United Nations
Convention to Combat
Desertification

State Forestry and
Grassland
Administration
of the People's
Republic of China

THE
CHANGWON
INITIATIVE

Kazakhstan Kyrgyzstan Tajikistan Turkmenistan Uzbekistan

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REGIONAL STRATEGY FOR DROUGHT MANAGEMENT AND MITIGATION IN CENTRAL ASIA FOR 2021–2030

DROUGHT STRATEGY

Almaty 2021

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Cover and layout: Marina Bazarevskaya
Cover photo: Victor Tsoy. Bitter chocolate with taste of drought

REGIONAL STRATEGY FOR DROUGHT MANAGEMENT AND MITIGATION IN CENTRAL ASIA FOR 2021–2030

DROUGHT STRATEGY

Content

Overview

In coordination with the Executive Committee of the International Fund for Saving the The Regional Strategy for Drought Risk Management and Mitigation in Central Asia for 2021–2030 (hereafter the Regional Strategy) proposes measures to enhance ecosystem and social resilience to droughts and periods of water scarcity by moving from reactive to proactive approaches and regional integration. Taking into account the natural, climatic and political features of Central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan), the Regional Strategy aims to boost joint actions to mitigate problems induced by climate change and the five countries' current economic activity in the area of land and water use. It also aims to help the countries achieve their long-term socioeconomic technical and institutional development goals for the effective and sustainable management of drought and other adverse natural phenomena, especially with regard to the anthropogenic factors that contribute to desertification, land degradation and drought (DLDD).

Drought is a slow-onset natural disaster, which progresses in scale and force. Droughts are caused by a lack of rainfall, resulting in a shortage of water for plants, animals and people, which in turn seriously impacts lives and livelihoods due to food insecurity, hunger, disease and forced migration. For the Central Asia region, drought also has significant implications for socioeconomic and livelihood activities in areas such as agriculture, livestock and water resources. According to the findings presented in Climate Change 2014: Impacts, Adaptation, and Vulnerability of the Intergovernmental Panel on Climate Change (IPCC), climate change is expected to increase the frequency, intensity and duration of droughts, which will affect many economic sectors, including food, water and energy (Hijioka *et al.* 2014).

Central Asia is the only region in the world that is composed entirely of landlocked developing countries. The region's combined gross domestic product (GDP) is about US$300 billion. Agriculture is the main driver of economic development in most countries in the region, with over 50 per cent of the population engaged in agriculture and related sectors.

One of the key focus areas of the Central Asian countries is to achieve national commitments relating to the Sustainable Development Goals (SDG). The countries agree that disaster risk reduction and climate change adaptation should be prioritized to ensure that national and regional development is not undermined by the impact of drought and climate change.

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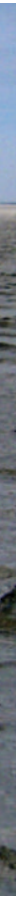
The five countries in the region therefore work within the priority areas of the Sendai Framework for Disaster Risk Reduction (2015–2030) to prevent and reduce disaster risks. The Regional Environmental Programme for Sustainable Development in Central Asia (REP4SD-CA) 2021–2030, developed by the Interstate Commission on Sustainable Development (ICSD), approaches drought and climate change issues from a regional point of view, and helps the countries achieve certain environmental SDGs through environmental protection and ecosystem restoration activities.



The Regional Strategy is building on a series of consultations with government officials and representatives of hydrometeorological services in each of the region's countries, as well as on research and findings of experts in each country, along with the contribution of international development partners. More data and information collected through the consultation process are available in the situation analysis on droughts in Central Asia.[1]

The analysis and assessment of key vulnerabilities and risks affecting water, energy and food security, the main economic sectors and vulnerable groups within the context of the countries' institutional and political frameworks point to the need for joint, comprehensive and coordinated actions to achieve the set national objectives for socioeconomic development.

The following priority areas identified for the Regional Strategy are also recommended for inclusion in REP4SD-CA:

- Area 1 Building monitoring, risk assessment and drought prevention capacities.
- Area 2 Strengthening drought mitigation, the development of plans to address water scarcity and data dissemination.
- Area 3 Building capacity and raising awareness.
- Area 4 Ensuring regional cooperation.

This Regional Strategy will contribute to strengthening the existing mechanisms of regional cooperation and capacity-building, as well as opportunities for data exchange on agroclimatic and hydrometeorological indicators, and the coordination of drought monitoring and forecasting processes, provided that the governments of the Central Asian countries and regional and international development institutions are actively involved and support it. The formation of joint proactive measures to reduce anthropogenic impacts on ecosystems and the promotion of UNCCD initiatives aimed at reducing the negative consequences of DLDD are the only real solutions for the region's environmental problems.

[1] For more information, please refer to the "Materials" section of the project's web page at: https://carececo.org/en/main/activity/projects/droughtSDS/.

