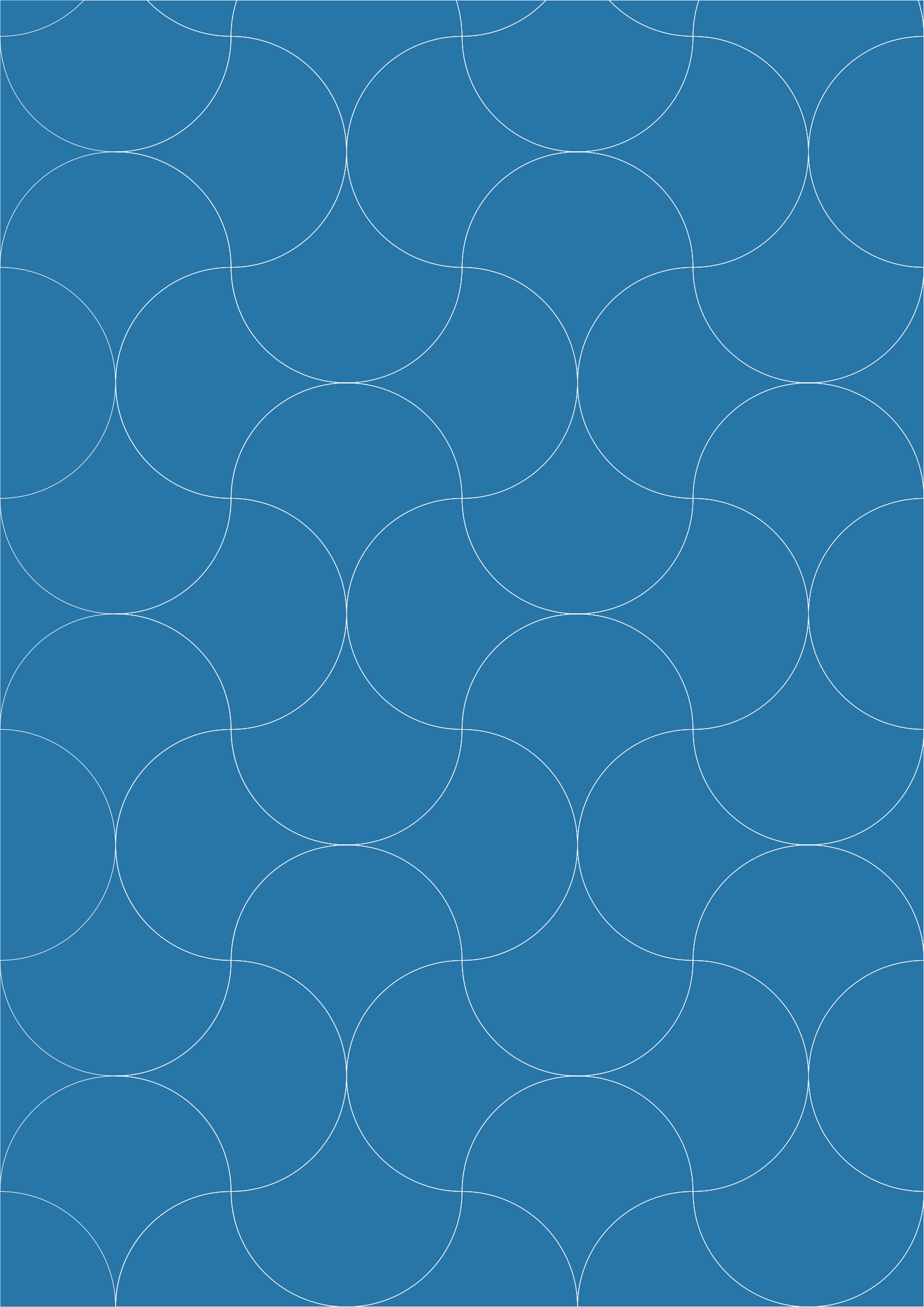
Threats to security and stability in Central Asia and the rise of the Taliban will lead the states to continue their largely conciliatory stance toward Kabul. Concerns over drought, electricity shortages, a slow economic recovery and the continued spread of COVID-19 due to high vaccine hesitancy will push Central Asian governments to seek improved ties with the Taliban government in Afghanistan out of fear that the humanitarian crisis in the country could exacerbate their own social and economic problems and make them targets for groups sympathetic to the Taliban. The threat of refugee flows from Afghanistan and their possible infiltration by extremists will also prompt the Central Asian governments to avoid confrontation with the Taliban despite their deep ideological disagreements. Tajikistan, the country most opposed to the Taliban leadership, will increasingly rely on Russian and Chinese support to deter incursion or destabilization by Taliban-aligned groups or provocations by the Taliban.

