UNECE

Central Asia

Environmental performance reviews

Scoping report





UNITED NATIONS

Acknowledgements:

The report was co-funded by the Governments of Germany and the United Nations Regular Programme for Technical Cooperation.

This report was co-funded by the German Federal Environment Ministry's Advisory Assistance Programme (AAP) for environmental protection in the countries of Central and Eastern Europe, the Caucasus and Central Asia and other countries neighbouring the European Union. It is supervised by the German Environment Agency (Umweltbundesamt, UBA).

The report was prepared with the support of ECE consultants, Bo Libert and Antoine Nunes.

The following ECE staff contributed to the preparation of the report: Angela Sochirca, David Weihrauch, Karin Fueri and Nicholas Bonvoisin, supported by Amie Figueiredo and Oksana Rott. Appreciation is extended to ECE interns for their support in preparing the report: Ms. Soliana Samson, Mr. Mario Cavolo and Ms. Anna Soldini.

Further, the report was consulted with the national focal points in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan; members of the ECE Expert Group on EPRs; partner organizations, UNEP, OECD and UNDRR; United Nations Resident Coordinator Offices in Central Asia; and others. Special thanks to Harry Liiv (Estonia); Hans-Joachim Hermann (Germany); Alessandra Fidanza (Italy); Daulet Yesmagambetov (Kazakhstan); Aizada Barieva (Kyrgyzstan); Teodora Grncarovska (North Macedonia); Fabio Petrig (Switzerland); Khaniya Asilbekova (Uzbekistan); Krzysztof Michalak, Takayoshi Kato and Matthew Griffiths (OECD); Marat Shashkenov (UN RCO Kazakhstan); Samal Bekmaganbetova (UNDRR); and Tomas Marques and Ekaterina Perfilyeva (UNEP).

Cover photos (left to right, top to bottom): Zhambyl region, Kazakhstan - 05.15.2013: Solar station panels are installed in a field with poppies, by Vladimir/stock.adobe.com; Big Alo mountain lake with turquoise water in sunshine on rocky mountain background. The Fann Mountains, Tajikistan, Central Asia, by maribom/stock.adobe.com; Hydroelectric power station on Naryn river in Kyrgyzstan, by Mieszko9/stock.adobe.com; Two ladies in national dress walking in the green hills of Turkmenistan near the Iranian border, by berimitsu/stock.adobe.com; Bukhara, Uzbekistan - September 11, 2022: Modern electric train "Afrosiyob" at the platform at Bukhara station. Uzbekistan, by Anna/stock.adobe.com; Horses grazing in front of Tien Shan snow-capped mountains, Sary Jaz valley, Issyk Kul region, Kyrgyzstan, by Gabriell/stock.adobe.com.

United Nations Economic Commission for Europe

Environmental Performance Reviews

Scoping Report for Regional Environmental Performance Review of Central Asia

10 April 2026

United Nations
Geneva, 2026

Executive Summary

The scoping report provides the analytical and strategic foundation for the preparation of the Regional Environmental Performance Review (Regional EPR) of Central Asia under the United Nations Economic Commission for Europe (ECE) Environmental Performance Review Programme. The Regional EPR is being prepared in response to a request by Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. Building on more than three decades of experience with national EPRs, the Regional EPR introduces an innovative approach focused on shared environmental challenges, transboundary dynamics and opportunities for strengthened regional cooperation among the countries of Central Asia. This scoping report is based on a desk study and expert analysis.

The report aims to identify priority areas where regional approaches can add value, to assess policy responses and institutional arrangements, and to support the selection of a limited number of themes for the forthcoming Regional EPR. It also serves as an analytical input to the Regional Ecological Summit 2026 (RES 2026) and reflects its thematic priorities, including climate transition, adaptation and resilience, sustainable natural resource management, food security, pollution control, environmental governance and inclusive green development.

Central Asia is characterized by a unique geography of mountains, deserts and steppes, a predominantly arid and continental climate, and a shared historical legacy that has shaped its infrastructure, institutional systems and economic structures. While the five countries differ significantly in many respects, they remain interconnected through shared river basins, energy networks and ecosystems. Rapid population growth, urbanization and economic expansion are placing increasing pressure on natural resources and environmental systems.

The region faces a complex set of interlinked environmental challenges that are national in manifestation but regional in scale and implication. Climate change stands out as a defining risk multiplier. Average temperatures have increased across the region and are projected to rise further, contributing to glacier retreat, altered precipitation patterns, more frequent droughts and floods, and growing water insecurity.

The region also contributes to climate change. While greenhouse gas emission intensity relative to GDP has declined, overall emissions have increased, particularly in fossil fuel rich economies. Per capita emissions remain high in some countries, reflecting carbon intensive energy systems and industrial structures. Agriculture and methane emissions represent important mitigation opportunities that are not yet fully realized.

Water scarcity is one of the most pressing challenges. The region is heavily dependent on transboundary rivers, notably the Amu Darya and Syr Darya. Irrigation remains the dominant water use and is often associated with ageing infrastructure and high losses. Climate change, population growth and expanding economic activity are expected to intensify competition over limited water resources. Downstream countries are particularly exposed to declining flows. Unmanaged municipal wastewater, agricultural runoff and industrial discharges affect surface water quality. Groundwater management is improving, although monitoring remains insufficient. Transboundary water cooperation continues to develop, yet significant challenges persist.

Air pollution poses severe risks to public health. Major sources include coal-based heating, outdated industrial installations, transport and dust storms. Fine particulate matter concentrations frequently exceed international guidelines in major urban areas, particularly during winter. The health impacts are substantial, with air pollution contributing significantly to mortality from cardiovascular and respiratory diseases. Sand and dust storms, exacerbated by desertification and the drying of the Aral Sea, further compound these impacts and create transboundary challenges.

Land and soil degradation is widespread across Central Asia, driven by unsustainable irrigation practices, salinization, overgrazing and deforestation, and further intensified by climate change. More than one fifth of the region’s land area is estimated to be degraded, with consequences for livelihoods, agricultural productivity and ecosystem stability. Soil salinity and erosion are increasing, while desertification processes continue to expand, particularly in areas affected by the Aral Sea crisis and declining water levels in the Caspian Sea.

Central Asia hosts globally significant ecosystems, endemic species and genetic diversity, including centres of origin for cultivated crops. However, ecosystem degradation, reduced river flows, forest loss and the collapse of the Aral Sea ecosystem have contributed to the disappearance of species and increased vulnerability of endemic flora and fauna. Monitoring systems and integrated biodiversity management, while evolving, remain insufficiently developed.

Nature based solutions (NbS) are increasingly recognized in Central Asia as effective tools for ecosystem restoration, climate resilience and sustainable land management. The region is applying NbS such as afforestation, landscape and pasture restoration, riparian forest rehabilitation and urban greening, which provide co benefits including soil stabilization, reduced dust and erosion, carbon sequestration and improved public health. The Aral Sea region demonstrates both the urgency and potential of NbS through large scale vegetation efforts that stabilize soils and foster new ecosystems. Recent Water Code reforms in Kazakhstan, Kyrgyzstan and Uzbekistan further integrate NbS into national policy frameworks. Several pilot projects highlight strong potential for scaling up NbS, including to enhance climate resilience of water, transport, urban systems and other critical infrastructure assets.

Waste management and industrial legacies continue to present environmental and health risks. Municipal waste is predominantly disposed of in landfills and dumpsites that often lack environmental safeguards. Recycling rates remain low and circular economy approaches are still at early stages. Mining activities have generated large volumes of tailings, including hazardous and radioactive materials, some of which pose transboundary risks. Ageing infrastructure and limited remediation efforts elevate the likelihood of environmental accidents, particularly in mountainous and seismically active areas.

The region is also highly exposed to natural and human induced disasters. Floods, mudflows, droughts, earthquakes and dam failures have significant socioeconomic impacts. Climate change is increasing the frequency and severity of extreme weather events. Ageing water infrastructure and population growth in vulnerable areas heighten risks across borders. Disaster risk management and regional coordination are progressing but remain limited.

Underlying many of these challenges are systemic governance constraints. Strengthening the status, influence and resources of environmental institutions is key for delivering integrated policies and achieving environmental and development goals. Environmental legislation is sometimes fragmented, inconsistently implemented or based on outdated standards. Economic instruments such as pollution charges offer room for improvement to better incentivize cleaner production and resource efficiency. Environmental mainstreaming across sectors remains limited, and enforcement capacity is often constrained by insufficient financial and human resources.

At the same time, positive developments are emerging. Regional political dialogue has intensified in recent years, creating new opportunities for cooperation. Countries have adopted climate strategies, Nationally Determined Contributions and sectoral programmes that increasingly integrate environmental protection and climate action. International development partners play an important role in supporting reforms and infrastructure investments. There is growing recognition that sustainable resource management, climate adaptation and environmental governance are essential to long term economic resilience and social stability.

The report concludes that water and climate change remain the highest strategic priorities for regional cooperation, given their cross-sectoral relevance and transboundary implications. Additional areas, such as green development, air quality, circular economy and waste management, the land-water-agriculture nexus and disaster risk reduction, also offer strong potential for enhanced joint regional action. Strengthening institutions for regional dialogue, improving environmental governance, expanding data-sharing and monitoring systems, refining economic and financial instruments and investing in sustainable infrastructure are key pathways to advance these priorities.

The Regional EPR process offers an important opportunity to consolidate joint efforts, identify a focused set of themes for in depth review and provide peer reviewed recommendations that can guide national and regional policy development.

Contents

Abbreviations and acronyms

ADB	Asian Development Bank
AI	artificial intelligence
BAT	best available technologies
BWO	basin water organization
CAREC	Regional Environmental Centre for Central Asia
CBD	Convention on Biological Diversity
CESDRR	Centre for Emergency Situations and Disaster Risk Reduction
CSO	civil society organizations
DRR	disaster risk reduction
EBRD	European Bank for Reconstruction and Development
EC-IFAS	Executive Committee of the International Fund for Saving the Aral Sea
EIA	environmental impact assessment
EPR	Environmental Performance Review
ESD	education for sustainable development
ESIA	environmental and social impact assessment
FAO	Food and Agriculture Organization
GAEP	Good Agriculture and Environmental Practices
GEF	Global Environmental Facility
GDP	gross domestic product
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICSD	Interstate Commission on Sustainable Development
ICWC	Interstate Commission for Water Coordination of Central Asia
IFAS	International Fund for Saving the Aral Sea
IISD	International Institute for Sustainable Development
IWRM	integrated water resources management
LDN	land degradation neutrality
MEA	multilateral environmental agreement
MRV	monitoring, reporting and verification
NAP	National Adaptation Plan
NbS	nature-based solution
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
RES 2026	Regional Ecological Summit 2026
SDG	Sustainable Development Goal
SEA	strategic environmental assessment
SIC	Scientific Information Centre
SPECA	United Nations Special Programme for the Economies of Central Asia
UNCCD	United Nations Convention to Combat Desertification
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VNR	Voluntary National Review

1. Introduction

This scoping report provides the analytical and conceptual basis for preparing the Regional Environmental Performance Review (EPR) of Central Asia (Regional EPR) under the United Nations Economic Commission for Europe (ECE) Environmental Performance Review Programme, following a request from the Central Asian countries. Building on more than 30 years of experience with national EPRs, the Regional EPR applies an innovative approach to address shared, regional and transboundary environmental challenges and to support sustainable development across Central Asia.

The primary purpose of the Report is to identify priority areas for regional cooperation and joint action, assess policy responses and institutional frameworks, and support the selection of a limited number of themes for the Regional EPR. The findings will inform the preparation of the terms of reference for the Regional EPR. The recommendations resulting from the Regional EPR, developed in close cooperation with participating countries, will undergo expert and peer review under the ECE EPR process and will be adopted by the ECE Committee on Environmental Policy. The Regional EPR is intended to be launched at the Tenth Environment for Europe Ministerial Conference in 2028.

The Report also serves as the analytical basis for preparing an Assessment of Ecological Priorities in Central Asia, to be presented for consideration by the ministers and chairmen responsible for the environment of the five Central Asian countries at RES 2026 (Astana, 22–24 April 2026). The Regional Environmental Summit 2026 (RES 2026) is envisioned as a key platform for advancing regional cooperation on climate change and environmental protection. The Report reflects the RES 2026's thematic priorities: Support for the climate transition; Adaptation and economic resilience to environmental and natural risks; Food security and the region's ecosystem; Sustainable management of natural resources; Combating air pollution and waste management; Mechanisms for achieving environmental ambitions; A just and inclusive regional transition; and Environmental and digital skills for a sustainable future.

A core objective of the Report is to help identify where regional approaches add clear value. This includes areas requiring direct transboundary cooperation, as well as opportunities for coordinated policy development, exchange of experience, joint capacity-building and the strengthening of regional and institutional frameworks. While recognizing the important role of international partners in Central Asia—particularly in areas such as climate change and water cooperation—the Report does not aim to provide a comprehensive inventory of ongoing projects. Instead, it focuses on strategic gaps, priorities and areas where enhanced coordination and synergy could bring added benefits.

The Report uses country-specific data and information to highlight diverse national circumstances while drawing regional-level conclusions on shared challenges and common interests. This approach enables the identification of practical and realistic pathways for joint action that respect national priorities and capacities.

The Report is based primarily on existing sources, including ECE EPRs, national and regional studies and reports by international organizations. Given differences in the timing of the most recent national EPRs—particularly the earlier review of Turkmenistan—additional sources have been used to ensure balanced and up-to-date coverage across the region. The drafting process has been supported by national expertise, notably through a national consultant for Kazakhstan, and complemented by inputs from national focal points and experts, in line with the methodology developed for the Regional EPR.

ECE wishes to acknowledge with appreciation the support of the German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety and the German Environment Agency, which provided funding through the Advisory Assistance Programme for this scoping report. Sincere thanks are extended to Italy and Switzerland and the United Nations Regular Programme of Technical Cooperation for additional financial support.

2. Central Asia as a region

Map: Central Asia

Source: UN Geospatial (2026)

The countries in Central Asia are landlocked and feature a unique geography of mountains, deserts and steppes. They are geographically located in the heart of Eurasia, surrounded by Afghanistan, China, the Islamic Republic of Iran and the Russian Federation (see Map).

The countries do not, however, constitute a homogeneous group. They differ in culture, language, economic structures and political systems. A shared history as former Soviet republics has left a clear imprint on many aspects of today's life: the political, administrative and education systems, as well as the widespread use of Russian as a shared language supporting dialogue between countries. Industry and natural resource extraction also retain features of approaches used in the Soviet period. The countries have inherited interconnected infrastructure such as irrigation canals, power grids and pipelines.

There are marked geographical contrasts: Kyrgyzstan and Tajikistan are predominantly mountainous, while the downstream countries of Kazakhstan, Turkmenistan and Uzbekistan are characterized by plains—steppes and deserts.

The countries have broadly similar climate conditions. The region is predominantly dry and continental, with extreme seasonal shifts—hot summers and cold winters—combined with low precipitation and strong winds. Mountainous areas receive more rainfall.

Forest cover in the countries of Central Asia ranges from 3 per cent in Tajikistan to 9 per cent in Turkmenistan. Lowland desert forests, such as saxaul forests, are sparse, while mountain nut and fruit and coniferous forests are denser. Forests constitute key habitats for wildlife and play an important role in soil protection and climate

regulation. Many mountain and floodplain forests have protected status.[1] Deserts, semi deserts and steppes dominate much of the land area in Central Asia, but mountains also occupy a significant share—ranging from about 5 per cent in Turkmenistan to 90 per cent or more in Kyrgyzstan and Tajikistan. The mountain ranges in Kyrgyzstan (Tien Shan) and Tajikistan (Pamir) function as the region's water towers and support globally important biodiversity.[2]

Central Asia is experiencing rapid population growth, with the regional population increasing from around 50 million in 1990 to over 70 million in 2019 and projected to reach 100 million by 2050.[3] The growing and increasingly urban population places rising demands on the environment and natural resources.

Overall economic growth in Central Asia is currently high,[4] but significant differences between the countries remain and continue to shape many aspects of development. These variations influence the issues raised in this report, including environmental and water management, and sustainable development priorities.

Over recent years, important steps have been taken to advance cooperation among the five countries. Annual and, at times, more frequent meetings of the respective Presidents have led to a notably improved dialogue. In 2025, Central Asian presidents met in Tashkent for their seventh formal consultative meeting. These meetings strengthen political cooperation in the region, and joint statements—including on environment and sustainable development—have been issued. The RES 2026 process also has the potential to further strengthen the implementation of high-level agreements into practice.

External actors and organizations frequently group the five countries together, using formats such as C5+1, which recognize them as a distinct regional grouping in the international system. The Central Asian countries also engage in this approach when cooperating with partners such as China, the European Union (EU), the Russian Federation and the United States of America.

Activities of regional organizations in Central Asia, however, have had limited impact, and a fully unified regional integration programme has yet to emerge. The Central Asian Cooperation Organization merged with the Eurasian Economic Community in 2005. Turkmenistan is the only Central Asian country that is not a member of the Shanghai Cooperation Organisation, where several major regional actors, including China and the Russian Federation are members.

3. Environmental challenges

3.1. Environmental governance

The system of institutions, policies, including programmes, and legislation established to guide, regulate and manage environmental protection is of central importance.[5] Although the Central Asian countries have put in place a basic and functional system, further strengthening could bring additional benefits. In some of the countries, the institutional framework for environmental protection continues to face issues of stability and continuity. Kazakhstan, Kyrgyzstan, Turkmenistan and Uzbekistan have changed the status of their environmental authorities from ministries to state or national agencies or committees, and in some cases several times since 2015. Frequent structural reorganization and changes of staff limit institutional memory and the retention of experienced personnel. At the same time, efforts to raise the status of national environmental institutions can have a positive influence on the sector.

Environmental mainstreaming considerations are often anchored in environmental strategic policy documents. However, the degree to which these considerations are consistently integrated into implementation and decision-making varies. Collaboration and cooperation between environmental authorities and other governmental institutions is unevenly established. Responsibilities are often approached from institutional silos, which may hinder the identification of integrated, cross-sectoral solutions. While some progress has been

[1] Zoi Environment Network (2015).
[2] Ibid.
[3] United Nations (n.d.).
4 Usov (2025).
[5] ECE (2024), ECE (2025a), ECE (2026).

achieved in mainstreaming climate change across sectors, biodiversity conservation remains an area where integration is still limited.

Given the importance that governments place on industry driven economic growth, including from highly polluting and carbon intensive sectors such as mining and metallurgy, there is an opportunity to further improve pollution charges and tariffs. Without such adjustments, ambitious economic and industrial policies, combined with limited incentives for green technologies, may risk resulting in environmental pressures.

Several key policy instruments offer potential for further development, such as the gradual phase-out of fossil fuel subsidies, the introduction of green procurement and the application of extended producer responsibility.

Environmental legislation often requires greater coherence and more consistent implementation. In many cases, the by-laws needed to operationalize environmental legislation are not yet in place. Frequent changes of laws and by-laws may indicate a dynamic regulatory environment but can also create uncertainty. Further strengthening of the legal framework would support more efficient environmental management.[6]

Permitting and licensing are central aspects in the management of natural resources. Central Asian countries generally have a related legal framework for permitting and licensing. Integrated permits and best available techniques (BAT) are still in early stages of development. The application of Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) is also at an early stage in some countries, presenting opportunities for further institutionalization.[7]

Emission standards for environmental media are usually in place to support sustainable natural resource management. The main challenge is to ensure that these standards are realistic and contribute effectively to improved environmental management. In some cases, older emission standards from the Soviet era, the 1990s and early 2000s continue to be used, and not all environmental standards are practical or consistently applied.

Pollution charges and tariffs for the use of natural resources are generally set at low levels and have, in many cases, remained unchanged for long periods, reducing their effectiveness over time.[8] The number of pollutants and chemical substances subject to effluent charges remains high, which can make monitoring and enforcement difficult. This situation may reduce incentives for companies to comply with environmental limits and limits the revenue available to address environmental impacts. Streamlining the system of pollution charges and tariffs and enhancing enforcement mechanisms would provide important improvements.

Access to environmental information is closely linked to public participation.[9] Strengthening the collection of primary data, improving linkages between different information systems and advancing digitalization would support wider access. Currently, stakeholders and the public often do not have full access to environmental information, which poses an additional constraint on public participation.[10]

Adapting progressive environmental policies to available expertise, staffing and financial resources remains a challenge for the countries. In many cases, policy ambitions exceed administrative capacity. Limited domestic funding also constrains progress. Participation in multilateral environmental agreements (MEAs) provides valuable frameworks but can place complex demands on Parties that may be difficult to meet with current administrative resources in some Central Asian countries.

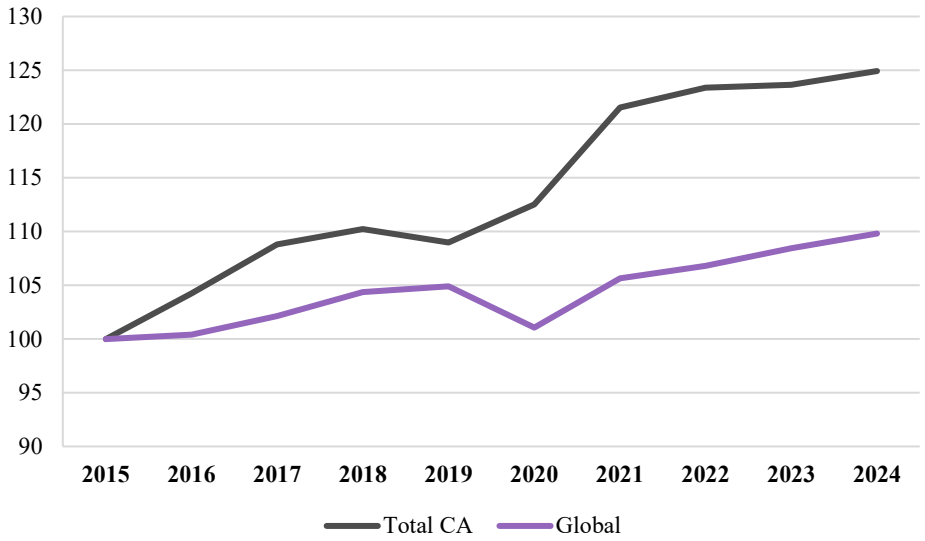
[6] ECE (2024).
[7] ECE (2024), ECE (2025a).
[8] ECE (2025a).
[9] ECE (2024).
[10] ECE (2024).

3.2 Climate change

Greenhouse gas emissions

On average, greenhouse gas (GHG) emissions in the Central Asia region increased by 25 per cent in the period 2015–2024, while global emissions increased by nearly 10 per cent in the same period (Figure 1). The COVID-19 pandemic had a greater impact on global GHG emissions than on those from Central Asian countries.

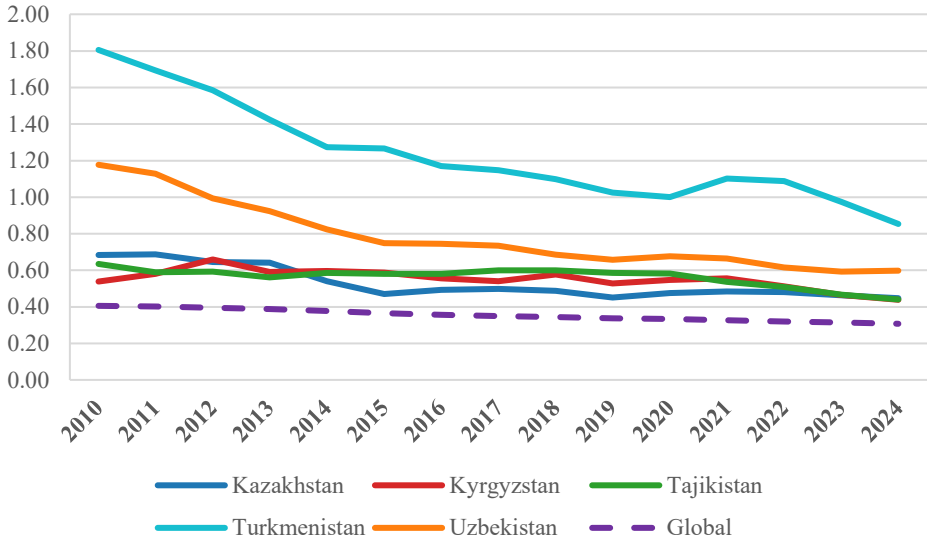
Figure 1: Total GHG, 2015–2024, Mt CO^2eq, 2015=100



Source: Crippa et al. (2025)
Note: Total CA = sum of GHG emissions of the five Central Asian countries

Between 2015 and 2024, GHG emission intensity decreased in all Central Asian countries, indicating a gradual decoupling between economic output and emissions (Figure 2). Turkmenistan consistently recorded the highest intensity, although it achieved substantial improvement over the period. Kazakhstan, Kyrgyzstan and Tajikistan showed converging trends toward lower intensity levels in recent years. Uzbekistan shows a gradual decline, with minor fluctuations after 2022. Nevertheless, emission intensity in all Central Asian countries remains above the global average, pointing to the need for continued structural and energy transitions.

Figure 2: GHG per GDP, 2015–2024, t CO_2eq/k US$



Source: Crippa et al. (2025)

While emissions intensity per unit of GDP shows a declining trend, per capita emissions remain high or have increased, particularly in Kazakhstan and Turkmenistan. This shows that efficiency gains at the macroeconomic level do not necessarily translate into lower individual carbon footprints. Persistently low per capita emissions in Tajikistan and Kyrgyzstan suggest limited energy consumption per person along with a reliance on hydropower, whereas higher values in resource rich economies reflect carbon intensive production and energy use patterns.[11]

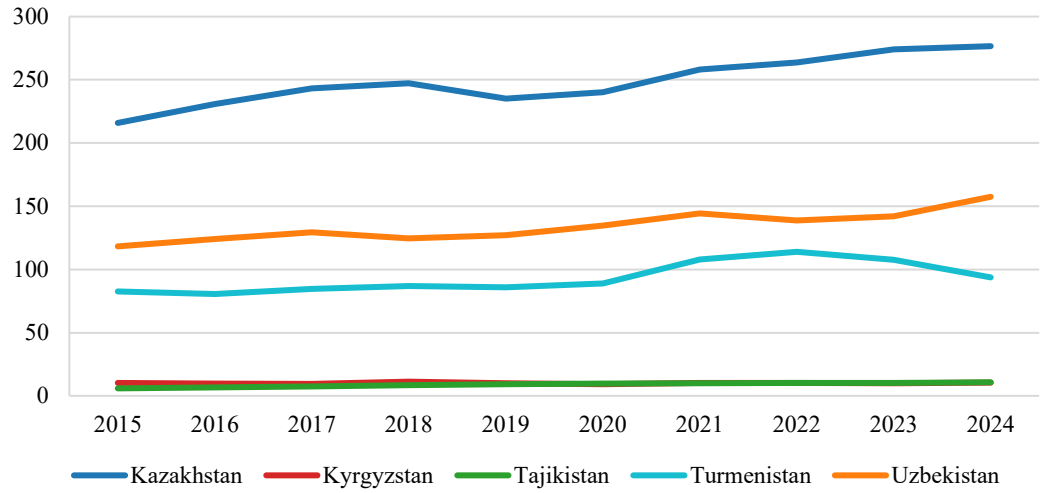
In the Central Asia region, high methane emissions are noted for Kazakhstan, Turkmenistan and Uzbekistan, mainly from leakage in fossil fuel infrastructure and agriculture.[12] Kazakhstan and Uzbekistan peaked around 2022, then stabilized or slightly declined, while remaining above 2015 levels. Kyrgyzstan and Tajikistan, starting from lower levels, experienced a steady increase throughout the period. Turkmenistan showed a generally stable or slightly downward trend, ending the period below its 2015 level. This diversity in trajectories reflects both the challenges and emerging opportunities for methane mitigation.

Energy

Kazakhstan, Turkmenistan and Uzbekistan have considerable reserves of fossil fuels that are central to their energy generation, industry and export capacity. Coal dominates Kazakhstan's energy mix. Turkmenistan ranks fourth in the world in terms of natural gas reserves.[13] Uzbekistan also has significant natural gas reserves. Emission levels are highest in those countries with substantial fossil fuel endowments (Figure 3). GHG emissions in Kyrgyzstan and Tajikistan—countries with very limited fossil fuel reserves and a high share of hydropower—are the lowest in the region, highlighting the climate benefits of their energy structure.

[11] Crippa and al. (2025).
[12] Ibid.
[13] IISD (2025).

Figure 3: CO_2 emissions from energy, 2015–2024, Mt CO_2eq



Source: Crippa et al. (2025)
Note: CO_2 emissions from energy include emissions from Buildings, Fuel Exploitation, Industrial Combustion, Power Industry and Transport

Agriculture

GHG emissions from agriculture in Central Asia remained broadly stable between 2015 and 2024, suggesting that existing policies have so far had limited impact on reducing emissions in this sector. These emissions originate primarily from livestock farming, agricultural soils and crop-related activities. High meat production—particularly in Kazakhstan—remains a significant driver of methane emissions. Agriculture represents a cost-effective and still underutilized mitigation opportunity within Nationally Determined Contributions (NDCs), through targeted measures such as improved pasture management and manure treatment.

In 2024, agriculture sector emitted 30.30 Mt CO_2eq in Kazakhstan, 7.58 Mt CO_2eq in Kyrgyzstan, 9.36 Mt CO_2eq in Tajikistan, 16.21 Mt CO_2eq in Turkmenistan and 52.25 Mt CO_2eq in Uzbekistan. Uzbekistan is the largest contributor to agricultural emissions, accounting for approximately 45.16 per cent of the regional total. While these figures illustrate differing sectoral profiles, they also highlight diverse opportunities across the region for tailored mitigation approaches that reflect national circumstances and priorities.

Climate change impact

Regional overview

Over the past decades, Central Asian countries have experienced an increase in average annual temperatures, and future projections indicate continued warming. Climate change is expected to lead to more precipitation in the northern parts of Central Asia and less in the south.

Heat waves, droughts, strong winds and heavy rainfall, resulting in floods, erosion and mudflows, are increasingly observed across large parts of the region. Both the frequency and severity of such events appear to be rising, causing damage to settlements, roads and railways.[14]

Climate change is placing growing pressure on health, agriculture, water management, forestry and emergency response systems. Several aspects of climate change undermine socioeconomic development and pose risks to health. For example, heat waves may lead to increased mortality, particularly among older persons and young children. Agricultural production is expected to decrease by about 10 per cent, fire hazard may rise (up to 13 per cent by 2080), and snowfall is projected to decrease by 26 per cent by 2100.[15] Against this backdrop,

[14] IISD (2025).
[15] IPCC (2021).

Central Asian countries are observing emerging signs of migration linked to climate and environmental changes.[16]

A major concern is rapid warming during spring, leading to earlier snowmelt. This causes excessive runoff and heightened flood risk in early spring, followed by reduced water availability and summer droughts that undermine water security for both irrigation and ecosystems. Once a large climate-regulating water body, the Aral Sea helped stabilize regional weather patterns; the loss of this natural buffer has contributed to more pronounced climate fluctuations.

Glaciers in Central Asia, primarily in the Tien Shan and Pamir-Alai mountain ranges, are retreating. These glaciers generate up to 50 per cent of the annual flow of the Amu Darya and Syr Darya rivers. Since the 1980s, glacier coverage in Tajikistan has decreased by more than 30 per cent.[17] This trend poses a significant concern for long-term water security, especially in summer months when glacial meltwater is crucial for agriculture and hydropower.

Water resources are unevenly distributed in Central Asia, and the region relies heavily on transboundary rivers:[18]

- Kazakhstan: Most water resources consist of surface waters, averaging 106 km³ annually. Of this, 59.04 km³ (55.7 per cent) originate from local runoff, while 46.96 km³ (44.3 per cent) come from transboundary rivers flowing from China, Uzbekistan, the Russian Federation and Kyrgyzstan. Prospective groundwater reserves are estimated at 40 km³.
- Kyrgyzstan: Total water resources amount to 2,458 km³, with 650 km³ (26.4 per cent) stored in glaciers (over 8,000 km²), 1,745 km³ (71 per cent) in lakes, around 13 km³ (0.5 per cent) in potentially usable groundwater and mineral thermal waters, and 44.5–51.9 km³ (2 per cent) as average annual river runoff. Renewable water resources total 46.5 km³ per year.
- Tajikistan: Water resources comprise glaciers, rivers, lakes, reservoirs and groundwater. The country hosts 14,509 glaciers covering 11,146 km². Its hydrological network includes 947 rivers with a combined length of over 28,500 km. Average annual river runoff is 64 km³—representing 55.4 per cent of the long-term average in the Aral Sea basin—with about 80 per cent flowing to the Amu Darya and 1 per cent to the Syr Darya. Tajikistan also has some 1,300 lakes with a total capacity of over 46.3 km³, including 20 km³ of fresh water.
- Turkmenistan: Water resources are primarily derived from surface runoff, with the Amu Darya accounting for 88 per cent of supply. Other sources include the Murgab (6.5 per cent), Tejen (3.5 per cent), and Atrek, Sumbar and Chandyr rivers (1.4 per cent), along with small watercourses from the Kopetdag Mountains (0.6 per cent). As all major rivers are transboundary, around 95 per cent of surface water originates outside Turkmenistan's borders.
- Uzbekistan: Annual water consumption is 51–53 km³, with roughly 80 per cent (around 41 km³/year) sourced from transboundary rivers. Natural fresh and brackish groundwater resources have a potential yield of 27.6 km³/year, but these are unevenly distributed.

Glaciers, which serve as an important source of water during the warm season, will supply less meltwater over time. Climate change is affecting the volume and timing of river flows, leading to increased water scarcity, particularly in areas dependent on irrigation. Prolonged droughts and inconsistent precipitation patterns further threaten the stability of water resources. More frequent and severe water shortages are therefore anticipated, with potentially significant impacts on crop production and food security. Such impacts are likely to affect the employment and income of the large rural population and may also influence export revenues.

Hydropower is sensitive to climate change and related extreme events. Rapid glacial melt can increase hydropower generation in the short term, but in the longer term reduced ice reserves may significantly lower output. Increased drought risk, reduced snow cover and altered snowmelt periods may also negatively influence production. Additionally, more extreme precipitation and floods require reservoirs to allocate more

[16] Scissa and Martin (2024).
[17] GEF–UNDP–UNESCO Cryosphere Project.
[18] CAWater-Info (2024).

capacity to flood control, potentially reducing generation efficiency. Future water stress may also affect cooling systems in other facilities such as thermal or nuclear power plants.

Country-specific insights

In Kazakhstan, agriculture is considered the most vulnerable sector to climate change. Heat and precipitation stress on agricultural production and periodic flooding are key concerns, with water availability and flow patterns shaped in part by conditions and management practices in upstream countries.

Kyrgyzstan and Tajikistan are highly dependent on hydropower. Limited adaptation of this sector to future climate change patterns may generate socioeconomic impacts over time. Globally, both countries rank among those most vulnerable to climate change.[19]

In addition, mountainous Tajikistan is prone to natural disasters such as floods, avalanches, landslides, extreme temperatures and droughts, all of which are being intensified by climate change. These events damage land, crops and infrastructure, reducing income sources and affecting livelihoods, particularly in rural areas. Glaciers and snowfields cover more than 8 per cent of the country's territory. The most vulnerable areas include glacier-dependent river basins supplying hydropower and irrigation, fragile mountain ecosystems and isolated forests in mountainous and riverine terrain, which increases susceptibility to landslides and land degradation.[20] Poverty remains a major factor influencing vulnerability to climate-related health risks. Engagement of the health sector in broader climate adaptation efforts could be further strengthened.[21]

In Turkmenistan, climate change is creating significant challenges. As an arid, desert-dominated country, increased drought frequency, desertification and land degradation are of particular concern. Water resources, agriculture, health and infrastructure are all affected by changing climatic conditions.

In Uzbekistan, as in other countries of the region, agriculture is the most climate-sensitive sector. In recent years, precipitation has fallen mainly as rain, including in low- and mid-mountain zones. Reduced snowfall has a direct impact on river flows during the vegetation season.[22] Over the 15 years up to 2022, per-capita water availability in Uzbekistan has more than halved, illustrating the growing pressures on water resources.[23]

3.3 Air pollution

Regional overview

Key sources of air pollution include industry, energy production, mining, urban transport, waste burning, agriculture and construction. Overall, air quality management in the region offers considerable room for further strengthening.

Industrial enterprises are significant contributors, emitting sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM) and ozone precursors from sectors such as metallurgy, oil and gas, energy, chemicals and construction materials. Many facilities continue to operate with ageing or insufficiently modernized production technologies and emission control systems.

Rapid growth in the number of cars has contributed to increased congestion and pollution in major cities. Factors include an ageing vehicle fleet, limited uptake of public transport, poor fuel quality and insufficient vehicle maintenance. Road transport remains the dominant mode for freight. In urban areas, particularly during stagnant weather conditions, transport emissions are a major source of nitrogen dioxide (NO_2), SO_2, CO and PM.

[19] World Bank (2017).
[20] World Bank (Climate Change Knowledge Portal).
[21] ECE (2025a).
[22] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[23] Ibid.

The widespread use of coal for energy generation and heating is a major source of urban air pollution. Continued use of unabated coal—extracted and consumed without measures to reduce greenhouse gas emissions—further exacerbates pollution and poses risks to public health.

Kazakhstan remains the largest coal user in the region, with significant consumption also in Uzbekistan. In Kyrgyzstan and Tajikistan, coal once played a minor role, but rising energy deficits and limited affordable alternatives have led to increased use of domestic and imported coal to meet growing energy needs.

Progress is still needed to ensure that reliable air quality data are readily accessible to the public. In most cases, citizens do not receive daily information on air quality.

Some rural communities in the region continue to lack regular access to clean and affordable energy, resulting in household fuel combustion that negatively affects public health.

Country-specific insights

In Kazakhstan, trends in key pollutant emissions between 2017 and 2024 show that pollution from stationary sources of SO_2 and PM has not significantly decreased, while NO_x emissions have increased.[24] Some major cities, such as Almaty, Karaganda and Temirtau, rank among the world's most polluted, while others such as Aktobe, Astana, Atyrau, Karaganda, Shymkent and Ust-Kamenogorsk, also experience elevated pollution levels. Fine particulate matter ($PM_{2.5}$) in Almaty consistently exceeds norms during winter due to coal heating, with no clear indication of improvement.[25] Between 2023 and 2025, the number of vehicles increased by one third in Kazakhstan. Within less than three years, the number of vehicles older than 20 years increased by almost 600,000, with significant consequences for urban air quality.[26]

In Kyrgyzstan, $PM_{2.5}$ monitoring shows that Bishkek's air is among the world's most polluted during the winter heating season. Residential heating with high-sulfur coal is the primary source of dangerous pollution levels, especially in winter. Intensive car traffic also contributes. Some evidence indicates that Osh may experience even higher pollution levels than Bishkek.[27]

In Tajikistan, 2021 $PM_{2.5}$ data for Dushanbe showed unhealthy peak concentrations in autumn and winter. Key sources included windblown dust and residential heating. Population exposure to $PM_{2.5}$ is the highest among the Central Asian countries.[28] Very high concentrations of total suspended particles and PM_{10} in Dushanbe are often associated with dust storms.[29]

Among industrial enterprises in Turkmenistan, the oil, chemical and gas industries contribute the largest share of atmospheric pollution, alongside dust. Türkmenbaşy and Ashgabat are the most affected cities.[30]

Urban centres in Uzbekistan, especially Tashkent, face mounting pressures. Temperature inversions trap pollutants near the ground, deteriorating air quality. Geographic, climatic and anthropogenic factors combine to make air pollution a complex and persistent issue with significant public health implications. According to the 2024 IQAir World Air Quality Report, Uzbekistan ranked 19th out of 138 countries with the highest population-weighted annual $PM_{2.5}$ concentrations, while Tashkent ranked 19th among 121 capitals, with winter peaks indicating that heating-related emissions are a major contributor. Air pollution is among the top 10 causes of death and disability in Uzbekistan.[31] In 2022, the largest volumes of pollutants from stationary sources were recorded in the Kashkadarya, Syrdarya, Samarkand and Tashkent regions.[32] While most power

[24] UNCT Kazakhstan (2026).
[25] Ibid.
[26] Ibid.
[27] ECE (2024).
[28] World Bank (2023).
[29] ECE (2025).
[30] IISD (2025).
[31] ECE (2025a).
[32] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).

plants in Uzbekistan are gas-fuelled, two thermal power plants—Angren and Novo-Angren—run on coal, including Angren coal, which is characterized by low quality and high ash content.[33]

Between 2012 and 2021, CO and hydrocarbon emissions in Uzbekistan declined. However, emissions of NO_x nearly doubled and PM emissions also increased.[34] Rapid growth in the vehicle fleet contributes significantly to pollution in urban areas, with transport accounting for about 63 per cent of total emissions.