Introduction

Drought is a complex natural phenomenon which requires comprehensive and integrated approaches and solutions. Since gaining their independence, the five countries in Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) have developed and adopted laws on environmental protection, as well as water, land and forestry codes and strategic plans for agricultural development, and have joined most international conventions and agreements.

Rooted in the traditional perception that drought is a natural part of the climate, **there is no official definition of it in any of the countries' regulatory or legal documents.** However, there is a shared understanding and international classification (mainly by the Food and Agriculture Organization of the United Nations (FAO) and the World Meteorological Organization (WMO)) among the countries that is used as a deviation indicator of available water for a specific region or territory.

During the 2013 High-level Meeting on National Drought Policy, the Global Water Partnership (GWP) and WMO initiated the Integrated Drought Management Programme (IDMP) to support regions and countries in developing national drought management policies and introducing preventive measures and more efficient tools for drought forecasting and control (World Meteorological Organization [WMO] and Global Water Partnership [GWP] 2014). At the same time, implementation of the Sendai Framework for Disaster Risk Reduction (2015–2030) was initiated, with all the Central Asian countries having since been actively involved in the drought management process.

The objectives of the new Strategic Framework for 2018–2030 of the United Nations Convention to Combat Desertification (UNCCD) pay special attention to drought. The third strategic objective in particular calls "to mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems" (United Nations Convention to Combat Desertification [UNCCD] 2017). Noting this, the Regional Strategy developers were guided by three pillars of drought preparedness specified in the UNCCD Drought Toolbox: i) monitoring and early warning; ii) vulnerability and risk assessment; and iii) risk mitigation measures.[2]

[2] See *https://knowledge.unccd.int/drought-toolbox*

The IPCC reports that the hydrological regime of rivers will change in the future, with some of the smallest rivers drying up altogether (Environment and Security Initiative 2018). River run-off anomalies will increase every year, with drought and flood cycles also expected in the coming decades. In Central Asia, droughts and transboundary river water supplies are closely coupled. The integration of drought management and mitigation measures into a transboundary management system would therefore increase efficiency, reduce environmental and social tension caused by the drying-up of the Aral Sea and strengthen the capacity of the whole Central Asia region (World Bank 2006).

Given the transboundary nature of drought impacts, planning for coherent and complementary actions to reduce risks and vulnerabilities at the regional level should be carried out in a collaborative manner, with data-sharing, monitoring and forecasting supported at the national level. This requires interdisciplinary strategic planning, which is only possible with the collaboration and participation of all stakeholders (hydrologists, agronomists, farmers, climatologists, soil scientists, engineers, sociologists, economists, politicians, local communities and the international community). A common region-wide concept, “one region, one ecosystem”, should become the long-standing goal of the Central Asian countries’ drought management efforts, as it will help ensure the integration of national and regional drought and water shortage prevention actions in areas potentially at risk.

1.1 Overview of the region

Central Asia is located in the heart of Eurasia and includes five independent countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Its total area is 400.8 million ha and the population exceeds 73.8 million. Statistically, the region can be classified as sparsely populated, as there are approximately 17 people per 1 km2. However, most of this population lives in the Aral Sea basin (formed by the Amu Darya and Syr Darya rivers) and is engaged in agriculture.

The region's aggregate GDP is about US$300 billion, with more than 50 per cent of the population engaged in agriculture and its related sectors, making it the main driver of most of the Central Asian countries' economic development. Given the direct correlation between soil productivity, anthropogenic factors, drought, water scarcity and agriculture, there is a need to include drought mitigation and prevention activities in proactive national and regional approaches.