The threat of extremist destabilization efforts may also prompt other states in the region to seek formal agreements to expand their security and economic relations with Moscow and Beijing, suggesting an increase in strategic competition between the two is on the way. Separately, despite the increased threat to domestic stability due to tensions on its southern border, Uzbekistan will not rejoin the Russian-led Collective Security Treaty Organization security alliance it left in 2012, in part due to concerns about losing strategic autonomy amid deepening ties with China. Russia will continue accepting large numbers of migrant laborers from the region despite the increased security concerns over such migration amid the rise of the Taliban as part of Moscow's strategy to combat extremist sentiments in Central Asia by allowing many of those who would be otherwise vulnerable to radicalization efforts amid low wages and unemployment to leave.

The Stratfor's annual report is downloadable on https://worldview.stratfor.com/article/2022-annual-forecast

[115] In this case, consumers ostracizing or blocking a company from markets

[116] Strategic Forecasting Inc. (Stratfor) – the American private geopolitics publisher and consultancy



Section 16

2022 Calendar of Events

January

- **January 14-16** – 12th IRENA Assembly, Abu Dhabi, UAE
- **January 17-19** – World Future Energy Summit, Abu Dhabi, UAE
- **January 25** – WWT Wastewater 2022 Conference and Exhibition, Birmingham, United Kingdom, online
- **January 26-28** – International Online Conference "The Silk Road of Knowledge: Science meets Green Policy", Almaty, Kazakhstan

February

- **February 2** – World Wetlands Day
- **February 8-10** – E-World Energy & Water, Essen, Germany
- **February 11** – International Day of Women and Girls in Science
- **February 23-25** – International Online Conference "The Silk Road of Knowledge: Science meets Green Policy"

March

- **March 3** – World Wildlife Day
- **March 3** – CAREC Women in Energy Summit
- **March 14** – World Rivers Day
- **March 21** – International Day of Forests
- **March 21-26** – 9th World Water Forum, Dakar, Senegal
- **March 22** – World Water Day
- **March 22-23** – Wasma 2022 Exhibition, Moscow, Russia
- **March 23** – World Meteorological Day
- **March 26** – Day of the Aral Sea
- **March 27-April 2** – LET 2022 – 17th IWA Conference, Reno, Nevada, USA
- **March 30-31** – Conference "Environmental Education for Sustainable Development: State, Challenges and Prospects", Almaty, Kazakhstan, online

April

- **April 17-21** – Singapore International Water Week, Singapore
- **April 19-23** – Global Soil Week
- **April 20-24** – IE Expo China 2022, Shanghai, China

- **April 22** – International Mother Earth Day
- **April 23-24** – 4th Asia-Pacific Water Summit, Kumamoto, Japan
- **April 26-27** – International Central Asian Science-to-Practice Conference "30-years of Water Cooperation among the Central Asian States: Facing the Future", Turkistan, Kazakhstan
- **April 27** – 82nd meeting of ICWC Central Asia, Turkistan, Kazakhstan
- **April 27** – Dialogue II: Sustainable Water Governance in Central Asia amid Climate Vulnerabilities