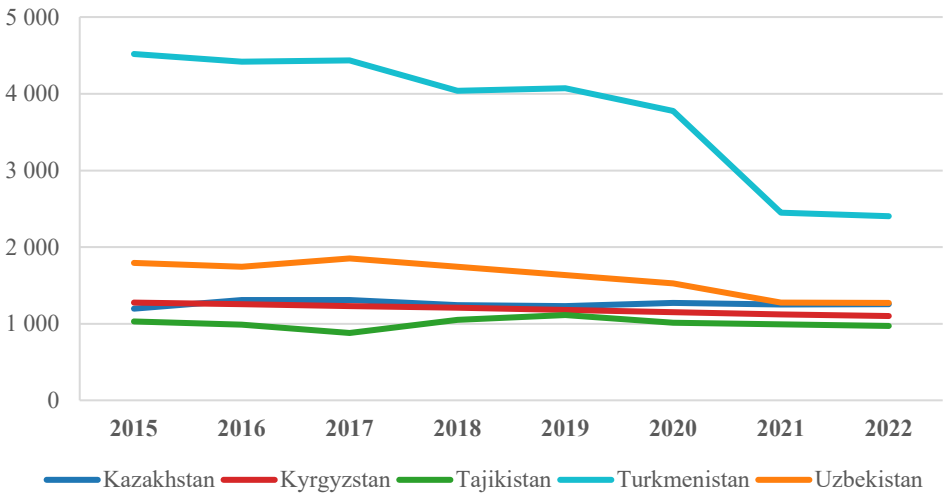
3.4 Water

Access to sufficient quantities of clean water remains a crucial challenge in Central Asia. This issue has persisted for several decades, and climate change is expected to place additional pressure on water availability.

Water for drinking, irrigation and ecosystem needs is becoming increasingly scarce. The national water security scores of the Central Asian countries remain low. These scores measure a nation's ability to guarantee sustainable access to sufficient, high-quality water for households, economies and ecosystems.[35]

Figure 4 shows the total withdrawal of water per capita in the period 2015–2022. Overall, per capita water withdrawal declined in most Central Asian countries between 2015 and 2022. Turkmenistan and Uzbekistan remained the largest water users per capita, while Tajikistan recorded the lowest levels.

Figure 4: Total water withdrawal per capita, 2015–2022, m³/capita



Source: FAO AQUASTAT Dissemination System

Surface water quantity

Regional overview

The expansion of irrigated agriculture in Central Asia during the Soviet period had a major impact on regional water resources, most visibly illustrated by the drying of the Aral Sea. Since 1960, its volume has declined from 1,083 km³ to 69.31 km³ (a decrease of 93.6 per cent).[36]

Water use for irrigation remains very high and is a central factor behind several environmental pressures in Central Asia. During dry years, ensuring adequate water for agriculture becomes particularly challenging.

[33] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[34] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[35] FAO et al. (2025).
[36] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).

Irrigation practices are generally inefficient, with up to 50 per cent of diverted water not reaching fields. Ageing and deteriorated infrastructure is a major cause of these losses. Low prices for irrigation water further discourage efficient use.

Drainage systems in irrigated areas are often insufficiently developed or maintained, contributing to salinization and waterlogging. Much of the irrigation infrastructure was not designed with climate change impacts in mind. Siltation of reservoirs, which reduces storage capacity, is another concern.

Between 1994 and 2020, water intake for utility and household purposes doubled to reach 8.6 km³. However, investments in drinking water infrastructure have not kept pace with this growth. Water losses in distribution networks remain high. An analysis of adopted development plans and programmes shows that proposed financial support is not yet sufficient to achieve Sustainable Development Goal 6 (clean water and sanitation) by 2030; a shortfall of approximately US$12 billion is estimated for 2025–2030.[37]

Water scarcity is further aggravated by climate change, which is already having and will continue to have significant impacts on water availability for all economic sectors and water-dependent ecosystems. The year 2021 was among the most water-poor in decades.

According to one estimate, by 2050 the flow volume in the Amu Darya and Syr Darya river basins may decrease by 10–15 per cent and 6–10 per cent, respectively.[38] Another model suggests that available water resources could rise from the current 120 km³ to 135 km³ by 2050, before declining to 110 km³ by 2070 due to climate change.[39]

Although all countries rely heavily on water for irrigation, upstream Kyrgyzstan and Tajikistan generally face fewer shortages than downstream Kazakhstan, Turkmenistan and Uzbekistan.

Largely due to population growth, per capita water availability in Central Asian countries declined by at least 20 per cent between 2000 and 2020.[40] In Uzbekistan, water supply per capita fell from 3,000 m³ to 1,500 m³ over 20 years (a 50 per cent reduction).[41]

Competing demands between energy and agriculture complicate transboundary cooperation in the Syr Darya basin. Kyrgyzstan needs winter hydropower generated at the Toktogul Dam, whereas downstream countries rely on summer water releases for irrigation.

Water flow in the Amu Darya is likely to decrease with the construction of the Qosh Tepa Canal and associated irrigation systems in Afghanistan. The infrastructure, expected to open more than 500,000 ha to irrigation by 2026, is projected to divert an estimated 8–20 per cent of the river's volume. This will significantly reduce water available for Turkmenistan and Uzbekistan, both for irrigation and ecosystems, at a time when water is already scarce.[42]

Because major rivers are transboundary, cooperation on their management is essential. Existing bilateral and regional frameworks are important, but several concerns indicate that cooperation remains limited. A particular challenge is the absence of a water agreement between Afghanistan and the Central Asian countries.

Country-specific insights

According to the World Bank, Kazakhstan's surface water flows have declined by 27 per cent in recent decades, mainly due to climate change and increased upstream use. Further reductions are forecast, particularly in the

[37] EDB (2024).
[38] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[39] GEF–UNDP–UNESCO Cryosphere Project.
[40] FAO et al. (2025).
[41] Arabov (2024).
[42] Fayzieva (2025).

Aral Sea–Syr Darya basin.[43] Concerns also exist regarding potential declines in flows of the Ili and Irtysh Rivers from China, and the Ural River from the Russian Federation.

As in other Central Asian countries, irrigation is the largest water user in Kazakhstan (70 per cent of abstractions). Water productivity remains low (<0.5 USD/m³), and losses range from 20–40 per cent, with the most acute shortages in the southern provinces. Nonetheless, current plans foresee an expansion of irrigated land from 1.6 million ha to 2.2 million ha over the next decade.[44]

Lake Balkhash faces ecological risks similar to those once observed in the Aral Sea, with potential declines in water levels, salinity increases and biodiversity pressures resulting from reduced Ili River inflows in both Kazakhstan and China, combined with climate change. However, as of 2025, water levels are reported as reasonable.[45]

Kyrgyzstan is the only country in Central Asia whose water resources are almost entirely generated within its borders. While overall access to water is comparatively good, ageing infrastructure and related losses affect irrigation, drinking water supply and ecosystems.

In Tajikistan, underinvestment in water infrastructure complicates efforts to improve and rationalize water use. Much of the irrigation network relies on pumping stations. Low tariffs, weak collection and limited metering create additional pressure on water suppliers and provide users with limited incentives for conservation.[46]

In Turkmenistan, significant water deficits exist in the northern and eastern provinces of Dashoguz and Lebap, as well as in several cities in the west.[47]

Between 2017 and 2022, total water intake and consumption in Turkmenistan decreased due to reduced water availability in rivers.[48] During dry years, shortages for agriculture and other production sectors become particularly pronounced.

Irrigated agriculture withdraws about 90 per cent of water resources used in Uzbekistan. Average water use was 46.66 km³ per year between 2013 and 2022.[49] Over the last decade, total water withdrawals declined mainly due to reduced availability.[50] Uzbekistan's water deficit (more than 3 km³ before 2015) could reach 7 km³ by 2030 and 15 km³ by 2050.[51]

Recent growth in industry and the energy sector in Uzbekistan has increased water demand, with total consumption in these sectors projected to rise by another 80 per cent by 2030.[52]

The Caspian Sea, the world's largest inland water body, is of particular importance to Kazakhstan and Turkmenistan. Both are exposed to anthropogenic pressures linked to oil and gas extraction, industry, shipping and other activities. The sea level fell by around 2 metres between 2006 and 2024, leading to shallower waters and reduced wetlands.[53] This trend appears linked to global warming, altered precipitation patterns in river basins and increased evaporation. Exposed seabed contributes to desertification and dust storms. Fluctuations in sea levels also cause significant damage to coastal infrastructure.[54]

[43] World Bank (2025).
[44] World Bank (2025).
[45] Ministry of Water Resources and Irrigation of Kazakhstan (2025).
[46] ECE (2025).
[47] BTI (2024).
[48] IISD (2025).
[49] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[50] Ibid.
[51] Ibid.
[52] Ibid.
[53] UNCT Kazakhstan (2026).
[54] IISD (2025).

In Turkmenistan's sector of the Caspian Sea, the costs of protecting water, air and land resources, as well as repairing production assets, are assessed as very high.[55]

Disruption of ecological flows

Water releases in the major rivers of Central Asia are largely regulated to meet the needs of irrigation and hydropower. This is enabled by the extensive system of reservoirs and dams, particularly along the Syr Darya River. However, by interrupting natural flows with barriers, migratory fish species are hindered in their movement and their habitats can be disrupted.

As an adaptation measure to climate change, and to support energy generation, all Central Asian countries have plans to construct additional water reservoirs of various sizes. Uzbekistan, for example, plans to build 3,000 micro hydropower plants on its watercourses, with an estimated total capacity of about 160 MW.[56]

Such developments may pose additional pressures on aquatic ecosystems and biodiversity if appropriate safeguards are not in place. Regulated flows and prolonged water storage can alter water temperature, reduce oxygen levels and increase evaporation. Forested areas are sometimes cleared and replaced by concrete structures. Cascades of hydropower plants along a river may lead to an accumulation of these effects. Civil society and scientific communities across the region have expressed concerns about the potential environmental risks associated with hydropower development and reservoir construction. High levels of irrigation-related water abstraction frequently reduce residual river flows to ecologically insufficient levels, undermining ecosystems and biodiversity.

Surface water pollution

Regional overview

Water quality remains a challenge, and limited monitoring capacity, combined with a lack of comparable data, continues to impede a comprehensive understanding of its full scale. Major sources of pollution include agriculture, households and industry.

Rural households are particularly exposed to pollution from agricultural runoff, septic waste, animal farming and poorly managed irrigation systems.

Municipal wastewater is a significant contributor to surface water pollution. It is widely recognized that sewage collection and treatment remain inadequate in many parts of the region.

Salinity levels increase downstream in major rivers as a result of intensive irrigation. The reuse of drainage water from irrigated land is limited, especially when salinity levels are high.

Drinking water challenges in rural areas are often more complex than in cities, where centralized systems are monitored by state sanitary and epidemiological services or equivalent bodies. For example, in Tajikistan, coliform bacteria have been detected more frequently in water sources used by rural households than in urban areas.[57]

It is estimated that around 13 per cent of the Central Asian population, mainly in rural areas, does not have access to safe drinking water.[58]

The effectiveness of wastewater management is constrained by insufficient maintenance and limited capacity of existing wastewater treatment facilities. Population growth further increases pressure. Downstream surface waters may be polluted, and in smaller settlements and rural areas with inadequate wastewater systems, heavy

[55] Ibid.
[56] ECE (2025a).
[57] World Bank (2017).
[58] EDB (2024).

rains and flash floods can carry pollution into rivers and canals. The lowest proportion of domestic wastewater treated is reported in Kyrgyzstan and Tajikistan.[59]

Industry also contributes to water pollution. Industrial wastewater treatment plants (WWTPs) often discharge insufficiently treated wastewater into municipal systems or directly into water bodies.

The mining sector poses additional risks: it requires large volumes of water, may impact groundwater level, flow and quality, generates tailings that can pollute soil and water, as well as pose environmental accident risks.

Spontaneous, illegal dumpsites for industrial and municipal waste are an emerging concern. Even organized landfills and hazardous chemical storage may contaminate both surface and groundwater.

Transboundary cooperation on water quality remains limited, with only a few examples of established collaboration. Some cooperation on monitoring has taken place between Kazakhstan and Kyrgyzstan on the Chu River and more recently between Kazakhstan and Uzbekistan on the Syr Darya.

Country-specific insights

A recent World Bank report highlights the state of water resources in Kazakhstan.[60] Water bodies face growing pressures from point and diffuse pollution and increasing abstractions. Of monitored water bodies, 64 per cent are assessed as being in good status, although monitoring coverage is limited and significant challenges persist in large water bodies such as the Northern Aral Sea. According to 2024 data on transboundary rivers, only the Irtysh River had water of good quality suitable for drinking water supply. The Emel, Ilek, Karaozen, Shagan, Saryozen and Zhaiyk rivers were considered suitable only for industrial use.[61] The Ayat, Kara Irtysh, Keles, Obagan and Tobol rivers were assessed as unsuitable for any use. Of 90 cities and large towns, 65 have municipal WWTPs. Much of the wastewater from industrial enterprises is discharged to municipal WWTPs that are not designed to treat industrial effluents.[62]

In Kyrgyzstan, 20–25 per cent of water samples taken from water bodies used for human activities fail to meet microbiological standards, while 4–5 per cent do not meet chemical standards. Monitoring is focused primarily on the Chu River and Lake Issyk-Kul. The Chu River is heavily polluted, especially downstream of Bishkek, while pollution levels in Lake Issyk-Kul remain low.[63]

In Tajikistan, only large cities have sewage networks, and many settlements with populations above 10,000 lack such systems.[64] The chemical characteristics of drinking water generally comply with national and World Health Organization (WHO) standards. However, chlorine concentrations are often low, meaning water quality may not fully meet health guidelines. As a result, households rely heavily on boiling water for safety.[65]

In Uzbekistan, most watercourses are classified as class III (moderately polluted). Higher pollution levels occur in areas with large industrial facilities and municipal wastewater installations. By the early 2020s, water quality along the main watercourses had stabilized.[66] Inadequate wastewater treatment remains a major pollution source and is closely linked to the state of industrial and municipal WWTPs.[67]

[59] FAO et al. (2025).
[60] World Bank (2025).
[61] UNCT Kazakhstan (2026).
[62] Ibid.
[63] ECE (2024).
[64] ECE (2025).
[65] Ibid.
[66] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[67] ECE (2025a).

Quantity and quality of groundwater

Regional overview

Where available, groundwater is frequently used as a source of drinking water in cities. With increasing use of groundwater for irrigation, the management of this limited resource is becoming even more important. Agricultural runoff, mining, oil and gas activities and waste disposal all contribute to groundwater pollution. Across the region, publicly accessible information on groundwater remains limited.

Transboundary cooperation on shared aquifers is not yet well developed, with the exception of the Pretashkent aquifer shared by Kazakhstan and Uzbekistan, where concerns persist about declining groundwater levels and potential increases in salinity.

Country-specific insights

In Kazakhstan, authorities report that groundwater resources have not been studied sufficiently. A significant share of reserves remains unexplored, and further research to assess their actual potential has not yet been undertaken.[68]

In Kyrgyzstan, groundwater resources are locally overexploited. In Bishkek, groundwater levels have dropped by 10–15 metres over recent decades.[69]

In Tajikistan, groundwater abstraction is largely unregulated, contributing to significant declines in groundwater levels and, in some cases, wells running dry. Concerns also persist regarding groundwater quality.[70]

In Turkmenistan, groundwater is a limited but essential resource. Only a fraction of available reserves is used, primarily for drinking water and livestock in desert areas.

In Uzbekistan, publicly available data on groundwater quality and pollution remain limited. Declining groundwater quantity is recognized as a critical issue. Concerns about groundwater quality and the impacts of pollution on remaining, and increasingly valuable, reserves are growing. Rising salinity is the most pressing challenge: groundwater with salinity levels exceeding 3.0 g/l now covers more than 50 per cent of Uzbekistan's territory.[71]

3.5 Waste management including tailings and nuclear legacy

Regional overview

Landfills or authorized dumpsites are the main approach for managing municipal waste across the region. Unmanaged landfills and authorized and illegal dumpsites remain widespread and contribute to habitat degradation and pollution. Illegal dumping, often in fields or near watercourses, poses significant environmental challenges. Leachate from landfills and dumpsites can contaminate soil and water.

Industrial waste, including mining waste, generated by enterprises generally has limited secondary use and is often placed in tailing ponds, sludge dumpsites or unorganized storage areas, including municipal dumpsites. Hazardous and medical waste present further challenges, as does waste generated from construction activities.

The number of mining sites and the volumes of mining waste are increasing across Central Asia, while conditions for sustainable mining and the application of modern sectoral legislation remain limited.

[68] Prime Minister of Kazakhstan (2026).
[69] ECE (2024).
[70] IGRAC (Groundwater Management Project Tajikistan).
[71] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2024), p. 32.

National production and consumption strategies aimed at reducing waste generation or promoting recycling are generally not prioritized in policy development. Integrated and circular-economy approaches remain at early stages.

The inventory and disposal of equipment containing polychlorinated biphenyls (PCBs) remains an unsolved challenge across Central Asia, although some progress is emerging. Kazakhstan has carried out inventory work on PCB-containing equipment under its most recent National Implementation Plan for the Stockholm Convention, and Uzbekistan has initiated similar work in cooperation with the United Nations Development Programme (UNDP). Tajikistan and Kyrgyzstan are preparing to update their National Implementation Plans in the coming years, although their inventory efforts remain at an early stage. No inventory data are currently available for Turkmenistan.[72]

Country-specific insights

In Kazakhstan, industrial waste volumes more than doubled in 2022–2023 compared with 2020, while most of this waste remained unrecycled.[73] Municipal waste collection is often irregular, leading residents to burn waste or dispose of it in unauthorized locations.[74] The quantity of recyclables recovered through municipal waste sorting facilities is very small. Waste collection, transport and disposal services are especially limited in rural areas. Kazakhstan hosts large tailings storage facilities due to extensive copper, gold, lead-zinc and polymetallic mining. Updated mapping under the Convention on the Transboundary Effects of Industrial Accidents identifies several high-risk and very high-risk facilities in southern Kazakhstan (Syr Darya River Basin).[75] Key high-risk sites include the Kainar sludge accumulators and tailings facilities in Baizhansai, Khantagin and Bayaldyr. Some of these have potential transboundary impacts affecting Kyrgyzstan, Tajikistan and Uzbekistan.

In Kyrgyzstan, incomplete reclamation of the old Bishkek city landfill remains a major concern, while a new modern landfill has not yet been constructed. More than 400 unorganized landfills do not meet sanitary standards. New landfill facilities are gradually being put into operation. A plastic processing (recycling) plant was launched in Bishkek in 2021.[76] The situation regarding hazardous waste management remains unclear.[77] Kyrgyzstan has several active mining sites with associated tailings. In many cases, tailings management is not fully integrated into environmental management plans and is insufficiently reported.[78] The country has also inherited tailings from historical uranium mining and other mining activities, including at Min-Kush, Kara-Balta and Kadamjai. Approximately 121 abandoned sites lack environmental rehabilitation or monitoring. Many older uranium facilities are located near settlements. For example, tailings at Mailuu-Suu pose risks to local communities and the environment; the most critical issue concerns slope stability. A dam failure could release toxic and radioactive sludge into the valley, potentially reaching Uzbekistan. Addressing these risks requires not only reclaiming old tailings facilities but also investing in local infrastructure and adequate living conditions.[79] High mercury concentrations are found in tailings from the Khaidarkan mine and processing plant in Kyrgyzstan, the world's only remaining producer and exporter of primary mercury. Mercury contamination affects soils, including farmland, and surface waters. Environmental management and monitoring efforts remain limited, creating health risks for workers and nearby communities. The site's proximity to Tajikistan and Uzbekistan raises the possibility of transboundary impacts.[80] Kyrgyzstan reports that, according to the results of an inventory assessment, more than 5,000 tons of obsolete pesticides are still placed in burial grounds and warehouses.[81]

In Tajikistan, statistical data on waste generation, processing and disposal remain limited across all waste categories. Of 80 authorized municipal dumpsites and landfills, only 5 are formally managed, while the rest

[72] Based on information shared by a UNEP expert familiar with ongoing PCB-related activities in the region.
[73] UNCT Kazakhstan (2026).
[74] UNCT Kazakhstan (2026).
[75] Rield (2023).
[76] ECE (2024).
[77] ECE (2024).
[78] Ibid.
[79] Ibid.
[80] ECE (2024), World Bank (2020).
[81] ECE (2024).

are effectively spontaneous. More than 218 sites with obsolete pesticides have been inventoried. Hazardous waste management continues to require strengthening.[82] Large volumes of industrial and mining waste have accumulated in Tajikistan. Several mining and processing tailing sites, both operational and closed, exist alongside uranium tailings from legacy mining. Some uranium legacy sites have undergone rehabilitation.[83] Environmental, health and safety risks are amplified by the location of certain tailings facilities in mountainous, disaster-prone areas near transboundary rivers. Seismic activity increases concerns about dam safety,[84] and climate change may further elevate natural hazard risks affecting tailings. The aluminium industry produces industrial waste, including *red mud* (bauxite residue), a highly alkaline and hazardous by-product. Environmentally sound management of this waste is complex and costly. Without fully integrating waste-management considerations into industrial and investment policies, risks of environmental degradation remain.[85]

In Turkmenistan, the volume of municipal waste increased 2.5 times between 2010 and 2020. Volumes of toxic industrial waste continue to grow, and recycling levels remain low.[86] The country has very limited systems for recycling electronic and electrical equipment and lacks organized collection and disposal of mercury-containing and energy-saving fluorescent lamps. Improper disposal of decommissioned refrigeration and heat-exchange equipment, as well as air conditioners without safe refrigerant removal, poses additional environmental concerns.[87]

In Uzbekistan, increasing production, lifestyle changes and rising consumption have contributed to growing waste volumes and waste generation per capita. Some progress has been made in waste management. However, aside from the modern landfill opened near Tashkent in 2024, most landfills do not meet basic environmental standards and lack impermeable liners, leachate and gas collection systems and other safeguards. Recycling rates remain low, estimated at about 5 per cent in 2024.[88] Industrial waste management in Uzbekistan continues to face challenges, with low recycling rates across most sectors.[89] Forty-one tailings ponds have been identified in Uzbekistan. Ten are located near the borders with Afghanistan, Kyrgyzstan and Tajikistan or close to shared rivers. In case of an accident, these sites could pose risks of transboundary pollution.[90]

3.6 Sand and dust storms

Sand and dust storms affect wide areas of Central Asia. The Kyzyl Kum and Kara Kum deserts, along with many other drought-affected areas across the region, contribute to long-range dust transport.

The dry bottom of the Aral Sea, now the Aralkum Desert, is another major source of salt-laden sand and dust. Given the historical use of pesticides such as dichlorodiphenyltrichloroethane (DDT) during the Soviet period, residues may be present in the dust. Approximately 5.5 million hectares of the exposed former seabed are now subject to severe wind erosion, generating more than 100,000 tons of dust and salt annually.[91] It is estimated that this material spreads over an area of 1.5–2 million km².[92]

Storms occur most frequently from autumn to spring. Dust particles reduce visibility, damage crops and infrastructure, and pose respiratory health risks. Concentrations of $PM_{2.5}$ and PM_{10} can rise sharply during such events. Significant volumes of salt dust also settle on agricultural crops, contributing to soil salinization and reduced agricultural productivity.

[82] ECE (2025a).
[83] Ibid.
[84] Ibid.
[85] Ibid.
[86] IISD (2025).
[87] Ibid.
[88] ECE (2026).
[89] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[90] Ibid.
[91] ECE (2025a).
[92] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).

3.7 Land and soil degradation

Regional overview

Land degradation remains a widespread concern in Central Asia, although its full extent is not yet entirely known. Land-use changes, the Aral Sea crisis, water scarcity and climate change are major contributing factors. The decreasing water level of the Caspian Sea presents an additional challenge. More than 20 per cent of Central Asia's total land area (around 80 million hectares) is affected by degradation. These conditions may affect up to 30 per cent of the region's population.[93] Gaps in soil information continue to constrain evidence-based policymaking and hinder effective decisions to support and maintain soil quality.

Agriculture contributes to desertification due to outdated irrigation systems and overgrazing. Climate change, through rising temperatures and declining precipitation, further contributes to the expansion of sandy deserts and wind erosion. Prolonged drought and strong winds accelerate erosion and generate dust storms that affect large areas. These storms remove topsoil and nutrients, degrading soil quality, reducing agricultural productivity and aggravating desertification.

Saline soils are less fertile. Salinity originates partly from irrigation water and partly from dust storms. High groundwater levels, caused by ineffective irrigation, can lead to upward capillary movement of saline water into the root zone. Flushing the soil in spring is commonly practised when salinity is high, but this leads to increased water use. If current trends in the salinization of water bodies and soils continue, large areas of agricultural land in the Syr Darya River basin may become unsuitable for irrigated agriculture within a few decades.[94]

Declining humus levels in agricultural soils are also a concern. Irrigation conditions, such as increased moisture and intensive cultivation, can accelerate humus decomposition more quickly than it can be replenished, contributing to greenhouse gas emissions.

Industrial activities, mining and fossil fuel exploitation also contribute to soil pollution, releasing heavy metals and other pollutants, including petroleum residues near oil fields and refineries. Pesticides are another source of contamination. Extensive use, particularly in cotton-growing regions, has caused soil pollution, and obsolete pesticide stockpiles pose additional risks.

Country-specific insights

Approximately 78 per cent of Kazakhstan's total land area is considered vulnerable to land degradation. According to 2019 data, 21.3 per cent of the country's land was already degraded, exposing 31.7 per cent of the population to degradation risks and more than 58 per cent to drought.[95]

In Kyrgyzstan, around one-third of the population is directly exposed to land degradation. In 2019, nearly 10 per cent of the country's land area was classified as degraded.[96]

In Tajikistan, all pastureland is affected by soil erosion. About 89 per cent of summer pastures and 97 per cent of winter pastures experience medium to severe erosion.[97]

Observations in Turkmenistan indicate ongoing desertification, wind and water erosion and deforestation. Over the past 12–15 years, these processes have been intensified by recurrent and prolonged droughts and increased salt and dust aerosols from the dried Aral Sea bed. Half of the cultivated land suffers from salinization and excessive moisture due to high groundwater levels.[98] Desertification processes continue to expand in the

[93] UNCCD (2023).
[94] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[95] Akhmetkali (2024). UNCCD (2025).
[96] UNCCD (2025).
[97] ECE (2025a).
[98] IISD (2025).

Turkmen Aral Sea region, where the dried seabed (Aralkum) forms new desert areas and centres of salt and dust storms.[99]

In Uzbekistan, wind erosion is estimated to affect around 50 per cent of cultivated land, while water erosion affects up to 20 per cent. Soil salinity is a major issue, increasing from 51.4 per cent of agricultural land in 2012 to 55.8 per cent in 2022.[100] Surveys indicate that the most polluted soils are found around cities.[101] Around 70 per cent of pastures are degraded due to overgrazing.[102]

Table 1 summarizes the share of irrigated land affected by salinity across Central Asian countries, illustrating the extent of soil degradation linked to irrigation practices in the region. Although the severity varies among countries, the data show that soil salinization remains a major environmental and agricultural concern, especially where irrigated agriculture is widespread. As such, salinity continues to pose a significant constraint on sustainable land and water management in Central Asia.

Table 1: Proportion of irrigated land affected by salinity, percentage

Country	Proportion of irrigated land affected by salinity, as described in 2016, based on earlier studies[103]	Other, generally more recent, estimates
Kazakhstan	33%	43% of agricultural land[104]
Kyrgyzstan	11.5%	-
Tajikistan	16%	15% of agricultural land[105]
Turkmenistan	95.9%	26% of irrigated land is weakly saline, 13% strongly saline[106] 60% of agricultural land[107]
Uzbekistan	50.1%	47% of irrigated land[108]

3.8 Loss of ecosystems and biodiversity

Regional overview

Central Asia hosts a rich diversity of ecosystems, including desert, mountain, forest and wetland ecosystems. The region, and especially its mountain areas, is one of the world's biodiversity hotspots, home to numerous endemic species.

It is also considered one of the *Vavilov centres* of origin for cultivated plants, which encompass regions of exceptional genetic diversity and primary centres of domestication for key crops such as wheat, onion, carrot and apple.

Many endemic species of animals and plants (155 species according to the IUCN Red List of Threatened Species)[109] are currently threatened with extinction, and some have already disappeared over the past century.[110] A prominent example is the Caspian tiger (*Panthera tigris virgata*), once common in forests of Central Asia, whose habitat loss and uncontrolled hunting led to its disappearance by the mid-1900s.

[99] Ibid.
[100] ECE (2026).
[101] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[102] ECE (2026).
[103] Hamidov and al. (2016).
[104] Smanov and al (2025).
[105] Asia-Plus (2024).
[106] Global Soil Partnership (2025).
[107] ECE (2012).
[108] Urozolievna (2025).
[109] IUCN (n.d.).
[110] FAO (2022).

Anthropogenic pressures on biodiversity

Biodiversity and ecosystems face pressures from habitat fragmentation and land-use change driven by agriculture and other sectors, contributing to desertification and deforestation. Illegal harvesting, poaching and trade in rare and endangered species, as well as unsustainable hunting practices, create additional stress on biodiversity. Climate change may intensify many of these threats.

Arid climatic conditions heighten the risk of land degradation and desertification, while the increased recurrence of droughts is likely to affect biodiversity directly. Pollution further reduces the adaptive capacity of ecosystems, although assessing the combined impacts of pollution and other drivers remains challenging.

The near-complete disappearance of the Aral Sea and its surrounding ecosystems has resulted in the loss of more than 50 species of wild animals and plants, including the Asiatic cheetah (*Acinonyx jubatus venaticus*) and striped hyena (*Hyaena hyaena*). The number of endangered species has increased to 12 mammal species, 26 bird species and 11 plant species.[111] As the Aral Sea dried, more than 20 endemic fish species disappeared from the main water body, some becoming globally extinct or nearly so.[112]

In rural areas, declining access to energy sources after independence led to a shift towards fuelwood. This long-standing reliance has contributed to forest degradation since the early 1990s.[113] Forest cover in the region is low to begin with, ranging from 1.3 per cent of total land in Kazakhstan to 8.7 per cent in Uzbekistan.[114]

Insufficient control of forest fires and pathogens adds pressure in all countries. In low-lying plains, particularly in Kazakhstan and Uzbekistan, soil salinization and reduced river runoff contribute to the degradation of *tugai* and black saxaul forests. Large areas of *tugai* forest have been lost due to clearance and conversion for irrigated agriculture.[115]

Livestock numbers declined after independence but have increased in all countries since the early 2000s, now exceeding pre-independence levels in Tajikistan, Turkmenistan and Uzbekistan. Livestock are now often kept close to settlements and less frequently moved to high-altitude summer pastures, increasing grazing pressure near communities and affecting forests and pastures.[116]

Climate and hydrological impacts

Fluctuations in water availability and temperature are altering natural habitats and threatening biodiversity. Wetlands, which are critical for migratory birds and rare plant species, are particularly vulnerable. Changes along major rivers and in the Caspian Sea, often linked to climate change, contribute to biodiversity loss and degradation of fragile ecosystems. Increasing water stress and aridity also affect biodiversity in forests and pastures.

The middle and lower reaches of major rivers show the highest levels of mineralization and pollution, posing risks to biodiversity and ecosystem integrity. Agricultural and industrial pollutants, including pesticides, ammonium nitrogen, nitrate nitrogen, copper, zinc and petroleum products, are likely to negatively impact ecosystems.

Spawning grounds for fish and resting sites for migratory birds are being lost due to declining water levels and increasing pollution in the Caspian Sea. The sea is the source of around 70 per cent of the world's sturgeon stocks and is home to more than 100 endemic fish species.[117]

[111] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[112] Gleick (n.d.).
[113] FAO (2022).
[114] FAO (2020).
[115] FAO (2022).
[116] Ibid.
[117] IISD (2025).

Country-specific insights

In Kazakhstan, biodiversity faces multiple pressures similar to those in other Central Asian countries. Invasive species threaten agriculture and ecosystems. The Aral Sea and its coastline represent an ecosystem that has largely been lost. Threatened species include the snow leopard (*Panthera uncia*) and saiga antelope (*Saiga tatarica*).

In Kyrgyzstan, more than 60 per cent of rural residents live in or near state-owned forests, which continue to face pressures from illegal logging and overgrazing. Rising energy costs may increase reliance on fuelwood in rural areas.[118]

In Tajikistan, the absence of a comprehensive biodiversity and ecosystem monitoring system limits the ability to assess the current state and trends of biodiversity.

In Turkmenistan, biodiversity has declined significantly over the past century due to desertification, land degradation and overexploitation. A full, up-to-date assessment of ecosystems and species is challenging due to incomplete monitoring systems and limited capacity.[119]

In Uzbekistan, important *tugai* and floodplain ecosystems continue to shrink due to agricultural expansion and use by local communities. Degraded low mountains (the Adyr zone) shelter many rare species but face pressures from grazing and mining. [120] The Aral Sea and its coastal ecosystems remain a primary example of ecosystem collapse in the country.

Table 2 provides an overview of forest area dynamics in Central Asian countries between 2015 and 2025, highlighting both absolute forest extent and net annual changes over the decade. Overall, the data indicate modest forest expansion in most countries, though growth rates vary considerably. Nevertheless, while forest cover in Central Asia is generally stable or increasing, growth remains slow across much of the region except in Kazakhstan and Uzbekistan. These trends underline both the opportunities and constraints for forest landscape restoration, with implications for climate mitigation, biodiversity conservation and sustainable land management.

Table 2: Forest area, 2015–2025, 1,000 ha

				Net annual change 2015–2025	
	2015	**2020**	**2025**	**1 000 ha/y**	**%**
Kazakhstan	3 308	3 451	3 521	21.2	0.62
Kyrgyzstan	1 247	1 255	1 255	0.9	0.07
Tajikistan	422	423	425	0.3	0.06
Turkmenistan	2 330	2 330	2 330	0	0
Uzbekistan	3 549	3 689	3 894	34.5	0.93

Source: FAO (2020)

3.9 Disasters and risk management

Regional overview

Central Asia faces a diverse range of natural and human-made hazards, with both their frequency and economic impacts increasing in recent decades. Floods and mudflows are common and often severe, while wildfires are becoming more frequent and affect communities, ecosystems and infrastructure. Weather hazards such as hailstorms, sandstorms, avalanches and heat waves further intensify risks. Water shortages and electricity deficits have affected millions of people. Many disasters have transboundary impacts.[121] There have been cases where dam failures resulted in fatalities and significant material damage.

[118] ECE (2024).
[119] ECE (2012).
[120] CBD (n.d.).
[121] UNDRR and UNDP (2024).

The mountainous parts of the region are seismically active and experience frequent earthquakes, as well as associated hazards such as flooding, mudslides, avalanches, snowstorms, droughts and Glacial Lake Outburst Floods (GLOFs).[122]

Lake Sarez, formed in 1911 by a massive earthquake-induced landslide in Tajikistan's Pamir Mountains, continues to pose a monitored but significant flood risk downstream. The 17 km³ lake is held back by the 500-m-high Usoi Dam, which could be vulnerable to landslides triggered by earthquakes, potentially causing overtopping.

Concerns persist regarding the safety of more than 100 large dams and other water-control facilities, most of them located on transboundary rivers. Ageing infrastructure, limited maintenance and growing populations living in downstream floodplains increase risks to life, health, property and the environment. A dam failure could have serious consequences across borders.

Country-specific insights

In Kazakhstan, an extreme heatwave and severe drought in 2021 led to a state of emergency and the loss of thousands of livestock. Large-scale wildfires occurred in forested areas in 2022 and 2023.[123] Downstream regions face considerable flood risks. In 2024 and 2025, rapid snowmelt combined with spring rains caused widespread flooding in northern Kazakhstan, inundating homes and displacing hundreds of people. Average annual losses from floods are estimated at US$419 million, around 1.4 per cent of GDP.[124] In 2010, a dam near Kyzyl-Agash burst, killing at least 43 people.

In Kyrgyzstan, the mountainous terrain is seismically active, with frequent earthquakes and hazards such as floods, mudslides, avalanches, snowstorms, droughts and GLOFs. Rapid glacial melting and increasing precipitation are accelerating emergency events. Rising temperatures and heat waves are expected to heighten drought risks and water scarcity.[125] In 2024, the country was severely affected by mudflows, resulting in significant damages.[126]

In Tajikistan, water-related disasters such as floods and mudflows account for more than 70 per cent of natural disaster events and over 80 per cent of associated damage. Climate change is expected to increase the frequency of extreme events and exacerbate land degradation, further intensifying risks.[127]

In Turkmenistan, frequent and destructive natural disasters include earthquakes, droughts, floods and mudflows. Around 80 per cent of the country is covered by the Karakum Desert, which is highly vulnerable to climate-related hazards such as dust storms and extreme temperatures.[128]

In Uzbekistan, earthquakes and floods are major hazards. Eastern regions, including Bukhara, Samarkand, Tashkent and the Fergana Valley, face significant seismic risks. Floods occur frequently, often triggered by snowmelt or the failure of mountain lakes. Climate change is increasing the frequency and severity of droughts.[129] In 2020, flooding was caused by accidental damage at the Sardoba Water Reservoir, resulting in significant impacts downstream.[130]

3.10 Environment and health

There are several aspects of environmental challenges, unsustainable development and climate change that have a direct impact on human health. However, significant gaps remain in the systems required to monitor and assess environmental health impacts.

[122] World Bank (2021).
[123] UNCT Kazakhstan (2026).
[124] World Bank (2022).
[125] ECE (2024).
[126] Information provided by UNDRR.
[127] ECE (2025).
[128] Othering and Belonging Institute (2025).
[129] EU (2016).
[130] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).

Territorial health inequalities across the region are pronounced. Access to healthcare services, safe drinking water, adequate hygiene conditions, clean air and healthy living environments are important factors influencing health outcomes.

A health and well-being gap persists between Central Asia and the WHO European Region, of which Central Asian countries are part. The mortality rate from household and ambient pollution in Central Asia is estimated at 96.62 per 100,000 population, compared with 30 in the WHO European Region.[131]

A number of environmental issues are central to the health impacts observed in the region as presented in the sections below.

Air pollution

Air pollution and dust storms pose serious health risks for the population. WHO estimates that the share of deaths from stroke and ischaemic heart disease attributable to air pollution is 23 per cent in Kazakhstan, 32 per cent in both Kyrgyzstan and Tajikistan, 15 per cent in Turkmenistan and 31 per cent in Uzbekistan.[132]

In Kazakhstan, air pollution was estimated to account for nearly 10 per cent of all deaths in 2023, with outdoor $PM_{2.5}$ identified as the leading risk factor.[133]

In Kyrgyzstan, air pollution is considered the most significant contributor to pollution-related mortality. More than 80 per cent of the nearly 5,000 pollution-related deaths in 2016 were attributed to air pollution.[134]

In Tajikistan, the mortality rate linked to $PM_{2.5}$ exposure is estimated at 78 deaths per 100,000 inhabitants, which is second highest in Central Asia after Uzbekistan.[135] In Dushanbe, air pollution is one of the leading environmental causes of morbidity and reduced life expectancy.[136]

In Uzbekistan, air pollution is one of the top 10 causes of death and disability and represents the country's most serious environmental health risk. Studies conducted in cities such as Angren, Almalyk, Chirchik, Fergana, Navoi and Tashkent confirm correlations between pollution levels and morbidity.[137] $PM_{2.5}$ and other pollutants contribute to asthma, chronic obstructive pulmonary disease, cardiovascular illnesses and other conditions, with disproportionate impacts on vulnerable groups such as children, older persons, people with chronic illnesses and outdoor workers. Urban environments, especially during heatwaves and sand and dust storms, intensify these risks by trapping heat and pollutants.[138]

Water pollution

According to WHO, a substantial proportion of deaths from diarrhoea is attributable to unsafe drinking water, inadequate sanitation and poor hygiene: 49 per cent in Kazakhstan, 57 per cent in Kyrgyzstan, 54 per cent in Tajikistan, 50 per cent in Turkmenistan and 47 per cent in Uzbekistan.[139]

For downstream countries, salinity in river water is a significant health concern. Higher salt concentrations can contribute to several health problems.