Figure 1 Gross domestic product of Central Asian countries in 2010 and 2019

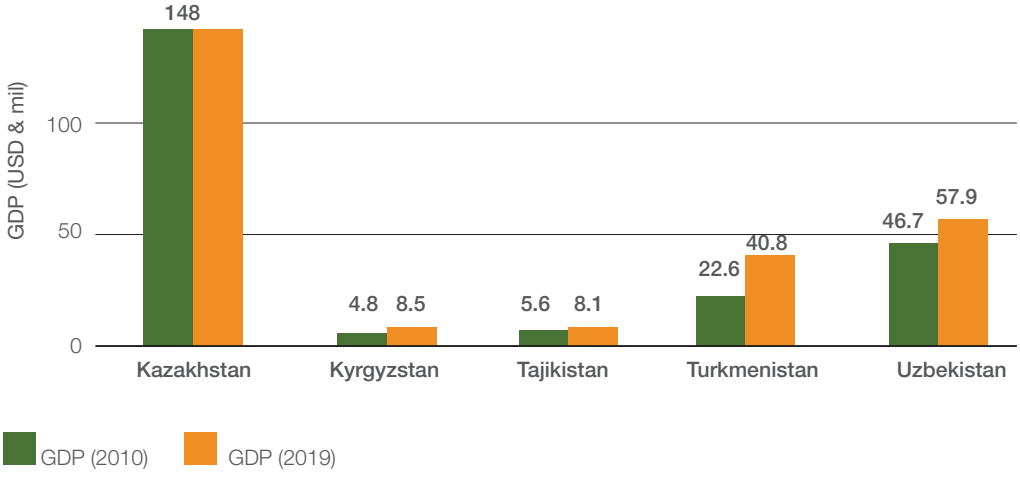
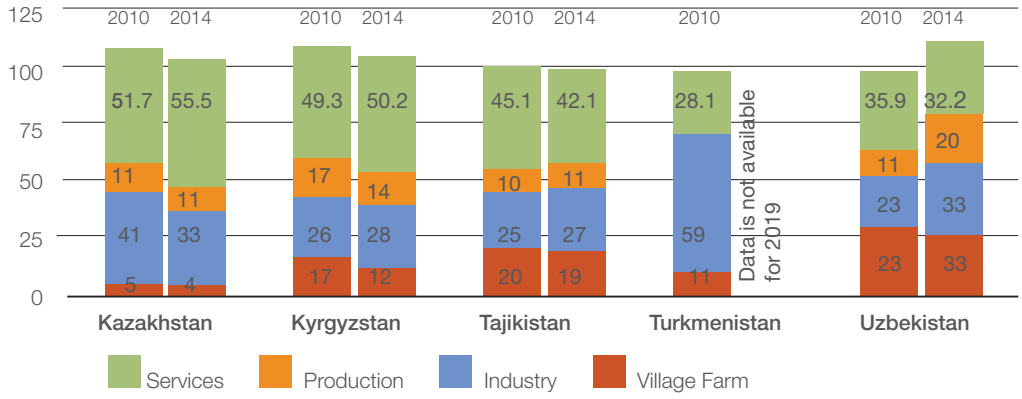


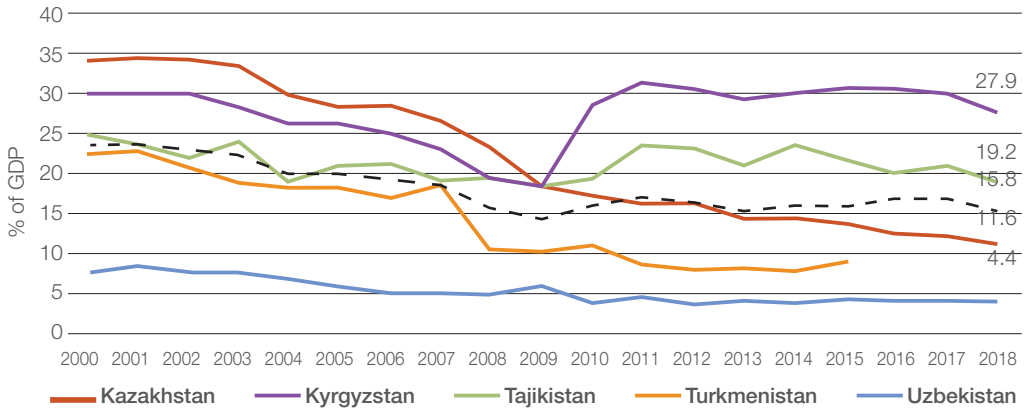
Figure 2 Sectors of the economy, percentage of gross domestic product



Source: *World Development Indicators, The World Bank*

According to the United Nations, 40 per cent of the global population are currently facing a shortage of fresh water (United Nations no date). **About 60 per cent of Central Asia's population is directly dependent on agriculture as their primary source of income, with drought therefore posing a serious threat to individuals' well-being.** There is a direct and strong correlation between drought, the availability of fresh water and agriculture, especially in the Central Asian context. Existing water consumption technology currently operates at a 50–60 per cent efficiency, with a large volume of fresh water lost in hydrotechnical systems, irrigated fields, industry and municipal utilities. Meanwhile, the rapid population growth, expansion of irrigated land areas and development of industrial and communal enterprises taking place in Central Asia necessitates the search for additional sources of fresh water, which are in fact lacking in the region. As over 90 per cent of agricultural products in Central Asia come from irrigated agriculture, it is clear that the shortage caused by the misuse of fresh water is jeopardizing the region's food security.

Figure 3 The value added ratio in agriculture, forestry and fishery (percentage of gross domestic product)



Source: *https://data.worldbank.org/indicator/*

Roughly 80 per cent of Central Asia is used for pastoralism, with livestock grazing occurring year-round. To date, up to 50 per cent of the region's rangelands are supplied with water. A lack of access to watering points reduces the mobility of herders, which causes overgrazing of pastures near settlements and undergrazing of remote areas. Uneven grazing ultimately contributes to the formation of anthropogenic sources of sand and dust storms (SDS), which further leads to a deterioration in the state of soils and a decrease in the biological activity of vegetation (Kerven et al. 2011). This issue can be partially solved through the use of alternative traditional water retention technologies, surface run-off in takyrs (salt flats), underground freshwater lenses and saline water conversion.