May

- **May 6-8** – Scientific Forum "The Force of Nature N+1" as part of the Stihia Festival, Muynak
- **May 16-18** – Global Water Summit, Madrid, Spain
- **May 22** – International Day for Biological Diversity
- **May 23-27** – 2022 Living Planet Symposium, Bonn, Germany
- **May 25-27** – 6th Annual International Congress and Exhibition: Hydropower Central Asia and Caspian, Dushanbe, Tajikistan
- **May 29-June 2** – IDA World Congress 2022, Sydney, Australia

June

- **June 2-4** – Regional Conference "Prospects of Renewables Development in the Central Asia Countries", Dushanbe, Tajikistan
- **June 4** – 3rd Meeting of Water and Climate Leaders, Dushanbe, Tajikistan
- **June 5** – World Environment Day
- **June 7-9** – 2nd International High-Level Conference on the International Decade for Action "Water for Sustainable Development", 2018-2028, Dushanbe, Tajikistan
- **June 8** – World Oceans Day
- **June 8-10** – Aquatech China 2022, Shanghai, China
- **June 15-17** – 20th China International Environmental Protection Exhibition and Conference (CIEPEC 2022), Beijing, China
- **June 17** – Desertification and Drought Day
- **June 21-23** – VI All-Russian Water Congress, St. Petersburg, Russia

July

- **July 1** – Geneva Water Dialogue, Switzerland
- **July 4-5** – 6th Eurasian Business Forum "Green Energy & Waste Recycling Forum 2022", Nur Sultan, Kazakhstan
- **July 5-15** – High-Level Political Forum on Sustainable Development, New York, USA

August

- **August 8-11** – Asia Water Forum 2022, online
- **August 8-12** – Virtual Conference on Rural and Agricultural Development in the Digital Age
- **August 12** – Day of the Caspian Sea
- **August 23-September 1** – World Water Week, Stockholm, Sweden

September

- **September 6-8** – The Green Expo 2022 : 28th International Environmental Technology Expo and Conference, Mexico city, Mexico
- **September 11-15** – IWA World Water Congress & Exhibition, Copenhagen, Denmark
- **September 13-15** – ECWATECH 2022, Moscow, Russia
- **September 14-16** – 7th International Exhibition of Environmental Technologies: Water, Air, Soil, Wastes (IE expo Guangzhou 2022), China
- **September 19** – World Cleanup Day
- **September 27-29** – WETEX&DSS 2022: 24th exhibition on water, energy technology and environment, Dubai, UAE
- **September 29** – World Maritime Day

October

- **October 3-10** – 24th ICID International Congress on Irrigation and Drainage and 73rd International Executive Council Meeting, Adelaide, Australia
- **October 5-6** – International Scientific-Practical Conference "Water Security – the Basis for Sustainable Development", Dushanbe, Tajikistan
- **October 5-7** – The Ninth "Environment for Europe" Ministerial Conference, Nicosia, Cyprus
- **October 6-7** – Sixth North and Central Asia Multi-Stakeholder Forum on Implementation of the Sustainable Development Goals, Almaty, Kazakhstan
- **October 15** – International Day of Rural Women
- **October 16-19** – Cairo Water Week, Cairo, Egypt
- **October 26-27** – ADB Conference on Water Resource Management for Achieving Food Security in Asia under Climate Change, online