[131] WHO (2022).
[132] WHO (n.d.).
[133] UNCT Kazakhstan (2026).
[134] ECE (2024).
[135] World Bank (2023).
[136] ECE (2025).
[137] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[138] ECE (2026).
[139] WHO (n.d.).

In Kazakhstan, more than 57 per cent of water users rely on groundwater sources (wells) that do not meet national or international standards. Nitrate pollution from agriculture and untreated wastewater continues to increase, raising concerns for environmental and human health.[140]

In Kyrgyzstan, 67 per cent of the rural population has access to safe drinking water, compared with 92 per cent in urban areas. Connection to centralized sewer systems and wastewater treatment remains considerably below regional averages. Mortality attributable to unsafe water, sanitation and hygiene stands at 0.78 per 100,000 inhabitants.[141]

In Tajikistan, children are particularly affected, with high mortality and morbidity linked to limited access to safe drinking water and hygiene. Water, sanitation and hygiene infrastructure, especially in urban areas and healthcare facilities, requires significant improvement to reduce infectious diseases.[142]

In Turkmenistan, health concerns arise from pollution, salinity and in some cases inadequate water infrastructure. Surface and groundwater sources, including the Amu Darya, are often saline and may be contaminated by agricultural chemicals, industrial wastewater and insufficient sanitation. Many rural areas face limited access to water, and drinking water treatment facilities remain insufficient.[143]

In Uzbekistan, access to drinking water and sanitation services remains low, with only 71 per cent of rural residents having safe drinking water and 32 per cent of wastewater treated. Rising salinity and pollution in surface and groundwater pose major challenges.[144]

Exposure of the population to toxic substances

Residents in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan may be exposed to hazardous substances from mining waste, including legacy uranium mining sites located near settlements. Hazardous industrial waste may pose similar risks. Obsolete pesticide stocks also represent a potential health concern, particularly where storage sites are unprotected.

Climate change

Climate change already affects human health and is expected to intensify existing risks. Decreasing water availability and quality, reduced food and crop production, more frequent disasters such as floods and droughts, worsening air pollution and increased dust storms all pose challenges. Heatwaves are particularly dangerous for older persons and young children. Declining water availability may increase waterborne disease risks, especially where sanitation infrastructure is inadequate.

Desertification contributes to food and water insecurity and worsens air quality. As fertile land degrades, dust storms become more frequent, increasing exposure to airborne pollutants that contribute to respiratory illnesses such as asthma and bronchitis.

4. Policy objectives and efforts

Central Asian countries continue to strengthen environmental governance, advance climate mitigation and adaptation, and introduce policies aimed at improving environmental quality and supporting the transition to greener, more sustainable economies.

Across the region, numerous examples demonstrate ongoing progress, or plans for progress, in developing and implementing environmental and climate-related reforms.

[140] Sailaukhanuly (2024).
[141] World Bank (2024a).
[142] ECE (2025).
[143] ECE (2012).
[144] ECE (n.d.).

In Kazakhstan, the National Development Plan to 2029 provides a comprehensive framework for sustainable development, identifying enhanced environmental sustainability as a key national priority. The revised Environmental Code, adopted in 2021, represents an important step toward modernizing environmental legislation. Current regulatory efforts focus on the 50 largest industrial installations, responsible for a substantial share of national pollution. While the transition toward integrated environmental permits and the use of best available techniques (BATs) is underway, implementation has progressed slowly and major steps remain outstanding.[145]

Kyrgyzstan has recently made notable advances toward achieving the 2030 Agenda for Sustainable Development. The National Development Strategy 2018–2040 guides long-term national priorities, while continued updates to environmental legislation have strengthened the policy framework. A milestone was the adoption of a new Water Code in 2025, aligning water governance with sustainability principles.

Tajikistan is also making steady progress in reinforcing its environmental legal and policy foundations. Sustainable development objectives have been mainstreamed into national strategic documents, and the Green Economy Development Strategy 2023–2037 underscores the government's commitment to climate-resilient and environmentally responsible economic planning. Investments in environmental monitoring have enhanced laboratory and measurement capacities for air and water quality.

In Turkmenistan, climate adaptation is increasingly integrated into national planning. Efforts include promoting water saving technologies, expanding large scale greening programmes, and strengthening land management to combat desertification and safeguard biodiversity and ecosystems.

Uzbekistan has introduced a series of environment-related strategies and programmes, including the Concept on Environmental Protection to 2030, the Municipal Waste Management Strategy 2019–2028, and the Biodiversity Conservation Strategy 2019–2028. Moreover, the government designated 2025 as the Year of Environmental Protection and Green Economy, signalling high-level commitment to environmental priorities.[146]

Although the region has made progress in environmental governance in recent years, significant challenges persist. The ECE Environmental Performance Reviews provide valuable insights and targeted recommendations that can support further improvements in the reviewed countries.

4.1 Climate action

All Central Asian countries are Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, and each submits nationally determined contributions (NDCs). To date, Uzbekistan is the only country in the region to include both mitigation and adaptation targets in its NDC.[147] Kazakhstan previously implemented binding targets under the Kyoto Protocol, while the other countries had limited or no commitments under that regime.

In several countries, the development of climate strategies and policies has been accompanied by the establishment of interministerial coordination mechanisms to support implementation.

In Kazakhstan, climate policy is led by the Ministry of Ecology and Natural Resources. The country's climate agenda centres on the goal of achieving carbon neutrality by 2060, reforms under the revised Environmental Code and sector-specific adaptation efforts, particularly in water management and agriculture.

In Kyrgyzstan, responsibility for climate change lies with the Ministry of Natural Resources, Ecology and Technical Supervision. Coordination bodies and sectoral working groups have been created to address climate-related issues. However, the country has no dedicated climate law and lacks a long-term strategy for low-carbon development.[148]

[145] UNCT Kazakhstan (2026).
[146] ECE (2026).
[147] OECD (2022).
[148] ECE (2024).

In Tajikistan, the Committee for Environmental Protection oversees climate-related matters, but there is no national mechanism to systematically coordinate climate activities across relevant ministries and agencies. Measurement, reporting and verification capacities remain limited.[149] Tajikistan has nevertheless taken an active role internationally, leading the initiative to declare 2025 the International Year for Glacier Protection, advocating for an international fund, and promoting sustainable water management. The initiative includes developing national policies for sustainable water and energy use, establishing protected glacier zones and strengthening monitoring systems.[150]

In Turkmenistan, the National Strategy on Climate Change (2019) provides the main framework for national climate action, with the Ministry of Environment serving as the lead institution.[151]

To implement its commitments under the Paris Agreement, Uzbekistan has adopted the Strategy for Transition to a Green Economy for 2019–2030 and developed a corresponding implementation road map. Climate governance is coordinated through the National Council for Climate Change, established under the President, while the National Ecology and Climate Change Committee is the lead executing institution for climate policy.[152]

Greenhouse gas mitigation

Regional overview

Across Central Asia, the energy sector remains the dominant source of greenhouse gas (GHG) emissions, making mitigation particularly challenging for Kazakhstan, Turkmenistan and Uzbekistan.

Agriculture also contributes significantly to emissions and, while all countries acknowledge this in varying degrees within their NDCs, the scope and ambition of their mitigation measures differ considerably.[153]

Forests serve as carbon sinks in the region, but their overall mitigation potential is constrained by ongoing deforestation and land degradation. Although afforestation and reforestation programmes are underway, available information indicate only a modest forest expansion in most countries, though growth rates vary significantly between countries (Table 2). Kazakhstan and Uzbekistan show the largest net gains in forest area.

Over the past decade, all Central Asian countries have achieved a modest but meaningful reduction in carbon intensity per unit of GDP, demonstrating some decoupling of economic growth from emissions. Nonetheless, measurement, reporting and verification (MRV) systems remain underdeveloped, and monitoring the implementation of mitigation and adaptation measures continues to pose difficulties across several countries.

Country-specific insights

Kazakhstan has adopted a Strategy on Achieving Carbon Neutrality by 2060 and developed a roadmap to operationalize its long-term vision. Its NDC sets interim goals, including an unconditional 17 per cent reduction below 1990 levels by 2035, rising to 25 per cent with international support.[154] The country is establishing a national MRV framework,[155] and has introduced an emissions trading system (ETS) covering roughly half of national emissions, especially from energy, mining and manufacturing. However, the ETS faces persistent challenges, including low liquidity, largely free allocation of allowances, and a relatively low carbon price.[156]

[149] ECE (2025).
[150] Bahrulo (2025).
[151] IISD (2025).
[152] ECE (2026).
[153] FAO (2024).
[154] Ministry of Ecology and Natural Resources of Kazakhstan (2025a).
[155] UNCT Kazakhstan (2026).
[156] Satubaldina. (2025).

In Kyrgyzstan, unconditional NDC targets aim to reduce net emissions by 18 per cent from the projected 2030 baseline and by 16 per cent in 2035. Conditional commitments foresee deeper reductions of 30 per cent and 39 per cent, respectively. Kyrgyzstan is the only country in the region to set specific, although limited, targets for agricultural emissions.[157] At the same time, government plans to significantly expand coal production pose a concern, as domestic coal resources are of lower quality and produce higher emissions than coal imported from Kazakhstan.[158]

Tajikistan has set an unconditional emissions cap of 60–70 per cent of 1990 levels through 2030, with a conditional cap of 50–60 per cent.[159] However, MRV capacities remain insufficient to ensure data quality or track progress toward NDC targets effectively.[160] Tajikistan has undertaken notable international leadership by spearheading the declaration of 2025 as the International Year for Glacier Protection.[161]

Turkmenistan has set an ambitious goal of reducing GHG emissions by 20 per cent by 2030 compared with 2010 levels. In 2023, the country joined the Global Methane Pledge and established an Interagency Commission on Methane Emissions Reduction. The energy sector remains heavily subsidized, with citizens receiving free electricity, heat and gas within set consumption limits. From 2030 onwards, the Government plans to gradually reduce subsidies to curb domestic demand and increase export potential.[162]

Uzbekistan has adopted a broad set of mitigation measures covering energy, industry, waste, forestry, agriculture and transport.[163] The country aims to reduce GHG emissions per unit of GDP by 35 per cent by 2030 relative to 2010, largely through expanding renewable energy and promoting energy efficiency.[164] However, its latest NDC projects an overall increase in total GHG emissions, reflecting rapid population growth, rising living standards and industrial expansion.[165] Uzbekistan joined the Global Methane Pledge in 2022, committing to a 30 per cent reduction in methane emissions by 2030 relative to 2020 levels.[166] The European Bank for Reconstruction and Development has been supporting the development of a national methane reduction programme, including reducing natural gas leaks.[167] Uzbekistan plans to increase the share of renewables to 26 per cent of electricity generation and 40 per cent of total installed capacity by 2030.[168] Since 2018, excise duties on petroleum products have been adjusted to promote cleaner fuels.[169]

Adaptation to climate change

Central Asian countries are highly vulnerable to the impacts of climate change, making the development and implementation of effective adaptation measures a regional priority. Strengthening resilience to current and projected climate risks is essential to reducing adverse impacts on economies, ecosystems and communities.

Kazakhstan has identified agriculture, water management, forestry and civil defence as the sectors most at risk from climate change. The Environmental Code requires that vulnerability assessments and adaptation planning be integrated into development programmes across these priority areas. Significant efforts are underway to improve water-use efficiency, reflecting mounting pressures on water resources.[170]

In Kyrgyzstan, climate adaptation is embedded in the National Development Strategy 2018–2040,[171] and the country has prepared a National Adaptation Plan with sector specific objectives. According to the third NDC,

[157] Kyrgyzstan (2025).
[158] ECE (2024).
[159] Tajikistan (2022).
[160] ECE (2025a).
[161] IISD (2025).
[162] IEA (Turkmenistan).
[163] ECE (2026).
[164] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[165] Uzbekistan (2025).
[166] Gazeta.uz (2024).
[167] EBRD (n.d.).
[168] Eurasianet (2025).
[169] UzDaily.uz (2024).
[170] UNCT Kazakhstan (2026).
[171] FAO (2024).

approximately 71.4 per cent of adaptation measures outlined in NDC2.0 have been fully or partially implemented.[172] Innovative initiatives have also emerged: with FAO support, projects generating artificial glaciers have accumulated more than 1.5 million m³ of ice, which is enough to irrigate substantial agricultural areas.[173] Similar pilot activities are now being tested in Uzbekistan.

Tajikistan has adopted the National Strategy for Adaptation to Climate Change to 2030, centred on reducing the risks posed by natural hazards to agriculture, food security and land use. The strategy emphasizes the need for effective water management and storage practices as essential components of national resilience.[174]

In Turkmenistan, adaptation efforts are ongoing in the water sector. Key activities include the secondary use of collector-drainage water and the promotion of modern water-saving technologies to cope with increasing water scarcity.[175]

Uzbekistan is developing five sectoral adaptation plans covering health, water management, agriculture, disaster risk reduction and infrastructure. In addition, regional adaptation plans have been prepared for the Aral Sea area, including Karakalpakstan, as well as the Bukhara and Khorezm regions. Implementation of sectoral National Adaptation Plans is estimated to cost around US$8 billion. Some sectors, such as energy, industry and transport, are not yet included in the adaptation planning framework. Uzbekistan's adaptation priorities include efficient water use, climate-resilient agriculture, protection of ecosystems, resilient infrastructure and targeted responses to the Aral Sea crisis.[176]

4.2 Combating air pollution and sand- and dust storms

Regional overview

Across Central Asia, important steps have been taken to limit air pollution, yet significant challenges remain. Several countries are moving toward the introduction of best available techniques (BATs), although the mechanisms needed to integrate BATs effectively into permitting systems are not yet fully operational.

A major priority for reducing air pollution is to phase out coal use or introduce cleaner coal technologies. Progress has been limited, and in both Kyrgyzstan and Tajikistan, coal consumption continues to rise.

Effective air quality management depends on reliable emissions data. Air quality indices can help inform the public about pollution levels and associated health risks, enabling people to take precautionary measures. Air pollution monitoring and assessment capacities remain limited in many cases. Institutional capacity is another constraint: in several countries, lack of resources and staffing impede air quality governance.

The Regional Strategy for Sand and Dust Storms Management in Central Asia, 2021–2030, aims to reduce vulnerability to sand and dust storms by addressing active source areas and implementing proactive measures in high-risk zones, with an emphasis on multi-sectoral and cross-border cooperation.[177]

Stronger regional collaboration on transboundary air pollution could provide major environmental and public health benefits. The Convention on Long-range Transboundary Air Pollution offers a suitable framework, yet only Kazakhstan and Kyrgyzstan are Parties, and neither has ratified any of its Protocols.

Country-specific insights

Kazakhstan has set long-term targets for reducing air pollution by 2030, 2040 and 2050, with goals covering both pollution in settlements and a list of fifty priority pollutants. The National Development Plan to 2029

[172] Kyrgyzstan (2025).
[173] FAO (2025).
[174] FAO (2022b).
[175] IISD (2025).
[176] ECE (2026). Uzbekistan (2025).
[177] CAREC (2021).

identifies air quality improvement as a key priority.[178] Emissions from the country's largest enterprises reportedly decreased by 7.2 per cent between 2022 and 2025, attributed to the transition toward integrated environmental permits and the application of BATs. However, there are indications that integrated permits have not yet been issued, despite progress on developing BAT reference documents.[179] Automated monitoring systems play an increasingly important role: 74 of 78 enterprise installations transmit real-time emissions data.[180] For population-level assessments, Kazhydromet has introduced a national Air Pollution Index.[181] Almaty's Development Plan to 2030 is considered a leading example of urban air quality planning, prioritizing the phase-out of coal and improvements in public transport.[182] Coal-to-gas conversions of combined heat and power plants are underway in Almaty and Astana, but new coal-fired plants are still planned in Kokshetau, Semey and Ust-Kamenogorsk.[183]

Kazakhstan and Uzbekistan are also making significant efforts to reduce salt and dust storms (SDS) risks originating from the dry Aral Seabed. Kazakhstan has planted around 1 million hectares, and Uzbekistan 1.9 million hectares, although survival rates are expected to be only 20–25 per cent due to harsh conditions.[184]

In Kyrgyzstan, expanding gas infrastructure over the past decade has improved access to cleaner fuels. However, household uptake has been slow because of high connection costs and gas prices that remain less competitive than coal or electricity.[185]

In Tajikistan, air quality management requires strengthening across policy, institutional and technical dimensions. The Government intends to consolidate relevant national strategies to improve coherence and implementation.[186]

Turkmenistan has ambitious plans to enhance air quality monitoring and management, although the extent to which these plans are being implemented remains unclear.[187]

In Uzbekistan, a series of legal and institutional reforms has improved air pollution control. Advances include better data collection, expanded public access to air quality information, and broader awareness-raising initiatives. Economic instruments are also being used to reduce pollution. Despite these efforts, Tashkent and other major cities continue to experience severe air pollution.[188] Uzbekistan is undergoing a substantial transformation in its energy and heating sector, including phasing out coal and fuel oil and scaling up renewable energy and energy efficiency.[189] To address SDS risks, Uzbekistan is implementing the National Programme for Combating Sand and Dust Storms (2024–2030). The Programme focuses on monitoring, forecasting and early warning, including expanding the air quality monitoring network and modernizing meteorological infrastructure. It also targets the root causes of sand and dust storms through large-scale land restoration and the planting of trees and shrubs, particularly in vulnerable regions such as the Aral Sea area.[190]

4.3 Sustainable waste management

Most Central Asian countries have taken steps to improve waste management systems, yet substantial challenges remain. Recycling measures have been introduced across the region, but their broader application and uptake are still limited. At the same time, international and national efforts continue to address legacy uranium tailings, seeking to contain, relocate and monitor these sites to prevent radioactive contamination.[191]

[178] UNCT Kazakhstan (2026).
[179] Ibid.
[180] Ministry of Ecology and Natural Resources of Kazakhstan (2025).
[181] UNCT Kazakhstan (2026).
[182] Ibid.
[183] Ibid.
[184] Voitas (2025).
[185] ECE (2024).
[186] World Bank (2023).
[187] IISD (2025).
[188] ECE (2026).
[189] Ibid.
[190] Ibid.
[191] Helwig (2026).

In Kazakhstan, the Concept for the Management of All Types of Waste for 2026–2030 guides national waste policy. Its two main goals are to reduce waste generation and disposal while maximizing reuse.[192] The ratio of industrial hazardous waste to total industrial waste has reportedly fallen from over 30 per cent to 4.4 per cent since the adoption of the Environmental Code in 2021, likely reflecting changes in waste classification and reporting practices. Recycling waste from the mining and metallurgical sectors remains difficult due to economic constraints.[193] Progress on recycling municipal waste has been limited, and the recycling rate has even declined since 2019. Waste processing plants previously operated in Almaty and Astana were closed because they were not economically viable. An estimated 117.6 billion tenge (around US$240 million) in recyclable materials is currently lost each year in Kazakhstan's waste stream. Plans are underway to build incineration facilities in Almaty, Astana and Shymkent for municipal waste.[194] The country is also considering building an incineration facility for hazardous waste in a location yet to be determined. A dedicated Working Group on the Safety of Tailings Storage Facilities has also been established to strengthen oversight and prevent accidental water pollution.

In Kyrgyzstan, the 2021 National Development Programme to 2026 designates waste management as a priority. The establishment of a long-term national solid waste management strategy responds to an Environmental Performance Review recommendation.[195] The country has hundreds of abandoned mining tailings sites, many located near communities and posing safety risks. Although an inventory has been completed, no comprehensive scientific assessment has been conducted to prioritise rehabilitation or identify remediation options and financing. International partners, including the World Bank and EBRD, are supporting remediation efforts, such as the securing of uranium tailings near Mailuu-Suu.[196]

In Tajikistan, around 90 per cent of the urban population has access to solid waste management services, but coverage falls to about 70 per cent in smaller cities and towns. The Anti-Monopoly Service sets waste collection and disposal tariffs based on local government submissions.[197] Tajikistan is developing a national waste management strategy[198] and continues efforts to rehabilitate legacy uranium tailings and improve the safety of mining operations.[199]

Turkmenistan is working to strengthen waste collection, removal and disposal infrastructure in cities. National development programmes include measures to modernize waste legislation and improve waste management practices, and initial steps have been taken to establish a national waste management system.[200]

In Uzbekistan, municipal solid waste collection and disposal are centralized under the Agency for Waste Management and Circular Economy Development. Waste collection tariffs have been raised since 2018 to fund improvements in recycling and disposal systems. Since 2019, retail customers must pay for plastic bags. A modern sanitary landfill has been constructed in Tashkent, and plans call for closing 50 unsanitary landfills by 2025.[201] Extended producer responsibility schemes are being developed but remain non-operational. Collection and recycling of e-waste, batteries and plastics are still insufficient. Meanwhile, the country is moving forward with plans for waste-to-energy facilities and initiating biogas production.[202]

[192] UNCT Kazakhstan (2026).
[193] Ibid.
[194] Ibid.
[195] ECE (2024).
[196] Ibid.
[197] ECE (2025).
[198] Ibid.
[199] Ibid.
[200] IISD (2025).
[201] ECE (2026).
[202] Ibid.

4.4 Sustainable management of natural resources

Water

Integrated Water Resources Management (IWRM) is declared as an objective in several Central Asian countries. However, in practice, irrigation and hydropower remain dominant policy priorities, and IWRM is not yet fully applied in line with its comprehensive definition. Nonetheless, progress is emerging, including moves toward basin-level management (covering groundwater), stakeholder engagement and closer links between water and land-use planning.

Dedicated water ministries have been established in Kazakhstan and Uzbekistan, while in Turkmenistan, a State Committee fulfils a similar function. Yet, despite the close interdependence of water quantity and water quality, these areas of work remain largely disconnected across the region.

In 2025, new Water Codes were approved in Kazakhstan**,** Kyrgyzstan and Uzbekistan, signalling significant reform efforts. Kazakhstan's Water Code, for example, introduces a shift toward ecosystem-based water management, including the incorporation of environmental flow requirements.[203]

In Tajikistan, water sector reforms are guided by the Programme of Water Sector Reform 2016–2025, which embraces IWRM principles, including the separation of policy and operational roles, decentralization, infrastructure rehabilitation and the creation of river basin organizations. Although legal and policy frameworks have improved substantially, implementation on the ground remains incomplete.[204]

Water quantity

Regional overview

Water availability is a critical issue across Central Asia. While the region faces mounting stress, several approaches could improve the situation: enhancing water-use efficiency, reallocating water to higher-value uses, implementing climate adaptation measures, strengthening groundwater management and deepening transboundary cooperation.

Water for irrigation is still managed inefficiently in many areas, though recent investments and stronger policy frameworks show promise.[205] Significant focus is placed on improving water-use efficiency; however, the resulting water savings are often earmarked for expanding irrigated land, limiting net gains in water availability.

Water tariffs are generally underused as a policy tool. Farmers do pay for irrigation water, and tariffs have been gradually increasing, but progress is hampered by the lack of water meters at the field level and the political sensitivity surrounding water pricing. Despite these challenges, gradual tariff reforms remain essential to promote efficiency.

Some steps have been taken to alleviate water-energy tensions between upstream and downstream countries. For example, Kyrgyzstan has provided irrigation water in summer while receiving electricity from downstream states in winter.

All Central Asian countries highlight the importance of water-related climate adaptation, including improved water management, conservation and more rational use. The construction of new reservoirs, large and small, is widely viewed as an adaptation solution for irrigation, water storage and flood protection.

Surface water in downstream countries is already heavily exploited, and reliance on groundwater is expected to increase, particularly in Kazakhstan, Tajikistan and Uzbekistan, where groundwater accounts for 20–30 per cent of total water resources but remains underused.[206] Sustainable groundwater management remains a major

[203] UNCT Kazakhstan (2026).
[204] ECE (2025).
[205] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2024), Table 14.
[206] FAO et al. (2025).

challenge, with limited regulatory frameworks and weak institutional capacity. Transboundary aquifer agreements are rare but increasingly necessary.

Opportunities exist for managed aquifer recharge (MAR), particularly in the Syr Darya Basin, where excess winter water could be directed to replenish groundwater. Implementing MAR would require substantial investment and a shift in planning perspectives.

Water monitoring and data systems for water quantity remain inadequate, though some progress is visible. Establishing a joint, integrated monitoring system for the Aral Sea Basin remains a key long-term objective.

Country-specific insights

Kazakhstan's Concept for the Development of the Water Resources Management System 2024–2030 prioritizes improving water-use efficiency, reducing demand and strengthening cooperation on transboundary waters. The Water Management Programme 2020–2030 aims to cap water use at 100 km³ annually by 2030, supported by new reservoirs (5–7 km³), annual water savings of up to 5 km³ and expanded groundwater use of up to 15 km³.[207] Significant investments of over US$1 billion in 2024 and 2025 have been made in infrastructure and related projects.[208] Policy measures include revising tariffs, strengthening agricultural efficiency and modernizing infrastructure. However, overall water use continued to increase in 2022–2024.[209] Kazakhstan has begun developing a groundwater management concept[210] and established a groundwater information system.[211] Following major floods in 2024 and 2025, flood protection has become a central policy priority.

Kyrgyzstan has increased funding for irrigation maintenance and attracted donor support. Rehabilitation by water user associations has helped reduce water losses.[212] However, the cancellation of surface water abstraction permits in 2012 hindered effective regulation and conflicted with SDG targets.[213] The 2025 Water Code reversed this decision, reinstating mandatory permits for abstraction and consumption.[214]

The National Water Strategy to 2040, adopted in 2024 in Tajikistan, aims to improve irrigation systems, reduce losses and increase water productivity.[215] International support remains essential. Groundwater management faces substantial regulatory and institutional gaps.[216] The construction of the Rogun Dam may create opportunities for improved regional water management if coordinated with downstream countries.

Turkmenistan's long-term development programme Revival of a New Era of a Powerful State 2022–2052 includes plans to introduce innovative water-saving technologies, reduce water use per unit of production and improve irrigation and land conditions.[217] However, progress on the ground is unclear. The State Programme for the Construction of Lake Altyn Asyr is intended to support climate adaptation by collecting drainage water and improving water quality in the lower Amu Darya.[218]

Uzbekistan's Concept of Development of the Water Sector 2020–2030 aims to introduce water-saving technologies across 50 per cent of the country's 4.3 million hectares of irrigated land. The Water Strategy 2030 outlines measures such as subsidies for modern irrigation, reducing canal losses, expanding water cooperation and constructing new reservoirs. By 2022, drip and sprinkler systems had been installed on 400,000 hectares, saving an estimated 3 km³ of water.[219] Uzbekistan has applied regional water withdrawal limits annually since

[207] Ministry of Justice of Kazakhstan (2024).
[208] Ministry of Water Resources and Irrigation of Kazakhstan (2025).
[209] UNCT Kazakhstan (2026).
[210] Prime Minister of Kazakhstan (2026)
[211] Ministry of Water Resources and Irrigation of Kazakhstan (2026).
[212] ECE (2024).
[213] Ibid.
[214] Sultanov (2025).
[215] CAREC (2025).
[216] IGRAC (Groundwater Management Project Tajikistan).
[217] IISD (2025).
[218] Ibid.
[219] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).

2020, though enforcement remains weak. The 2025 Water Code introduces provisions to strengthen regulation of water withdrawals.[220]

Facilitated trade of agricultural products

Greater stability and improved trade relations within Central Asia would create opportunities for countries to reduce irrigated wheat production, which typically generates low economic returns per unit of water and is often of relatively low quality. Even now, there is a substantial flow of virtual water, the water used to produce crops, from Kazakhstan to neighbouring Central Asian countries through exports of rainfed wheat, sunflower and other crops. Expanding this trade could allow water-scarce countries to use water more efficiently or allocate more water to environmental needs.

A growing trend across the region is the expansion of high-value irrigated crop production for export, which increases the economic value of irrigation water and may create space for higher water tariffs and greater investment in water infrastructure. To support this direction, a regional working group bringing together Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan has been established to jointly facilitate agricultural exports. Several Central Asian countries are launching Agroekspress rail routes to deliver fresh produce to the Russian Federation, while plans are also underway to expand trade links with China for fruit and vegetable exports. However, many prerequisites for scaling up high-value agricultural exports, and for doing so without harming food security, are still missing. Key gaps include insufficient logistics and cold-chain infrastructure, limited trade facilitation measures and inadequate transport networks. Addressing these weaknesses is essential to support agricultural diversification, enable economic development and improve the efficiency of regional water use.

Caspian Sea

Several environmental and resource-related challenges affecting the Caspian Sea are transboundary in nature, requiring coordinated action among the coastal states. The Framework Convention for the Protection of the Marine Environment of the Caspian Sea plays an important role in supporting such cooperation.

In Kazakhstan, the Caspian Sea Research Institute has been established in Aktau to study fluctuations in sea levels, assess impacts on ecosystems and fish populations, investigate the causes of mass seal deaths and develop strategies and technologies for conserving marine resources.

In Turkmenistan, the National Caspian Action Plan (2008) aims to protect the marine environment from pollution and preserve biodiversity in the Caspian Sea.[221]

Water quality

Regional overview

Water quality is a critical concern in Central Asia, with direct implications for public health, agricultural productivity and ecosystem integrity. Investments in drinking water and wastewater infrastructure remain insufficient, and the region faces a funding gap of more than US$12 billion to achieve SDG 6 on universal access to safe drinking water and sanitation.[222] Although financing has increased in recent years, it still falls far short of needs.

Historically, countries have prioritized drinking water infrastructure over wastewater treatment, though some progress has been made, often supported by international financial institutions. According to the Eurasian Development Bank, a comprehensive strengthening of institutional, legal, financial and technical frameworks is required. Investments in safe drinking water generate particularly high returns, estimated at 3:1 for the Central Asian region.[223]

[220] ECE (2026).
[221] IISD (2025).
[222] EDB (2024).
[223] Ibid.

In areas affected by the Aral Sea crisis, including the Autonomous Republic of Karakalpakstan (Uzbekistan)[224] and the Kyzylorda region (Kazakhstan),[225] improvements in access to safe drinking water have been achieved despite persistent salinity challenges.

Strengthening the protection of water resources is likely the most effective strategy for reducing treatment costs and addressing unsafe drinking water. Most countries have begun reinforcing water pollution control frameworks, but further action is required to ensure meaningful improvements.[226]

Country-specific insights

Under the Concept for the Development of Housing and Utility Infrastructure 2023–2029, Kazakhstan aims to expand access to water supply services in both urban and rural areas by 2030. The Concept also seeks to reduce the physical deterioration of water and sanitation networks.[227]

In Kyrgyzstan, frequent institutional restructuring has delayed the approval and implementation of the 2005 Water Code, as well as the establishment of basin councils and basin management plans that are key elements for operationalizing the National Water Strategy. A moratorium on technical supervision introduced in 2018 was intended to allow companies time to adjust to new regulations but has slowed progress.[228] Responsibility for drinking water and sanitation services lies with local governments, overseen by a State Agency. The Strategy and Programme for the Development of Drinking Water Supply and Sanitation Systems until 2026 and the National Water Strategy until 2040 aim to ensure that 95 per cent of the urban population and more than 2 million rural residents have access to safe drinking water, and that 70 per cent of district-centre residents receive sanitation services.[229] The Programme also targets improved hygiene conditions in schools and preschools and better regulatory frameworks. However, most financing is expected to come from international donors.[230]

In Tajikistan, the State Programme for Drinking Water Supply and Sanitation until 2032 seeks to more than double water supply coverage and raise sanitation coverage from 15 per cent to 35 per cent of the population.[231] Despite limited funding, the National Water Strategy to 2040 sets ambitious goals of 90 per cent population access to clean drinking water and 100 per cent sewage coverage by 2040.[232]

Although Turkmenistan is gradually phasing out its system of free utilities, water tariffs remain very low. Ongoing activities include constructing new water treatment facilities, upgrading pipelines and introducing water-saving technologies. The country plans to build desalination plants along the Caspian Sea and in the Aral Sea crisis zone, and wastewater treatment plants in administrative centres. A national programme has been approved to modernize water and sanitation equipment. However, financial resources remain insufficient, external investment is limited, and no recent statistics are available on access to centralized water supply services.[233]

Water scarcity remains a major challenge for Uzbekistan. The country has undertaken extensive reforms and invested significantly in water and sanitation systems over the past eight years: 60 per cent from the state budget and 40 per cent from international financial institutions.[234] Legal and institutional reforms have strengthened water pollution control. The Inspectorate for Water Safety under the Ministry of Water Resources oversees enforcement of water use regulations. In 2024–2025, its mandate was expanded, including incentives for reporting violations. In June 2025, Uzbekistan updated its surface water pollutant standards and introduced

[224] UNDP (2025).
[225] Omirgazy (2025).
[226] ECE (2026).
[227] EDB (2024).
[228] ECE (2024).
[229] EDB (2024).
[230] Ibid.
[231] Ministry of Energy and Water Resources of Tajikistan (2024).
[232] CAREC (2025).
[233] EDB (2024).
[234] The Caspian Post (2025).

new discharge requirements for municipal wastewater treatment plants. Requirements for wastewater discharge from industry have also been tightened, mandating upgrades to treatment facilities and offering financial incentives for compliance.[235] Access to sewage systems improved from 37.3 per cent in 2020 to 50.1 per cent in 2024,[236] although wastewater treatment capacity has not kept pace, limiting progress in reducing domestic pollution.

Soils and land

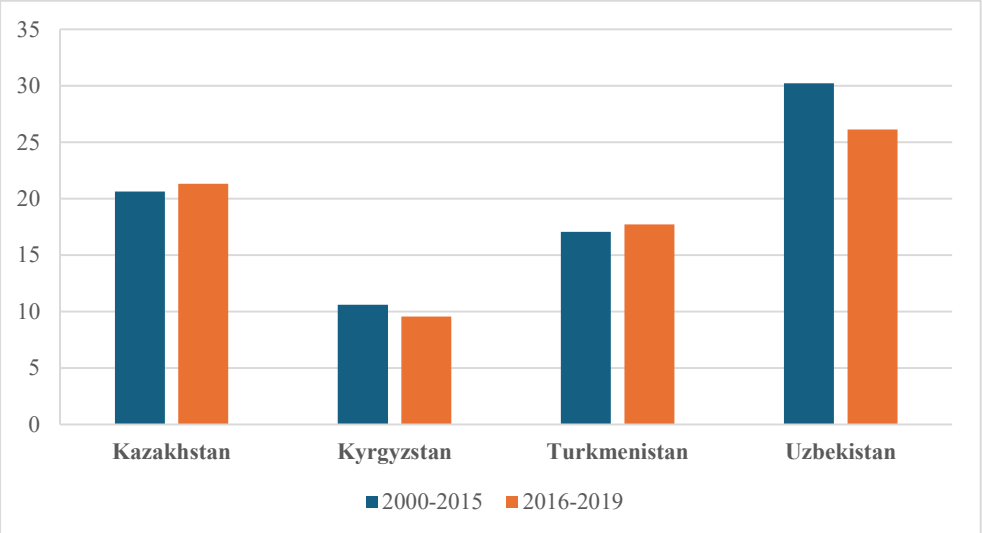
Regional overview

Preventing and controlling land and soil degradation is essential for environmental security and sustainable socioeconomic development in Central Asia. Although all countries have developed national policies for soil and land protection, implementation remains challenging. The main drivers of soil degradation in the region include land-use change and abandonment, climate change, droughts and extreme weather events, unsustainable agricultural, pasture and forestry management, poor waste and chemical management, inadequate irrigation and drainage systems and the reuse of untreated water for irrigation.

Salinization, particularly of agricultural land, remains a major problem. Modern water-saving irrigation technologies are being introduced both to conserve water and to prevent soil salinity. In Uzbekistan, such technologies currently cover 23 per cent of irrigated land.[237] Afforestation, greening initiatives and the expansion of protected areas are widely used soil protection strategies across the region.

Progress on SDG indicator 15.3.1, measuring the proportion of degraded land, varies significantly. Between 2015 and 2019, the share of degraded land increased by 0.68 percentage points in Kazakhstan and 0.66 in Turkmenistan, while it decreased by 1.03 points in Kyrgyzstan and 4.08 points in Uzbekistan (Figure 5). No data are available for Tajikistan.

Figure 5: Proportion of land that is degraded over total land area, 2000–2015, 2016–2019, percentage



Sources: Ministry of Agriculture of Kazakhstan. Ministry of Agriculture of Kyrgyzstan. Ministry of Agriculture and Environment Protection of Turkmenistan. State Committee on Forestry of Uzbekistan.

[235] ECE (2026).
[236] Ibid.
[237] ECE (2026).

Both Kazakhstan and Uzbekistan have undertaken extensive afforestation efforts on the dried bed of the Aral Sea. This is technically challenging and survival rates vary widely depending on planting techniques and local conditions.[238]

The Regional Strategy for Drought Risk Management and Mitigation in Central Asia (2021–2030), developed by CAREC and the UNCCD, aims to improve monitoring, strengthen cooperation and build technical capacities to enhance resilience to drought and sand- and dust storms.[239]

The ExSoil & Smart Agriculture regional initiative, launched in 2026, aims to establish a regional network of soil science competence centres in Germany, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan and Uzbekistan. Its objective is to combat land degradation, promote science-based land management and strengthen capacity building.[240] All Central Asian countries have also set national Land Degradation Neutrality (LDN) targets under the UNCCD.[241]

A worrying regional trend is the expansion of agricultural land into ecologically fragile areas, heightening degradation risks. Monitoring systems remain incomplete, with large areas not yet covered. Land restoration is slow, and soil responds gradually, making improvement a long-term process. A regional landscape approach that takes into account ecosystem functions and services has not yet been established. Soil erosion, for example, often results from degraded vegetation in upland areas, with downstream impacts such as increased flooding in lowlands.

Country-specific insights

Kazakhstan reports an alarming rise in soil erosion. The Roadmap for Soil Fertility Improvement 2024–2030 includes a comprehensive survey of soil conditions.[242] LDN measures focus on enhancing land-use efficiency and increasing irrigated land by 40 per cent, expanding the total irrigated area to 2 million hectares.[243]

Key LDN measures in Kyrgyzstan include improving pasture conditions through rotational grazing, expanding access to 10,000 hectares of pastures via strengthened infrastructure, implementing sustainable land management across 100,000 hectares of pastures and forests, and reclaiming 10,000 hectares of agricultural land.[244]

With international support, Tajikistan has developed a national plan to combat desertification. A working group defined the national LDN baseline and voluntary targets. The Pasture Development Programme 2023–2027 aims to reverse pasture degradation.

To achieve LDN, Turkmenistan aims to green desert areas, irrigated land and settlements covering up to 160,000 hectares by 2025.[245] To improve conditions in the Aral Sea region, the country is implementing a five-year National Aral Sea Programme.[246]

Uzbekistan's soil protection strategy emphasizes afforestation and the expansion of green and protected areas, alongside improvements to irrigation infrastructure. As noted earlier, modern water-saving technologies now cover 23 per cent of irrigated land, contributing to reduced soil salinization and land degradation.[247]

[238] Ibid.
[239] CAREC (2021).
[240] National Information Agency "Ecology" (2026).
[241] UNCCD (2023a).
[242] UNCT Kazakhstan (2026).
[243] UNCCD (2023a).
[244] Ibid.
[245] Ibid.
[246] IISD (2025).
[247] ECE (2026).

Mineral resources

Regional overview

Central Asia possesses substantial fossil fuel resources, though they are distributed very unevenly. Kazakhstan, Turkmenistan and Uzbekistan are the region's major hydrocarbon producers, while Kyrgyzstan and Tajikistan have very limited fossil fuel reserves. Extraction of oil, gas and coal continues to generate significant environmental impacts, including land degradation, water and air pollution, greenhouse gas emissions, soil contamination and biodiversity loss.

Beyond hydrocarbons, the region holds important reserves of critical minerals such as uranium, lithium, copper and rare earth elements — resources that are increasingly needed for advanced technologies and the global clean energy transition. Their responsible development could strengthen national and regional economic resilience and integrate Central Asia more deeply into global supply chains. Rising global demand creates incentives not only for extraction but also for processing facilities, logistics services and related industries, offering opportunities for job creation and economic diversification. At the same time, mineral extraction and processing can pose serious environmental and health risks, which can be mitigated only when investment is coupled with robust regulatory frameworks, strong environmental standards and long-term remediation requirements.