Climate change in Central Asia will significantly exacerbate pasture degradation, especially in the foothills of Kyrgyzstan and Tajikistan, where livestock mobility and quantity exceed normal rates of ecological restoration. Although climate change forecasts associated with warmer and drier summers are of great importance for agriculture, extreme high temperatures play a significant role both for the vegetation cover of grasslands and the animals, which are especially sensitive to drought (Kerven et al. 2012).

Table 1 General information on areas, by country

Country	Farmlands (million ha)	Degraded lands	Pastures (million ha)	Areas under salinization (million ha)	Sand and desert areas (million ha)
Kazakhstan	221.6	80.2	186.4	35.8	112.1
Kyrgyzstan	6.70	0.67	9.0	0.05	0
Tajikistan	4.00	3.90	3.6	0.10	0.20
Turkmenistan	40.5	0.45	38.0	0.90	40.7
Uzbekistan	20.2	1.20	11.0	1.50	31.0

Note: Kyrgyzstan: 0.67 million ha of degraded lands is included within 1.2 million ha of croplands; 0.05 million ha of saline lands is included within 1.02 million ha of irrigated lands.
Source: Taken from state agencies for water resources (2019).

The power industry in Central Asia is relatively well developed. Kazakhstan generates more than 94.7 billion kWh, Uzbekistan 63 billion kWh (Podarilove no date), Turkmenistan 24 billion kWh (Trapeznikov 2017), Tajikistan 20.6 billion kWh (Popov 2018) and Kyrgyzstan 15–15.5 billion kWh (Regnum.ru 2018). However, global warming (changes in the hydrological cycle) and population growth (water and food security) negatively affect the level of risks associated with hydropower generation, directly affecting the availability of water resources in the vegetation period in downstream countries and the winter period in upstream countries.

Table 2 International environmental conventions and treaties of Central Asian countries

	KAZ	KGZ	TAJ	TKM	UZB
United Nations Framework Convention on Climate Change (UNFCCC)[3]	+	+	+	+	+
Convention on Biological Diversity	+	+	+	+	+
United Nations Convention to Combat Desertification (UNCCD)	+	+	+	+	+
International Convention for the Safety of Life at Sea (SOLAS)	+			+	
Convention on Environmental Impact Assessment in a Transboundary Context	+	+			
Convention on the Protection and Use of Transboundary Watercourses and International Lakes	+			+	+
Convention on Long-Range Transboundary Air Pollution	+	+			
Stockholm Convention on Persistent Organic Pollutants	+	+	+		+

Note: For more information, see *https://treaties.un.org/Pages/Home.aspx?clang=_en.*
Source: Interstate Commission on Sustainable Development (ICSD) (no date).

All countries in the region are now Parties to UNCCD and some are also members of other international environmental conventions and treaties. Over the years, UNCCD-related activities have included the preparation of national action programmes (NAPs) to combat desertification, the setting of land degradation neutrality (LDN) targets, the development of national drought policies in Tajikistan, Turkmenistan and Uzbekistan, and the preparation of Nationally Appropriate Mitigation Actions (NAMAs) in the context of sustainable development and climate change-related actions. The Central Asian countries recognize the need for regional cooperation to encompass not only NAPs, but other national action plans and national development priority documents to improve the region's socioeconomic and ecological situations.

[3] All five Central Asian countries are Non-Annex I Parties to this Convention.

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The current environmental risks and unsustainable use of natural resources, which are crucial aspects of agricultural production in Central Asia, may become sources of conflict both within and between the countries. The region's political and socioeconomic stability depends largely on the availability and quality of fresh water. Droughts and the degradation of economically productive lands in turn can lead to increased poverty, higher levels of environmental migration and lower development rates in the region unless proactive and collective actions are taken to address the causes that lead to these negative natural phenomena.

1.2 Understanding drought

The Regional Strategy addresses three main types of droughts: i) meteorological, when the amount of precipitation in the region is significantly lower than expected; ii) agricultural, when available water reserves are not sufficient to meet agricultural needs; and iii) hydrological, when a shortage of precipitation persists over a long period of time, resulting in the depletion of surface-water and groundwater reserves. Socioeconomic drought is the impact of these three types of droughts, and a factor that affects human life and its interaction with the environment.