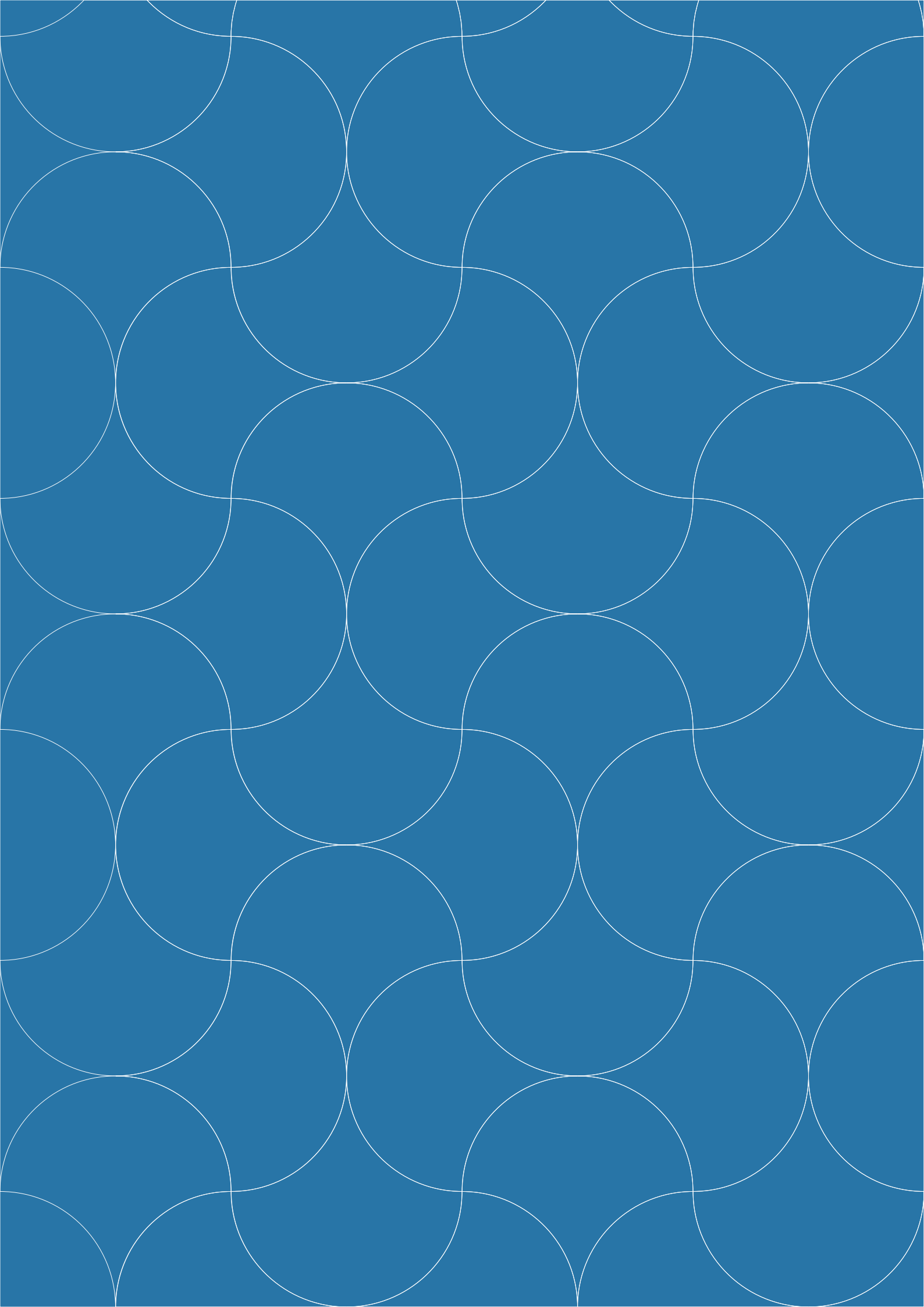
November

- **November 2** – Conference "Towards COP27: Climate Financing and Water Infrastructure", online
- **November 2** – 3rd Meeting on Groundwater Cooperation within the Tashkent Area Transboundary Aquifer, Almaty, Kazakhstan
- **November 7-13** – International Week of Science and Peace

- **November 7-18** – Climate Change Conference – COP27, Sharm El-Sheikh, Egypt
- **November 10** – World Science Day for Peace and Development
- **November 17-18** – 11th All-Russian Scientific-Practical Conference "Rivers of Siberia and the Far East: Preservation of River Ecosystems in Global Change Age", Khabarovsk, Russia
- **November 22** – 83rd meeting of ICWC Central Asia, Ashgabat, Turkmenistan