Mining tailings pose transboundary risks, particularly where facilities are located near shared watersheds or in areas prone to natural hazards. Regional cooperation is expanding in this area. For example, under the Convention on the Transboundary Effects of Industrial Accidents, a project implemented jointly with ESCAP focuses on improving climate knowledge and disaster risk governance for mine tailings facilities in Central Asia. This initiative has resulted in risk maps combining natural hazard information with the location of tailings sites, helping prevent failures, minimize accidental water pollution and strengthen preparedness for incidents with potential cross-border impacts.

In some cases, environmental impact assessments are not adequately applied, and mine design often fails to incorporate water recycling, increasing both freshwater demand and pollution risks. Introduction of best available techniques (BAT) in the mining sector remains at an early stage across the region. Environmental monitoring and public disclosure of environmental data are also insufficient.

Country-specific insights

Kazakhstan has the largest oil reserves in the region and is Central Asia's leading oil producer. It also possesses substantial coal deposits. The country is one of the world's most mineral-rich economies, attracting significant foreign investment in copper, uranium and rare metals. Environmental impacts, particularly water pollution and land degradation, remain major concerns. Kazakhstan has developed BAT Reference Documents for mining and for the oil and gas sector, but these are not yet applied in practice. Strategic environmental assessment (SEA) could also be used for mining development programmes, but this tool has likewise not been implemented.[248]

Kyrgyzstan's mining sector plays an important role in the national economy and is highlighted in the National Strategy for Sustainable Development. Many mining sites are located near cross-border water sources and in areas with high seismicity and landslide risks, posing dangers for the wider region. The Strategy emphasizes the need for environmental monitoring at mining operations and encourages citizen monitoring to strengthen compliance and oversight.[249] Kyrgyzstan has negligible oil and gas reserves and only small coal deposits, leaving the country heavily reliant on hydropower and energy imports.

Tajikistan requires a licence for mining activities, as in other Central Asian countries.[250] The sector is growing, but Tajikistan still lacks a long-term strategy for sustainable mining and modern sectoral legislation. Climate change and frequent earthquakes heighten the risks of failures at mining tailings facilities, with potential

[248] UNCT Kazakhstan (2026).
[249] ECE (2024).
[250] ECE (2025).

releases of hazardous or radioactive substances that could affect neighbouring countries.[251] As in Kyrgyzstan, Tajikistan has minimal oil, gas and coal reserves, and depends on hydropower and energy imports.

Turkmenistan is among the world's major natural gas holders, ranking fifth globally in proven reserves. Its most economically significant mineral resources include bromine–iodine brines and sulfur. The sector is regulated by the 2015 Subsoil Law, but challenges remain in attracting foreign investment.[252] There is notable potential for lithium extraction in the Karabogazgol Bay, which contains large renewable brine deposits.[253] While land degradation from mining is acknowledged, publicly available information remains limited.

Uzbekistan has more limited oil and coal resources but possesses substantial natural gas reserves, making it a moderate yet significant regional gas producer. Between 2018 and 2025, the country reformed its subsoil taxation system, introducing rent taxes to replace basic extraction fees. All subsoil use requires a licence.[254] Mining activities contribute to soil pollution, waste accumulation, and surface and groundwater contamination, while mitigation and remediation efforts remain limited despite the sector's growing economic importance.[255]

Ecosystems and biodiversity

Regional overview

Protection of ecosystems and biodiversity, together with afforestation and reforestation, is a major area of work for environmental authorities across Central Asia. Each country has established its own network of protected areas. Forests remain state-owned and, although all countries report efforts to increase forest area, available statistics are not always comprehensive or consistent. Afforestation is closely linked to multiple policy objectives and takes place across diverse landscapes. All countries maintain national-level programmes with specific targets for expanding forested areas or achieving annual planting numbers.

All five Central Asian countries are Parties to the Convention on Biological Diversity (CBD) and have developed National Biodiversity Strategies and Action Plans (NBSAPs). Each country is also a Party to the Ramsar Convention on Wetlands, with 24 Ramsar sites designated region-wide.[256] However, protection levels vary significantly; many sites lack management plans, and financing is often insufficient or unstable. Only three new Ramsar sites, all in Uzbekistan, have been designated in the past decade. Many ecologically important wetlands remain without formal protection.

All Central Asian countries publish Red Data Books identifying endangered, rare and threatened species, although updates are irregular in some cases.[257] While some progress has been made in mapping ecosystems and species,[258] biodiversity monitoring systems are still limited, both nationally and regionally. Systematic monitoring is largely absent in Kyrgyzstan[259] and Tajikistan,[260] making regional assessments difficult.

Concerns are common regarding the effectiveness of protected areas and forest management. Strengthening institutional capacity and ensuring adequate financial resources, including fair remuneration for staff, is essential to improve management quality. Another persistent gap is that ecosystem and biodiversity considerations are insufficiently integrated into sectoral and national development programmes. Without stronger cross-sectoral policy coherence, stand-alone biodiversity initiatives cannot achieve their full potential.

[251] Ibid.
[252] USGS (n.d.).
[253] Mommayev (2022).
[254] PwC (2025a).
[255] ECE (2026).
[256] Convention on Wetlands (The Contracting Parties).
[257] ECE (2024).
[258] CAREC (Biodiversity).
[259] ECE (2024).
[260] ECE (2025a).

Country-specific insights

Kazakhstan's Concept for Conservation and Sustainable Use of Biodiversity to 2030 identifies the dry Aral Sea bed and protective tree belts along transport corridors as priority areas for forest restoration. The Concept sets targets to increase wooded land to 4.7 per cent of total area by 2020 and to 5 per cent by 2030.[261] Between 2021 and 2025, 1.5 billion seedlings were planted.[262] A new NBSAP for the period to 2035 has been adopted in March 2026.[263] The most recent Red Data Book was published in 2006, an update is overdue.[264] Expanding the network of protected areas remains a key priority. As of December 2025, protected areas covered close to 11 per cent of the country's territory, with six new protected areas created since 2018.[265] Kazakhstan has stabilised the Northern Aral Sea through the Kokaral Dam. In 2025, water volume in the Small Aral Sea reached 20.6 cubic kilometres, with plans to raise the dam and increase storage to 34 cubic kilometres by 2030, further supporting ecosystem recovery and fisheries.[266]

Kyrgyzstan has made progress in strengthening its biodiversity legislation and protects more than 7 per cent of its territory. Conservation programmes focus on globally threatened species such as the snow leopard (*Panthera uncia*) and Tian Shan argali (*Ovis ammon karelini*), with some species showing stabilising or increasing populations. Hunting is reported to be regulated at sustainable levels.[267] The Red Data Book regulation was approved in 2016, but the latest published edition dates from 2006, leaving the list outdated.[268] Moreover, species listed in the Red Data Book often lack formal protection measures. The Forest Sector Development Concept to 2040 aims to enhance forests' climate-regulating and water-regulating functions. Afforestation and restoration of degraded pasturelands are central elements.[269] Timber harvesting is prohibited and reforestation is promoted. Overall, forest area in Kyrgyzstan is slowly increasing.[270]

Tajikistan allocates around 22 per cent of its territory to protected areas—one of the highest proportions in the region. However, management capacity remains limited. The recent transfer of supervisory responsibility for protected areas back to the Committee for Environmental Protection may help strengthen governance.[271] The most recent Red Data Book was published in 2015, and hunting licences may still be issued for some listed species.[272] A new NBSAP is under preparation.[273] The State Forestry Agency continues implementing a long-term forest strategy (2015–2030).[274] In addition, the State Greening Programme to 2040 aims to expand tree and shrub planting to improve air quality, enhance ecological balance and strengthen climate resilience.[275]

Turkmenistan's National Programme for Socio-Economic Development 2011–2030 includes biodiversity conservation, afforestation and anti-desertification measures. Under the National Forestry Programme 2025–2030, projects are underway to preserve and expand forest areas. Public-private partnership schemes enable entrepreneurs to lease forest plots for fruit, oilseed and medicinal crops, ecotourism and job creation, while maintaining state ownership.[276] Turkmenistan also has a programme for planting bushes and trees in green belts around Ashgabat and other major cities.[277] Protected areas cover 4.38 per cent of Turkmenistan's territory. Plans aim to expand this by an additional 10–12 per cent by 2030, ensuring protection for 95 per cent of endangered species and supporting key ecological functions such as watershed protection and erosion

[261] FAO (2022).
[262] Ministry of Ecology and Natural Resources of Kazakhstan (2025). Prime Minister of Kazakhstan (2026a).
[263] BIOFIN (2026).
[264] Ibid.
[265] Ibid.
[266] Prime Minister of Kazakhstan (2026a).
[267] ECE (2024).
[268] Ibid.
[269] FAO (2022).
[270] Ibid.
[271] ECE (2025a).
[272] Ibid.
[273] CBD (2024).
[274] FAO (2022).
[275] Abakirov (2024).
[276] Cis Internet Portal (2026).
[277] IISD (2025).

control.[278] The 2024 Red Data Book lists 119 plant species and 145 animal species. Rare, endemic and endangered species are protected through state nature reserves and overseen by regional environmental protection departments.[279]

Uzbekistan's NBSAP (2019–2028) is being implemented,[280] with restoration of *tugai* and saxaul forests identified as priorities.[281] A new NBSAP is expected by 2027. The Red Book (2019) lists 206 animal species and 314 plant species.[282] Since 2021, the nationwide Yashil Makon ("Green Land") campaign has targeted the planting of 200 million seedlings annually, with the goal of increasing urban green space from 8 per cent to 30 per cent.[283] Protected areas have expanded significantly, covering 14.08 per cent of national territory in 2022, i.e., three times more than in 2016.[284] Coverage of Key Biodiversity Areas (KBAs) has also improved:[285] freshwater KBA protection increased from 9.8 per cent in 2000 to 19.2 per cent in 2023, and terrestrial KBA protection from 13.2 per cent to 20.5 per cent over the same period.[286] Protected areas now include habitats for 83 per cent of vertebrate species and 89 per cent of plant species listed in the Red Book.[287] A major conservation project in the National Nature Park "Priaralie" supports five new protected areas covering more than 2.4 million hectares in the Autonomous Republic of Karakalpakstan.[288] The Concept for the Development of the Forestry System to 2030 outlines measures for forest protection, sustainable forest management and improved climate resilience, including enhanced fire-risk management. Forest reserve land has increased markedly: from 5.3 per cent in the 1990s to 26.1 per cent today.[289] The Sudochye wetlands rely on irrigation channels during dry seasons. However, water allocation competes with agricultural and fisheries needs. The Lake Sudochye Management Committee coordinates water use from irrigation networks and the Amu Darya.

Transboundary cooperation

There is a strong case for Central Asian countries to cooperate more closely on the monitoring and protection of biodiversity and ecosystems. The countries already collaborate in several areas, including the creation and management of transboundary protected areas. Examples include the Western Tien-Shan UNESCO World Heritage property (Kazakhstan, Kyrgyzstan and Uzbekistan), the Cold Winter Deserts of Turan (Kazakhstan, Turkmenistan and Uzbekistan) and the Zarafshan River floodplain (Tajikistan and Uzbekistan).[290]

Two biodiversity hotspots where expanded regional cooperation would be particularly beneficial are the mountains of Central Asia, which span all five countries, and the Caspian Sea, whose conservation requires coordinated action among the coastal states.

4.5 Sustainable energy development and a just and inclusive energy transition

Regional overview

Important differences exist among Central Asian countries in terms of primary energy sources. Kazakhstan relies largely on coal and oil; Kyrgyzstan on hydropower, coal and oil; Tajikistan on hydropower with some coal and oil; Turkmenistan on natural gas; and Uzbekistan on natural gas and oil. All countries continue to invest in new generation capacity and cross-border electricity trade to ensure affordable and reliable energy. Kyrgyzstan and Tajikistan are prioritizing hydropower development, while Uzbekistan is expanding its solar, wind and hydropower capacity.

[278] IISD (2025).
[279] IISD (2025).
[280] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[281] FAO (2022).
[282] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[283] Ibid.
[284] ECE (2026).
[285] KBAs are globally crucial places on our planet where unique species and ecosystems occur in important numbers or extent.
[286] UNDESA (n.d.).
[287] UNDP (2023). p. 38.
[288] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[289] Ibid.
[290] Tursunaliyev (n.d.).

Table 3 highlights the diverse energy mixes across Central Asian countries, reflecting differences in resource endowments and energy policies. Overall, the region remains heavily dependent on fossil fuels, with very limited contributions from renewable sources beyond hydropower. Across all five countries, the contribution of solar, wind and other renewable energy sources, besides hydropower, remains negligible, highlighting a major opportunity for diversification, energy security and decarbonization. Expanding modern renewables will be essential to support long–term climate commitments and reduce environmental impacts.

Table 3: Primary energy supply, 2023, percentage

Primary energy supply	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Coal and coal products	49.20	28.10	24.50	0.00	8.40
Oil and oil products	22.40	35.50	30.70	15.50	11.40
Natural gas	26.70	10.00	3.60	84.50	79.00
Hydropower	1.00	26.50	41.30	0.00	1.20
Solar, wind and other renewables	0.00	0.00	0.00	0.00	0.00
Biofuels and waste	0.00	0.00	0.00	0.00	0.00

Source: https://www.iea.org/countries/

The shift toward sustainable, low-carbon economies must be fair and inclusive. A just transition requires that benefits are widely shared, costs managed equitably, decent work opportunities created, and affected workers and communities meaningfully engaged in decision-making. Emerging activities such as artificial intelligence (AI) data processing and cryptocurrency mining pose risks to the energy transition because of their exceptionally high and rapidly growing electricity demand, which can slow decarbonization and place additional pressure on energy systems.

Electricity demand is rising across all countries, but tariffs remain low. These low prices discourage investment in new generation capacity and in cleaner and more efficient technologies. They also contribute to wasteful consumption patterns and limited public awareness of the environmental and economic costs of inefficiency. Improving energy efficiency is therefore a cornerstone of the energy transition. Strengthening institutional and policy frameworks remains essential for promoting more sustainable and efficient energy use.

Coal-based systems continue to play a role in ensuring energy security in several countries, despite their significant environmental and health risks. A full phase-out may not be feasible in the medium term, but policy measures can substantially reduce the impacts of coal and other fossil fuels. These include improving energy efficiency, phasing out subsidies, adopting cleaner coal technologies, strengthening emissions monitoring and upgrading flue-gas treatment systems. Progress in fossil fuel subsidy reform is slow and, in some cases, subsidies are rising as a share of GDP. In Tajikistan, they increased from 2.0 per cent in 2010 to 6.7 per cent in 2022.[291]

The transition from fossil fuels to renewable energy, including solar, wind, hydropower and green hydrogen, is essential for reducing carbon emissions and air pollution. In rural areas, there is often untapped potential for decentralized renewables such as small hydropower and solar energy. However, limited financial incentives, insufficient technical capacity, low awareness and weak institutional support continue to hinder the development of off-grid and small-scale renewable systems. Integrating these systems into national grids also poses challenges.

Large-scale hydropower remains a major renewable energy source in the region, and expansion is underway. New installations are planned or being built in Kyrgyzstan and Tajikistan. Uzbekistan has announced plans to develop approximately 3,000 micro hydropower plants with a combined estimated capacity of around 160 MW,[292] and similar initiatives are being explored in Kazakhstan. Most existing hydropower infrastructure was designed without considering future climate variability and may be ill-prepared for more frequent and severe extreme weather events. Declining river flows also pose risks to energy security, particularly in Kyrgyzstan and Tajikistan. Integrating climate-risk assessment and resilience planning into future energy strategies is therefore essential. Hydropower installations may also affect biodiversity and aquatic ecosystems. While

[291] ECE (2025a).
[292] ECE (2026).

internationally financed projects generally require EIAs, national small hydropower projects may proceed without comprehensive environmental assessment.[293] Ensuring systematic EIA application to all projects is critical for sustainable hydropower development.

The long-standing water–energy conflict—water for irrigation in summer versus water for hydropower in winter—continues despite existing seasonal energy-exchange arrangements. Regional energy cooperation is nevertheless gaining momentum. Efforts are underway to modernize the Central Asian power grid, supported by several international initiatives.[294] The water-energy exchange between Kazakhstan and Kyrgyzstan is a positive recent development, and cross-border electricity trade is increasing between the countries.

Country-specific insights

In Kazakhstan, residential energy consumption (36.5 per cent) and transport (24.9 per cent) together exceed the share of industry (22.2 per cent) as of 2024. Energy efficiency measures appear more advanced in industry than in households and transport, where consumption continues to rise in absolute terms.[295] Measures have been introduced to ensure compliance with energy-efficiency class requirements for buildings, with post-project inspections to begin in 2026.[296] Kazakhstan has long-term plans for renewable energy, but the current contribution remains low. The country is among the 15 largest fossil-fuel subsidizers globally and ranks first in coal subsidies.[297] Concerns have been raised regarding the integration of new renewable energy sources into the grid, with some voices calling for a slower pace of deployment.[298] Kazakhstan has set long-term energy targets for 2030, 2040 and 2050, relating to energy intensity, the share of alternative energy, and the gradual phase-out of coal in electricity generation. The target for 2030—to reach 15 per cent renewable electricity—is considered relatively modest.[299] Tariff reform in the district heating sector is being gradually implemented, with increases to cover operating and maintenance costs first, followed later by investment costs.[300] The country plans a gradual transition from coal to gas as part of its carbon-neutrality pathway. A recent national referendum approved the construction of a nuclear power plant to complement the energy mix.[301] Kazakhstan's Strategy to Achieve Carbon Neutrality by 2060 and its NDCs discuss the fairness of climate actions, highlighting the absence of mechanisms to mitigate social risks arising from the energy transition, such as retraining and social protection for affected workers.[302]

Hydropower dominates electricity generation in Kyrgyzstan, accounting for around 90 per cent in 2021. In high-water years, the country becomes a net exporter of electricity. There are plans to expand summer exports through CASA-1000, which will connect Kyrgyzstan and Tajikistan to Afghanistan and Pakistan.[303] Wind and solar energy are being discussed but currently play a minimal role.[304] Electricity demand is rising, while power reserves are limited and import volumes remain insufficient.[305] Electricity tariffs in Kyrgyzstan are kept low through subsidies, far below cost-recovery levels. Although a tiered tariff structure exists, it provides limited incentives for energy conservation or efficiency investments. The electricity sector's financial deficit was projected to reach 2.2 per cent of GDP by 2023. For poorer households, even current tariffs can be burdensome, encouraging the use of solid fuels, especially where service quality is poor.[306] During dry years, low water levels in the Toktogul and other reservoirs have led the Government to ban electric heating appliances during winter to conserve electricity. This has driven an increase in the use of coal and other low-quality fuels for heating.[307] Kyrgyzstan remains dependent on energy imports for a large share of primary energy, particularly

[293] Ibid.
[294] Tukueva T. (2026).
[295] UNCT Kazakhstan (2026).
[296] Ibid.
[297] ECE (2019).
[298] CAREC (2025a).
[299] UNCT Kazakhstan (2026).
[300] Ibid.
[301] Ibid.
[302] Ibid.
[303] CASA-1000.
[304] ECE (2024).
[305] Ibid.
[306] Ibid.
[307] Ibid.

coal, natural gas and oil**,** with imports making up more than 50 per cent of the national fuel and power balance.[308]

Hydropower is also the main source of electricity in Tajikistan, supplemented by imported oil, gas and coal. Energy policy focuses on ensuring uninterrupted supply, improving regional cooperation and enhancing efficiency. Significant domestic and foreign investment will be required for continued energy sector development, but low tariffs undermine the country's investment attractiveness.[309] A renewable energy programme (2023–2027) is expected to support Tajikistan's goal of energy independence, primarily through the expansion of large and small hydropower plants. Like Kyrgyzstan, Tajikistan aims to become a major electricity exporter. Energy efficiency and environmental considerations are included in the Strategy for the Development of the Construction Sector to 2030. The Concept for the Development of the Coal Industry to 2040 and the National Development Strategy to 2030 include ambitious plans to increase coal production fivefold compared with the 2019–2022 average.[310] The Electric Power Sector Development Programme (2026–2030) focuses on expanding generation capacity, reducing grid losses and improving distribution.[311] Although Tajikistan's electricity system is not highly carbon-intensive due to its reliance on hydropower, the metallurgical sector and irrigation are major energy consumers. These sectors benefit from very low electricity tariffs, giving little incentive to invest in efficiency or low-carbon technologies. More broadly, low household and enterprise tariffs discourage behavioural change.[312] Low electricity prices lead to large subsidies for energy-intensive sectors. Poor bill collection further undermines the financial viability of Barqi Tojik, the main electricity provider. Ongoing reforms aim to improve the management of the company's substantial debts.[313]

Turkmenistan's energy sector is fully dependent on natural gas, with renewable energy only beginning to be introduced.[314] The sector is almost entirely subsidized, with households receiving free electricity, heat and gas up to specified consumption levels. The Government has announced steps to gradually reduce subsidies to curb domestic demand and increase export potential.[315]

Uzbekistan aims to reduce energy consumption by at least 20 per cent across the economy and 15 per cent in public and social buildings by 2030.[316] The country plans to phase out fossil-fuel subsidies by 2027, with targeted social protection measures being considered to offset the impact of rising energy costs.[317] Production of green hydrogen is expected to begin in 2025.[318] In 2024, Uzbekistan introduced a tiered electricity tariff system, applying higher rates to households with larger consumption levels and establishing a "social norm" to ensure affordable access for essential needs.[319] Tariffs for district heating and hot water were scheduled to rise by approximately 15 per cent in 2025.[320] Since 2019, tax exemptions and other incentives have been in place for producers and users of renewable energy installations, alongside premium feed-in tariffs for solar and wind energy.[321] An EBRD investment package of US$195.5 million is supporting the construction of a 300 MW solar power plant with 75 MWh battery storage in the Kashkadarya region.[322] New buildings, including schools, hospitals and residential buildings, are required to use more sustainable insulation materials such as basalt and foamed concrete; older buildings are expected to adopt these materials during refurbishment.[323] Starting in 2025, Uzbekistan will require solar panels and solar water heaters on at least 50 per cent of the free roof space of all new and renovated residential and commercial buildings.[324] Approximately

[308] Ibid.
[309] IEA (Tajikistan).
[310] ECE (2025).
[311] Chorshanbiev (2025).
[312] ECE (2025a).
[313] IEA (2022).
[314] IISD (2025).
[315] IEA (Turkmenistan).
[316] UZA (2026).
[317] ECE (2026)
[318] UzDaily.uz (2026).
[319] ECE (2026).
[320] Ibid.
[321] Ibid.
[322] UzDaily.uz (2026a).
[323] ECE (2026).
[324] Kun.uz (2025).

2.4 million hectares of agricultural land, representing 56 per cent of Uzbekistan's irrigated area, depend on pumping stations that consume nearly 16 per cent of national energy use annually. Improving the energy efficiency of irrigation systems is therefore a major challenge for both the agricultural and water sectors, not only in Uzbekistan but across the region.

4.6 Sustainable agriculture and food security

Regional overview

A key objective of the RES 2026 is to promote sustainable, environmentally sound and socially balanced food systems in Central Asia. This is to be achieved through enhanced regional cooperation, integrated natural resource management and the systematic consideration of climate- and migration-related risks. Strengthened food systems are expected to reinforce food security,[325] reduce the likelihood of new waves of forced migration and support the sustainable development of vulnerable areas.

According to the 2022 Global Food Security Index, Kazakhstan ranked 32nd, Uzbekistan 73rd and Tajikistan 75th out of 113 countries.[326] Although food security has generally improved, undernourishment remains an issue in parts of the region and anaemia among women continues to be a significant public health concern. The share of people unable to afford a healthy diet is still relatively high. At the same time, malnutrition, particularly childhood stunting, has declined considerably over the past decade.[327]

Water remains the resource most closely linked to food security in Central Asia. A joint FAO report highlights that, "water is not only a foundation for food security but also a catalyst for the transformation of agrifood systems, enabling sustainable practices and resilience against climate challenges." [328]

Agriculture is an important economic sector across Central Asia, employing between 20 and 50 per cent of the labour force, with particularly significant roles in Tajikistan and Uzbekistan. However, the sector faces persistent environmental challenges, including water pollution, land degradation and biodiversity loss. Climate change poses an additional and growing threat, requiring measures such as better grazing management and efforts to reduce land salinization.

Fertilizer use varies widely across the region, from very low rates in Kazakhstan to high application levels in irrigation-intensive countries such as Turkmenistan and Uzbekistan. The legacy of hazardous pesticides from the Soviet era, including organochlorines, remains unresolved, with obsolete stocks still present at various sites. Current pesticide use is lower than in many European countries and modern initiatives supported by FAO and other partners are promoting integrated pest management.

Steps toward more sustainable agriculture are being taken in several countries. Farmer training through extension services is a core component. Environmentally friendly farming approaches, such as conservation agriculture, regenerative practices and climate-smart agriculture, are still not widely developed or implemented. Additional technical measures being promoted include expanding the cultivation of legumes and fodder crops, notably alfalfa, to help improve soil fertility.

Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan have also introduced laws and standards to define and support organic agriculture. In Kazakhstan and Uzbekistan, farmers receive subsidies linked to obtaining organic certification for their farms. However, despite these policy efforts, the overall share of organically managed agricultural land in the four countries remains significantly below the global average.[329]

Recent years have seen substantial investment in irrigation infrastructure by governments and international development partners. At the same time, all Central Asian countries are taking steps to control grazing and

[325] FAO (2006). Food security is when all people at all times have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.
[326] The Economist Group (2022).
[327] FAO et al (2025).
[328] Ibid.
[329] FiBL & IOFAM (2025).

reduce pressure on rangelands. Introducing volumetric water tariffs, which is an important tool for encouraging efficient water use, remains administratively complex and politically sensitive. Despite growing investment in irrigation modernization, overall funding levels are still insufficient to drive systemic, region-wide improvements.

Expanding the production of high-value export crops, while ensuring that agricultural commodities can be traded without undue obstacles, may provide a viable path forward. A more economically robust agricultural sector, combined with sustainable trade in commodities such as non-irrigated wheat, can improve food security and enable more efficient water use. However, several viable alternatives to irrigated wheat production remain underexplored.

In this context, the Principles of Sustainable Trade, adopted at the 14th Session of the SPECA Governing Council in 2019, reflect a commitment by SPECA countries, including those of Central Asia, to ensure that trade policy evolves in a manner that contributes to sustainable development across the region.[330]

Country-specific insights

The guiding framework for Kazakhstan's agricultural development is the Concept for the Development of the Agro-Industrial Complex for 2021–2030. It sets priorities such as improving the efficiency of land and water use and strengthening agricultural science and trade. Kazakhstan also plans to expand large-scale animal production, a development that could generate significant environmental pressures if not managed carefully.

The Programme for the Development of Organic Production for 2025–2029 promotes organic farming, climate-smart agriculture and sustainable water and land management. Key measures include modern irrigation systems, soil conservation and improved pasture management. The programme foresees a tripling of the area under organic production.[331] However, low water tariffs and a strong policy focus on expanding animal production could undermine long-term sustainability objectives.

Tajikistan seeks to develop an agricultural system that uses land and water resources efficiently and is resilient to climate change through the Programme for the Development of the Agri-Food System and Sustainable Agriculture to 2030. In addition, a Programme for Creating Favourable Conditions for the Introduction of Good Agricultural Practices was approved in 2020 to encourage the uptake of improved production standards across the sector.[332]

Turkmenistan's Revival of a New Era of a Powerful State: National Programme of Socio-Economic Development for 2022–2052 includes measures to introduce innovative water-saving technologies, reduce water use per unit of agricultural output and improve irrigation efficiency. Other important elements include improving soil conditions, cultivating salt-tolerant crops and making productive use of saline land areas.[333]

In Uzbekistan, improvements in irrigation systems and water-use practices have been observed in recent years. Drought-tolerant and early-maturing crop varieties, including cotton, have been introduced.[334] The Strategy for the Development of Agriculture for 2020–2030 promotes the adoption of Good Agriculture and Environmental Practices (GAEP), including proper fertilizer and pesticide application. Some hazardous pesticides have been banned and the country has set a target for 20 per cent of farmers to apply GAEP or an international management quality system by 2030. Significant challenges remain in scaling up the adoption of these practices. Uzbekistan is also planning a substantial expansion of animal production between 2026 and 2030, primarily to supply the domestic market.[335] The Government allocates subsidies to encourage the cultivation of high-value crops such as fruits and nuts that are commodities with strong profitability and export potential.[336] Subsidies also support investments in modern technologies, including drip irrigation, as well as in

[330] ECE (2019a).
[331] The Caspian Post (2025a). FAO (n.d.).
[332] ECE (2025a).
[333] IISD (2025).
[334] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[335] Ministry of Agriculture, Fisheries, Food Security and Nature of the Netherlands (2026).
[336] Aliyeva (2025).

horticulture and livestock development.[337] Uzbekistan has historically been the sixth-largest producer and second-largest exporter of cotton globally.[338] While the area under cotton cultivation—an extremely water-intensive crop—has declined in recent years, cotton remains an important crop in Uzbekistan and continues to play a significant role across Central Asia.

4.7 Disaster risk reduction

Regional overview

Central Asian countries have made progress in strengthening disaster risk reduction (DRR), guided primarily by the Sendai Framework for Disaster Risk Reduction 2015–2030.[339] At the regional level, the Strategy for Development of Cooperation of Countries of Central Asia in Disaster Risk Reduction for 2022–2030, endorsed by the Heads of Emergency Authorities, outlines priorities such as reinforcing the regional institutional and legal framework, improving understanding of disaster risk, increasing regional investment in DRR and strengthening preparedness.[340] The United Nations Office for Disaster Risk Reduction (UNDRR) has issued recommendations to support the development of regional and national early warning systems, a central component of effective DRR.[341]

Despite these advances, significant challenges remain. Transboundary cooperation requires further strengthening to ensure the effective implementation of arrangements such as flood-related water-release agreements and interoperable early warning systems. Strong national regulatory frameworks for dam safety, supported by subregional cooperation, are essential for reducing shared risks.

In several countries, stakeholder roles and responsibilities remain insufficiently defined, and the high turnover of qualified staff in scientific and operational institutions undermines institutional continuity. Persistent gaps exist in professional expertise, information technology, monitoring capacities and integrated data systems. As a result, DRR efforts often remain primarily reactive, rather than oriented toward prevention, mitigation and recovery. Moreover, the protection, monitoring and remediation of contaminated sites continues to require more systematic attention.

Greater integration of international norms and good practices, particularly those consistent with the Convention on the Transboundary Effects of Industrial Accidents, would enhance preparedness, coordination and response. Cooperation with the international DRR community is well established, but additional knowledge exchange could further strengthen resilience to environmental risks. In this context, the International Atomic Energy Agency (IAEA) has adopted a new strategic master plan extending cooperation with Kyrgyzstan, Tajikistan and Uzbekistan, as well as other partners, on the remediation of uranium legacy sites through 2030, building on earlier efforts in the region.[342]

Country-specific insights

Kazakhstan has positioned itself as a regional leader by explicitly integrating transboundary cooperation into its national DRR strategy. A key milestone was the establishment of the Centre for Emergency Situations and Disaster Risk Reduction in Almaty in 2016. The Centre functions as a regional coordination hub, supporting joint training, information exchange and shared risk assessments across Central Asia. Kazakhstan's national DRR framework prioritizes regional and international collaboration, including the development of joint early warning systems for glacier lake outburst floods (GLOFs) in the Tien Shan mountains.[343] The Water Code also contains provisions aimed at strengthening dam safety.[344] Kazakhstan remains the only country in the region that is a Party to the Convention on the Transboundary Effects of Industrial Accidents.

[337] World Bank (2021). p. 80.
[338] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[339] UNDRR (2015).
[340] UNCT Kazakhstan (2026).
[341] UNDRR and UNDP (2024).
[342] IAEA (2026).
[343] UNDRR (2025).
[344] Kazakhstan (2025a).

In Kyrgyzstan, while the National Development Programme provides the overarching policy direction, DRR priorities are guided by the Concept of Comprehensive Protection of Population and Territories from Emergency Situations for 2018–2030. A central objective is to shift national efforts from reactive emergency response toward proactive risk reduction.[345] Additional guidance is provided by the Strategy for the Development of the State Civil Protection System and DRR until 2040 and by the Global Framework for the Five Years of Action for the Development of Mountain Regions 2023–2027.[346]

Tajikistan's principal DRR framework is the National Strategy on Disaster Risk Reduction for 2019–2030, in which agriculture is a priority sector and food security a key strategic concern.[347] The country has introduced a nationwide warning network that includes 42 municipal and regional systems, with alerts disseminated to residents through mobile phone providers.[348] A Programme for the Implementation of the National Concept on the Rehabilitation of Tailings of Uranium Ore Processing Waste (2016–2024) was in place, although it is unclear whether it has been renewed.[349]

DRR efforts in Turkmenistan appear to be driven largely by international projects, with a strong emphasis on improving seismic resilience.[350]

Uzbekistan has taken important steps to strengthen its emergency preparedness and response capacity. The National Strategy for the Implementation of the Sendai Framework for DRR 2015–2030 and its accompanying Action Plan focus on improving understanding of disaster risks, enhancing DRR governance, investing in preventive measures and increasing disaster preparedness.[351] Recent legislative reforms and more rigorous inspections are likely to have improved dam safety.

4.8 Sustainable transport

Regional overview

Rapid population growth and continued migration from rural to urban areas are driving urbanization across Central Asia. By 2021, nearly half of the region's population lived in cities.[352] However, urban planning, management systems and institutional capacities remain insufficient to meaningfully reduce the environmental impacts associated with transport. The rapid expansion of urban populations is intensifying pressure on transport systems, water supply and wastewater infrastructure. Air pollution levels are particularly high in cities located near industrial facilities and in those where coal remains a widespread heating source.

There are, nonetheless, encouraging examples. Astana has made progress toward smart and sustainable urban development, including a 100,000-hectare green belt surrounding the city. The 2035 master plan aims to reduce emissions, expand green spaces, improve energy efficiency and support sustainable transport solutions.[353]

The continued use of outdated and inefficient vehicles in collective transport systems increases operating costs, reduces service quality and limits progress toward more environmentally sustainable mobility. At the same time, all countries have invested in road infrastructure, and several cities have introduced more fuel-efficient public transport vehicles, rehabilitated trolleybus networks or expanded metro systems, all of which are positive developments for long-term sustainability.

Rail transport for both freight and passengers remains underdeveloped, but ongoing efforts aim to expand the network, increase rail usage and strengthen international connectivity. Cycling remains a marginal mode of transport due to safety concerns and social perceptions. However, local initiatives, such as universities in

[345] Kyrgyzstan (2018).
[346] Information provided by UNDRR.
[347] ECE (2025a).
[348] Ibid.
[349] Ibid.
[350] UNDP (2025a).
[351] ECE (2026).
[352] Dankov (2023).
[353] ECE (2020). UNDP (2022).

Uzbekistan offering free bicycle access, demonstrate that targeted measures can help shift attitudes and promote more sustainable mobility.

At the regional level, the development of transport communications is a core focus of Central Asia Regional Economic Cooperation. An action plan for the development of six transport corridors, including rail corridors, within Central Asia and connecting the region with global markets has been prepared.[354] Strengthening these corridors offers opportunities to improve cross-border mobility, reduce transit times and increase logistics efficiency, thereby promoting trade while reducing air pollution and greenhouse gas emissions.

Country-specific insights

The share of electric vehicles is gradually increasing in Kazakhstan but remains very low: as of 1 September 2025, gas and electric vehicles accounted for just over 0.5 per cent of all registered vehicles. The Comprehensive Development Plan for the Gas Industry (2025–2029) foresees further measures to convert both private vehicles and public transport from diesel and petrol to gas.[355] Similar ambitions are reflected in major cities. The Almaty City Development Plan to 2030 includes full electrification of public transport by 2028 and the modernization and expansion of transport systems. Astana, Almaty and Shymkent are actively implementing measures to convert public transport fleets to gas and electricity.[356]

With support from ECE, Kyrgyzstan has developed the Sustainable Transport Action Plan (2024–2028). The plan highlights the need to modernize public transport through the acquisition of sustainably powered vehicles, including the development of electric vehicle charging infrastructure.[357] The Green City Action Plan for Bishkek (2022) identifies investments required for a more sustainable transport system and outlines potential EBRD contributions.[358]

Tajikistan's Electric Transport Development Programme for 2023–2028 aims to establish a national network of charging stations, promote the recycling of electric vehicle batteries and develop a domestic manufacturing base for electric transport technologies.[359]

Turkmenistan plays an active role in global transport diplomacy. In 2026, the United Nations adopted a Turkmenistan-sponsored resolution declaring 2026–2035 the UN Decade of Sustainable Transport.[360] Domestically, the new city of Arkadag has been established as the country's first smart city, featuring a fully electrified and digitalized transport network, including electric buses and taxis operated using AI-based management systems.[361]

Uzbekistan is pursuing several measures to reduce emissions and energy consumption in the transport sector, including the promotion of alternative fuels, fleet renewal and a gradual transition to electric vehicles. Metro lines are being extended, modern buses procured and road infrastructure, including bicycle lanes, expanded. Domestic production of electric and environmentally friendly vehicles is growing. The electrification of railway lines and modernization of rolling stock are key priorities for the rail sector.[362] A nationwide transition toward gas and electric public transport is planned, targeting 80 per cent fleet conversion by 2030.[363] Since 2018, vehicle registration fees have been adjusted to support transport infrastructure, with incentives for electric vehicles. Fee revisions in 2024 increased charges for most vehicles while raising fees for electric vehicles by a smaller margin.[364]

[354] CAREC (Corridors).
[355] UNCT Kazakhstan (2026).
[356] Ibid.
[357] ECE (2025).
[358] Usov (2022).
[359] ECE (2025a).
[360] Turkmenistan News Portal (2026).
[361] Turkmenistan (2023).
[362] ECE (2026).
[363] Ibid.
[364] Ibid.

4.9 Environment and health

The WHO's Central Asia Health Action Programme 2022–2025 highlights two environment- and climate-related priorities: establishing a subregional initiative on climate, environment and health, and improving access to water, sanitation and hygiene (WASH) services. These elements are central to strengthening resilience to environmental and climate pressures across the region.[365] Although Central Asian countries have undertaken some measures to address the negative health impacts of environmental degradation and climate change, intersectoral cooperation remains insufficient. This lack of integration between environmental and health institutions continues to be a major limitation in advancing comprehensive environment–health policies.

Kazakhstan revised its 2013 Concept on Transition to a Green Economy in 2019 and 2023. The updated Concept includes several targets related to reducing air pollution; however, these targets are not linked to associated human health outcomes, nor are there indicators addressing the health impacts of access to safe drinking water and sanitation. A positive development is Kazakhstan's 2025 ratification of the Protocol on Water and Health, which offers an important framework for linking water management actions with public health objectives.[366]

In Kyrgyzstan, the National Development Strategy sets out some health-related objectives centred on physical culture, healthy nutrition, clean drinking water and environmental preservation as key determinants of health. It further emphasises a shift from treating disease toward prevention, healthy lifestyles and individual responsibility for health.[367]

Tajikistan has adopted the Strategy for the Protection of the Health of the Population to 2030, which acknowledges that public health emergencies may arise from natural disasters, climate change impacts, chemical contamination and radioactive fallout. The strategy includes provisions for strengthening the monitoring and control of behavioural risks, such as those related to food safety and environmental exposures, and for enhancing cooperation with environmental protection bodies and providers of water and sanitation services.[368]

In Turkmenistan, progress in environment and health is largely driven by international initiatives, with external partners supporting projects on environmental health, climate resilience and risk reduction.[369]

Uzbekistan is addressing the main environment–health challenges in cooperation with WHO and other international partners, including under initiatives focusing on climate change and health.[370] Water remains a critical concern, particularly in relation to quality and availability. It is notable that Uzbekistan was the first country in Central Asia to join the Protocol on Water and Health, demonstrating an early commitment to linking environmental management with public health protection.

4.10 International environmental commitments and agreements

Multilateral environmental agreements (MEAs) provide essential frameworks for developing and implementing environmental protection policies and for establishing principles of cooperation among countries. Central Asian countries participate in a broad range of MEAs (Annex III) and have all adopted the 2030 Agenda for Sustainable Development and the Paris Agreement, integrating their objectives into national strategies and policies. They are also Parties to the three Rio Conventions: UNFCCC, CBD and UNCCD.