Although droughts are a natural phenomenon, anthropogenic activities and the drying-up of the Aral Sea in the last few decades have affected their nature and intensity in Central Asia. The following are the main causes of drought in the region:

- Natural causes: cyclical weather conditions of ecosystems:
    - Ocean temperature fluctuations: minor changes in ocean temperatures affect global weather conditions (El Niño and La Niña) and moisture in the air.
    - Land temperature changes: changes in land surface temperatures affect the nature of air circulation in internal ecosystems, thus changing precipitation patterns.
    - Decreases in soil moisture: such changes affect cloud formation and lead to excessive dryness of the land in the absence of precipitation.
    - Water shortages: a change in the available amount of water from the norm for a certain area, which affects irrigated agriculture and the hydropower industry.
- Anthropogenic causes: agricultural activities, the unsustainable use of water resources and greenhouse gas (GHG) emissions:
    - Climate change: global warming increases the humidity of humid regions and the dryness of dry regions, while also exacerbating natural causes of droughts, creating a cycle of cause and effects.
    - Overconsumption of water: growing populations demand more food, which leads to intensified farming, resulting in an increased load on ecosystems and natural resources.
    - Land degradation: stronger winds result in soil erosion, decreased soil moisture content and weaker heat regulation and moisture retention capacity.

1.3 Monitoring and early warning

In accordance with the joint action plan to implement the Commonwealth of Independent States (CIS) Hydrometeorological Security Concept (Commonwealth of Independent States [CIS] Council of Heads of States 2004), all countries in the region cooperate on the exchange of information on dangerous hydrometeorological events. As WMO members, the national hydrometeorological services of the Central Asian countries provide the international hydrometeorological community with access to data generated by national meteorological monitoring networks.

In recent years, the technical capacity of hydrometeorological services in Central Asia and their employees has been strengthened through several international programmes and projects, as has the expansion of the data exchange network. The upgrades of forecasting systems in the region have increased the accuracy of river run-off forecasts by 20–50 per cent and of weather forecasts by 5–20 per cent (Center for Emergency Situations and Disaster Risk Reduction [CESDRR] 2020).

Nevertheless, not all countries enjoy the same level of technological and professional equipment. At present, no national hydrometeorological service in the region is equipped with the material and technical base needed for full coverage of its country's entire territory and the fulfilment of its tasks. This affects the quality and accessibility of services for all, and especially for agricultural producers, as they often do not have available funds to obtain fee-based meteorological forecasts.

Although droughts cannot be avoided, they can be predicted (up to a month in advance in some cases) thanks to growing technological innovations. Droughts can also be efficiently mitigated if the right policy instruments are available.

As found through the situational analysis of drought in Central Asia, current research on climate variability and conditions affecting the formation of extreme weather events in the region is insufficiently developed. Complex studies on drought dynamics in Central Asia that are based on an analysis of the ocean-atmosphere-land-cryosphere system are therefore needed. An integrated approach using hydrodynamic, statistical and synoptic methods could serve as one of the most viable options to solve drought-related socioeconomic challenges. **A common regional drought indices system is thus required to address drought forecasts, early warning systems and mitigation measures at the regional level.**

Although there are currently no established drought indicators and indices or calculation and forecasting systems in Central Asian countries, specialists use the combined methods described in the Handbook of Drought Indicators and Indices, prepared by WMO and GWP (2016). The region faces certain challenges in accessing baseline information required for drought monitoring and modelling. Obtaining soil moisture data is especially difficult, as in most cases, such data are sporadic. Systematic observations of other heat and moisture exchange processes in the near-surface layer are also not available, particularly observations of evaporation from soil and water surfaces (CESDRR 2020).

Figure 4 Map of agroclimatic zoning of Central Asia

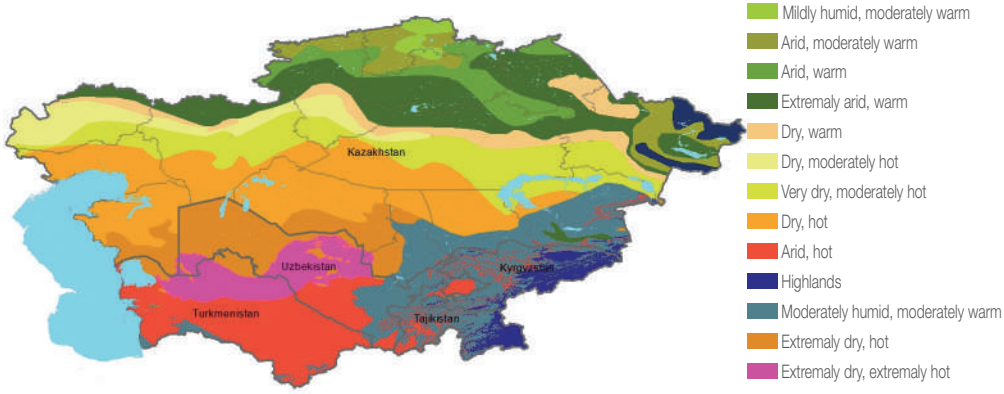
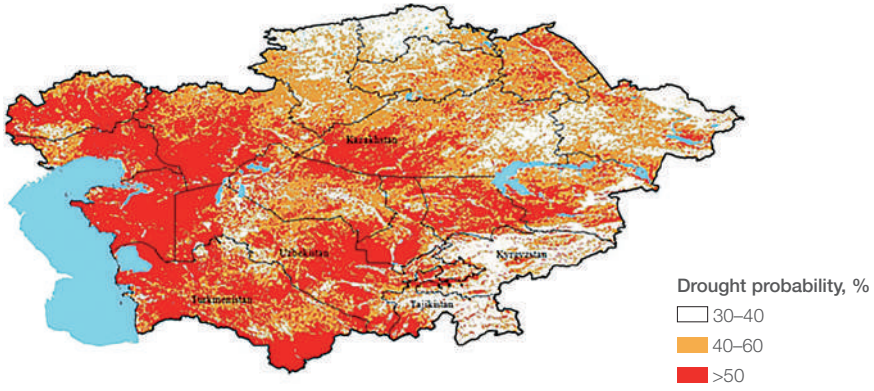