December

- **December 1-2** – Fifteenth meeting of the Implementation Committee of the Water Convention, Geneva, Switzerland
- **December 5** – World Soil Day
- **December 5-17** – Fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity, Montreal, Canada
- **December 6-12** – UN-Water Summit on Groundwater, Paris, France
- **December 7** – 15th UN Conference on Desertification, Montreal, Canada
- **December 11** – International Mountain Day



Section 17

In Memoriam

In this issue of the Yearbook we are introducing a new section - "In Memoriam". Time and tide wait for no man and, unfortunately, our veterans pass away... but they remain in our memories forever

2020

One of senior water workers, **Ferdinand F. Beglov** passed away on January 10

F. Beglov devoted more than 60 years to the water sector. He started as a laboratory assistant and worked his way up to the head of big division at the Central Asian Irrigation Research Institute (SANIIRI) named after V.D. Zhurin.

In 1996, he moved to SIC ICWC, heading the research planning division and working to the benefit of the sector and ICWC.

Source: SIC ICWC

Meirajdin Zulpuyev, a public figure and statesman, first member of ICWC from the Kyrgyz Republic passed away on March 10.

Having graduated from the Moscow Hydromeliorative Insitute in 1966, M. Zulpuyev started working at the Osh Provincial Irrigation System Authority and headed it in 1973.

In 1979-1980, he was assigned the Deputy Minister of Land Reclamation and Water Resources.

M. Zulpyev headed the Ministry of Land Reclamation and Water Resources of the Kyrgyz Republic in 1992, then he was assigned the Secretary at the Government of Kyrgyzstan and the Deputy Prime Minister in 1992-1993 and again the Minister of Land Reclamation and Water Resources in 1993-1996 .

M. Zulpuyev worked at OAO "Kyrgyzsuudolboor" since 2002 and was the Chairman of the Board since 2005. In 1979-1985, he was elected deputy of the Supreme Council of Kyrgyz SSR, contributing to the republican development.

Meirajdin Zulpuyev devoted himself to the development of water management and irrigation sectors in the Republic, and multiple irrigation canals were laid and extended to thousands hectares under his direction.

Source: http://kabar.kg/news/v-vozraste-78-let-skonchalsia-gosudarstvennyi-deiatel-kr-zulpuev-meirazhdin/

Biologist, biophysicist and merited scientist of Uzbekistan, **Bekjan O. Tashmukhamedov** passed away on June 24.

B. Tashmukhamedov was born on January 27, 1935 in Tashkent in the family of the famous Uzbek writer Oybek. After graduating from the Moscow State University in 1958, he began his scientific career at Tashkent State University, became associate professor at the department of biophysics and at the age of 36 defended his doctoral dissertation. In 1986, he became Director of the Institute of Physiology at the Academy of Sciences of Uzbekistan, and in 1987 he was elected a full member of the Academy.

Bekjan Tashmukhamedov carried out research in Great Britain, Germany, Peru, the USA, and Japan. He wrote over 300 scientific papers, trained over 20 doctors and over 40 candidates of science. In 1995 he was awarded the title of Merited Scientist of the Republic of Uzbekistan.

Academician Tashmukhamedov fruitfully cooperated with SIC ICWC, taking an active part in research efforts on the Aral Sea Region and the Aral Sea.

Source: https://uznews.uz/ru/article/21835

On July 18, chief researcher of the Karakalpak branch of the Research Institute on Irrigation and Water Problems (NIIIVP), doctor of technical sciences, professor **Yerezhep Kurbanbayev** passed away.

Ye. Kurbanbayev was born on August 22, 1941 in the Kungrad district of the Republic of Karakalpakstan. He graduated from Tashkent State University in 1965. He started his career with the expedition along the lower reaches of the Amu Darya River, studying water regime in the Tuyamuyun-Aral Sea section.