Since 2020, Central Asian countries have acceded to or ratified several important MEAs, although progress has been slow and uneven, and a number of key instruments have yet to be ratified by all States in the region (Annex III). Identifying the most urgent MEAs for accession in the Central Asian context would be useful,

[365] WHO (2022).
[366] UNCT Kazakhstan (2026).
[367] ECE (2024).
[368] ECE (2025a).
[369] WHO (2025)
[370] UNDP (n.d.).

though such an assessment falls outside the scope of this report. Examples of progress include accession or ratification of the Kigali Amendment to the Montreal Protocol (Kyrgyzstan and Turkmenistan in 2020; Tajikistan in 2022); the Aarhus Convention (Uzbekistan in 2025); the Protocol on Pollutant Release and Transfer Registers to the Aarhus Convention (Kazakhstan in 2020) and the Protocol on Water and Health to the Water Convention (Kazakhstan in 2025; Uzbekistan in 2024).

Countries generally make considerable efforts to comply with MEA obligations. However, implementation and reporting are frequently hampered by limited administrative capacity, significant information gaps, frequent institutional reorganizations and weak inter-agency coordination. Financial constraints pose additional challenges to fulfilling MEA commitments. To date, Central Asian countries have not established a clear priority order for MEAs to guide implementation efforts toward those most relevant to national and regional needs.

The driving force behind MEA accession is usually the work of MEA secretariats and, in several Central Asian countries, international support remains crucial for effective implementation. Three MEAs are particularly important for strengthening regional cooperation:

- Convention on Environmental Impact Assessment in a Transboundary Context;
- Convention on the Transboundary Effects of Industrial Accidents;
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes.

These conventions provide cooperation frameworks for activities such as planning projects with possible transboundary impacts, exchanging information and support concerning industrial and other accidents and managing shared water resources. Secretariats continue to support non-Parties in the region, with the aim of encouraging broader accession in the future.

Kazakhstan is the only country in the region that is Party to all five ECE environmental conventions.

Kyrgyzstan has not acceded to the Minamata Convention on Mercury, despite the country hosting the Khadairkan mine and smelter, which is the world's only remaining producer and exporter of primary mercury. Notably, for those MEAs whose implementation is managed by dedicated agencies (such as the Ozone Centre or Climate Finance Centre) outside the core government structure, institutional arrangements in Kyrgyzstan have proven more stable and less affected by administrative restructuring.[371]

In Tajikistan, international development partners play an important role in strengthening MEA implementation. External support has been particularly valuable in advancing climate policy and efforts to reduce ozone-depleting substances.

Turkmenistan remains active in Caspian environmental cooperation, particularly under the Framework Convention for the Protection of the Marine Environment of the Caspian Sea.

Uzbekistan has been expanding its engagement in MEAs as part of a broader reform agenda aimed at modernizing environmental governance and transitioning towards a greener economy. Recent steps include accession to several nuclear-related multilateral agreements and to the Aarhus Convention.

5. Horizontal issues

5.1 Green and resilient development

Regional overview

Central Asian countries are increasingly developing and applying green economy strategies. However, the systematic integration of environmentally sustainable practices, technologies and investment choices into

[371] ECE (2024).

sectoral strategies remains limited. OECD Green Growth indicators suggest that there is substantial untapped potential for greening the economies of the region.[372]

In 2022, Heads of State adopted a regional Green Agenda programme, through which countries committed to strengthening bilateral and regional cooperation in deploying modern energy- and resource-efficient technologies, including low-emission solutions. The programme also covers climate change adaptation, environmental protection and disaster risk reduction. To date, there is no clear evidence of its practical impact.[373]

The region faces acute demographic pressures, requiring the creation of substantial numbers of new jobs each year. Numerous sectors can contribute to green job creation, including:

- agriculture and forestry (through climate-smart practices and sustainable forest management);
- renewable energy (solar, wind and hydropower projects);
- waste management (recycling systems and waste-to-energy facilities);
- energy efficiency (improving building and industrial performance); and
- eco-tourism (promoting sustainable tourism that supports local employment and protects natural assets).

Additional steps toward greener and more resilient development have been taken in the Aral Sea region, including the establishment of the International Innovation Centre of the Priaralie (2018), the Aral Sea Region Development Fund (2017) and the UN Multi-Partner Trust Fund for Human Security for the Aral Sea Region.[374]

Green public procurement is not yet well established in the region. Nonetheless, relevant provisions exist in Uzbekistan, where procuring entities are required to consider economic, environmental and social impacts.[375] Basic enabling legislation has also been introduced in Kazakhstan.[376]

International sustainable trade can support green development objectives when guided by principles reflected in the SPECA Principles of Sustainable Trade, such as:

- Integrating trade policy with national and sectoral strategies for achieving the SDGs;
- Encouraging long-term investment in productive capacities, diversification and innovation aligned with sustainable development;
- Adopting regulatory frameworks that support a transition to a green economy by facilitating the exchange of environmentally sound goods and services, improving resource and energy efficiency and generating inclusive economic opportunities.[377]

Country-specific insights

Kazakhstan adopted the Concept on Transition to Green Economy in 2013, outlining phased actions through 2050 across sectors such as water management, agriculture, energy, waste management and ecosystem protection. The country has also developed a taxonomy of green projects eligible for green bonds and loans. The taxonomy covers seven categories: renewable energy, energy efficiency, green buildings, pollution prevention and control, sustainable water use, waste management, sustainable agriculture and land use, and green transport.[378] Although public financial institutions have invested in green projects, the share remains small, and green criteria are not yet systematically incorporated into investment decisions.[379] The Astana

[372] OECD (Data Explorer).
[373] UNDP (2022a).
[374] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[375] ECE (2026).
[376] UNCT Kazakhstan (2026).
[377] ECE (2019b).
[378] UNCT Kazakhstan (2026).
[379] ECE (2019).

International Financial Centre has established a Green Finance Centre to mobilize financing and support companies in integrating sustainability into their operations.[380]

Kyrgyzstan has made efforts to integrate green economy principles into national planning, but implementation has lagged. Revisions to the Tax Code, adjustments to utility tariffs and subsidies for renewable energy represent positive steps.[381] The country's initiative, Five Years of Action for Mountain Regions (2023–2027) supports sustainable development in mountain areas globally by promoting sustainable agriculture, eco-tourism, green jobs and renewable energy, enhancing access to services, strengthening climate resilience and mobilizing sustainable finance. Kyrgyzstan will host the Second Global Mountain Summit in 2027.[382] In 2020, Kyrgyzstan launched a two-year project to implement an Integrated National Financing Framework alongside a development finance assessment, supported by the Joint Fund for the 2030 Agenda.[383] The effectiveness of this initiative remains unclear.

Tajikistan's Green Economy Development Strategy for 2023–2037, developed with support from international partners, focuses on sectors including energy, agriculture, industry and transport. It outlines phased measures and emphasizes increased public investment aligned with sustainable principles, as well as support for research, innovation and technology. The Strategy requires integrating green economy provisions into sectoral plans and multi-year programmes. The State Programme for Greening Tajikistan to 2040 is complemented by the Action Plan for 2025–2027.[384] Recent reforms to pricing and tariff rules aim to address the negative externalities of energy- and pollution-intensive production, rationalize subsidies, properly value natural resources and link public procurement more closely to sustainability criteria.[385] While the Law on Public Procurement includes sustainability and social provisions, these remain largely declarative due to the absence of detailed implementing regulations.[386]

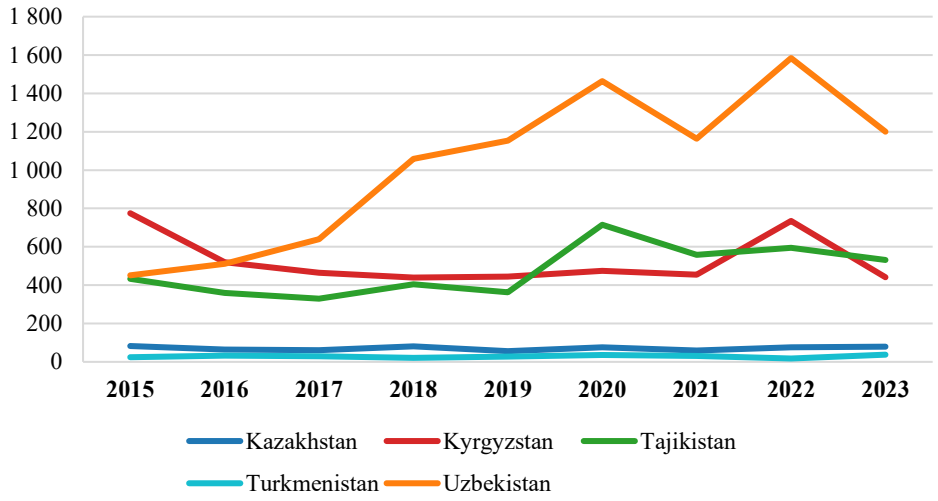
Uzbekistan's Strategy for the Transition to a Green Economy 2019–2030 targets enhanced energy efficiency, diversified energy sources, reduced greenhouse gas emissions and increased climate resilience. In 2023, Uzbekistan adopted a green taxonomy defining environmentally sustainable activities and projects to guide public and private investment. Public-private partnerships offer additional potential to advance the green transition, and initial steps have already been taken.[387] Uzbekistan issued its first green sovereign Eurobonds in 2023, raising 4.25 trillion soums (approximately US$350 million) for measures such as water-saving technologies, expanding railway and metro infrastructure and creating forest plantations to combat wind erosion.[388] Between 2020 and 2022, the country mobilized US$2–3 billion in domestic public funding for green projects, US$1.5–2 billion in loans from development banks and more than US$2 billion in private and PPP investment, particularly in renewable energy and electric vehicles.[389] Urban planning in Tashkent has advanced considerably. The updated 2024 Master Plan incorporates airflow modelling and stricter standards for green space allocation to improve natural ventilation and reduce heat stress. Planned green infrastructure includes a 441-hectare green belt and several green gardens. New requirements include stricter regulation of construction sites, enhanced energy efficiency under the national Green Building system and the elimination of fuel oil from power and heat generation by 2030. Industrial emissions are also addressed.[390] Foreign direct investment (FDI) and official development assistance (ODA) are major drivers of green investment in Uzbekistan. China is the country's largest trading partner, and Chinese investment, particularly in renewable energy, has grown significantly, with renewable energy investments increasing fivefold.[391]

Figures 6 and 7 illustrate trends in external financial flows across Central Asian countries. ODA between 2015 and 2023 is highest in Kyrgyzstan and Tajikistan, reflecting their stronger reliance on concessional financing

[380] UNCT Kazakhstan (2026).
[381] ECE (2024).
[382] CAREC (2025b).
[383] ECE (2024).
[384] ECE (2025a).
[385] ECE (2025a)
[386] Ibid.
[387] ECE (2026).
[388] Ibid.
[389] Ibid.
[390] Ibid.
[391] Ibid.

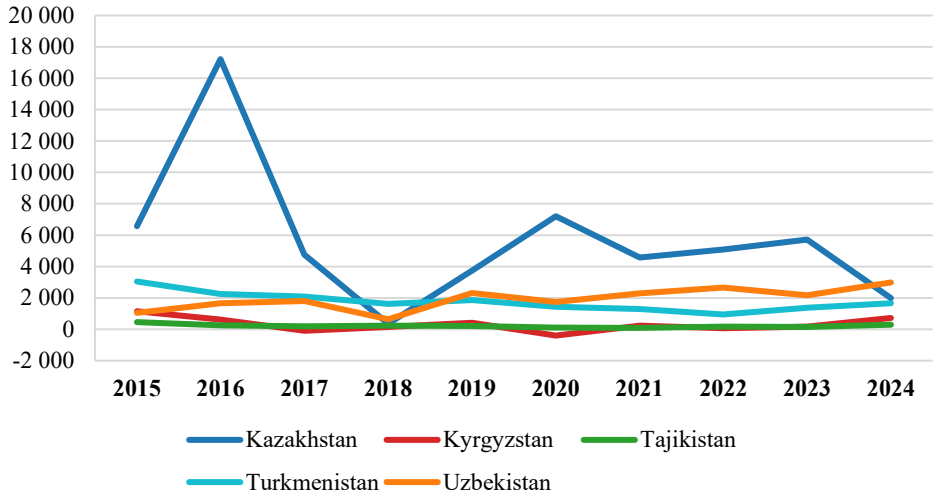
and development support. ODA volumes for these countries remain relatively stable over time, with moderate year-to-year fluctuations but no clear long-term upward or downward trajectory. By contrast, Kazakhstan, Turkmenistan and Uzbekistan receive comparatively limited ODA, consistent with their higher income levels and greater domestic resource availability. FDI follows a markedly different pattern. Kazakhstan consistently attracts the largest share of FDI in the region, with substantial but highly volatile inflows throughout the period. Uzbekistan has experienced a significant rise in FDI since the late 2010s, signalling increased investor confidence and ongoing economic reforms. Turkmenistan shows smaller and more irregular inflows, while Kyrgyzstan and Tajikistan receive relatively low and stable levels of FDI.

Figure 6: Net official development assistance and official aid received, 2015–2023, current million US$



Source: World Bank https://data.worldbank.org/indicator/DT.ODA.ALLD.CD

Figure 7: Foreign direct investment, net inflows (balance of payments) 2015–2024, current million US$



Source: World Bank https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?locations=XO

5.2 Nature-based solutions

As defined by the Fifth United Nations Environment Assembly, nature-based solutions (NbS) are "actions aimed at protecting, conserving, restoring and sustainably managing natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity

benefits." NbS are multifunctional approaches that rely on natural processes to deliver a wide range of benefits.[392]

In Central Asia, NbS are still emerging but hold significant potential. They can contribute to biodiversity conservation, combat desertification and water scarcity, strengthen climate resilience and enhance urban liveability. Approaches such as afforestation, pasture restoration, agroforestry, landscape rehabilitation, riparian forest protection and wetland restoration are increasingly important in the region, providing multiple environmental and human health benefits. All Central Asian countries have national level afforestation initiatives, accompanied by national targets for either expansion of afforested areas or annual planting numbers. In addition to biodiversity and ecosystem restoration, NbS often generate co-benefits including carbon sequestration, soil stabilization, desalinization, reduced erosion and landslides, and improved mental and physical well-being.

The Aral Sea disaster has prompted numerous initiatives aimed at restoring biodiversity and preventing further land degradation. Current efforts in Kazakhstan and Uzbekistan to establish vegetation that stabilizes soils and reduces dust emissions illustrate the application of NbS in practice. New ecosystems have also emerged around the reservoirs formed in the deltas of the Amu Darya and Syr Darya rivers (Northern Aral Sea). At the same time, developments in the Qosh Tepa area pose new challenges for the Amu Darya delta, which is already affected by reduced river flow.

Along major rivers such as the Amu Darya and Syr Darya, green corridors are largely absent but would be valuable for combating desertification, supporting biodiversity and providing ecosystem services in an otherwise arid environment. Such corridors can function as natural buffers, reducing erosion and desertification while supporting soil stabilization, flood regulation, wildlife habitat and moisture retention. Common NbS for riparian areas include reforestation with native floodplain species, controlled flooding to restore natural water regimes and enable forest regeneration, removal of invasive species (particularly salt-tolerant weeds that displace native vegetation) and the establishment of biosphere reserves or protected corridors to conserve sensitive zones. NbS are increasingly referenced in water-related legislation. In 2025, Kazakhstan, Kyrgyzstan and Uzbekistan each adopted new Water Codes[393] that include measures such as afforestation of watersheds and floodplains, and the protection of wetlands and natural vegetation surrounding waterbodies.

Nature-based solutions are also used across Central Asia to support infrastructure services and protect urban and linear infrastructure assets. Urban green spaces and green belts around cities play a critical role, helping to mitigate heat islands, improve air quality and reduce the impacts of dust and sandstorms. They additionally contribute to stormwater drainage and flood prevention.

In Uzbekistan, the Yashil Makon Initiative incorporates several NbS components, including landscape restoration and forest stabilization, urban greening and park development, climate-resilient design features such as windbreaks and dust-mitigation measures, and mechanisms for financial sustainability and long-term planning.[394] The green belt around Astana, planted in the 1990s, shields the city from cold winds.[395] Afforestation is also deployed along roads and railways in some countries to reduce erosion, heat stress and the impact of sand and dust storms.[396] In Tajikistan and Kyrgyzstan, NbS projects are implemented or planned to stabilize slopes and reduce landslide and mudflow risks, with support from ADB.[397]

Although many pilot projects supported by international organizations are already testing NbS for sustainable land management, there remains significant potential to scale up these approaches systematically across Central Asia.

[392] UNEP (n.d.).
[393] Lex.uz (2025). Prime Minister of Kazakhstan (2025). Daryo.uz (2025).
[394] ECE (2026).
[395] Driscoll et al. (2025).
[396] ECE (2026).
[397] ADB (2021), ADB (2025).

5.3 Science-policy interface and evidence-informed decision-making

In Central Asia, the connection between scientific knowledge and policymaking remains relatively weak. Gaps in basic data and analytical capacity limit the development of sound policies, while insufficient coordination among institutions and vested economic interests further constrain effective evidence-based decision-making.

Nevertheless, there are notable examples of productive collaboration between government bodies and research institutions. Water-related research institutes, in particular, play a critical role in generating knowledge to inform infrastructure planning and investment. The Scientific Research Institute of Irrigation and Water Problems in Tashkent is one prominent example of such an influential institution.

International organizations and development partners also contribute to strengthening the science–policy interface. For instance, GIZ implements multiple science-focused initiatives in Central Asia supporting climate adaptation, renewable energy development and sustainable resource management. Key programmes include the Green Central Asia initiative, which promotes science-based policy dialogue and climate risk assessment, as well as regional research networks facilitating knowledge exchange for the energy transition.[398]

Enhanced environmental monitoring is fundamental to ensuring that policy decisions are grounded in reliable evidence. For example, water quality monitoring remains limited in scope and coverage, and therefore does not sufficiently underpin assessments, policy formulation or implementation. As a result, current knowledge of water quality across the region is incomplete. Environmental impact assessments (EIAs) can contribute to more informed decision-making, yet their application remains inconsistent.

Other constraints also hinder evidence-informed policymaking. Economic instruments such as tariffs are not widely or effectively used to regulate the consumption of natural resources, including water and energy, limiting their potential to influence behaviour and resource use.

Waste management is another sector where decision-making could be improved by better understanding public attitudes toward recycling and how behavioural incentives might enhance recycling rates and waste reduction. More broadly, gaining deeper insights into public motivations and incentives would support the design of more effective future environmental policies.

5.4 Environmental impact assessment

Environmental impact assessment (EIA) is a process for evaluating the potential positive and negative environmental effects of a proposed project. Its aim is to provide decision-makers with reliable information on likely impacts, enabling them to avoid, reduce or offset adverse consequences before approving a project. Public participation is often included to ensure planning decisions are taken with full awareness of environmental implications. A persistent weakness in several Central Asian countries is that EIA is not consistently applied before major project decisions. For example, cumulative impacts from cascades of water reservoirs on the same river system are often not assessed within existing EIA procedures.

Transitioning from a purely state-led environmental expertise model to a system that incorporates EIA with public participation has significant advantages. Adoption of EIA legislation helps prioritise the prevention and mitigation of major impacts. However, national EIA systems in Central Asia remain unevenly developed and inconsistently implemented.

The Espoo Convention on Environmental Impact Assessment in a Transboundary Context recognises that environmental risks do not respect national borders. Its procedures are highly relevant for Central Asia, where many planned activities have transboundary implications. Parties to the Convention are required to notify and consult neighbouring States on major projects that may have cross-border impacts. Kazakhstan and Kyrgyzstan are currently Parties to the Convention.

[398] Green Central Asia.

International financial institutions also drive demand for robust EIA procedures. The World Bank, the European Bank for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB) each have operational policies and performance standards requiring EIAs for investments they support.

Applying SEA to policies, plans and programmes in the region would add substantial value. Given the scale and cumulative environmental impacts associated with hydropower development, reservoir construction and other major projects, SEA would help integrate environmental considerations early in the strategic planning process. None of the five Central Asian countries are currently Parties to the Protocol on Strategic Environmental Assessment to the Espoo Convention.

International experience demonstrates that effective implementation of EIA and Strategic Environmental Assessment (SEA) requires ongoing learning and active engagement of all stakeholders. In Central Asia, targeted capacity-building is still limited at all stages of environmental assessment.

Positive developments in the region include the 2021 revision of the Environmental Code strengthened EIA provisions and improved alignment with the Espoo and Aarhus Conventions in Kazakhstan. The revision provides more detailed regulation of transboundary EIA procedures and formally introduced SEA into national legislation.[399] Kyrgyzstan reinforced national legislation requiring a mandatory EIA for a wide range of planned economic activities.[400] Tajikistan established a framework for EIA, but ambiguities remain regarding public participation, specifically, who from the public has the right to participate, who must be informed and how authorities and developers should engage affected communities. Current legislation does not explicitly recognise residents of project-affected areas as stakeholders, nor does it set clear requirements to involve them. Access to justice remains the least implemented pillar of the Aarhus Convention, both in law and practice. While NGOs previously challenged denials of access to environmental information, no such cases have been reported since 2016.[401] The only project in Tajikistan undergoing a transboundary EIA is the construction of the Rogun hydropower plant, where consultations with neighbouring countries and their public are being conducted at the request of potential international financiers.[402]

5.5 Environmental monitoring, data management and assessment

Regional overview

Hydrometeorological organizations in Central Asian countries are generally responsible for monitoring ambient environmental conditions, although other institutions are involved in specific operational aspects of environmental monitoring.

Across the region, substantial challenges persist at both the national and regional levels. Some progress has been made in air quality monitoring,[403] and laboratory equipment standards are gradually improving, often with the support of international projects.[404] However, a number of laboratories still lack accreditation[405] and shortages of reagents occur frequently.

Joint monitoring in the water sector is especially critical, given the need to coordinate irrigation planning and hydropower generation. Although important steps have been taken at the national level to improve monitoring systems,[406] regional cooperation remains limited. While some data are shared across borders, the region lacks a coherent and reliable framework for consistent monitoring and information exchange. Such a framework is essential for sustainable water allocation and for developing joint programmes to improve water quality in shared rivers.

[399] UNCT Kazakhstan (2026).
[400] ECE (2024).
[401] ECE (2025a).
[402] Ibid.
[403] ECE (2026), ECE (2024).
[404] ECE (2025a).
[405] ECE (2024).
[406] ECE (2026).

In some cases, official data are withheld due to concerns about sharing sensitive information with neighbouring countries. For example, the 2025 Water Code of Kyrgyzstan includes provisions restricting open publication and exchange of certain water-related data.

Several initiatives have supported the implementation of the Shared Environmental Information System (SEIS) and its principles. Assessments show that Kazakhstan and Kyrgyzstan, and to some extent Uzbekistan, have made measurable progress in applying SEIS principles.[407]

Hydrobiological monitoring remains limited throughout the region, constraining the understanding of water pollution and its impacts on biodiversity. For instance, in Uzbekistan, hydrobiological indicators are monitored in only 10 water bodies, compared to chemical monitoring in 59 water bodies.[408]

Access to environmental information and opportunities for public participation in decision-making remain restricted in some countries.

Environmental data are often collected in parallel by different agencies due to insufficient knowledge management and weak information-sharing mechanisms. Limited cooperation among national institutions and between national and international stakeholders frequently leads to duplicated efforts and increased costs. State of the Environment reports are an important source of information, but they are not regularly published (e.g., at least every four years), which reduces the public's ability to track environmental conditions over time.

Moreover, extensive reporting obligations under multilateral environmental agreements (MEAs) present significant challenges for many Central Asian countries, due to limited human resources and suboptimal institutional arrangements for collecting and sharing data. Overall, data and information management systems are not sufficiently streamlined to consistently support decision-making or reporting obligations under MEAs.

Country-specific insights

Kazakhstan is advancing e-governance systems that also encompass the environmental sector and statistics. Access to environmental information has improved through legislative amendments and practical implementation efforts. A new information portal is currently under development, although public access to environmental data remains limited.[409] An integrated online report on the State of the Environment and Environmental Policy is published annually, and online reporting tools are available.[410] The air and water monitoring networks are gradually being expanded.[411]

Monitoring activities in Kyrgyzstan remain limited. Although significant needs for modernizing the monitoring network were identified as early as 2010, little progress has been achieved since. Water quality monitoring is almost entirely absent, and the air pollution monitoring network has not been upgraded.[412] The most recent national State of the Environment report, covering 2015–2018, was published in 2020.[413]

Tajikistan's air monitoring network has insufficient coverage and does not adequately measure parameters important for public and environmental health. Most monitoring stations do not collect $PM_{2.5}$ or PM_{10} data and do not measure ground-level ozone or heavy metal components of particulate matter. Monitoring is largely conducted manually, which limits the availability of real-time data. Laboratories frequently face shortages of chemicals and calibration gases and lack resources to operate mobile laboratories. Outdated analytical equipment further disrupts monitoring and often results in gaps in environmental quality data.[414] As part of the World Bank-funded RESILAND CA+ Programme: Tajikistan Resilient Landscape Restoration Project, the State Forestry Agency is conducting a comprehensive inventory of national forest resources.[415] The

[407] Zoi Environment Network (2022a).
[408] ECE (2026).
[409] UNCT Kazakhstan (2026).
[410] Zoi Environment Network (2022a).
[411] UNCT Kazakhstan (2026).
[412] ECE (2024).
[413] Zoi Environment Network (2022a).
[414] ECE (2025a).
[415] World Bank (2024).

Environmental Department of Sughd Region regularly measures gamma radiation at radioactive waste dumpsites.[416] Tajikistan last produced an environmental report in 2018, both online and in printed form.[417]

Public access to environmental information in Turkmenistan remains limited. The latest State of the Environment report from 2024 is expected to be published by the end of 2026. Most environmental data and statistics are generated for internal use by state institutions. Nonetheless, Turkmenistan generally fulfils its international reporting obligations and participates in regional information exchange. Some environmental information is published and made publicly accessible.[418]

Uzbekistan has made notable progress in expanding and modernizing its air quality monitoring system.[419] Atmospheric conditions are monitored in 26 cities through 66 fixed stations, one background station and two automatic monitoring stations in Tashkent. Additional automatic stations capable of measuring $PM_{2.5}$ and PM_{10} are being installed.[420] Uzbekistan also set up national monitoring platform that provides real-time access to air pollution data from the country's monitoring stations.[421] The World Bank–funded project Strengthening Hydromet and Multi-hazard Early Warning Services in Uzbekistan: a Road Map outlines a comprehensive plan for modernizing hydrometeorological and early warning services.[422] In parallel, the UNDP–Green Climate Fund Enhancing Multi-Hazard Early Warning System project aims to transform the national early warning system into an impact-based, multi-hazard system by 2027, implemented in cooperation with the Ministry of Emergency Situations and the Agency of Hydrometeorological Service.[423] E-governance reforms have expanded access to environmental information. The national Open Data Portal enables public access to environmental permits, natural resource use data and air pollution indicators. A separate Unified Portal for Interactive Public Services allows users to obtain permits related to natural resource use.[424] The latest State of the Environment Report (2023) is available online.[425]

5.6 Education for sustainable development and green digital skills for a sustainable future

Regional overview

All Central Asian countries are advancing education for sustainable development (ESD) at the levels of general, vocational and higher education. Efforts are also being made to strengthen the capacities of experts, educators and decision makers.

Emerging technologies, including artificial intelligence (AI), may significantly influence how environmental knowledge is taught and how natural resources are managed. AI could, in the future, support autonomous energy optimization, pollution detection and improved environmental monitoring in Central Asia. In education, it could enable more personalised and efficient learning pathways. However, realizing these opportunities requires careful regulation, institutional capacity and responsible governance to ensure safe and equitable deployment.

Country-specific insights

Environmental education is integrated into preschool and general secondary education in Kazakhstan. Recent curriculum updates incorporate ESD principles. However, integration of ESD into vocational training and higher education remains limited.[426] The Concept for the Development of Environmental Culture Taza Kazakhstan for 2024–2029 calls for strengthened environmental education in schools and universities, though no dedicated funding has been allocated. Several universities are actively incorporating green economy

[416] ECE 2025
[417] Zoi Environment Network (2022a).
[418] Ibid.
[419] ECE (2026).
[420] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[421] ECE (2026).
[422] World Bank (2022e).
[423] UNDP (n.d. a).
[424] Zoi Environment Network (2022a).
[425] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[426] ECE (2019).

principles into curricula and research.[427] The Concept of Digital Transformation for 2023–2029 foresees integration of green and digital economies into urban development through the smart city approach.[428]

In Kyrgyzstan, the profile of ESD has been elevated in national strategic documents, and sustainable development is reflected in various state educational standards. Creative and innovative programmes have been introduced, and government authorities responsible for the environment have played a strong role in promoting ESD.[429]

Tajikistan has incorporated ESD elements into recent policy documents, including the Environmental Education and Culture Programme in Tajikistan for 2026–2030.[430] However, implementation is hampered by limited financial resources, particularly in rural areas where education infrastructure is weaker.[431]

In Turkmenistan, ESD is supported by the Government in collaboration with UNICEF and UNDP. The Green School initiative focuses on integrating climate education, environmental sustainability and disaster risk reduction into school curricula, helping strengthen environmental literacy among younger generations.[432]

Uzbekistan's environmental institutions are highly active in education and public awareness, regularly implementing campaigns and activities related to environmental protection.[433] The country has established Central Asia's first Green University, which is building regional links and offering qualifications in Environmental and Sustainable Management, Environment and Economics, and Ecology and Public Administration. Educational programmes for school and pre-school groups are being expanded, and environmental topics are integrated into existing subjects such as biology, chemistry and geography.[434]

5.7 Civil society and the environment

All Central Asian countries are Parties to the Aarhus Convention. Ensuring access to information—including information for public participation in EIA, environmental permitting, results of environmental inspections and the use of natural resources—is essential. Aarhus Centres,[435] established with the support of the Organization for Security and Co-operation in Europe (OSCE), are active throughout the region and play an important role in strengthening access to environmental information and public engagement.

Cross-border environmental forums have also been created to facilitate the exchange of data, knowledge and best practices among civil society actors. Regional cooperation enhances the capacity of civil society organizations (CSOs), and regional institutions often serve as information hubs. Positive examples include the Scientific-Information Centre of the Interstate Commission for Water Coordination in Tashkent and the CAREC in Almaty.

Despite these efforts, bottlenecks remain with respect to public participation in environmental decision-making. Although most national legislation aligns with international standards, procedural rules are often insufficient or poorly implemented. Public involvement in processes such as EIA remains challenging in several countries, and access to justice is limited.

Environmental NGOs are active across the region and can influence important environmental decisions. This is particularly evident in Kazakhstan and Uzbekistan. In Tajikistan, civil society engagement is more constrained, while in Kyrgyzstan the Law on Foreign Agents is expected to further restrict NGO activities.[436]

[427] UNCT Kazakhstan (2026).
[428] Ibid.
[429] ECE (2024).
[430] Khovar (2025).
[431] ECE (2025a).
[432] UNICEF (2025).
[433] Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023).
[434] Ibid.
[435] OSCE (Aarhus Centres).
[436] Sangini (2024).

Turkmenistan lacks an independent civil society sector; environmental NGOs do exist but operate under strict state oversight.[437]

Rules governing financial support to CSOs vary across countries, but generally all foreign funding must be reported to the authorities. CSOs are required to disclose foreign grants, submit detailed expenditure reports and may be subject to tax audits. While intended to ensure accountability and prevent misuse of funds, these requirements can significantly reduce CSOs' capacity and independence. Public participation in environmental decision-making also remains weak: CSO involvement in advisory bodies is limited, and legal mechanisms for engaging civil society in legislation, strategic planning and environmental assessments are not well developed. Table 4 provides a comparative overview of how five Central Asian countries regulate foreign funding directed to CSOs and government entities. Overall, foreign funding is formally permitted across all countries, but the restrictions and oversight vary.

CSOs continue to play an important role in environmental education. They organize eco-school programmes, youth conferences and awareness campaigns on air pollution, biodiversity, forests, climate change and the green economy. These initiatives are particularly important for enhancing environmental literacy among young people and rural communities and often compensate for gaps in state-led environmental education. Public participation is further supported through community-based activities such as tree-planting campaigns, waste reduction initiatives and school-level competitions on environmental themes. Together, these efforts help strengthen environmental stewardship and broaden societal engagement in sustainability issues.

Table 4: Overview of regulatory frameworks for foreign funding to civil society and government entities in Central Asia

Country	Foreign funding to CSOs allowed	Foreign funding to government entities allowed	Grant registration required	Government approval required	Key reporting / oversight requirements
Kazakhstan	Yes	Yes	Yes – CSOs must report foreign funding to tax authorities	No formal approval generally required	CSOs must disclose foreign grants, report expenditures, and may face tax audits
Kyrgyzstan	Yes	Yes	Yes – reporting required	No approval for funding itself, but CSOs involved in "political activities" must register as "foreign representatives"	Enhanced reporting, government oversight, labelling requirements
Uzbekistan	Yes	Yes	Yes – grants must be registered with the Ministry of Justice	Often required for CSO projects receiving foreign funds	Government oversight of projects; coordination with national partner institutions
Tajikistan	Yes	Yes	Yes – foreign grants must be registered with authorities	Sometimes required depending on project	CSOs must report activities and funding sources regularly
Turkmenistan	Very limited	Yes (mostly through government channels)	Yes	Yes – foreign funding to CSOs requires state approval	Strong state control; few independent CSOs allowed to receive funds;

Source: UNEP, pers. comm.

Country-specific insights

Public participation in environmental matters is established in Kazakhstan, though the effectiveness of advisory public councils in representing public interests remains limited.[438] Access to justice in environmental matters has been increasingly promoted by the Supreme Court, but further efforts are needed to ensure

[437] Human Rights Watch (2024).
[438] UNCT Kazakhstan (2026).

consistent implementation across the judiciary.[439] Kazakhstan generally provides an enabling environment for CSOs, while maintaining a structured system of financial transparency and oversight. Foreign funding to NGOs is permitted, and international grants may also be allocated to government bodies. This facilitates collaboration with international partners, although CSOs are required to comply with extensive transparency obligations. Kazakhstan's environmental governance framework increasingly acknowledges the role of civil society, particularly in climate action, sustainable development and public accountability. Civil society engagement is most visible in the implementation of the SDGs, where national review processes such as Voluntary National Reviews (VNRs) have involved domestic organizations. While these mechanisms reflect a growing culture of participatory oversight, CSO input is not yet consistently institutionalized across all sectors. In environmental management, NGOs contribute to monitoring, public awareness and participation through digital tools that support online hearings as part of the EIA process. These systems have improved communication, but participation levels remain uneven, with many hearings attracting limited engagement and varying influence on final decisions. Practical implementation is further constrained by inconsistent enforcement of regulations, uneven dissemination of information and limited access to environmental data at local levels. Although specialized administrative courts provide avenues for legal challenges, procedural gaps, particularly related to environmental damage assessment and liability, continue to pose obstacles.

In Kyrgyzstan, civil society holds a formally recognized role in environmental governance, but its substantive influence remains limited. CSOs participate in SDG consultations, thematic working groups and legislative discussions, yet their input rarely shapes final governmental decisions. Despite these constraints, CSOs play important roles in monitoring, public awareness and data provision. While public involvement in EIA is legally guaranteed, practical engagement remains weak. Public hearings are infrequent, timeframes are short, and there is no binding requirement for public comments to be reflected in final decisions. Current legislation places responsibility for public notification and consultation on developers, and the system diverges from Aarhus and Espoo Convention standards. Although the legal basis for access to justice appears adequate, procedural clarity remains limited [440] Some public hearings have been organized with support from Aarhus Centres. Persistent barriers, including limited government transparency, weak information management systems and constrained legal remedies, reduce the impact of civil society engagement. Participation mechanisms vary across ministries, and opportunities for early input into strategies, laws or permitting decisions are inconsistent.

Tajikistan's legislation requires the establishment of information systems, but in practice data on issued licences, permits and inspection results are often unavailable to the public.[441] CSOs remain important actors in environmental protection but operate under restrictive conditions shaped by the Law on Public Associations, which imposes burdensome reporting and administrative procedures. Frequent inspections and limited access to funding have further reduced the number of active organizations. Public participation in environmental decision-making is limited, and access to environmental information remains weak. Environmental monitoring data and inspection results are rarely published. EIA legislation restricts participation mainly to registered public associations, excluding local residents and community groups directly affected by environmental impacts. Despite these challenges, CSOs, often with international donor support, contribute significantly to hazardous waste and chemicals monitoring, climate and environmental awareness initiatives, and community-based air quality and environmental education activities. When the institutional space allows, Tajik CSOs also engage in international processes, though participation in environmental agreements and reporting remains largely ad hoc.

Although Turkmenistan has legislation aligned with the Aarhus Convention, implementation gaps persist due to limited opportunities for independent civil society engagement. CSOs and public associations nonetheless play an increasingly visible role in environmental education, awareness raising and the application of international environmental principles. Partnerships with schools, universities and community groups are common at the local level. Despite a restrictive operating environment, CSOs remain active in promoting environmental literacy, supporting community-based conservation initiatives, providing training on sustainable agriculture and involving youth in ecological projects. However, their work is constrained by strict political and legal controls.

[439] ECE (2019).
[440] ECE (2024).
[441] ECE (2025a).

Uzbekistan has strengthened legislation related to public participation and access to justice in environmental matters, but full alignment with international standards remains incomplete.[442] Registration procedures for CSOs have not changed since 2014. As a result, no new national or interregional environmental organizations have been registered, and restrictions on foreign funding and public events limit independent activism. Only one international environmental CSO is registered in the country. Nevertheless, local groups remain active in targeted initiatives, such as battery-recycling campaigns, biodiversity monitoring and small-scale community projects, although these efforts are not situated within a broader systemic framework for civic participation. Engagement is somewhat stronger in SDG-related monitoring, where parliamentary bodies hold hearings with CSO involvement, and in international programmes, including biodiversity projects and participatory mapping in the Aral Sea region. These forms of engagement, however, remain project based and are not yet integrated into national environmental governance structures.

5.8 Gender

Regional overview

Across Central Asia, gender issues follow similar patterns shaped by historical, cultural and socio-economic factors. In Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, women remain underrepresented in political decision-making. National parliaments, ministerial structures and senior executive bodies continue to be dominated by men, and gender quotas—where introduced—have had mixed effectiveness. Although all Central Asian countries have legal frameworks promoting gender equality, the level of enforcement varies considerably.

Economic inequality also persists. Women across the region face wage gaps and are concentrated in lower-paid sectors such as education, health and agriculture. Structural barriers, including limited access to finance, land ownership and entrepreneurship opportunities, restrict women's economic independence and their participation in higher-income sectors.

The intersection between gender and environmental issues is receiving increasing attention. Environmental challenges such as water scarcity; land degradation and pollution tend to affect men and women differently. Women, particularly in rural areas, often bear a greater burden due to their role in household resource management, food production and community well-being. At the same time, they play a crucial role in local-level resource management and environmental stewardship. However, women's participation in environmental governance and decision-making remains insufficient to meaningfully advance both gender equality and sustainable development.

Country-specific insights

Kazakhstan seeks to align environmental action with social justice, consistent with the International Labour Organization's Decent Work Agenda.[443] While the environmental and climate governance framework acknowledges principles of equality and non-discrimination, gender considerations are not systematically integrated. National strategies for a low-carbon, climate-resilient economy recognise women and youth as actors in green entrepreneurship and sustainable enterprise development, but gender is primarily addressed through the lens of inclusive economic participation rather than through environmental sector planning. Climate vulnerability assessments identify several population groups at heightened risk, but civil society advocates expanding these categories to include pregnant women, girls and newborns, given their greater exposure to heat stress, air pollution and water scarcity. National and local adaptation plans have not yet been adopted, and existing sectoral policies do not include gender-disaggregated targets, gender impact assessments or clear institutional responsibilities for gender mainstreaming. Key environmental policy areas, such as water, biodiversity, waste management and the energy transition, remain largely gender-neutral. Women predominate in environmental NGOs, including many women-led organizations. However, Kazakhstan does not yet apply a gender-responsive approach to climate adaptation planning, climate vulnerability assessments or EIAs. Civil society consultations under the broader sustainable development framework rarely prioritize gender-specific

[442] ECE (2026).
[443] ILO (1999).

expertise. Emerging just transition processes offer opportunities for gender mainstreaming, particularly in coal-dependent regions, but this potential has not yet been realized.