Figure 4 illustrates an example of estimating the possibility and probability of drought formation (characterized by the contours) depending on latitudinal climatic zonation, longitudinal sectorality and altitude zonation, using Selyaninov's hydrothermal coefficient. This design matches existing maps of agroclimatic zoning of Kazakhstan, Turkmenistan and Uzbekistan. Within the framework of this document, existing maps of agroclimatic zoning of Central Asian countries were combined, along with projections for countries with no such maps (Kyrgyzstan and Tajikistan). Analysis of drought conditions from satellite data was based on vegetation health index (VHI) values calculated from May to August for the five countries' territories. The VHI (derived from the Advanced Very High Resolution Radiometer (AVHRR)) is based on the reflectance of visible light by vegetation cover to characterize crop health, and is used by FAO to address drought conditions.

To calibrate the satellite information, an assessment and an analysis of terrestrial drought conditions were carried out for the Kazakhstan's territory, with further extrapolation performed for the entire study area. The drought probability was based on a scale used by FAO.

Figure 5 Assessment of drought-afflicted conditions in Central Asia within the last 10 years (satellite data)



Based on the outcomes of the calculations, almost 30 per cent of the region's territory falls within a zone with a drought probability of 50 per cent or more. Droughts in the northern part of Central Asia are associated with atmospheric air circulation systems in the Arctic, Siberia and the Atlantic, while in the southern regions they may be caused by a number of factors. According to the expert panel on climate risks, global warming of 1.0–1.5°C in Uzbekistan by 2050 will lead to an increase in the number of dry days in the region by 15–18 per cent. Kyrgyzstan and Tajikistan have enough water to meet their needs even during droughts and in dry years, but their energy security will decrease due to their heavy dependence on hydropower engineering and water inflows. Turkmenistan and Uzbekistan cultivate vast irrigated lands and depend heavily on external water sources, meaning they are particularly affected by droughts and water shortages (Organization for Security and Co-operation in Europe [OSCE] 2017).

Table 3 Drought probability in the Central Asia region

Country	Drought probability					
	30–40%		40–50%		50% or more	
	%	Million ha	%	Million ha	%	Million ha
Kazakhstan	21.3	57.7	28.5	79.2	26.2	70.9
Kyrgyzstan	24.7	4.9	13.2	2.6	4.5	0.9
Tajikistan	19.3	2.7	12.1	1.8	15.5	2.2
Turkmenistan	10.1	4.8	22.8	10.6	55.1	26.5
Uzbekistan	19.8	8.9	29.5	13.2	40.1	18
Total		79		107.4		118.5

As of the 2021–2022 national reporting and review process under UNCCD, the Central Asian countries, alongside other UNCCD Parties, will be invited to build capacity and report on: i) trends in the share of drought-prone lands in the total land area; ii) trends in the share of drought-prone population in the total population; and iii) trends in vulnerability to drought. Based on common indicators and reporting methodologies, Central Asian countries could consider organizing an exchange of expertise and data, as well as data entry into a regional database or other platforms designed for knowledge-collection and -sharing (Barker 2021).

The analysis shows that none of the Central Asian countries cover the full range of stakeholders interested in drought-related topics. Countries with relative potential conduct such analysis either on a for-fee basis or at the request of their government. In countries where systems are being piloted, such forecasts only cover part of the country's territory.