In 1967-1970, he worked as a chief of operational division at the Land Reclamation Authority of the Ministry of Agriculture of Karakalpakstan and contributed to design of several key collecting drains. He was the top expert of the State Program on development and construction of rice farms in the lower reaches of the Amu Darya River. Since 1970, he moved to the SANIIRI and later one became the Director of the Karakalpak branch of SANIIRI.

Over his scientific work, Ye. Kurbanbayev has published numerous scientific papers and monographs, trained young professionals, and was a member of the Scientific Council at TIIAME.

Special thanks to F. Shoazizov, associate professor of the Water energy use and pumping station department, TIIAME for the information.

2021

On July 26, Rector of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, doctor of economic sciences, professor **Uktam P. Umurzakov** passed away.

U. Umurzakov was born on August 20, 1952. He graduated with honors from TIIAME. U. Umurzakov began his career as a junior researcher at the Institute in 1974 and until the end of life he has worked there, holding such responsible positions as the Head of Laboratory, Dean of Faculty, Vice Rector, Advisor to the Rector. Since May 26, 2017, he has been assigned the Rector of TIIAME. Since October 10, 2019, he has also served as the Chairman of the Republican Council of Higher Education.

For almost 50-year scientific and pedagogical activity, Uktam Umurzakov developed many textbooks and manuals, scientific monographs, patents and techniques in the field of agricultural economics. Under his scientific leadership, dozens of candidates and doctors of science were prepared.

Sources: https://yuz.uz/ru/news/professor-uktam-pardaevich-umurzakov, https://ru.wikipedia.org/wiki/Умурзаков,_Уктам_Пардаевич, https://kun.uz/ru/news/2021/07/26/skonchalsyarektor-irrigatsionnogo-instituta-uktam-umurzakov

On July 26, **Shavkat Kh. Rakhimov**, former Director of SANIIRI (currently – NIIVP), doctor of technical sciences, professor, passed away.

After graduating from Moscow Power Engineering Institute in 1969, he started working at the SANIIRI. He started as a junior researcher and worked his way up to become the Director of the SANIIRI Institute.

Sh. Rakhimov was the first Director of the Research Institute of Irrigation and Water Problems (NIIVP) established in 2012 by merging the SANIIRI with the Institute of Water Problems of the Academy of Sciences of Uzbekistan.

Dozens of doctors and candidates of sciences, several monographs, articles, and other publications were prepared and patents were issued under Sh. Rakhimov's supervision.

Special thanks to F. Shoazizov, associate professor of the Water energy use and pumping station department, TIIAME for the information

Nurlibek Yu. Mirzamuratov, Director of the International Innovation Center of the Aral Sea Region under the President of Uzbekistan, left this world on August 12.

N. Mirzamuratov was born on September 4, 1963 in the Chimbay region of the Republic of Karakalpakstan.

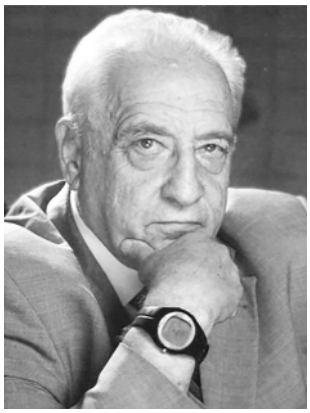
In 1990, he graduated from the Tashkent Automobile and Road Construction Institute.

Since 1996, he worked as Deputy Director and later Director of the Karakalpak regional organization of the International Charitable Public Foundation for Ecology and Health "ECOSAN".

Since October 2018 until the last days of his life he was the Director of the International Innovation Center of the Aral Sea Region

Source: https://t.me/mininnovation

Viktor A. Dukhovniy, Director of SIC ICWC, doctor of technical science, professor passed away on August 14.