Kyrgyzstan maintains a strong legal foundation for gender equality, including constitutional protections, dedicated laws and national gender strategies supported by the National Gender Council and gender focal points across ministries. Despite this, gender integration in environmental and sectoral policymaking remains limited. A 2016 assessment found most strategic documents to be gender-blind, and current gender strategies do not adequately address environmental issues. Gender considerations therefore remain mostly ad hoc in natural resource management. Women face specific vulnerabilities, including low participation in water user associations, increased burdens related to water access and domestic responsibilities, and exposure to medical waste in the health sector. Positive examples exist. More than half of Kyrgyzstan's 633 water user associations have gender-balanced boards, and evidence indicates that women's participation improves their performance. Women bring practical experience as primary water users and decision makers at household level.[444]

Tajikistan has strengthened its gender equality framework through the 2022 Law on Equity and Elimination of Discrimination and long-term strategies such as the 2021–2030 Strategy for Enhancing the Role of Women. Women's political representation has increased, nearing the 30 per cent target, but significant disparities remain. Women earn around 60 per cent of men's wages; gender parity in primary and secondary education has not translated into equal representation in higher education. Women face disproportionate vulnerabilities in sectors affected by environmental change. Labour participation remains low (18.3 per cent in 2019–2022), partly because of restrictive labour laws that bar women from hazardous and physically demanding jobs. Education strongly influences employment prospects, and environmental burdens reinforce inequalities: women and girls carry responsibility for water collection, have reduced schooling opportunities due to inadequate WASH facilities, and remain central to agriculture yet excluded from decision-shaping processes, technology and finance.

Turkmenistan integrates gender equality into national environmental and socio-economic strategies. The government reports having achieved absolute equality across demographic, social and economic indicators. Gender equality is embedded in the national SDG agenda, with a focus on health, food security, environmental safety and inclusive development. The national programme "Healthy Mother, Healthy Child, Healthy Future" (2021–2025) prioritizes women's health and family well-being, addressing issues closely linked to environmental determinants such as water quality, sanitation and climate-related risks. Programmes supported by UNICEF and the Ministry of Education build child and gender-responsive resilience to environmental and climate challenges. International environmental projects deliver tangible gender benefits. A UNDP renewable-energy water project in remote desert villages improved year-round drinking water access for some 1,200 residents (half of them women and girls) enhancing health, sanitation and climate resilience. Environmental education is inclusive across all levels, and the 2023 UNESCO Chair has strengthened institutional support for gender-responsive ESD. Legislation, including the 2020 Law on Environmental Information, guarantees equal access to data for all. While political commitment to gender equality is strong, the absence of gender-specific indicators highlights opportunities for further integration, particularly in environmental governance, climate adaptation, natural resource management and community-based resilience.

Uzbekistan has undertaken reforms in land rights, water management and social protection, but gender mainstreaming remains limited in climate and environmental policy. Major strategic documents, including NDCs, climate action plans and sectoral adaptation plans, lack gender-responsive measures, gender-disaggregated data and analysis of differentiated climate impacts. Women's informal employment remains high, especially in agriculture, reducing resilience to climate shocks and limiting participation in the green economy. Despite progress on women's land rights under SDG indicator 5.a.2, implementation gaps remain, particularly regarding access to financial resources needed for land use and agricultural investment. Gender-sensitive vulnerability assessments are absent, weakening adaptation policy effectiveness. In the water sector, a Gender Assessment approved by the Senate and a forthcoming Gender Strategy for Water Management to 2030 signal a shift toward inclusion, but these initiatives remain under development. Education for sustainable development and emerging green-skills programmes, including the Green University, provide entry points for women's participation in green employment. However, no gender-specific training

[444] FAO et al. (2025).

programmes yet exist in technical fields such as renewable energy, waste management or environmental monitoring.

5.9 Availability of experts and employment conditions

Across Central Asia, there is a notable shortage of qualified experts and trained personnel in many areas essential for environmental protection and sustainable development. Salaries and working conditions in the environmental protection and natural resource management sectors are generally low,[445] which affects students' choices of university programmes and discourages experienced professionals from entering or staying in the public sector. Many experts are instead drawn to international projects, where compensation and working conditions are significantly better. Some positive trends exist, including gradual increases in civil service salaries in Uzbekistan[446] and salary increases of 35–50 per cent for water specialists in Kazakhstan.[447] Salary levels are linked to broader budgetary and political considerations, including the balance of the state budget and pay structures across other public-sector fields. These constraints are not always addressed in a way that meets the long-term needs of individual countries. Reliance on donor funding for basic staff positions creates risks for institutional continuity and undermines the sustainability of environmental management efforts.

Training and capacity development remain heavily dependent on international development partners. While international seminars and conferences provide valuable opportunities for sharing regional and global experience, systematic and long-term capacity building at national level is still limited. The German Professional Green Skills in Central Asia initiative is one example of support,[448] but much of the training landscape remains externally driven rather than institutionally embedded. There are, however, several promising initiatives within the region. In Kazakhstan, five new training centres for water-sector staff have recently been established.[449] In Uzbekistan, the School of Water Professionals has been set up in all 13 provinces to train farmers and water specialists in water-saving technologies.[450] These efforts demonstrate growing recognition of the need to strengthen domestic expertise and build a skilled workforce to support the region's environmental and sustainable development priorities.

5.10 Sustainable Development Goals

The five Central Asian countries are actively engaged in implementing the SDGs. While they share common challenges, the pace and depth of progress vary considerably. All countries participate in the Voluntary National Review (VNR) process[451] and are working to integrate the SDGs into national policy frameworks, institutional strategies and statistical systems.[452]

Weak governance and limited institutional capacity are frequently cited as major impediments to SDG achievement, particularly in relation to SDG 16 (peace, justice and strong institutions). The region is also highly vulnerable to environmental pressures, including the legacy of the Aral Sea disaster, persistent water scarcity and rising pollution levels, which directly affect several SDGs (notably 6, 12, 14 and 15) and underscore the need for strengthened cross-border cooperation. A substantial financing gap remains a further barrier to achieving the SDGs.

Global SDG performance rankings illustrate the wide variation in progress across the region. Out of 167 countries assessed, Kyrgyzstan ranked 47th, Uzbekistan 62nd, Kazakhstan 70th, Tajikistan 88th and Turkmenistan 96th.[453]

[445] ECE (2025a).
[446] The Tashkent Times (2025).
[447] Ministry of Water Resources and Irrigation of Kazakhstan (2025).
[448] GIZ (n.d.).
[449] Ministry of Water Resources and Irrigation of Kazakhstan (2026b).
[450] Gazeta.uz (2023).
[451] HLPF (Countries who have presented their Voluntary National Reviews).
[452] ESCAP (2024).
[453] Sustainable Development Report (Rankings).

An overview of the 2022 status of SDG indicator development has been compiled by UNEP.[454] All Central Asian countries are working to nationalize and report on SDG indicators, but full coverage of all 169 targets is not yet achieved. In Tajikistan, for example, 33 per cent of the 248 nationalized indicators were reported in 2023.[455]

Recent VNR submissions by the region include Kazakhstan's third VNR in 2025, Kyrgyzstan's second VNR in 2025 and the second VNRs of Tajikistan, Turkmenistan and Uzbekistan in 2023.

In Turkmenistan, progress continues in implementing the Roadmap for Strengthening SDG Reporting in Turkmenistan for 2025–2027, aimed at improving data quality, transparency and monitoring of nationalized SDGs.[456]

Uzbekistan's SDG-related reforms include major poverty-reduction policies, ambitious targets for renewable and green energy development, and significant education reforms, each of which contributes to accelerated SDG progress.[457]

5.11 Support from international development partners

All Central Asian countries maintain extensive cooperation with development banks and international partners in the fields of environmental protection and sustainable development. Numerous international projects operate across a broad range of thematic areas in the region (see Annex IV).

Climate change and water management are the sectors receiving the highest levels of international support. In 2021, Kyrgyzstan, Tajikistan and Uzbekistan recorded the highest water- and sanitation-related official development assistance disbursements among countries in Europe and Central Asia.[458]

Development banks, particularly the World Bank and ADB, provide significant financial resources. Many bilateral donors are also active in the water sector, including Austria, Finland, France, Germany, Japan, the Republic of Korea, Saudi Arabia, Switzerland and the United Arab Emirates. Climate-related funds such as the Adaptation Fund and the Global Environment Facility (GEF) play an important complementary role.

International projects provide substantial value to participating countries, although challenges remain in ensuring their long-term and sustainable impact. A recurring concern is that activities may not be maintained after the completion of project funding. The capacity built, infrastructure established and documentation produced are not always fully utilized, partly due to high staff turnover and limited institutional continuity in national institutions.

In some cases, limited understanding of the operational modalities of international financial institutions and development partners can hinder smooth implementation, although capacity is gradually being strengthened.[459] Development cooperation may also be affected by limited consolidated guidance or strategic direction from recipient governments. Donor coordination can be challenging, partly because partners operate under different administrative rules and protocols that can make it difficult to streamline processes, align timelines or adapt projects to the evolving needs of the countries.

Platforms to share information on policy developments and ongoing or planned projects, both among donors and with national authorities, are important. However, these mechanisms are not always sufficient to achieve full coordination or ensure that external support is optimally aligned with national priorities.

[454] Zoi Environment Network (2022a).
[455] ECE (2025a).
[456] United Nations (2025).
[457] Tulaganova (2025).
[458] ECE (2024a).
[459] ECE (2024).

6. Environmental institutions and cooperation

In 2025, the Presidents of the Central Asian countries met in Tashkent for their seventh formal consultative meeting. These meetings play an important role in strengthening political cooperation in the region, and joint statements have increasingly included commitments on environmental protection and sustainable development.

At the 2024 Astana Summit, the Presidents adopted the Concept for the Development of Regional Cooperation Central Asia 2040 (Central Asia – 2040), initially proposed by Kazakhstan. The document outlines long-term priorities for regional security and development and focuses on cooperation in trade, infrastructure, transport, industry and digital development. It also highlights key sustainable development priorities such as water resource management, climate change mitigation and adaptation, early warning systems for disasters and the energy transition. The concept further calls for expanding regional cooperation to parliaments, ministries and other institutions, and includes proposals for creating a more institutionalized structure for high-level regional cooperation. A roadmap for regional cooperation for 2025–2027 was approved at the 2024 Astana Summit.

However, the operationalization of decisions taken by the Presidents remains limited. The outcomes of RES 2026 could mark an important step towards strengthening the implementation of regional political commitments.

6.1 Environment and water cooperation

In the water sector, bilateral water-management agreements have been a major development. These agreements typically address specific issues such as joint financing and maintenance of water infrastructure, data sharing and discussions on local water allocations. Considerable efforts have been made to cooperate on water flow and volumes, which are essential for agriculture and energy generation. Nonetheless, significant challenges remain, particularly regarding the exchange of data and information needed to ensure compliance with agreed-upon quotas.

Due to limited cooperation, several countries have invested unilaterally in additional infrastructure to increase their self-sufficiency in water, agriculture and energy. Earlier assessments estimated that the lack of full cooperation costs the region more than USD 4.5 billion annually.[460] Although some progress has been achieved since then, and interest in closer cooperation is growing, gaps still remain. High-level political meetings have repeatedly emphasized the need for enhanced collaboration.

Initial steps have been taken to address water–energy interdependencies. Kyrgyzstan, for example, has provided irrigation water and electricity to downstream countries during summer while receiving energy imports in winter. Another example is the planned Kambarata-1 hydropower dam in Kyrgyzstan, which is under discussion for joint development with Kazakhstan and Uzbekistan. The project has the potential to regulate regional water flows, increase water availability during the irrigation season and ensure electricity generation during winter.

Cooperation remains limited in two key areas: (i) water pollution and water quality management; and (ii) protection of water-dependent ecosystems along the Amu Darya and Syr Darya rivers. In each country, multiple institutions are responsible for water quality, which complicates transboundary dialogue. Although a basin-wide process to harmonize water quality assessment has not yet been initiated, there are positive bilateral examples. The Kazakh-Uzbek Working Group on Environmental Protection and Water Quality in the Syr Darya Basin held its eighth meeting in December 2025, demonstrating effective collaboration. Similarly, Kazakhstan and Kyrgyzstan have begun cooperation on water quality and aquatic ecosystem protection in the Chu River basin. Strengthened cooperation on shared groundwater aquifers is also needed.

All Central Asian countries participate in meetings of the Regional Working Group on Water Quality, which, although informal, provides a useful platform for experience exchange and capacity development with support from international partners. However, obstacles persist. These include the absence of effective cross-border water quality monitoring systems, limited intersectoral cooperation to identify the drivers of water quality

[460] Pohl and al. (2017).

deterioration (point-source and diffuse pollution), insufficient investment in water-source protection and wastewater treatment, and a lack of harmonized regulations and enforcement measures. These factors continue to hinder improvements to water quality across the region.

International Fund for Saving the Aral Sea

The International Fund for Saving the Aral Sea (IFAS) was established in 1993 by the Presidents of the Central Asian countries to mobilize resources and coordinate the implementation of environmental and socio-economic projects in the Aral Sea basin. Its purpose is to address the ecological impacts of the Aral Sea crisis and support sustainable development in affected areas. All five countries are members; however, Kyrgyzstan froze its participation in 2016. An ongoing reform process aims to modernize IFAS and create conditions under which Kyrgyzstan could consider returning as a full member.

The Executive Committee of IFAS (EC-IFAS) serves as the Fund's permanent executive body. Located in the country holding the IFAS chairmanship, it is staffed by representatives of member states. EC-IFAS plays a key role in developing and coordinating programmes and projects to address challenges in the Aral Sea basin.

The Interstate Commission on Sustainable Development (ICSD) operates under IFAS as a coordinating body for regional cooperation on environmental protection and sustainable development. ICSD develops and oversees regional programmes, including the Regional Environmental Programme for Sustainable Development of Central Asia 2020–2030. Approved by all Central Asian countries except Kyrgyzstan, this programme defines broad regional priority areas in environmental protection and sustainable development.[461] ICSD is supported by a Scientific-Information Centre based in Ashgabat, Turkmenistan, with branches across the region.

The ICSD Regional Environmental Programme for Sustainable Development of Central Asia 2020–2030 identifies the following priority areas:[462]

- Inclusive and equitable quality education and lifelong learning for all;
- Availability and sustainable management of water and sanitation for all;
- Green economy, including renewable energy, waste management and environmentally friendly transport;
- Action to combat climate change and its impacts;
- Protection and restoration of terrestrial ecosystems and their sustainable use;
- Strengthening implementation mechanisms and revitalizing global partnerships for sustainable development.

Although these priorities align with ongoing national and regional policy processes, there is little publicly available information on recorded progress. RES 2026 may provide an opportunity to renew political support for implementing the programme.

The Interstate Commission for Water Coordination of Central Asia (ICWC) also operates under the IFAS umbrella. Established in 1992, ICWC coordinates the management of shared water resources in the Amu Darya and Syr Darya basins. Two basin-level organizations—the Basin Water Organization (BWO) Amu Darya and BWO Syr Darya—manage transboundary water infrastructure, allocation, reservoir operation schedules, and the maintenance of interstate canals and hydraulic structures. However, their authority remains limited, as BWOs cannot override national decisions. Water managers from all Central Asian states meet quarterly under ICWC to agree on seasonal water allocations, primarily for irrigation. ICWC is supported by a Scientific-Information Centre based in Tashkent, Uzbekistan, with branches in other participating countries.

The legal foundation for transboundary water cooperation on the Amu Darya and Syr Darya rivers is the 1992 Almaty Agreement,[463] which remains formally in force. However, it was based on Soviet-era water allocation arrangements and does not fully reflect the diverging interests of independent states, particularly the energy

[461] SCI (n.d.).
[462] SCI (n.d.).
[463] CAWater-Info (1992).

priorities of Kyrgyzstan and Tajikistan. While seasonal water allocation agreements under ICWC remain important, implementation has weakened over time. For example, winter releases from Kyrgyzstan's Toktogul reservoir to generate electricity have reduced water availability for irrigation during the summer vegetation season.

6.2 Other regional cooperation frameworks

Regional Environmental Centre for Central Asia

CAREC is an independent international organization with a regional mandate to address environmental challenges across the five Central Asian countries. Its board includes official representatives from all Central Asian states. The main office is located in Almaty, Kazakhstan, with country offices in each Central Asian capital. CAREC actively promotes regional cooperation and provides an effective platform for technical collaboration among countries. Its activities are primarily technical rather than political, and a large share of its work is funded by international development partners through project-based arrangements.

One example of CAREC's work is the Central Asian Network of Academic Societies, which brings together universities and research institutions working on environmental management, water resources, energy and climate change. CAREC also plays an important role in advancing ESD in the region through training programmes, knowledge-sharing networks and support to national institutions.

Central Asia Regional Economic Cooperation Programme

The Central Asia Regional Economic Cooperation Programme (CARECP), supported by ADB and other development partners, is a partnership among 11 countries aimed at promoting economic growth, sustainable development and regional cooperation. CARECP focuses on enhancing connectivity in transport, energy and trade, with the ADB serving as host to its Secretariat.

Shanghai Cooperation Organization

The Shanghai Cooperation Organization engages, to some extent, in environmental activities. These include the development of an Environmental Information Sharing Platform, joint initiatives on clean energy and land protection, and broader collaboration aimed at promoting sustainable development and building capacity for climate mitigation and adaptation among member states.

United Nations Special Programme for the Economies of Central Asia

The United Nations Special Programme for the Economies of Central Asia (SPECA), established in 1998, is a United Nations-supported platform designed to enhance economic cooperation, integration and sustainable development among Central Asian countries, as well as Azerbaijan and Afghanistan. SPECA's working groups, comprised of representatives from participating states, address issues related to transport, water, energy, environment and trade, and contribute to policy dialogue and joint regional initiatives.

Regional cooperation on energy, disaster risk reduction and thematic initiatives

During Soviet times, the Central Asian countries operated a common, integrated electricity grid. This cooperation declined significantly after independence but has recently begun to improve. A regional electricity network is re-emerging, supported by the Coordinating Dispatch Centre in Tashkent, Uzbekistan, which functions under the Coordinating Electric Power Council of Central Asia. Turkmenistan is not part of the Centre at present.

The Centre for Emergency Situations and Disaster Risk Reduction (CESDRR), located in Almaty, Kazakhstan, is another key regional institution. It is an intergovernmental body mandated to strengthen regional cooperation on disaster preparedness, response and risk mitigation. All Central Asian countries are members.

Many further institutions and initiatives reflect growing national and regional engagement on environment, climate and sustainable development:

- United Nations Regional Centre for Sustainable Development Goals for Central Asia and Afghanistan, established in 2025 in Astana with United Nations support, provides a regional platform for SDG-related cooperation.
- Project Office for Central Asia on Climate Change and Green Energy, launched by Kazakhstan, supports coordination of green transition initiatives across the region.
- UNESCO Central Asian Regional Glaciological Centre in Almaty conducts research on glaciers in Kazakhstan, Kyrgyzstan and Tajikistan.
- The Dushanbe Water Process, initiated by Tajikistan and supported by the United Nations, includes international conferences and activities linked to the International Decade for Action Water for Sustainable Development 2018–2028. Several conferences have taken place in Dushanbe featuring dedicated sessions on Central Asia.
- International Innovation Centre for the Aral Sea Basin in Nukus (established in 2018) supports research and pilot projects on landscape rehabilitation and livelihood improvement in the Aral Sea region, and is backed by an international fund.
- Regional Centre for Climate Technology in Central Asia, currently under development in Ashgabat in cooperation with UNEP, aims to strengthen regional capacity for climate technology deployment.
- Regional Centre to Combat Desertification for Central Asian Countries, also planned in Ashgabat, will support coordinated efforts to address land degradation.[464]
- Global Mountain Resilience Centre, proposed by Kyrgyzstan, seeks to position Bishkek as a regional hub for mountain-related climate resilience research and cooperation.[465]

There are also ongoing discussions on establishing a Regional Glaciology Coordination Centre in Dushanbe under the auspices of the World Meteorological Organization.

Kazakhstan has additionally proposed the creation of a regional water–energy consortium. The initiative aims to ensure equitable and efficient allocation of water resources, mitigate water shortages, prevent conflict risks and optimize the water–energy nexus in the Syr Darya basin.

6.3 Bilateral cooperation

While regional organizations and institutions working on water cooperation face challenges, bilateral cooperation tends to be more operational and practical, though generally narrower in scope. Bilateral arrangements on water management, water infrastructure and/or energy exist between most neighbouring countries, including:

- Kyrgyzstan and Kazakhstan
- Kazakhstan and Uzbekistan
- Kyrgyzstan and Tajikistan
- Kyrgyzstan and Uzbekistan
- Tajikistan and Uzbekistan
- Turkmenistan and Uzbekistan

Regular bilateral cooperation on water management also takes place between:

- Kazakhstan and China
- Kazakhstan and the Russian Federation
- Turkmenistan and the Islamic Republic of Iran

In addition, frameworks for cooperation on water and the environment exist between Tajikistan and Afghanistan, although these mechanisms are not currently operational due to the political situation in Afghanistan.

[464] Turkmenistan News Portal (2025).
[465] Ministry of Natural Resources, Environment and Technical Supervision of Kyrgyzstan (2025).

Bilateral agreements on environmental cooperation are common across the region, although activities under these agreements are often limited in scale or continuity. A positive recent example is the updated Agreement between the Government of Kazakhstan and the Government of Uzbekistan on Cooperation in the Field of Ecology and Environmental Protection, which demonstrates a more hands-on and action-oriented approach, particularly in areas such as water quality management.[466]

7. Conclusions and initial suggestions for joint action

Conclusions

This scoping report confirms that Central Asia is experiencing rapid and complex environmental change driven by climate variability, demographic and economic pressures, and longstanding infrastructure and governance constraints. These dynamics heighten shared vulnerabilities across Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, underscoring the need for stronger and more coherent regional cooperation.

Climate change and water scarcity clearly emerge as the region's most urgent strategic priorities. Rising temperatures, glacier retreat, shifting precipitation patterns and more frequent droughts and floods directly threaten regional water security and sustainable development. Because the countries rely on connected river basins, energy systems and ecosystems, climate and water issues cannot be effectively addressed at the national level alone. They require harmonized policies, improved monitoring and early-warning systems and stronger institutional mechanisms for coordinated action.

Other environmental pressures, such as air pollution, soil and land degradation, biodiversity loss, pollution from waste and industrial legacies, and exposure to natural and technological disasters, further compound regional risks. These challenges are interlinked: degraded land reduces agricultural productivity, dust storms worsen air quality and weakened ecosystems limit climate resilience. While nature-based solutions are increasingly recognized, their application remains limited compared with the scale of degradation across the region.

The lack of effective environmental governance remains a fundamental constraint. Environmental authorities often have less influence than economic institutions; legal frameworks and economic instruments are unevenly applied; and data systems, scientific monitoring and information sharing remain insufficient for regional decision-making. These structural limitations hinder effective implementation of policies and the transition toward greener, more climate-resilient economies. Moreover, adverse environmental impacts are not evenly distributed: rural communities, women, children and other vulnerable groups face the greatest risks and will require targeted support to ensure a just and inclusive transition.

Despite these challenges, the region is taking meaningful steps forward. Countries have adopted new climate and environmental strategies political dialogue has intensified and development partners continue to support reforms and investments. Regional initiatives, such as the Regional Strategy for Sand and Dust Storms Management and the preparations for the RES 2026, demonstrate growing recognition of the benefits of coordinated action. RES 2026, in particular, offers a platform to reinforce joint efforts on climate resilience, food security, natural resource governance and social inclusion.

Based on the assessment, the scoping report concludes that the Regional EPR could focus on a selected set of themes where regional cooperation can generate the greatest added value. Priority areas include transboundary climate change adaptation, water related ecosystems and water quality, green development and economic instruments, air quality management, circular economy and waste management, the land–water–agriculture nexus and disaster risk reduction. Concentrating the Regional EPR on these themes would enable the development of targeted, peer reviewed recommendations that reflect regional priorities, strengthen environmental governance and data systems, and support Central Asian countries in advancing resilient and environmentally sustainable development pathways.

The section below presents initial suggestions for potential joint action developed on the basis of the findings of the scoping report as of March 2026 and structured around main themes of RES 2026 and key environmental

[466] Tengrinews.kz (2024).

priorities in Central Asia. These initial suggestions are intended to serve as input for both the RES 2026 process and the process of selection of thematic priorities for the Regional Environmental Performance Review of Central Asia. The future Regional EPR will provide a detailed factual assessment on the selected thematic priorities and develop relevant recommendations for the consideration by the governments of the five Central Asian countries. The examples of possible joint action presented here are not a substitute for the recommendations that will be formulated under the Regional EPR.

Initial suggestions for possible joint action

Supporting the climate transition

The challenge of climate transition in Central Asia is fundamentally regional. Average temperatures have risen across the region and are projected to continue rising, leading to glacial retreat, altered precipitation patterns and more frequent droughts. At the same time, GHG emissions continue to increase, particularly in fossil fuel-rich economies, and methane leaks remain a major contributor to global warming. These trends underscore the need for coordinated mitigation strategies, common standards and regional monitoring systems.

Furthermore, the region's energy systems are highly interconnected, with shared grids, cross-border energy flows and common industrial structures. Emissions intensity in all Central Asian countries remains above the global average, reflecting outdated technologies and carbon-intensive production. However, a coordinated transition driven by shared carbon market readiness, renewable energy integration and industrial decarbonization is not in place to support the reduction of overall costs, prevents policy fragmentation and accelerates progress toward both national and regional climate goals.

Initial suggestions for possible joint action:

1. *Optimize and consolidate existing Central Asia climate and water resilience mechanisms to coordinate mitigation, adaptation and shared investments.*
2. *Develop a regional methane emission reduction agreement, incorporating harmonized standards for leak detection, repair and satellite monitoring.*
3. *Develop a regional carbon market readiness programme to harmonize measurement, reporting and verification systems, baseline data and carbon pricing approaches, which will support implementation of Article 6 of the Paris Agreement.*
4. *Adopt a regional renewable energy integration roadmap to coordinate grid planning, cross-border electricity trading and storage solutions.*
5. *Launch a green industrial transformation platform to accelerate the adoption of best available techniques and clean technologies in carbon-intensive sectors.*

Adaptation and economic resilience to environmental and natural risks

Central Asia is one of the world's most vulnerable regions to climate change. In particular, climate change is a major aggravating factor, intensifying floods, droughts, mudslides and extreme weather events. Melting glaciers threaten long-term water availability, while aging dams and hydraulic infrastructure increase the risk of catastrophic failures. These hazards know no borders, making regional coordination essential for early warning, emergency response, and long-term adaptation planning.

Economic resilience also depends on concerted action. Aging infrastructure and limited restoration efforts further increase the risk of environmental accidents, particularly in mountainous and seismic areas. Mining tailings and hazardous waste could pose significant transboundary threats that no single country can manage on its own. The region has some experience in using nature-based solutions to address environmental challenges and strengthen resilience, though these efforts are not yet systematically implemented. A regional strategy for disaster risk adaptation and management, supported by shared monitoring systems and coordinated emergency protocols, is still lacking, leaving communities and economies more vulnerable that they need to be.

Initial suggestions for possible joint action:

1. *Develop a regional strategy for disaster risk adaptation and management that integrates climate projections, glacier monitoring, and early warning systems.*
2. *Establish a Central Asian glacier and cryosphere observatory to monitor glacier retreat and seasonal flows.*
3. *Establish a regional water diplomacy and conflict prevention mechanism to manage seasonal flows, droughts and resource allocation tensions.*
4. *Ensure that the Regional Strategy for Sand and Dust Storms Management in Central Asia for 2021–2030 includes shared monitoring, forecasting and mitigation measures.*
5. *Strengthen the safety of mine tailings and hazardous waste through a regional protocol for monitoring, emergency preparedness and remediation.*
6. *Develop joint emergency response mechanisms for industrial accidents in seismic zones.*
7. *Strengthen the implementation of nature-based solutions for climate and infrastructure resilience and promote the exchange of good practices in this area.*
8. *Strengthen engagement of the health sector in broader climate adaptation efforts.*

Food security and the region's ecosystem

Food security in Central Asia is inextricably linked to healthy ecosystems and reliable water systems. Agriculture is the region's primary water consumer, yet irrigation infrastructure is outdated and inefficient, contributing to salinization, erosion and declining soil fertility. More than one-fifth of the region's land is considered degraded, directly impacting agricultural productivity and rural livelihoods. Coordinated action on sustainable irrigation, drought-resistant crops and land restoration is lacking.

Ecosystems across the region are under severe pressure. The collapse of the Aral Sea ecosystem, reduced river flows, and deforestation have led to species extinction and increased vulnerability of endemic flora and fauna. National and transboundary environmental monitoring systems and integrated biodiversity management remain underdeveloped. Ecological resilience is not strengthened and long-term food security is not supported by transboundary biodiversity corridors, shared restoration programmes and an integrated regional approach linking water, food and energy.

Initial suggestions for possible joint action:

1. *Launch a regional initiative for food security and ecosystems, integrating sustainable irrigation, drought-resistant crops and biodiversity protection.*
2. *Develop a sustainable pasture and rangeland management programme to combat overgrazing, salinization and erosion.*
3. *Create transboundary biodiversity corridors to protect migratory species and fragmented ecosystems.*
4. *Promote a circular agriculture strategy and water-food-energy value chains to optimize water use and reduce pressure on ecosystems.*
5. *Develop and implement nature-based solutions for land restoration, flood protection and combating desertification.*

Sustainable management of natural resources

Central Asia's natural resources are a shared heritage that demands shared management. The region's heavy reliance on transboundary rivers, such as the Amu Darya and Syr Darya rivers, forms the backbone of agriculture, energy and ecosystems. However, water losses in irrigation systems remain extremely high and groundwater for a proper use is insufficiently monitored. The lack of joint investment in modern infrastructure, digital water accounting and nature-based solutions significantly hinders improvements in efficiency and sustainability.

Land and forest resources are equally vulnerable. Desertification, salinization and erosion are progressing, particularly in areas affected by the Aral Sea crisis. Forest cover is sparse throughout the region and mountain forests are under various threats. Ecosystem degradation has increased the vulnerability of endemic flora and fauna. Coordinated policies for land restoration, forest management and sustainable resource use to strengthen resilience and reduce long-term environmental and economic risks are lacking.

Initial suggestions for possible joint action:

1. *Modernize regional water infrastructure through joint investment in canal rehabilitation, digital water accounting and groundwater monitoring.*
2. *Implement a regional water efficiency initiative to reduce losses in irrigation systems and protect ecological flows.*
3. *Strengthen regional cooperation on forest management, including saxaul restoration and the protection of mountain forests.*
4. *Develop a regional land restoration partnership focused on degraded land, the restoration of the Aral Sea basin and erosion control.*
5. *Promote regional trade in water-efficient, high-value crops to reduce pressure on scarce water resources.*

Combating air pollution

Air pollution is one of the most serious and widespread environmental and public health challenges in Central Asia. Concentrations of fine particulate matter frequently exceed international limits in major urban areas, particularly during winter, due to coal-fired heating, outdated industrial facilities, transport emissions and dust storms. These pollutants contribute significantly to cardiovascular and respiratory diseases, placing a heavy burden on public health and economic systems and reducing life expectancy throughout the region. While the sources and impacts of air pollution (e.g., air transport and dust storms) are transboundary, regional cooperation is rather limited.

The region's vulnerability is compounded by environmental degradation and climate change. Sand and dust storms, exacerbated by desertification and the drying up of the Aral Sea, further aggravate these impacts and create transboundary environmental and health challenges. Urbanization, population growth and the expansion of industrial activity are intensifying pressures on air quality, while monitoring systems remain uneven and often outdated. Due to the lack of a coordinated regional approach that combines cleaner heating, harmonized standards, shared monitoring and joint action during dust storms, health risks are not being reduced, resilience is not being strengthened, and the climate transition is not being supported.

Initial suggestions for possible joint action:

1. *Establish a regional framework for air quality by harmonizing air quality standards, air quality emission limits and monitoring methods to ensure comparability and promote coordinated action across borders, taking into account the WHO Air quality guidelines.*
2. *Promote the transition from coal-fired heating to cleaner alternatives through shared financing models, technology transfer and regional guidelines for building energy efficiency.*
3. *Integrate national monitoring networks into a shared digital system, enabling real-time data exchange, early warning and coordinated responses to pollution episodes.*
4. *Support the adoption of best available techniques, modern filtration systems and cleaner production methods in key industrial sectors across the region.*
5. *Monitor the implementation of the Regional Strategy for Sand and Dust Storms Management in Central Asia for 2021–2030.*
6. *Coordinate the monitoring, forecasting and mitigation of dust storms, particularly those related to desertification and the Aral Sea basin.*
7. *Develop regional vehicle emission standards, expand electric mobility infrastructure and coordinate policies related to fuel quality and public transportation.*

8. *Assist cities in developing action plans for cleaner air, including low-emission zones, sustainable urban planning and measures to reduce winter pollution peaks.*
9. *Establish a regional health and air pollution observatory to better assess the impacts of air pollution and guide targeted interventions.*
10. *Create joint funding mechanisms to support clean heating, industrial facility upgrades, monitoring systems and dust storm mitigation.*
11. *Develop regional campaigns and educational programmes to promote behaviour change, citizen science, and citizen participation in air quality management.*
12. *Consider creating a regional coordination mechanism or structure on air quality management.*

Improving waste management

Waste management remains one of the region's environmental weaknesses. Municipal solid waste is mostly disposed of in landfills, which often lack environmental protection measures. Recycling rates are low and circular economy approaches are underdeveloped. These challenges are common throughout the region. The lack of harmonized standards, shared monitoring systems and regional recycling markets slows progress and prevents the reduction of environmental and health risks.

Initial suggestions for possible joint action:

1. *Adopt a regional circular economy and waste risk reduction programme, with harmonized standards for the collection, recycling and management of municipal solid waste.*
2. *Create a regional waste data and monitoring system to track flows, risks and compliance.*
3. *Promote regional recycling markets through common standards and incentives.*
4. *Strengthen coordination at the regional level on hazardous waste management.*

Mechanisms to deliver environmental ambition

Environmental governance systems in Central Asia face similar structural challenges: fragmented legislation, inadequate enforcement, outdated standards and limited administrative capacity. Often, ambitions do not match available administrative resources and environmental institutions generally lack stability and continuity. Governance mechanisms are not strengthened by regional harmonization of standards, pollution charges and permitting systems, which reduces efficiency and leads to duplication.

Despite piecemeal efforts, access to environmental information is another common weakness in Central Asia. Stakeholders and the public often lack full access to environmental information. The absence of a common regional environmental information space, supported by a dedicated governance body and stronger science-policy interface, undermines transparency, limits evidence-based policymaking and weakens compliance with multilateral environmental agreements.

Initial suggestions for possible joint action:

1. *Strengthen regional environmental governance by harmonizing legislation, pollution charges and enforcement mechanisms.*
2. *Create a common environmental information space for Central Asia to improve data access and support evidence-based policymaking.*
3. *Establish a regional environmental governance academy to build administrative capacity and reduce implementation gaps.*
4. *Promote green public procurement through a harmonized regional framework.*
5. *Improve science-policy interfaces through shared assessments, joint research and coordinated monitoring.*

A just and inclusive transition

The transition to low-carbon and resource-efficient economies is expected to have significant social repercussions in Central Asia. Many communities depend on carbon-intensive industries or water-intensive agriculture for their livelihoods. The few environmental reforms that have been implemented were not accompanied by adequate financial and human resources. Furthermore, vulnerable groups require targeted support. Regional guidelines on social protection, skills retraining and community engagement are still lacking to ensure a just and inclusive transition.

Public participation and access to environmental justice remain limited across the region. Stakeholders do not have full access to environmental information, which restricts meaningful engagement. Participation mechanisms, gender mainstreaming and youth empowerment are not sufficiently strengthened to build public trust, improve policy outcomes and ensure that environmental decisions address the needs of all communities.

Initial suggestions for possible joint action:

1. *Develop regional guidelines for social protection and retraining to support workers affected by the transition away from carbon-intensive sectors.*
2. *Strengthen community participation and environmental justice mechanisms to ensure inclusive decision-making.*
3. *Promote gender-sensitive environmental policies in the areas of climate, water and natural resource management.*
4. *Support youth engagement in green innovation, climate action and environmental governance.*
5. *Ensure that rural and vulnerable communities benefit from climate and environmental investments.*

Environmental and digital competencies

The region faces a shortage of environmental and technical expertise. The availability of experts and employment conditions are a major constraint, limiting the capacity of institutions to implement ambitious policies. The creation of regional centres of excellence, the harmonization of training programmes and investment in digital and green skills would help bridge this capacity gap and support sustainable environmental governance.

Digitalization is essential for modern environmental management. Current monitoring, data management and assessment systems are underdeveloped and often incompatible across countries. Regional cooperation on digital tools, such as remote sensing, geographic information systems, measurement, reporting and verification systems and interoperable databases, would improve transparency, strengthen decision-making and foster more effective environmental action.

Initial suggestions for possible joint action:

1. *Create regional centres of excellence for green technologies, digital water management and environmental governance.*
2. *Develop a roadmap for green and digital skills, aligned with labour market needs and the climate transition.*
3. *Develop regional training programmes in remote sensing, geographic information systems, measurement, reporting and verification systems and environmental monitoring.*
4. *Promote the digitization of environmental information systems to improve transparency and interoperability.*
5. *Support education for sustainable development through shared curricula, teacher training and youth programmes.*

8. Initial suggestions for possible thematic content of Regional EPR of Central Asia

Selecting thematic priorities for the Regional EPR of Central Asia requires careful consideration of where regional cooperation can generate the greatest added value. Although significant initiatives are already under way to strengthen collaboration on environmental and sustainability issues, identifying areas where the Regional EPR can provide a distinct contribution remains essential. National perspectives will ultimately guide the choice of themes, making early and open dialogue with countries a critical step in shaping the scope of the review.

With this background, the following initial ideas are proposed for further discussion in the Regional EPR process. From a development cooperation perspective, the proposed themes appear highly relevant. A central element could be a stronger prioritization and clearer focus on the water–climate nexus.

Climate change adaptation from a transboundary perspective

Climate change is reshaping hydrology, river regimes and extreme weather patterns across Central Asia, creating shared risks that transcend national borders. Developing a joint knowledge base, aligning strategic priorities and sharing institutional expertise could help countries establish coherent regional adaptation pathways. A basin-wide lens is essential to address complex climate-induced risks, transform fragmented national efforts into coordinated actions and strengthen resilience across interconnected river systems. Integrating nature-based solutions into regional planning could further support climate adaptation across shared river systems. Potential involvement of Afghanistan should be considered.

Water-related ecosystems and water quality

Water-dependent ecosystems and water quality remain underdeveloped areas of cooperation, despite their importance for public health and ecological stability. Some elements, including monitoring approaches, legal frameworks and the protection of remaining aquatic ecosystems, offer a constructive entry point. While fully addressing transboundary water management may provide limited added value, given the breadth of existing regional and international initiatives, incremental progress on water quality cooperation in the Amu Darya and Syr Darya basins could be explored over time.

Green development

Accelerating the transition to a green economy would help Central Asian countries align economic growth with environmental sustainability, strengthen climate change mitigation, enhance resource efficiency and build long-term resilience. Strengthening regulatory, fiscal and financial frameworks is essential to unlock greener investment and encourage businesses to adopt cleaner technologies. Potential areas of focus include blended finance structures to mobilize private capital, reviewing investment frameworks and tax and customs codes, and assessing the effectiveness, enforcement and potential scale up of fees and charges related to pollution and natural resource use.

Air quality management

Air pollution represents one of the most pressing environmental and public health challenges in Central Asia. Major urban centres routinely experience exceedances of air-quality standards due to coal-based heating, outdated industrial installations and aging vehicle fleets. Weak monitoring networks, limited real-time public information and uneven enforcement highlight the need for improved policy frameworks. A regional approach could support emission reductions, strengthen monitoring and harmonize standards where appropriate.