The countries in the region are currently engaged to different extents in several global meteorological data exchange agreements and environmental and climate monitoring initiatives. These agreements could become a foundation for further regional actions and the creation of a regional database for hydrometeorological and climate data. Such agreements and initiatives include the following:

- The WMO SDS project was initiated in 2004, with the associated **Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)** launched by the fifteenth World Meteorological Congress in 2007. The SDS-WAS strengthens countries' ability to provide stakeholders with timely and high-quality SDS forecasts, observations, information and knowledge through international partnerships between research and operational communities. It is run by the SDS-WAS Global Steering Committee and three regional nodes. To date, Kazakhstan is the only country in the region that is a participant of WMO's SDS-WAS regional centre for the Asia node (WMO no date).

- As part of the **Sendai Framework**, a regional programme for Central Asia and its drought status was developed.

- In accordance with the joint action plan to implement the **CIS Hydrometeorological Security Concept**, all countries in the region support the collaborative exchange of information on dangerous hydrometeorological events. This plan specifies that dust storms, along with other listed natural phenomena, are dangerous hydrometeorological and heliogeophysical events. The joint action plan regulates some aspects of regional and global cooperation between the Central Asian countries' hydrometeorological services. The countries currently exchange information on dangerous and natural hydrometeorological phenomena and send climate warnings to neighbouring countries. Despite such activity, no shared database has been created thus far (CIS Council of Heads of States 2004).

- As members of **WMO**, national hydrometeorological services of the region's countries provide the international hydrometeorological community with access to data generated by national meteorological monitoring networks.

Given the aforementioned needs and opportunities, the Regional Strategy prioritizes the development of a drought monitoring and early warning system based on the use of remote sensing and open climatic and hydrometeorological data.

Due to the complexity and multifaceted nature of drought forecasting and an early warning system, the success of the Regional Strategy will depend largely on the Central Asian countries' willingness to share meteorological data and integrate monitoring and forecasting efforts at the national level.

1.4 Vulnerability and risk assessment

A regionally acceptable and dynamic impact monitoring system is crucial for effective communication on the social, economic and environmental impacts of droughts. At present, the region only has prototypes of such systems, while drought vulnerability assessments are either absent of based on "shortfalls in profits" data, with no data available on the monetary value of losses or damages. There is a high demand for introducing evidence-based data to inform about adverse natural phenomena that have social and economic impacts.

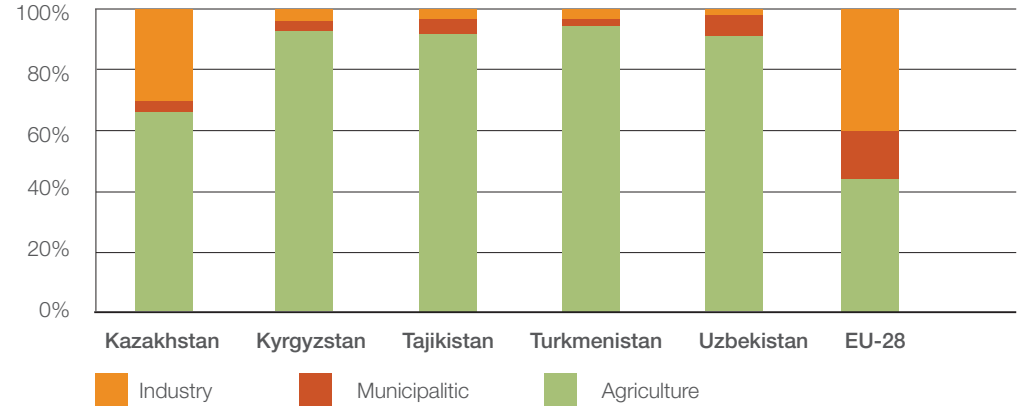
Risks for agriculture

A. Irrigated lands

Despite the frequent occurrence of droughts in Central Asia, the cases are rarely recorded officially, comprising just 2–3 per cent of the total amount of recorded disasters in the region (United Nations Economic and Social Commission for Asia and the Pacific [ESCAP] 2019). However, the economic losses associated with these recorded disasters are still huge. According to data from the Emergency Events Database (EM-DAT), in 2000–2016, economic losses from droughts in Central Asia exceeded US$2 billion, with most losses in the agricultural sector. The probability of drought, in combination with soil types, enables forecasts of potential economic risks to be made for agricultural areas likely to be affected.