Having graduated with honors from Kiev Hydromeliorative Institute as an engineer-hydrotechnician in 1956, he started working at the "Golodnostepstroy" trust.

As a chief engineer of Golodnostepstroy and later Glavsredazirsovkhozstroy in the 1960s-1970s, he worked on development and implementation of the integrated method of irrigation and development of vast areas of Golodnaya (Hunger) steppe and later the zone of Karakum canal, Dzhizak and Karshi steppes, Asht and Kyzylinsk land in Tajikistan, Lyailak in Kyrgyzstan, and rice-growing areas in Karakalpakstan.

In 1973, he became the director of the SANIIRI Institute, later transformed into a large multi-profile scientific-production association, which organized the following work cycle: research – design, production, and implementation.

Since 1969, V. Dukhovniy actively participated in the work of international organizations. Since independence of the five countries of the Central Asian region, Prof. Dukhovniy has been actively involved in the development of interstate water cooperation in the Amu Darya and the Syr Darya river basins, which contributed to the establishment of the Interstate Commission for Water Coordination in Central Asia and SIC ICWC in 1992. In 1996, by the ICWC decision, V. Dukhovniy was appointed Director of SIC, an analytical and information body of ICWC for elaboration of principles and ways of prospective water development and interstate cooperation in CAR.

Prof. Dukhovniy is the author of more than 400 pieces of research, 17 monographs, 37 invention certificates, and over 150 reports for international conferences and symposiums. He defended his Candidate's thesis in 1972 and doctor's thesis in 1991. He trained 11 candidates of science.

See Tribute to Prof. V. Dukhovniy on: http://sic.icwc-aral.uz/memory_of_prof_dukhovny.htm
Photogallery: http://sic.icwc-aral.uz/photo_of_prof_dukhovny.htm

On September 2, **Arslan N. Berdyev**, an expert of the Turkmen Analytical Agency "Ynanch-Vepa" passed away.

A. Berdiyev graduated from the Turkmen Agricultural Institute in 1986. The same year, he began his career at the South Karakum Hydrogeological Field Service.

Later, he worked at the Turkmengiprovodkhoz Institute, the Turkmen Ministry of Agriculture, and the Executive Committee of IFAS.

As an expert he collaborated with UNICEF, UNECE, GWP CACENA, and GIZ.

Since 2016, he worked at the Analytical Agency "Ynanch-Vepa". A. Berdyev is the author of numerous articles and analytical materials.

Special thanks are due to G. Nurmukhammedova, Chairman of GWP CACENA for the information

Hasanzoda Homid Usmon, Deputy Director of the Agency for Land Reclamation and Irrigation at the Government of Tajikistan, passed away on October 27.

Hasanzoda Homid has worked for many years in the water management system of Tajikistan as Deputy Minister and made a worthy contribution to the development of land reclamation and irrigation in the country.

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

Boris M. Kizyaev, doctor of technical sciences, professor, academician of the Russian Academy of Sciences, honored irrigator of the Russian Federation, tragically died on December 9.

B. Kizyaev has worked for almost 60 years at the All-Russian Hydraulic Engineering and Land Reclamation Research Institute (VNIIGiM): since 1997 as the Director, and since 2016 as the chief research officer.

B. Kizyaev was a prominent scientist in the area of water management, land reclamation and protection; he made a major contribution to agricultural science, practices and capacity building of the country agroindustry. He developed the priority area of agricultural science in part of modernization of technologies and technique for reconstruction and rehabilitation of irrigation and drainage systems and structures. In his work, for the first time, B. Kizyaev substantiated the methods for optimization of processes and organization of construction of irrigation and drainage systems.

He published more than 200 scientific papers. Among them are 34 books and monographs, 33 patents and certificates of authorship for inventions. For many years B. Kizyaev has served as the Chairman of the Institute's Dissertation Council.

Source: http://www.vniigim.ru/2021/12/10/памяти-бориса-михайловича-кизяева/