Circular economy and waste management

Modernizing waste management and advancing circular-economy principles offer strong opportunities for regional cooperation. Shared recycling infrastructure, harmonized classification and technical standards and coordinated approaches to hazardous and mining waste could generate economies of scale and improve

environmental safety. Joint progress in this area would also support green industrial development and help transform waste into a resource.

Land–water–agriculture nexus

Improving coordination at the land–water–agriculture interface could deliver substantial regional benefits, including enhanced food security, climate resilience and more sustainable resource use. All countries are investing in modern irrigation, better land management and climate-resilient agricultural practices. Aligning these efforts and deepening cooperation on agricultural trade, capacity development and innovation would help scale progress and strengthen policy coherence at both national and regional levels.

Disaster risk reduction

Central Asia faces frequent and increasingly severe disasters, such as floods, droughts, mudflows, earthquakes and risks associated with dams, which require coordinated, cross-border approaches. The Centre for Emergency Situations and Disaster Risk Reduction provides an institutional platform for cooperation on preparedness, early warning and joint risk assessments. Building on the jointly adopted Strategy for Development of Cooperation of Countries of Central Asia in Disaster Risk Reduction for 2022–2030, further regional initiatives could support alignment with the Sendai Framework and accelerate resilience-building across the region. At the same time, the potential of nature-based solutions as a cost-effective complement to conventional measures for enhancing disaster risk reduction and the resilience of critical infrastructure could be explored.

Country views on priority topics for the Regional Environmental Performance Review of Central Asia

Central Asian countries were invited to share their views on priority topics for the Regional EPR through a survey, covering vertical[467], sectoral and horizontal topics and ranking these as either high or additional priority. The results provide important guidance for shaping the scope of the review. As of 7 April 2026, Kazakhstan, Kyrgyzstan and Uzbekistan had submitted their responses. The final selection and organization of topics into integrated themes will be discussed jointly by the participating countries, the ECE secretariat and international partners at a workshop on 20–21 April 2026.

The survey results (see Tables 5–7) reveal a strong degree of convergence among Central Asian countries on priority topics for the Regional EPR. Across vertical, sectoral and horizontal categories, countries consistently identified a core set of themes as high priorities, namely air, water, agriculture, environmental monitoring and environmental assessment. This alignment provides a solid foundation for scoping the Regional EPR and suggests that a focused, regionally coherent set of chapters is achievable. At the same time, some variation in national priorities, particularly at the sectoral level, points to areas where further discussion will be needed to determine the most appropriate scope and depth of coverage.

Air and water have been ranked as high priority themes by all three countries, reflecting strong consensus on these as key topics for the regional EPR (Table 5). In addition, climate change, waste and chemicals, and biodiversity and ecosystems were each identified as either high or additional priority by all three countries. Moreover, all five topics are included directly or indirectly in the list of ideas proposed in the scoping report, indicating close alignment between national priorities and the initial thematic suggestions.

Table 5: Central Asian countries' responses on priority vertical topics

Priority	Uzbekistan	Kyrgyzstan	Kazakhstan
High	Air	Climate change	Air
High	Water	Water	Water
High	Climate change	Waste and chemicals	Waste
High	Ecosystems	Air	Biodiversity
High	Land degradation and desertification		
Additional	Natural disasters and risks	Biodiversity	Climate change
Additional	Waste and chemicals	Ecosystem conservation	Land degradation

[467] The term "vertical topics" is used to cover environmental areas, such as climate change, biodiversity, water or soil.

Additional	Environmental health	Natural disasters / risks	Soil
Additional		Urban planning	

Agriculture was identified as a high priority sector by all three countries, in line with the land-water-agriculture nexus proposed in the scoping report (Table 6). Mining was ranked as high priority by Kyrgyzstan and Uzbekistan but not included by Kazakhstan. Transport, urban development, energy, construction, industry and forestry have been included by all three countries as either high or additional priority sectoral topics, underscoring the breadth of sectors where environmental mainstreaming needs to be strengthened. Further discussions will be needed to determine which sectors to prioritize in the Regional EPR.

Table 6: Central Asian countries' responses on priority sectoral topics

Priority	Uzbekistan	Kyrgyzstan	Kazakhstan
High	Agriculture	Energy	Transport
High	Energy	Construction	Forestry
High	Mining	Agriculture	Industry
High	Industry	Mining	Agriculture
Additional	Forestry	Urban development	Construction
Additional	Transport	Industry	Public transport
Additional	Urban Development	Forestry	Energy
Additional	Construction	Transport	Urban development

Environmental monitoring and environmental assessment were ranked as high priorities by all three countries, suggesting that these topics should be addressed across the thematic chapters of the Regional EPR (Table 7). Topics related to capacity building and education, green economy and financing, and the pillars of the Aarhus Convention – access to information, participation in decision-making, and access to justice in environmental matters – were identified by all three countries as either high or additional priorities, reflecting a shared interest in strengthening the governance, finance and institutional dimensions of environmental policy across the region. These topics thus merit integration in the regional EPR, though the precise scope remains to be discussed.

Table 7: Central Asian countries' responses on priority horizontal topics

Priority	Uzbekistan	Kyrgyzstan	Kazakhstan
High	Monitoring	Monitoring	Access to information
High	Environmental assessment	Environmental assessment	Environmental impact assessment (EIA)
High	Financing and Green Economy	Public participation in decision-making	Environmental monitoring
High	Regulatory and Compliance Mechanisms	Green economy	Access to justice in environmental matters
High	Capacity-building, Education and Training		
Additional	Nature-based Solutions (NbS)	Regulatory and compliance mechanisms	Public participation
Additional	Sustainable Infrastructure	Green procurement	Education and training
Additional	Public Participation	Education and training	Green economy
Additional	Green Public Procurement	Capacity development	Financing · Green economy

Annex I: Methodology

Background

The Scoping Report provides the analytical basis for defining the content and structure (selecting priority topics and organizing them into thematic chapters) of the Regional Environmental Performance Review of Central Asia, carried out under the ECE Environmental Performance Review Programme, pursuant a request from the Central Asian countries.

The primary purpose of the Report is to identify priority areas for regional cooperation and joint action, assess policy responses and institutional frameworks and support the selection of a limited number of themes for the Regional EPR.

The Scoping Report also serves as the analytical basis for preparing an Assessment of Ecological Priorities in Central Asia, to be presented for consideration by the ministers and chairmen responsible for the environment of the five Central Asian countries at the Regional Ecological Summit 2026 (RES 2026, Astana, 22–24 April 2026). The Summit is envisioned as a key platform for advancing regional cooperation on climate change and environmental protection. The Report reflects and integrates the Summit's thematic priorities.

The final selection and organization of topics into integrated themes for the Regional EPR will be discussed jointly by the participating countries, the ECE secretariat and international partners at a workshop in Astana on 20–21 April 2026.

Report methodology

The Scoping Report is based primarily on existing sources, including ECE national EPRs, national and regional studies and reports by international organizations. Given differences in the timing of the most recent national EPRs, particularly the earlier review of Turkmenistan, additional sources have been used to ensure balanced and up to date coverage across the region. The drafting process has been supported by national expertise, notably through a national consultant for Kazakhstan, and complemented by inputs from national focal points and experts.

The Report uses country specific data and information to highlight diverse national circumstances while drawing regional level conclusions on shared challenges and common interests. This approach enables the identification of practical and realistic pathways for joint action that respect national priorities and capacities. The Scoping Report was consulted with the national focal points and experts in Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan; members of the ECE Expert Group on EPRs; UNEP, OECD and UNDRR; United Nations Resident Coordinator Offices in Central Asia; and others.

Survey methodology

Central Asian countries were invited to share their views on priority topics for the Regional EPR through a survey, covering vertical, sectoral and horizontal topics and ranking these as either high or additional priority. The term "vertical topics" is used for environmental areas, such as air, water, soil, biodiversity, waste, climate change, etc. The term "sectoral topics" is used for agriculture, construction, energy, forestry, industry, mining, transport, etc. The term "horizontal topics" includes monitoring, environmental assessments, public participation, education, green economy, nature-based solutions and procurement. The survey results provide important guidance for shaping the scope of the regional EPR and are presented in section 8 of this report.

Selection criteria

The criteria proposed for the selection of topics and themes for the Regional EPR are: relevance to common or transboundary environmental challenges in Central Asia; opportunities for regional cooperation and joint action; feasibility of implementing future Regional EPR recommendations; and potential to leverage financing mechanisms in the region.

Annex II: Selected regional institutions, programmes and policies in Central Asia

Table 8: Selected regional institutions and platforms for cooperation

Institution	Focus areas	Website
Interstate Commission for Water Coordination (ICWC)	- Water resources management - Water monitoring - Water allocation	link
Scientific Information Centre of the Interstate Commission for Water Coordination	- Research and applies scientific knowledge to water management - Developing and maintaining practical tools for water management (regional level) - Preparation of educational material	link
Centre for Emergency Situations and Disaster Risk Reduction (CESDRR)	- Disaster risk reduction - Climate change adaptation - Emergency management - Early warning	link
Regional Environmental Centre for Central Asia (CAREC)	- Regional cooperation - Environmental economy nexus - Sustainable development dialogue	link
Scientific Information Centre Interstate Commission for Sustainable Development (ICSD)	- Sustainable development - Environmental policy coordination - SDGs	link
Regional Mountain Centre of Central Asia (RMCCA)	- Regional cooperation for conserving mountain ecosystems - Sustainable resource management	link
Green University – Central Asian University of Environmental and Climate Change Studies	- Foster regional cooperation in Central Asia - To train scientists, managers and entrepreneurs to solve environmental problems	link
Basin Water Organization Amu Darya Interstate Commission for Water Coordination of Central Asia	- Water distribution and operational water management - Monitoring water quality - Flood control and emergency measures - Planning of water withdrawals and reservoir operation regimes	link
Basin Water Organization Syr Darya Interstate Commission for Water Coordination of Central Asia	- Water management and allocation - Operation of hydroscheme - Reporting: monthly water-use reports	link
United Nations Special Programme for the Economies of Central Asia (SPECA)	- Water, Energy and Environment cooperation - Sustainable Transport, Transit and Connectivity - Promoting trade policies - Improving statistical system	link
Central Asia Water and Energy Program	- Regional water security - Energy sector reforms - Climate change adaptation	link
Central Asia Climate Information Platform	- Climate mitigation - Climate adaptation - Includes the CAMP4ASB (see row below)	link
Climate adaptation and mitigation Programme for Aral Sea Basin (CAMP4ASB)	- Improving climate change knowledge services for key stakeholders - Increasing investments and capacity building	link
Executive Committee of the International Fund for Saving the Aral Sea (EC-IFAS)	- Environment - Water resources - Aral Sea basin	link

Institution	Focus areas	Website
	- Climate adaptation	
Climate-sensitive water resources management in Central Asia (GIZ)	- Organisation of a dialogue between representatives of national and regional organisations - Sharing knowledge about climate-sensitive - IWRM (Integrated water resources management) - Planning international water law and water diplomacy	link
Climate Change and Sustainable Energy Programme (CCSE)	National Climate & Energy Policies, Regional & intersectoral cooperation, Low-carbon development & sustainable energy	link
Blue Peace Central Asia	- Transboundary water management (water and peace) - IWRM - RCCAS - Environmental flow - Water quality	link

Table 9: Some key regional policy documents and programmes

Document / Agreement	Type	Focus	Link
Regional Climate Change Adaptation Strategy for Central Asia (2023)	Strategy	Climate adaptation, SDGs, resilience	link
Green Central Asia: Enhancing regional dialogue on climate, environment and security	Regional Action Plan	Climate security, water diplomacy, data systems	link
Aral Sea Basin Programme (ASBP4)	Regional Plan	Water cooperation, Aral Sea restoration, environment	link
The 2020–2025 Strategy of the Regional Environmental Centre for Central Asia [468]	Strategy	Environmental governance, SD, regional dialogue	link
Regional Action on Climate Change (2024)	Vision/Strategy	Climate resilience, low-carbon pathways	link
UN initiatives on water management in Central Asia and potential entry points	Policy Framework	Water management, climate, forestry, conventions	link
UN Water & Climate Policy Entry Points (2024)	Policy Framework	Water governance, climate resilience, cooperation	link
New Bilateral Agreements on Shared Rivers (2021–2024)	Bilateral Water Agreements	Cooperation on Amu Darya et Syr Darya, climate-induced scarcity	
Green Central Asia II (2024–2028)[469]	Regional initiative	Strengthening cross-border cooperation on climate and security	link
Managing water better in Central Asia	Policy Brief	Documents bilateral agreements 2021–2024 (Amu Darya, Syr Darya)	link
Central Asia Climate Change Conference (CACC) (2025)	Regional Climate Conference Mechanism	Facilitate regional dialogue, climate change mitigation and adaptation	link
World Water Forum (ICWC) and GWP CACENA	Regional Climate Conference Mechanism	Water resources management, coordinate regional climate action, mobilize climate finance	link
Central Asia Nexus Dialogue – *UN initiative on water management in Central Asia and potential entry points* (2024)	Multisector Nexus Dialogue Platform	Institutionalizing the Water-Energy-Food Nexus, Strengthening transboundary cooperation on joint WEF resource security	link
EU-Funded SDG Platform for Central Asia *EUCAM (2024)*	Policy brief	EU development cooperation with Central Asia, green and climate-aligned	link

[468] This revived the Sub-regional Sustainable Development Strategy for Central Asia (2009), supported by UNEP.
[469] Led and financed by the German Foreign Office, implemented with GIZ and scientific partners.

Document / Agreement	Type	Focus	Link
		infrastructure, climate and green transition	
Guideline on the Integration of Sand and Dust Storm Management into Key Policy Areas	Guideline for Key Policy Areas	Raise awareness on development challenges related to SDS risk, promote management of SDS	link
Regional Transparency Hub for Central Asia (ReCATH) (2024)[470]	Regional Climate conference	Enhance Paris Agreement transparency, improve climate data systems, Strengthen regional cooperation on climate reporting	link[471]
Central Asia Forum on water & climate change (2018–2028)	Concept note for a Regional High-Level Forum (2024)	Strengthen regional dialogue on climate-resilient water management and disaster risk reduction	link
Central Asia Regional Economic cooperation program, Climate change action plan (2025–2027)	Regional plan (November 2024)	Identify gaps in regional climate actions, Prioritize and attract financing for regional climate adaptation, Climate mitigation projects, Strengthen regional collaboration	link
Central Asian Climate Change Conference (CACCC) (2024)	Declaration of commitment	Strengthening regional cooperation, Climate mitigation, Climate adaptation, Implementing innovative solutions	link
GEF Central Asia Water and Land Nexus (CAWLN) program (2025–2028)	Multi-year program	Enhance water-land nexus approaches and implementation for strengthening water security, increasing resilience and improving rural livelihoods in the Amu Darya and Syr Darya river basins.	link

[470] Under the Paris Agreement Enhanced Transparency Framework (ETF).
[471] Concept note

Annex III: Participation in multilateral environmental agreements

		KZ		KG		TJ		TM		UZ	
Year	**Agreement**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**
1957	(Geneva) European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)	2001	Ac	2025	Ac	2011	Ac			2020	Ac
1958	(Geneva) Agreement – Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts	2010	Ac	2023	Ac					2025	Ac
1960	(Geneva) Convention concerning the Protection of Workers against Ionising Radiations (ILO 115)			1992	Ra	1993	Ra				
1961	(Paris) International Convention for the Protection of New Varieties of Plants			2000	Ac					2004	Ac
1963	(Vienna) Convention on Civil Liability for Nuclear Damage	2011	Ac							2025	Ac
	1997 (Vienna) Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage	2011	Ac								
1968	(London, Moscow, Washington) Treaty on the Non-Proliferation of Nuclear Weapons (NPT)	1994	Ac	1994	Ac	1995	Ac	1994	Ac	1992	Ac
1971	(Ramsar) Convention on Wetlands of International Importance Especially as Waterfowl Habitat	2007	Ac	2002	Ra	2001	Ac	2009	Ac	2001	Ac
	1982 (Paris) Amendment					2001	Ac				
1971	(Geneva) Convention on Protection against Hazards from Benzene (ILO 136)										
1972	(Paris) Convention concerning the Protection of the World Cultural and Natural Heritage	1994	At	1995	Ac	1992	Su	1994	Su	1993	Su
	1996 (London) Protocol										
1972	(London, Moscow, Washington) Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction	2007	Ra	2004	Ac	2005	Ra	1996	Ac	1996	Ac
1972	(London) International Convention on the International Regulations for Preventing Collisions at Sea	1994	Ac					2009	Ac		
1972	(Geneva) International Convention for Safe Containers	1994	Ac								
1973	(Washington) Convention on International Trade in Endangered Species of Wild Fauna and Flora	2000	Ac	2006	Ac	2016	Ac			1997	Ac
	1979 (Bonn) Amendment	2000	At	2007	At					1997	At
	1983 (Gaborone) Amendment									1998	At
1973	(London) Convention for the Prevention of Pollution from Ships (MARPOL)							2009	Ac		

		KZ		KG		TJ		TM		UZ	
Year	**Agreement**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**
	1978 (London) Protocol relating to the International Convention for the Prevention of Pollution from Ships	1994	Ac					2009	Ac		
	1978 (London) Annex III on Hazardous Substances carried in packaged form							2009	Ac		
	1978 (London) Annex IV on Sewage							2009	Ac		
	1978 (London) Annex V on Garbage							2009	Ac		
	1997 (London) Protocol to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto										
1974	(Geneva) Convention concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents (ILO 139)										
1977	(Geneva) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)	1996	Ra	1992	Ra	1993	Ra			2023	Ra
1979	(Bonn) Convention on the Conservation of Migratory Species of Wild Animals	2006	Ac			2001	Ac			1998	Ra
	1995 (The Hague) Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)									1998	Ra
1979	(Geneva) Convention on Long-range Trans-boundary Air Pollution	2001	Ac	2000	Ac						
	1984 (Geneva) Protocol – Financing of Co-operative Programme (EMEP)										
	1985 (Helsinki) Protocol – Reduction of Sulphur Emissions by 30%										
	1988 (Sofia) Protocol – Control of Emissions of Nitrogen Oxides										
	1991 (Geneva) Protocol – Volatile Organic Compounds										
	1994 (Oslo) Protocol – Further Reduction of Sulphur Emissions										
	1998 (Aarhus) Protocol on Heavy Metals										
	1998 (Aarhus) Protocol on Persistent Organic Pollutants										
	1999 (Gothenburg) Protocol to Abate Acidification, Eutrophication and Ground-level Ozone										
	2009 (Geneva) Amendments to the Text and to Annexes I, II, III, IV, VI and VIII to the 1998 Protocol on Persistent Organic Pollutants										
	2009 (Geneva) Amendments to Annexes I and II to the 1998 Protocol on Persistent Organic Pollutants										

		KZ		KG		TJ		TM		UZ	
Year	**Agreement**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**
	2012 (Geneva) Amendment of the text and annexes II to IX to the Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-level Ozone and the addition of new annexes X and XI										
	2012 (Geneva) Amendments to the Text of and Annexes Other than III and VII to the 1998 Protocol on Heavy Metals										
1981	(Geneva) Convention Concerning Occupational Safety and Health and the Working Environment (ILO 155)	1996	Ra			2009	Ra				
1985	(Vienna) Convention for the Protection of the Ozone Layer	1998	Ac	2000	Ra	1996	Ac	1993	Ac	1993	Ac
	1987 (Montreal) Protocol on Substances that Deplete the Ozone Layer	1998	Ac	2001	Ra	1998	Ac	1993	Ac	1993	Ac
	1990 (London) Amendment to Protocol	2001	Ac	2003	Ra	1998	Ac	1994	Ac	1998	Ac
	1992 (Copenhagen) Amendment to Protocol	2011	Ac	2003	Ra	2009	Ac	2008	Ac	1998	Ac
	1997 (Montreal) Amendment to Protocol	2011	Ac	2003	Ra	2009	Ac	2008	Ac	2006	Ra
	1999 (Beijing) Amendment to Protocol	2014	Ra	2005	Ra	2009	Ac	2008	Ac	2006	Ra
	2016 (Kigali) Amendment to Protocol										
1986	(Geneva) Convention Concerning Safety in the Use of Asbestos (ILO 162)	2011	Ra								
1986	(Vienna) Convention on Early Notification of a Nuclear Accident	2010	Ac			2011	Ac			2025	Ac
1986	(Vienna) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	2010	Ac			2011	Ac				
1989	(Basel) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	2003	Ac	1996	Ac	2016	Ac	1996	Ac	1996	Ac
	1995 Ban Amendment										
	1999 (Basel) Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal										
1990	(Geneva) Convention concerning Safety in the use of Chemicals at Work (ILO 170)	2000	Ra	2003	Ra						
1991	(Espoo) Convention on Environmental Impact Assessment in a Transboundary Context	2001	Ac	2001	Ac						
	2001 (Sofia) First Amendment										
	2003 (Kiev) Protocol on Strategic Environmental Assessment										
	2004 (Cavtat) Second Amendment										

		KZ		KG		TJ		TM		UZ	
Year	**Agreement**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**
1992	(Helsinki) Convention on the Protection and Use of Transboundary Watercourses and International Lakes	2001	Ac							2007	Ac
	1999 (London) Protocol on Water and Health	2006	Ac							2023	Ac
	2003 (Madrid) Amendments to Articles 25 and 26	2015	At							2011	At
1992	(Helsinki) Convention on the Transboundary Effects of Industrial Accidents	2001	Ac								
	2003 (Kiev) Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters										
1992	(Rio De Janeiro) Convention on Biological Diversity	1994	Ra	1996	Ac	1997	Ac	1996	Ac	1995	Ac
	2000 (Montreal) Cartagena Protocol on Biosafety	2008	Ac	2005	Ac	2004	Ac	2008	Ac	2019	Ac
	2010 (Nagoya) Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization	2015	Ac	2015	Ac	2013	Ra	2020	Ac		
	2010 (Nagoya-Kuala Lumpur) Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety										
1992	(New York) United Nations Framework Convention on Climate Change	1995	Ac	2000	Ac	1998	Ac	1999	Ra	1993	Ac
	1997 (Kyoto) Kyoto Protocol	2009	Ra	2003	Ra	2008	Ac	1999	Ra	1999	Ra
	2012 (Doha) Doha Amendment to the Kyoto Protocol										
	2015 (Paris) Paris Agreement	2016	Ra	2020	Ra	2017	Ra	2016	Ra	2018	Ra
1993	(Rome) Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas										
1993	(Paris) Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction	2000	Ra			1995	Ra			1996	Ra
1994	(Vienna) Convention on Nuclear Safety	2010	Ra							2025	Ac
1994	(Paris) United Nations Convention to Combat Desertification	1997	Ra	1999	Ac	1997	Ac	1996	Ac	1995	Ra
1994	(Lisbon) Energy Charter Treaty	1995	Ra	1997	Ra	1997	Ra	1997	Ra	1995	Ra
	1994 (Lisbon) Protocol on Energy Efficiency and Related Environmental Aspects	1995	Ra	1997	Ra	1997	Ra	1997	Ra	1995	Ra
	1998 Amendment to the Trade-Related Provisions of the Energy Charter Treaty										
1997	(Vienna) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2010	Ra			2007	Ac			2009	Ac

		KZ		KG		TJ		TM		UZ	
Year	**Agreement**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**	**Year**	**Status**
1997	(New York) Convention on the Law of Non-navigational Uses of International Watercourses	2024	Ac							2007	Ac
1997	(Vienna) Convention on Supplementary Compensation for Nuclear Damage										
1998	(Rotterdam) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2007	Ac	2000	Ra	2025	Ra				
1998	(Aarhus) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	2001	Ra	2000	Ac	2001	Ac	1999	Ra	2025	Ac
	2003 (Kiev) Protocol on Pollutant Release and Transfer Registers	2020	Ac			2003	Si				
	2005 (Almaty) Amendment on GMOs										
2001	(Stockholm) Convention on Persistent Organic Pollutants	2007	Ra	2006	Ra	2007	Ra			2019	Ac
2001	(London) Convention on Civil Liability for Bunker Oil Pollution Damage										
2003	(Geneva) WHO Framework Convention on Tobacco Control	2007	Ra	2006	Ra	2003	Ac	2011	Ac	2012	Ac
2004	(London) Convention for the Control and Management of Ships' Ballast Water and Sediments										
2006	(Ashgabat) Framework Convention on Environmental Protection for Sustainable Development in Central Asia			2006	Si	2006	Si	2006	Si		
2006	(Semipalatinsk) Treaty on a Nuclear-Weapon-Free Zone in Central Asia	2009	Ra	2007	Ra	2009	Ra	2009	Ra	2007	Ra
2013	(Kumamoto) Minamata Convention on Mercury										

Ac = Accession; Ad = Adherence; Ap = Approval; At = Acceptance; De = Denounced; Si = Signature; Su = Succession; Ra = Ratification

Annex IV: Selected regional projects

C5-regional project programme	/Timeline and status	Objective and scope (short)	Financial resources (publicly stated)	Project page / sources
Aral Sea Basin Program ASBP-4 (IFAS)	Designed for 2020–2030; programme framework adopted in 2021 and implemented through a portfolio of actions/ projects.	Joint actions and long-term programmes to overcome the Aral crisis; integrated water resources use/protection, environmental improvement, socio-economic development; cross-border project portfolio.	Portfolio programme (multiple investment and non-investment projects); a single consolidated budget is not stated on the programme summary page.	IFAS EC programme description and timeline. [link]
Central Asia Water & Energy Program (WB multi-donor partnership)	Phase 3: 2018–2022; WB states the programme is in its fourth phase, brief in 2025.	Improve enabling environment for regional cooperation on water and energy security under climate change; analytics, capacity, investment pipeline and dialogue.	Phase 3: Total €11.2m; EU €7m (partners include EU, Switzerland/SECO and UK support alongside WB administration).	WB overview and EU (EEAS) fiche with budget/duration. [link]
Green Central Asia II (GCA II) – transboundary dialogue on climate, environment and security	Apr 2024–Jun 2028 (ongoing).	Strengthen regional coordination on adaptation/mitigation, support NDC updates, develop unified vulnerability methodologies and improve climate finance mobilisation; conflict-prevention logic via climate security cooperation.	€7.5m (commissioned by German Federal Foreign Office; EU co-financing for Turkmenistan policy dialogue on methane/environment noted in the factsheet).	GIZ factsheet (budget/duration/objective). [link]
Blue Peace Central Asia 2.0	SDC database lists Oct 2022–Sep 2029; partner page describes active implementation over 2024–2029 (project partner reporting convention).	Hydro-diplomacy + basin/sub-basin cooperation solutions; evidence-based regional dialogue; demonstration and investment planning; youth and women capacity building.	SDC phase budget CHF 9.85m (SDC contribution); total budget across phases is reported separately by SDC.	SDC project database entry (budget/period); partner project description and website. [link]
SECCA – EU Support to Sustainable Energy Connectivity in Central Asia	Listed as 2021–2025 in EU regional initiatives overview. Closing roundtables in Feb 2026.	Regional sustainable energy connectivity support (policy/institutional measures and enabling conditions for energy transition and cooperation).	€8m (EU regional initiatives list).	EU regional initiatives infographic list. [link]
SWITCH Central Asia (resource efficiency / circular economy / SCP)	Listed as 2018–2024 (€14m) in EU overview; WECOOP database contains a major regional SWITCH entry (2019–2022) with comparable envelope scale. Is continuing beyond 2026	Promote sustainable consumption and production, resource efficiency and circular economy approaches across the region, including capacity building and private-sector oriented actions.	EU overview lists €14m; WECOOP database lists €13.95m for SWITCH Central Asia II (time-bounded component).	EU regional initiatives overview; WECOOP database. [link]
Energy–Water–Land nexus transformation (OECD-led consortium; IKI-funded)	IKI project entry published for implementation starting 2023 (ongoing).	Economic and financial analysis + political momentum for operationalising nexus approaches; explore and identify financing opportunities; regional policy dialogue with consortium partners.	Budget not stated on the IKI summary page excerpt; EBRD technical cooperation entry confirms programme scope and approval status.	IKI project page; EBRD technical cooperation page; OECD brochure framing the four-year regional concept. [link]

Annex V: Water withdrawal, 2015–2022, billion m^3

	2015	2016	2017	2018	2019	2020	2021	2022
Kazakhstan								
Agricultural water withdrawal	13.23	14.70	15.12	14.97	15.79	15.40	14.71	14.26
of which, Irrigation water withdrawal	10.16	11.95	11.70	11.46	12.40	12.29	11.56	11.57
Industrial water withdrawal	6.12	6.98	6.98	4.94	4.00	4.54	5.97	6.00
Municipal water withdrawal	2.32	2.40	2.35	3.64	3.85	4.85	4.02	4.88
	21.67	**24.08**	**24.45**	**23.54**	**23.64**	**24.80**	**24.69**	**25.14**
Kyrgyzstan								
Agricultural water withdrawal	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7.10
of which, Irrigation water withdrawal	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Industrial water withdrawal	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Municipal water withdrawal	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Total	**7.66**	**7.66**	**7.66**	**7.66**	**7.66**	**7.66**	**7.66**	**7.66**
Tajikistan								
Agricultural water withdrawal	7.84	7.09	5.19	7.38	7.38	7.38	7.38	7.38
of which, Irrigation water withdrawal				7.38	7.38	7.38	7.38	7.38
Industrial water withdrawal	0.36	0.34	2.08	1.61	1.61	1.61	1.61	1.61
Municipal water withdrawal	0.39	0.33	0.58	0.79	0.91	0.91	0.91	0.91
Total	**8.91**	**8.75**	**7.99**	**9.77**	**10.60**	**9.90**	**9.90**	**9.90**
Turkmenistan								
Agricultural water withdrawal	26.50	26.51	27.21	25.35	16.35	16.12	16.12	16.12
of which, Irrigation water withdrawal	13.56	13.56	13.56	13.56	13.56	13.56	13.56	13.56
Industrial water withdrawal	0.84	0.84	0.87	0.81	0.81	0.81	0.81	0.81
Municipal water withdrawal	0.76	0.76	0.78	0.73	0.59	0.45	0.45	0.45
Total	**28.10**	**28.12**	**28.86**	**26.88**	**27.71**	**26.24**	**17.38**	**17.38**
Uzbekistan								
Agricultural water withdrawal	50.77	50.01	54.36	52.08	49.80	47.20	39.70	41.00
of which, Irrigation water withdrawal	49.97	49.43	53.70	51.13	48.56	45.90	38.50	39.60
Industrial water withdrawal	1.96	2.11	2.13	1.99	1.84	1.80	1.80	1.20
Municipal water withdrawal	2.41	2.44	2.41	2.37	2.34	2.30	2.20	2.30
Total	55.14	54.56	58.90	56.44	53.98	51.30	43.70	44.50

Annex VI: GHG emissions

Table 6: GHG emissions for Kazakhstan, 1990, 2015–2024, Mt CO^2eq

Substances	Sector	1990	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CO_2	Agriculture	0.08	0.23	0.29	0.28	0.31	0.22	0.29	0.22	0.19	0.19	0.20
	Buildings	26.63	31.62	32.99	36.34	39.08	38.24	39.13	40.18	37.98	37.57	37.99
	Fuel Exploitation	7.54	22.55	23.32	23.46	21.62	18.16	18.60	21.98	19.02	20.61	20.72
	Industrial Combustion	80.97	35.78	38.60	36.20	31.63	27.52	28.26	27.90	26.49	24.97	24.93
	Power Industry	109.68	84.39	92.82	102.20	106.64	104.92	104.04	114.26	124.71	128.28	130.09
	Processes	9.30	12.89	12.18	12.79	12.45	13.13	14.28	14.16	14.17	13.90	13.87
	Transport	14.42	15.26	15.77	15.00	17.43	16.32	20.69	22.96	23.67	29.59	30.67
	Waste	0.00	0.04	0.15	0.19	0.22	0.29	0.22	0.25	0.30	0.32	0.34
CH_4	Agriculture	34.81	20.41	21.08	22.05	23.12	23.98	25.24	26.36	27.47	22.08	22.33
	Buildings	0.11	1.02	1.15	1.43	1.51	1.52	1.41	1.46	1.38	1.52	1.49
	Fuel Exploitation	41.78	24.22	25.09	27.37	28.27	27.30	26.76	27.99	28.92	29.78	28.91
	Industrial Combustion	0.20	0.07	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05
	Power Industry	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05
	Processes	0.05	0.06	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.07
	Transport	0.13	0.10	0.10	0.09	0.10	0.09	0.13	0.12	0.12	0.14	0.14
	Waste	2.62	4.02	4.08	4.13	4.22	4.31	4.39	4.47	4.32	4.28	4.22
F gases	Processes	0.01	2.14	2.30	2.55	2.70	2.85	3.05	3.25	3.46	3.66	3.87
N_2O	Agriculture	10.96	6.37	6.60	7.12	7.22	7.20	7.67	7.70	8.14	7.16	7.78
	Buildings	0.36	0.22	0.23	0.27	0.27	0.26	0.25	0.27	0.27	0.21	0.22
	Fuel Exploitation	0.01	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.04	0.05
	Industrial Combustion	0.30	0.10	0.11	0.10	0.09	0.08	0.08	0.08	0.08	0.07	0.07
	Power Industry	0.39	0.28	0.31	0.34	0.36	0.35	0.35	0.37	0.40	0.42	0.42
	Processes	1.41	0.67	0.71	0.70	0.74	0.68	0.72	0.79	0.82	0.89	0.90
	Transport	0.25	0.17	0.20	0.17	0.17	0.14	0.24	0.31	0.45	0.64	0.66
	Waste	0.24	0.30	0.31	0.33	0.34	0.35	0.35	0.36	0.36	0.37	0.38
	Total	**342.27**	**262.97**	**278.61**	**293.32**	**298.68**	**288.13**	**296.35**	**315.64**	**322.93**	**326.86**	**330.39**

Source: Crippa et al. (2025).

Table 7: GHG emissions for Kyrgyzstan, 1990, 2015–2024, Mt CO^2eq

Substance	Sector	1990	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CO_2	Agriculture	0.18	0.04	0.03	0.13	0.11	0.15	0.10	0.13	0.08	0.07	0.07
	Buildings	4.37	2.39	3.14	4.62	6.20	4.95	4.08	4.23	4.50	4.40	4.59
	Fuel Exploitation	0.01	0.11	0.03	0.05	0.10	0.14	0.09	0.06	0.09	0.10	0.10
	Industrial Combustion	8.45	1.77	0.82	0.80	1.13	0.84	0.46	0.54	0.51	0.48	0.52
	Power Industry	3.92	2.69	1.83	1.49	1.55	2.11	2.34	2.81	2.66	2.46	2.74
	Processes	0.70	0.64	0.62	0.71	0.90	0.91	0.86	1.12	1.21	1.22	1.24
	Transport	6.02	2.67	3.27	1.84	1.49	1.13	1.38	1.63	1.45	1.50	1.48
	Waste											
CH_4	Agriculture	5.75	5.03	5.16	5.29	5.44	5.59	5.71	5.79	5.84	5.91	5.92
	Buildings	0.02	0.10	0.10	0.14	0.17	0.15	0.13	0.10	0.12	0.11	0.13
	Fuel Exploitation	0.77	0.56	0.53	0.54	0.64	0.68	0.71	0.78	0.90	0.89	0.95
	Industrial Combustion	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Power Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Processes											
	Transport	0.04	0.02	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01
	Waste	0.93	2.28	2.52	2.58	2.61	2.65	2.69	2.74	2.80	2.83	2.85
F gases	Processes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N_2O	Agriculture	1.83	1.35	1.36	1.63	1.62	1.75	1.68	1.72	1.60	1.57	1.59
	Buildings	0.01	0.04	0.04	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
	Fuel Exploitation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Industrial Combustion	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Power Industry	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Processes	0.17	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	Transport	0.09	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Waste	0.06	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10
	Total	33.37	19.87	19.63	20.00	22.13	21.23	20.40	21.83	21.95	21.72	22.37

Source: Crippa et al. (2025).

Table 8: GHG emissions for Tajikistan, 1990, 2015–2024, Mt CO^2eq

Substances	Sector	1990	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CO_2	Agriculture	0.15	0.02	0.01	0.11	0.10	0.06	0.09	0.04	0.05	0.05	0.05
	Buildings	8.75	2.53	2.27	1.91	1.92	2.08	2.18	2.33	2.23	2.18	2.30
	Fuel Exploitation	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.03	0.03
	Industrial Combustion		0.06	0.74	1.18	1.58	1.62	1.31	1.41	1.35	1.25	1.39
	Power Industry	1.53	0.29	0.53	0.97	1.49	1.86	2.07	1.80	1.80	1.66	1.85
	Processes	1.15	0.85	0.87	1.57	1.87	2.05	2.03	1.97	1.89	1.88	1.90
	Transport	0.73	1.33	1.29	1.18	1.23	1.36	1.69	1.85	2.21	2.28	2.25
	Waste											
CH_4	Agriculture	3.77	6.33	6.54	6.65	6.69	6.81	6.98	7.22	7.37	7.45	7.47
	Buildings	0.24	0.14	0.11	0.08	0.07	0.07	0.09	0.10	0.10	0.09	0.10
	Fuel Exploitation	0.35	0.64	0.79	0.96	1.01	1.07	1.10	1.10	1.21	1.21	1.24
	Industrial Combustion		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Power Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Processes	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Transport	0.79	1.08	1.12	1.16	1.20	1.26	1.31	1.37	1.43	1.47	1.51
	Waste											
F gases	Processes	3.22	0.31	0.34	0.27	0.25	0.19	0.14	0.10	0.08	0.04	0.01
N_2O	Agriculture	1.18	1.53	1.54	1.82	1.80	1.77	1.89	1.81	1.87	1.86	1.85
	Buildings	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
	Fuel Exploitation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Industrial Combustion		0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
	Power Industry	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Processes	0.03	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04
	Transport	0.00	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03
	Waste	0.05	0.10	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15
	Total	**21.99**	**15.29**	**16.32**	**18.06**	**19.43**	**20.41**	**21.13**	**21.35**	**21.85**	**21.67**	**22.19**

Source: Crippa et al. (2025).

Table 9: GHG emissions for Turkmenistan, 1990, 2015–2024, Mt CO^2eq

Substance	Sector	1990	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CO_2	Agriculture	0.38	0.92	0.84	0.81	0.82	0.89	0.91	0.87	0.85	0.84	0.84
	Buildings	21.02	27.73	26.92	27.28	29.26	29.57	34.04	35.91	36.97	34.17	29.53
	Fuel Exploitation	3.01	8.97	8.53	8.38	8.25	8.71	9.67	8.80	8.81	8.72	8.14
	Industrial Combustion	0.73	0.92	0.91	0.90	1.03	1.01	1.25	15.50	15.81	14.86	12.01
	Power Industry	10.07	15.70	16.51	20.74	21.61	19.82	18.07	21.79	25.76	24.22	19.57
	Processes	0.66	2.34	2.57	2.69	2.21	2.30	2.13	1.65	1.97	1.85	1.94
	Transport	9.82	11.32	11.01	11.37	11.05	10.96	10.76	10.91	11.11	10.06	9.38
	Waste											
CH_4	Agriculture	3.79	9.83	9.94	10.03	10.09	10.16	10.46	10.51	10.51	10.55	10.59
	Buildings	0.16	0.08	0.08	0.08	0.08	0.08	0.09	0.10	0.10	0.09	0.08
	Fuel Exploitation	9.09	17.58	16.43	15.79	15.51	15.45	14.96	14.79	15.20	15.21	14.93
	Industrial Combustion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	Power Industry	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.03
	Processes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transport	0.04	0.04	0.04	0.04	0.03	0.04	0.03	0.04	0.04	0.03	0.03
	Waste	0.67	1.25	1.28	1.32	1.35	1.38	1.39	1.36	1.43	1.46	1.49
F-gases	Processes	0.00	0.13	0.15	0.16	0.18	0.20	0.22	0.24	0.25	0.27	0.29
N_2O	Agriculture	1.50	4.84	4.56	4.54	4.52	4.59	4.74	4.72	4.71	4.73	4.77
	Buildings	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.02
	Fuel Exploitation	0.00	0.02	0.02	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01
	Industrial Combustion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	Power Industry	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Processes	0.23	0.91	0.90	0.90	0.90	0.90	0.91	0.97	0.98	0.96	0.94
	Transport	0.06	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07
	Waste	0.05	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Total	**61.32**	**102.82**	**100.91**	**105.30**	**107.16**	**106.33**	**109.88**	**128.43**	**134.78**	**128.32**	**114.81**

Source: Crippa et al. (2025).

Table 10: GHG emissions for Uzbekistan, 1990, 2015–2024, Mt CO^2eq

Substances	Sector	1990	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CO_2	Agriculture	2.48	1.88	1.97	1.46	1.79	1.82	1.92	1.79	1.80	1.76	1.77
	Buildings	62.47	29.69	33.51	35.41	28.05	27.63	37.66	35.99	31.23	32.06	36.66
	Fuel Exploitation	3.78	7.22	7.37	7.67	12.29	10.04	9.21	8.94	8.91	8.53	9.32
	Industrial Combustion	0.41	9.96	10.72	11.85	11.70	13.32	11.89	13.10	14.80	14.90	16.99
	Power Industry	43.81	43.94	45.17	45.73	37.09	39.13	39.40	48.47	44.08	47.70	54.38
	Processes	7.23	6.73	7.08	7.29	7.39	8.20	8.21	9.79	10.27	10.05	10.17
	Transport	7.69	8.13	8.20	8.86	14.47	14.97	15.65	16.28	17.82	17.63	19.25
	Waste											
CH_4	Agriculture	16.76	29.00	31.57	32.38	33.20	33.67	34.21	35.13	35.92	37.62	37.79
	Buildings	0.61	0.21	0.31	0.26	0.27	0.20	0.43	0.22	0.28	0.39	0.43
	Fuel Exploitation	6.29	18.99	18.48	19.34	20.24	21.15	19.79	20.59	20.95	19.89	19.41
	Industrial Combustion	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Power Industry	0.02	0.02	0.03	0.03	0.02	0.03	0.03	0.04	0.03	0.03	0.04
	Processes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Transport	0.08	0.03	0.03	0.03	0.11	0.12	0.12	0.14	0.15	0.15	0.17
	Waste	3.34	5.42	5.52	5.60	5.69	5.80	5.87	6.02	6.24	6.32	6.45
F gases	Processes	0.01	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26
N_2O	Agriculture	7.26	10.83	11.82	10.91	11.71	12.01	12.26	12.33	12.62	12.48	12.69
	Buildings	0.07	0.02	0.03	0.03	0.02	0.02	0.04	0.02	0.04	0.05	0.05
	Fuel Exploitation	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Industrial Combustion	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Power Industry	0.05	0.04	0.08	0.08	0.08	0.09	0.10	0.12	0.12	0.18	0.19
	Processes	0.52	0.24	0.24	0.25	0.30	0.31	0.32	0.33	0.34	0.35	0.39
	Transport	0.05	0.11	0.11	0.11	0.28	0.30	0.31	0.33	0.38	0.37	0.42
	Waste	0.27	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.61	0.62	0.63
	Total	**163.18**	**173.19**	**182.97**	**188.05**	**185.52**	**189.64**	**198.24**	**210.48**	**206.85**	**211.37**	**227.49**

Source: Crippa et al. (2025).

Annex VII: References

Documents

Abakirov U. (2024). Tajikistan approves state greening program until 2040. Available at https://www.trend.az/casia/tajikistan/3918024.html.

ADB (2021). Kyrgyz Republic: Landslide Risk Management Sector Project. Project Administration Manual. Available at https://www.adb.org/sites/default/files/project-documents/53022/53022-001-pam-en.pdf

ADB (2025). Republic of Tajikistan: Green Corridor Demonstration Project. Project Administration Manual. Available at https://www.adb.org/sites/default/files/project-documents/54286/54286-001-pam-en_0.pdf

Ahmadov E. (2010). Uzbekistan's ecological movement demonstrates against Tajik aluminum company. Available at https://www.cacianalyst.org/publications/field-reports/item/12036-field-reports-caci-analyst-2010-4-14-art-12036.html?tmpl=component&print=1.

Akhmadiyeva Z., Herzfeld T. (2021). The reality of land rights in Kazakhstan and Uzbekistan. Available at https://www.iamo.de/fileadmin/user_upload/iamo2021_en_c1.pdf.

Akhmetkali A. (2024). UN Expert Warns of Land Degradation Risks in Central Asia. Available at https://astanatimes.com/2024/03/un-expert-warns-of-land-degradation-risks-in-central-asia/.

Arabov N. et al. (2024). Addressing the Economic Impacts of Climate Change in Uzbekistan: Challenges and Strategies. E3S Web of Conferences 542, 04006. Available at www.e3s-conferences.org/articles/e3sconf/abs/2024/72/e3sconf_yifhg2024_04006/e3sconf_yifhg2024_04006.html

Asia-Plus (2024). *One in seven hectares of land in Tajikistan is affected by Salinization. Asia-Plus*. Available at: https://asiaplustj.info/en/news/tajikistan/economic/20241223/one-in-seven-hectares-of-land-in-tajikistan-is-affected-by-salinization.

Bahrulo S. (2025). Tajikistan's Global Push to Combat Glacier Melting. Available at https://thediplomaticinsight.com/tajikistans-global-push-to-combat-glacier-melting/.

BIOFIN (2026). Kazakhstan Approves National Biodiversity Conservation Strategy for 2026–2035. Available at https://www.biofin.org/news-and-media/kazakhstan-approves-national-biodiversity-conservation-strategy-2026-2035

BTI (2024). Turkmenistan Country Report 2024. Available at https://bti-project.org/en/reports/country-report/TKM.

CAREC (2021). Regional strategy for drought management and mitigation in Central Asia for 2021–2030. Available at https://www.unccd.int/resources/brief/regional-strategy-drought-risk-management-and-mitigation-central-asia-2021-2030.

_____ (2025). Clean Water and Sewage for All: Tajikistan to Have Them by 2040. Available at https://centralasiaclimateportal.org/clean-water-and-sewage-for-all-tajikistan-to-have-them-by-2040/.

_____ (2025a). Kazakhstan's renewable energy industry proposed to be suspended. Available at https://centralasiaclimateportal.org/kazakhstans-renewable-energy-industry-proposed-to-be-suspended/.

_____ (2025b). The President of Kyrgyzstan proposed to consolidate efforts in promoting the mountain agenda. Available at https://centralasiaclimateportal.org/the-president-of-kyrgyzstan-proposed-to-consolidate-efforts-in-promoting-the-mountain-agenda-presidents-speech/.

_____ (2025c). Regional Climate Change Adaptation Strategy in Central Asia. Available at https://centralasiaclimateportal.org/publications/regional-climate-change-adaptation-strategy-in-central-asia/.

CAWater-Info (1992). Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Uzbekistan, the Republic of Tajikistan, and Turkmenistan on cooperation in the field of joint management of the use and protection of water resources of interstate sources. Available at https://www.cawater-info.net/library/rus/icwc1.pdf.

_____ (2024). Water Yearbook – Central Asia and around the Globe. Available at https://www.cawater-info.net/yearbook/index_e.htm.

CBD (2024). Notification 2024-054. Dialogue on National Biodiversity Strategies and Action Plans in Tajikistan, 30 July to 1 August 2024, Dushanbe, Republic of Tajikistan. Available at https://www.cbd.int/notifications/2024-054

_____ (n.d.) Uzbekistan – Country Profile. Available at https://www.cbd.int/countries/profile?country=uz.

Chorshanbiev P. (2025). Tajikistan approves Electricity Sector Development Program for 2026–2030. Available at https://asiaplustj.info/ru/news/tajikistan/economic/20251220/v-tadzhikistane-utverdili-programmu-razvitiya-elektroenergeticheskogo-sektora-na-2026-2030-godi.

Cis Internet Portal (2026). В Туркменистане разработана новая Национальная лесная программа на 2026–2030 годы. Available at https://e-cis.info/news/567/133374/.

Crippa M., Guizzardi D., Pagani F., Banja M., Muntean M. et al. (2025). GHG emissions of all world countries. Publications Office of the European Union, Luxembourg, 2025, doi:10.2760/9816914, JRC143227. Available at https://edgar.jrc.ec.europa.eu/report_2025.

EBRD (n.d.). Methane Emissions Reduction Programme in the Energy, Waste and Agribusiness Sectors. Available at www.ebrd.com/home/work-with-us/projects/tcpsd/16401.html.

Dankov (2023). The Belt and Road Initiative and Sustainable Urban Development in Central Asia. In: Mihr, A., Sorbello, P., Weiffen, B. (eds) Securitization and Democracy in Eurasia. Springer, Cham. Available at https://doi.org/10.1007/978-3-031-16659-4_20.

Daryo.uz (2025). Kyrgyzstan adopts new water code to regulate use and protection of resources. Available at https://daryo.uz/en/2025/07/02/kyrgyzstan-adopts-new-water-code-to-regulate-use-and-protection-of-resources/.

Driscoll, E., Portugues Fernandez del Castillo, J., Bazarkulova, D., Hicks, D. and de Beurs, K. (2025). Using satellite imagery to track the development of the green belt of Astana, Kazakhstan: A remote sensing perspective on artificial forestry development. Remote Sensing Applications: Society and Environment, 38, 101543. Available at https://doi.org/10.1016/j.rsase.2025.101543

ECE (2012). 1st Environmental Performance Review of Turkmenistan. Available at https://unece.org/environment-policy/publications/1st-environmental-performance-review-turkmenistan.

_____ (2019). 3rd Environmental Performance Review of Kazakhstan. Available at https://unece.org/environment-policy/publications/3rd-environmental-performance-review-kazakhstan.

_____ (2019a). Fourteenth session of the SPECA Governing Council. Available at https://unece.org/info/SPECA/events/20176.

_____ (2019b). Principles of Sustainable Trade. Available at https://unece.org/fileadmin/DAM/SPECA/documents/gc/session14/Principles_of_Sustainable_Trade__Trade__English.pdf.

_____ (2020). Smart Sustainable Cities Profile: Nur-Sultan, Kazakhstan. Available at https://unece.org/housing/nursultan-cityprofile.

_____ (2024). 3rd Environmental Performance Review of Kyrgyzstan. Available at https://unece.org/info/Environment-Policy/Environmental-Performance-Reviews/pub/390916.

_____ (2024a). UN initiatives on water management in Central Asia and potential entry points. Available at https://uneuropecentralasia.org/sites/default/files/2025-01/IBC%20Central%20Asia%20Water%20Paper%202024_Final.pdf.

_____ (2025). Sustainable Transport Action Plan for Kyrgyzstan: Promoting low carbon and environmentally friendly transport. Available at https://unece.org/publications/sustainable-transport-action-plan-kyrgyzstan-promoting-low-carbon-and-environmentally.

_____ (2025a). 4th Environmental Performance Review of Tajikistan.

_____ (2026). 4th Environmental Performance Review of Uzbekistan.

_____ (n.d.). Strengthening action in Uzbekistan on water and sanitation and protection of water resources from accidental pollution in the face of climate change. Available at https://unece.org/strengthening-action-uzbekistan-water-and-sanitation-and-protection-water-resources-accidental.

EDB (2024). Drinking Water Supply and Sanitation in Central Asia. Eurasian Development Bank. Available at https://eabr.org/en/analytics/special-reports/drinking-water-supply-and-sanitation-in-central-asia/.

ESCAP (2013). Urbanization in Central Asia: Challenges, Issues and Prospects. Available at https://www.unescap.org/resources/urbanization-central-asia-challenges-issues-and-prospects.

_____ (2024). Asia and the Pacific SDG progress report 2024: showing transformative actions. Available at https://www.unescap.org/kp/2024/asia-and-pacific-sdg-progress-report-2024#.

EU (2016). Disaster risk reduction in Uzbekistan. Available at https://www.eeas.europa.eu/node/12425_en.

Eurasianet (2025). Uzbekistan: Going green in a big way. Available at https://eurasianet.org/uzbekistan-going-green-in-a-big-way.

FAO (2006). Food security. Policy Brief Issue 2. Available at https://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf.

_____ (2020). Global Forest Resources Assessment 2020. Available at https://www.fao.org/interactive/forest-resources-assessment/2020/en/.

_____ (2022). Improving Biodiversity and Sustainable Forestry in Azerbaijan, Kazakhstan, Kyrgyzstan, Montenegro, Tajikistan, Türkiye, Turkmenistan and Uzbekistan. GCP /SEC/025/TUR. Available at https://openknowledge.fao.org/items/d111d7af-ce26-426d-9ed8-9b83c9087953.

_____ (2022b). Comprehensive analysis of the disaster risk reduction system for the agricultural sector in Tajikistan. Available at https://openknowledge.fao.org/server/api/core/bitstreams/21b72bb4-24eb-4eb1-9282-9838423ca6c2/content

_____ (2024). Policy Analysis of Nationally Determined Contributions in Europe and Central Asia. Available at https://openknowledge.fao.org/bitstreams/77e50019-a122-4c47-8e01-054404f5b28a/download

_____ (2024a). FAO commemorates International Mountain Day 2025 by spotlighting glacier preservation. Available at https://www.fao.org/newsroom/detail/fao-commemorates-international-mountain-day-2025-by-spotlighting-glacier-preservation/en.

FAO (2025). Seven artificial glaciers created in Batken region for sustainable agriculture and climate change adaptation. Available at https://www.fao.org/countryprofiles/news-archive/detail-news/en/c/1735375/

FAO (n.d.). Kyrgyzstan. Available at https://www.fao.org/platforms/green-agriculture/countries/kyrgyzstan/en.

FAO, IFAD, ECE, UNICEF, WHO and WMO (2025). Europe and Central Asia Regional Overview of Food Security and Nutrition 2024 – Managing water sustainably for improved food security and nutrition. Budapest. Available at https://doi.org/10.4060/cd4739en.

Fayzieva K. (2025). Afghanistan's Qosh Tepa Canal and the Paradox of Central Asian Water Politics. Avilable at https://thediplomat.com/2025/09/afghanistans-qosh-tepa-canal-and-the-paradox-of-central-asian-water-politics/.

FiBL & IOFAM (2025). The World of Organic Agriculture. Statistics and emerging trends 2025. Available at https://www.fibl.org/fileadmin/documents/shop/1797-organic-world-2025.pdf.

Gazeta.uz (2023). At the initiative of the President, "Suvchilar Maktabi" was launched. Available at https://www.gazeta.uz/ru/2023/06/03/agrobank/.

_____ (2024). US company helped Uzbekistan to detect over 50,000 methane leaks. Available at www.gazeta.uz/en/2024/10/03/leak-detection/.

GIZ (n.d.). Professional Green Skills for Central Asia. Available at https://www.giz.de/en/projects/professional-green-skills-central-asia.

Gleick P. (n.d.). National Geographic ScienceBlogs: The Death of the Aral Sea. Available at https://pacinst.org/national-geographic-scienceblogs-the-death-of-the-aral-sea/.

Global Soil Partnership (2025). *Advancing sustainable soil management in Turkmenistan: tackling salinity and erosion challenges through the Global Soil Doctors Programme. FAO*. Available at: https://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1731664/

Hamidov, A., Helming, K. & Balla, D. (2016). Impact of agricultural land use in Central Asia: a review. Agron. Sustain. Dev. 36, 6 (2016). Available at https://doi.org/10.1007/s13593-015-0337-7

Helwig J. (2026). IAEA and Central Asian countries Extend Cooperation on Safe Management of Former Uranium Mining Sites. Available at https://www.iaea.org/newscenter/news/iaea-and-central-asian-countries-extend-cooperation-on-safe-management-of-former-uranium-mining-sites-0.

Human Rights Watch (2024). Turkmenistan Events of 2023. Available at https://www.hrw.org/world-report/2024/country-chapters/turkmenistan.

IAEA (2026). IAEA and Central Asian Countries Extend Cooperation on Safe Management of Former Uranium Mining Sites. Available at https://www.iaea.org/newscenter/news/iaea-and-central-asian-countries-extend-cooperation-on-safe-management-of-former-uranium-mining-sites-0.

IISD (2025). National Report on the State of the Environment, Turkmenistan.

ILO (1999). Decent work and the 2030 agenda for sustainable development. Available at https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@dcomm/documents/publication/wcms_436923.pdf.

IPCC (2021). Climate Change 2021: The Physical Science Basis. Available at https://www.ipcc.ch/report/ar6/wg1/.

IUCN (n.d.). IUCN Red List of Threatened Species. Available at https://www.iucnredlist.org/.

Kazakhstan (2025). Kazakhstan NDC 3.0. Available at https://unfccc.int/documents/630387.

_____ (2025a). Water Code. Available at https://adilet.zan.kz/rus/docs/K2500000178.

Khovar (2025). The Program of Environmental Education and Culture in Tajikistan for 2026–2030 was presented in Dushanbe. Available at https://khovar.tj/rus/2025/12/v-dushanbe-predstavlena-programma-ekologicheskogo-prosveshheniya-i-kultury-v-tadzhikistane-na-2026-2030-gody/.

Kyrgyzstan (2018). About the Concept of complex protection of the population and the territory of the Kyrgyz Republic from emergency situations for 2018–2030. Available at https://cis-legislation.com/document.fwx?rgn=111758.

_____ (2025). Nationally Determined Contribution of the Kyrgyz Republic NDC3.0. Available at https://unfccc.int/sites/default/files/2025-10/NDC3.0_Kyrgyzstan_English_30-09-2025%20%282%29.pdf.

Kun.uz (2025). Gov't mandates solar panels and energy-efficient heating in new buildings. Available at https://kun.uz/en/news/2025/03/17/govt-mandates-solar-panels-and-energy-efficient-heating-in-new-buildings.

Lex.uz (2025). Water Code of Uzbekistan. Available at https://lex.uz/en/docs/7655343.

Ministry of Agriculture, Fisheries, Food Security and Nature of the Netherlands (2026). Agricultural newsletter of Central Asia December 2025. Available at https://www.agroberichtenbuitenland.nl/actueel/nieuws/2026/01/20/agricultural-newsletter-of-central-asia-december-2025.

Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan (2023). National state of the environment report: Uzbekistan. International Institute for Sustainable Development. Available at https://www.iisd.org/publications/report/uzbekistan-state-of-the-environment.

_____ (2024). National State of the Environment Report: Uzbekistan. Available at https://gov.uz/en/eco/news/view/8684.

Ministry of Ecology and Natural Resources of Kazakhstan (2025). The Ministry of Ecology summed up the results. Available at https://www.gov.kz/memleket/entities/ecogeo/press/news/details/1128859?lang=ru.

_____ (2025a). Nationally determined contribution of the Republic of Kazakhstan to the global response to climate change until 2035. Available at https://unfccc.int/sites/default/files/2025-11/NDC_Kazakhstan%203.0%20eng.pdf.

Ministry of Energy and Water Resources of Tajikistan (2024). Establishing a strategic framework for achieving universal access to safely-managed drinking water supply and sanitation services in Tajikistan. Available at https://sdgs.un.org/partnership-progress/establishing-strategic-framework-achieving-universal-access-safely-managed.

Ministry of Justice of Kazakhstan (2024). On approval of the Concept for the Development of the Water Resources Management System of the Republic of Kazakhstan for 2024–2030. Available at https://adilet.zan.kz/rus/docs/P2400000066.

Ministry of Natural Resources, Environment, and Technical Supervision of Kyrgyzstan (2025). COP30: Kyrgyzstan promotes creation of Global Mountain Resilience Center in Bishkek. Available at https://en.kabar.kg/news/cop30-kyrgyzstan-promotes-creation-of-global-mountain-resilience-center-in-bishkek/.

Ministry of Water Resources and Irrigation of Kazakhstan (2025). 579 billion tenge of investments have been attracted into fixed capital in the water sector over the past two years. Available at https://www.gov.kz/memleket/entities/water/press/news/details/1128850?lang=ru.

_____ (2026). Водная дипломатия: Около 30 млрд кубометров воды направлено в озеро Балхаш за последние два. Available at https://www.gov.kz/memleket/entities/water/press/news/details/1145263?lang=ru.

_____ (2026a). Установка и развертывание информационной системы для управления подземными водами завершена в Казахстане. Available at https://www.gov.kz/memleket/entities/water/press/news/details/1149723?lang=ru.

_____ (2026b). Пять учебных центров устойчивого орошения будут созданы на базе южных филиалов РГП «Казводхоз». Available at https://www.gov.kz/memleket/entities/water/press/news/details/1148622?lang=ru.

Mommayev N. (2022). Lithium and Prospects of Lithium Mining in Turkmenistan. Available at https://business.com.tm/post/8407/lithium-and-prospects-of-lithium-mining-in-turkmenistan.

National Information Agency “Ecology” (2026). A network of soil science centers will be created in Central Asia and Mongolia. Available at https://nia.eco/2026/01/16/110879/.

OECD (2022), Green Economy Transition in Eastern Europe, the Caucasus and Central Asia: Progress and Ways Forward, OECD Green Growth Studies, OECD Publishing, Paris, Available at https://doi.org/10.1787/c410b82a-en.

Omirgazy D. (2025). Kazakhstan Invests Recovered Assets to Transform Rural Water Access. Available at https://astanatimes.com/2025/03/kazakhstan-invests-recovered-assets-to-transform-rural-water-access/.

Othering and Belonging Institute (2025). Available at https://belonging.berkeley.edu/climatedisplacement/case-studies/turkmenistan.

Pohl B.; Kramer A., Hull W., Blumstein S., Abdullaev S., Kazbekov J., Reznikova T., Strikeleva E., Interwies E. and Görlitz S. (2017). Rethinking Water in Central Asia: The costs of inaction and benefits of water cooperation. Available at https://adelphi.de/en/publications/rethinking-water-in-central-asia.

Peña-Guerrero, M.D., Senay, G.B., Umirbekov, A. et al. (2026). Climate change has increased crop water consumption in Central Asia despite less water-intensive cropping. Commun Earth Environ 7, 122 (2026). Available at https://doi.org/10.1038/s43247-025-03142-y

Prime Minister of Kazakhstan (2025). How the Government Is Implementing the President’s Directive on Large-Scale Modernization of the Water Sector. Available at https://primeminister.kz/en/news/reviews/how-the-government-is-implementing-the-presidents-directive-on-large-scale-modernization-of-the-water-sector-30249.

_____(2026). A Concept for the Integrated Use of Groundwater Is Being Developed in Kazakhstan. Available at https://primeminister.kz/en/news/a-concept-for-the-integrated-use-of-groundwater-is-being-developed-in-kazakhstan-30953.

_____ (2026a). Олжас Бектенов поручил расширить меры поддержки в целях развития обрабатывающей промышленности. Available at https://primeminister.kz/ru/news/ispolnenie-porucenii-prezidenta-obieem-severnogo-arala-planiruetsiauvelicit-do-34-kub-kilometrov-30988.

PwC (2025). Uzbekistan. Corporate – Other taxes. Available at https://taxsummaries.pwc.com/republic-of-uzbekistan/corporate/other-taxes.

Reyer C.P.O., Otto I.M., Adams, S., Albrecht, T., Baarsch F., Cartsburg M., Coumou D. et al. (2017). Climate change impacts in Central Asia and their implications for development. Regional Environmental Change, 17(6): 1639-1650. Available at https://doi.org/10.1007/s10113-015-0893-z.

Rield O. (2023). Updates to the inventory and mapping of TMFs in Kazakhstan. Available at https://unece.org/environment/documents/2023/03/presentations/updates-inventory-and-mapping-tmfs-kazakhstan-ms.

Sachs J.D., Lafortune G., Fuller G. and Iablonovski G. (2025). Sustainable Development Report 2025. Financing Sustainable Development to 2030 and Mid-Century. Available at https://s3.amazonaws.com/sustainabledevelopment.report/2025/sustainable-development-report-2025.pdf.

Sailaukhanuly Y., Azat S., Kunarbekova M., Tovassarov A., Toshtay K., Tauanov Z., Carlsen L., Berndtsson R. (2024). Health Risk Assess Sailaukhanuly ment of Nitrate in Drinking Water with Potential Source Identification: A Case Study in Almaty, Kazakhstan. Available at https://portal.research.lu.se/sv/publications/health-risk-assessment-of-nitrate-in-drinking-water-with-potentia/.

Sangini I., Timurova A. (2024). The Role of Civil Society in Green and Just Transition in Central Asia. Available at https://cabar.asia/en/the-role-of-civil-society-in-green-and-just-transition-in-central-asia.

Satubaldina A. (2025). Kazakhstan Eyes Stronger Carbon Market as Global ETS Evolves. Available at https://astanatimes.com/2025/08/kazakhstan-eyes-stronger-carbon-market-as-global-ets-evolves/.

SCI (n.d.). Regional Environmental Programme for Sustainable Development of Central Asia (REP4SD CA) for 2020–2030. Available at https://sic-icsd.com.tm/en/strategii-i-programmy/rpoosur

Scissa, C. and Martin S.F. (2024). Migration in the Context of Climate and Environmental Changes within Central Asia and to the European Union and the Russian Federation. International Organization for Migration (IOM), Geneva. Available at: https://publications.iom.int/books/migration-context-climate-and-environmental-changes-within-central-asia-and-european-union.

Smanov, Z., Duisenbayev, S., Zulpykharov, K., Laiskhanov, S., Turymtayev, Z., Kozhayev, Z., Taukebayev, O. (2025). Soil salinization and its impact on the degradation of agricultural landscapes of the Talas District, Kazakhstan. Journal of the Geographical Institute "Jovan Cvijić" SASA, 75(2), 233–250. Available at https://doi.org/10.2298/IJGI2502233S.

Sultanov A. (2025). Water Code: Switzerland to help Kyrgyzstan introduce water use permit system. Available at https://24.kg/english/349705_Water_Code_Switzerland_to_help_Kyrgyzstan_introduce_water_use_permit_system/.

Tajikistan (2022). The updated NDC of the Republic of Tajikistan. Available at https://unfccc.int/sites/default/files/NDC/2022-06/NDC_TAJIKISTAN_ENG.pdf.

Tengrinews.kz (2024). President Kassym-Jomart Tokayev signed the law on ratification of the agreement with Uzbekistan in the field of ecology and environmental protection. Available at https://en.tengrinews.kz/kazakhstan_news/tokayev-ratified-the-agreement-with-uzbekistan-264956/.

The Economist Group (2022). Global Food Security Index 2022. Available at https://impact.economist.com/sustainability/project/food-security-index/reports/Economist_Impact_GFSI_2022_Global_Report_Sep_2022.pdf.

The Caspian Post (2025). Uzbekistan Sets High Bar in Water Reform with Strategic Leadership and Global Backing. Available at https://caspianpost.com/uzbekistan/uzbekistan-sets-high-bar-in-water-reform-with-strategic-leadership-and-global-backing.

_____ (2025a). Kyrgyzstan Plans to Boost Organic Agriculture Development. Available at https://caspianpost.com/kyrgyzstan/kyrgyzstan-plans-to-boost-organic-agriculture-development. .

The Tashkent Times (2025). President Mirziyoyev signs decree raising wages of budget-financed organizations, pensions, stipends and benefits from July 1. Available at https://tashkenttimes.uz/economy/15345-president-mirziyoyev-signs-decree.

Tulaganova S. (2025). How Uzbekistan has achieved rapid SDG progress. Available at https://www.dandc.eu/en/article/its-leap-forward-has-raised-eyebrows-central-asian-country-ranks-fifth-worldwide-its-2015.

Tukueva T. (2026). World Bank to Support First Regional Electricity Market in Central Asia. Available at https://24.kg/ekonomika/359094_vsemirnyiy_bank_podderjit_pervyiy_regionalnyiy_ryinok_elektroenergi/.

Turkmenistan (2023). Urban transport of the first «smart» city of Arkadag in Turkmenistan. Available at https://turkmenistan.gov.tm/en/post/73641/urban-transport-first-smart-city-arkadag-turkmenistan.

Turkmenistan News Portal (2025). The initiative to establish a Regional Center to Combat Desertification has received international support. Available at https://turkmenistaninfo.gov.tm/en/news/initsiativa-po-sozdaniiu-regionalnogo-tsentra-borby-s-opustynivaniem-poluchila-mezhdunarodnuiu-podderzhku.

_____ (2026). Transport as a catalyst for the global economy and a sustainable future. Available at https://turkmenistaninfo.gov.tm/en/news/transport-kak-katali.

Tursunaliyev A. (n.d.). Central Asian Countries Unite for Sustainable Development. Available at https://www.ouzbekistan.fr/news/3107?language=en&.

UN Geospatial (2026). Central Asia. Available at https://www.un.org/geospatial/content/central-asia-1

UNCCD (2023). Over one-fifth of Central Asia's land degraded, new UN data warns. Available at https://www.unccd.int/news-stories/press-releases/over-one-fifth-central-asias-land-degraded-new-un-data-warns.

_____ (2023a). Regional factsheet on Central Asia. Available at https://www.unccd.int/resources/factsheets/regional-factsheet-central-asia.

_____ (2025). Restoring land, restoring lives: A new chapter for Kyrgyzstan. Available at https://www.unccd.int/news-stories/stories/restoring-land-restoring-lives-new-chapter-kyrgyzstan.

UNCT Kazakhstan (2026). Assessment of Ecological Priorities for Kazakhstan.

UNDESA (n.d.). *SDG* indicator *base*. *SDG Country Profile Uzbekistan.* Available at https://unstats.un.org/sdgs/dataportal/countryprofiles/uzb#.

UNDP (2022). Astana fashions a people-friendly city through clean energy transition. Available at https://www.undp.org/eurasia/stories/people-friendly-city.

_____ (2022a). High-Level Central Asian Dialogue on Climate Change and Resilience. Available at https://www.undp.org/uzbekistan/high-level-central-asian-dialogue-on-climate-change.

_____(2023). Uzbekistan – Biodiversity Expenditure Review. Available at www.biofin.org/sites/default/files/content/knowledge_products/BER%20Uzbekistan%202023_Eng_Final%20Final_rev.19.07.24.pdf

_____ (2025). Enhancing Rural Access to Clean Drinking Water and Wastewater Treatment System in Karakalpakstan. Available at https://www.undp.org/uzbekistan/press-releases/enhancing-rural-access-clean-drinking-water-and-wastewater-treatment-system-karakalpakstan.

_____ (2025a). UNDP and Government of Turkmenistan Conclude Landmark Project on Seismic Risk Reduction. Available at https://www.undp.org/turkmenistan/press-releases/undp-and-government-turkmenistan-conclude-landmark-project-seismic-risk-reduction.

_____ (n.d.). Piloting Climate Change Adaptation to Protect Human Health in Uzbekistan. Available at https://www.adaptation-undp.org/projects/piloting-climate-change-adaptation-protect-human-health-uzbekistan.

UNDRR (2015). Sendai Framework for Disaster Risk Reduction 2015–2030. Available at https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030.

_____ (2025). Pioneering regional resilience: Kazakhstan's model for transboundary disaster risk reduction. Available at https://www.undrr.org/resource/case-study/pioneering-regional-resilience-kazakhstans-model-transboundary-disaster-risk.

UNDRR and UNDP (2024). Early Warning Systems Stakeholders Mapping Exercise Across Central Asia. Available at https://www.undrr.org/publication/documents-and-publications/early-warning-systems-stakeholders-mapping-exercise-across

UNEP (n.d.). Overview of Nature-based solutions. Available at https://www.unep.org/topics/nature-action/nature-based-solutions/overview-nature-based-solutions.

UNICEF (2025). Turkmenistan Launches the Implementation of the Green School Programme – a Joint initiative of the Ministry of Education and UNICEF. Available at https://www.unicef.org/turkmenistan/press-releases/turkmenistan-launches-implementation-green-school-programme-joint-initiative.

United Nations (2025). Progress in the implementation of the Roadmap for Strengthening SDG Reporting in Turkmenistan for the period 2025–2027. Available at https://turkmenistan.un.org/en/304652-progress-implementation-roadmap-strengthening-sdg-reporting-turkmenistan-period-2025%E2%80%932027.

_____ (n.d.). World Population Prospects 2024. Available at https://population.un.org/wpp/.

Urozolievna G. Z. (2025). Soil degradation in Uzbekistan: a quantitative analysis of salinization, deflation, and socio-economic consequences. London International Monthly Conference on Multidisciplinary Research and Innovation (LIMCMRI), 2(1), 460-463. Available at https://worldsiencepub.com/index.php/lmc/article/view/563

USGS (n.d.). Minerals Yearbook – Metals and Minerals. Available at https://www.usgs.gov/centers/national-minerals-information-center/minerals-yearbook-metals-and-minerals.

Usov A. (2022). Kyrgyz capital Bishkek launches Green City Action Plan. Available at https://www.ebrd.com/home/news-and-events/news/2022/kyrgyz-capital-bishkek-launches-green-city-action-plan.html#.

_____ (2025). EBRD gives positive outlook for Central Asian economies. Available at https://www.ebrd.com/home/news-and-events/news/2025/ebrd-gives-positive-outlook-for-central-asian-economies.html

UZA (2026). Progress in implementing instructions related to the oil and gas sector reviewed. Available at https://uza.uz/ru/posts/obsuzhdeny-voprosy-povysheniya-energoeffektivnosti-i-razvitiya-rynka-energetiki_806772

UzDaily.uz (2024). From 1 April, the excise tax on gasoline, diesel fuel and gas will increase. Available at www.uzdaily.uz/en/from-1-april-the-excise-tax-on-gasoline-diesel-fuel-and-gas-will-increase.

_____ (2026). The first stage of green hydrogen production has been launched in Uzbekistan. Available at https://www.uzdaily.uz/ru/v-uzbekistane-zapushchen-pervyi-etap-proizvodstva-zelionogo-vodoroda/.

_____ (2026a). EBRD to invest up to $195.5 million in construction of solar power plant and battery storage in Uzbekistan. Available at https://www.uzdaily.uz/ru/ebrr-investiruet-do-1955-mln-v-stroitelstvo-solnechnoi-elektrostantsii-i-akkumuliatornogo-khranilishcha-v-uzbekistane/.

Uzbekistan (2024). Fourth National Communication to the United Nations Framework Convention for Climate Change. Available at https://unfccc.int/sites/default/files/resource/4NC_Uzbekistan_ENG_14%2010_SEC.pdf.

_____ (2025). Uzbekistan NDC 3.0. Available at https://unfccc.int/documents/498027.

Voitas K. (2025). Truths from the bottom: Experts from Kazakhstan, Kyrgyzstan, Russia and Uzbekistan discussed the situation around the Aral Sea. Available at https://rg.ru/2025/12/22/realnaia-katastrofa-kak-ostanovit-peresyhanie-aralskogo-moria.html.

WHO (2022). Roadmap for health and well-being in Central Asia (2022–2025). Copenhagen: WHO Regional Office for Europe. Available at https://www.who.int/europe/publications/i/item/WHO-EURO-2022-5905-45670-65601.

_____ (2025.). WHO enhances national capacity on environment and health through the One Health approach in Turkmenistan. Available at https://www.who.int/turkmenistan/events/item/2025/11/17/default-calendar/who-enhances-national-capacity-on-environment-and-health-through-the-one-health-approach-in-turkmenistan.

_____ (n.d.). Health and Environment Country Scorecards. Available at https://www.who.int/teams/environment-climate-change-and-health/monitoring/scorecards.

World Bank (2017). A Rocky Future? Ensuring Central Asia's Mountains are Climate and Disaster Resilient. Available at https://www.worldbank.org/en/news/feature/2017/12/11/ensuring-central-asias-mountains-are-climate-and-disaster-resilient.

_____ (2020). Disaster Property Insurance in Uzbekistan: Overview and Recommendations. Available at https://openknowledge.worldbank.org/entities/publication/29efd284-17af-5a6a-a543-435be3d0588b.

_____ (2021). Uzbekistan: Second Agricultural Public Expenditure Review. Available at https://openknowledge.worldbank.org/server/api/core/bitstreams/123d4d00-7132-5df4-a1c4-40f5c4a82b10/content.

_____ (2022). Green Growth and Climate Change in Uzbekistan Policy Dialogue Series: A Compendium of Proceedings. Available at https://documents1.worldbank.org/curated/en/099240007072223752/pdf/P1771080edd66408f0bcd9015de19bc66dc.pdf.

_____ (2022a). Towards a Greener Economy in Uzbekistan. Available at https://documents1.worldbank.org/curated/en/099920009092215042/pdf/P17852214a422b0d7193c41dac9a52927a4.pdf .

_____ (2023). Air Quality Management in Tajikistan. Available at: https://openknowledge.worldbank.org/entities/publication/6cda3107-4943-44f7-aab8-11f4454723db

_____ (2024). RESILAND CA+ Program: Tajikistan Resilient Landscape Restoration Project (P171524). Available at https://documents1.worldbank.org/curated/en/099091324062044122/pdf/P1715241dc439005d1a7b5163418e25d875.pdf.

_____ (2024a). Kyrgyz Republic – General Water Security Assessment. Available at https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099062424121121592.

_____ (2025). Kazakhstan General Water Security Assessment. Available at https://documents1.worldbank.org/curated/en/099062424121021579/pdf/P1700301c580430118aca1917d53b41c92.pdf.

_____ (2025a). Air Quality Management in Central Asia: Summary Report. Available at https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099050125114034648.

Zoi Environment Network (2015). The State of the Environment in Central Asia. Available at https://zoinet.org/wp-content/uploads/2018/02/SOE-regional-eng.pdf.

_____ (2022). Methane In Central Asia Emissions, Trends, Actions. Available at https://zoinet.org/wp-content/uploads/2022/09/methane-CA_EN.pdf.

_____ (2022a). Environmental information in Central Asia 2022. Available at https://zoinet.org/product/seis-ca-2022/.

Websites

CAREC (Biodiversity) https://centralasiaclimateportal.org/sector/biodiversity/

CAREC (Corridors) https://carecprogram.org/?page_id=20

CASA-1000 https://www.casa-1000.org/

Convention on Wetlands (The Contracting Parties). https://www.ramsar.org/contracting-parties

GEF–UNDP–UNESCO Cryosphere Project. GEF–UNDP–UNESCO Cryosphere Project Publishes Diagnostic Analysis on Key Cryosphere Issues in Central Asia. Available at https://cryosphereca.org/en/news/proekt-gef-proon-iunesko-po-kriosfere-opublikoval-diagnosticeskii-analiz-kliucevyx-problem-kriosfery-v-centralnoi-azii.

FAO www.fao.org

FRA – FAO Global Forest Resources Assessment
https://www.fao.org/interactive/forest-resources-assessment/2020/en/

Green Central Asia https://greencentralasia.org/en/about-us/

HLPF (Countries who have presented their Voluntary National Reviews) https://hlpf.un.org/countries

IGRAC (Groundwater Management Project Tajikistan). https://un-igrac.org/our-work/activities/groundwater-management-project-tajikistan/

IEA – International Energy Agency
https://www.iea.org/countries/

IEA (Tajikistan) https://www.iea.org/countries/tajikistan

IEA (Turkmenistan). https://www.iea.org/countries/turkmenistan
SIC ICWC (Scientific-Information Center of the Interstate Commission for Water Coordination) https://www.cawater-info.net/

OECD (Data Explorer) https://data-explorer.oecd.org/

OSCE (Aarhus Centres) https://aarhus.osce.org/

Sustainable Development Report (Rankings). https://dashboards.sdgindex.org/rankings/

UNFCCC. Nationally Determined Contributions Registry. https://unfccc.int/NDCREG

UN WATER SDG 6 Data Portal. https://www.sdg6data.org/en

The United Nations Economic Commission for Europe (ECE) Environmental Performance Review Programme assesses progress made by individual countries in reconciling their economic and social development with environmental protection, as well as in meeting international commitments on environment and sustainable development.

The Programme assists countries to improve their environmental policies by making concrete recommendations for better policy design and implementation. Environmental Performance Reviews help to integrate environmental policies into sector-specific policies such as those in agriculture, energy, industry, transport and health. Through the peer review process, the reviews promote dialogue among Governments about the effectiveness of environmental policies as well as the exchange of practical experience in implementing sustainable development and green economy initiatives. They also promote greater Government accountability to the public.

This scoping report provides the analytical and conceptual basis for preparing the Regional Environmental Performance Review (Regional EPR) of Central Asia, following a request by Central Asian countries. Building on more than 30 years of experience with national EPRs, the Regional EPR applies an innovative approach to address shared, regional and transboundary environmental challenges, and to support sustainable development across Central Asia.

The primary purpose of the report is to identify priority areas for regional cooperation and joint action, assess policy responses and institutional frameworks, and support the selection of a limited number of themes for the Regional EPR. The findings will inform the preparation of terms of reference of the Regional EPR.

Printed Environmental Performance Reviews may be obtained from the United Nations Department of Public Information at: https://shop.un.org/.

Environmental Performance Reviews are available online at: http://www.unece.org/env/epr/.