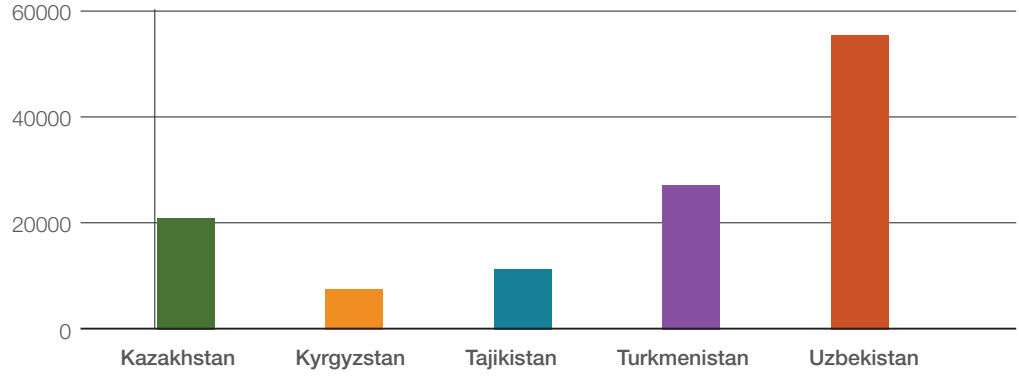
The efficiency of the region's irrigation system does not exceed 50–60 per cent. The Central Asian countries mainly use their water supplies for irrigation purposes, meaning their total water consumption is very high. Of the five countries, Turkmenistan and Uzbekistan are the largest water consumers. All five countries are also major agricultural producers, cultivating water-intensive crops such as cotton and rice. Since precipitation is becoming increasingly scarce, agricultural producers are having to revert to using irrigation water. The total area of irrigated lands in the countries is about 100,000 km2, which is three times the size of Belgium, and therefore requires significant amounts of irrigation water. Due to the large amounts of water used for irrigation, agriculture is the largest consumer of water across Central Asia (Russell 2018).

Figure 6 Use of water by sectors (percentage of total consumption)



Source: European Environment Agency (no date).

Figure 7 Total water consumption (million m³/year)



Source: European Environment Agency (no date).

The losses incurred by droughts, even in the short term, are alarming and require proactive actions to mitigate their impact on people (World Bank 2005).

In the summer months of 2021, the Central Asian countries faced an abnormal rise in temperature. In some regions of Tajikistan, the air warmed up to 48°C, rising up to 44°C in Uzbekistan, up to 40°C in Kazakhstan and up to 37°C in Kyrgyzstan (Chikunov 2021).

In 2012, all wheat and barley harvests were lost from 7,000 ha in the Turkistan region of **Kazakhstan** due to drought (Republic of Kazakhstan 2012). In 2019, in the north of the country, crop losses amounted to 2.9 million tons due to a three-month drought and other problems (Raisova 2019). The Kostanay region, Kazakhstan's main breadbasket, was also hit by the 2019 drought, and much harder than any other region, with well-developed farms only managing to harvest 400–500 kg of grain per hectare, which is three times below the average. The rest of the harvest was lost due to a lack of rain throughout the summer months. During the 2020 harvesting campaign, 20.389 million tons of cereal and leguminous crops were harvested in the country from 15.79 million ha with an average yield of 13,200 kg per hectare. These are the most recent data released by the State Inspection Committee in the Agro-Industrial Complex of the Ministry of Agriculture of Kazakhstan (Republic of Kazakhstan, Ministry of Agriculture 2020).

The 2021 drought affected crops over a total area of more than **11 million ha**, but farmers' losses were reimbursed for only KZT 190 million.

Region	Affected area (hectares)	Pay-out (KZT)
Pavlodar	17,577	131,759,182
Kostanay	11,065	38,547,842
Akmola	8,980	17,429,665
East Kazakhstan	1,398	2,007,651
North Kazakhstan	477	734,825
Total	**39,497**	**190,479,165**

Source: Agroqogam (2021)

© Alexander Vlasyuk. Spring in the steppe

According to the Official Information Source of the Prime Minister of the Republic of **Kazakhstan**, following recommendations issued by the Republican Headquarters for Monitoring and Prompt Resolution of Issues on Providing Fodder to Farms, as at July 2021, the Government had already allocated KZT 1.9 billion to compensate the losses incurred by the 2021 drought. The funds have been used to partially reimburse the cost of fodder for breeding stock in the Mangystau region, with the Prime Minister having also instructed additional funding to be allocated to the creation of a stabilization fund to purchase and deliver 114,700 tons of harvested hay to farms at affordable prices, as well as 56,300 tons of feed (bran) through the joint-stock company, Food Contract Corporation (Official Information Source of the Prime Minister of the Republic 2021).

A total of 6,069 ha of grain crops were affected in the south of **Kyrgyzstan** due to the 2011 drought, 78 per cent of which was wheat. In 2014, the country's gross agricultural output decreased by 25 per cent (Food and Agriculture Organization of the United Nations [FAO] 2014). With respect to animal husbandry, the average yearly milk yield per cow fell by 50 per cent following the 2012 water shortage, and continued to decline for a few more years due to the animals' long biological recovery period. The 2016 water shortage also resulted in a decreased milk yield, down to 1,978 kg (National Statistical Committee of the Kyrgyz Republic 2016). Risks to agricultural output include the appearance of new types of pests and emerging infections among plants and animals, which are not native to the region, as well as the increased frequency of climate-dependent emergencies, which could result in US$70 million in agricultural damages.

The Ministry of Agriculture, Water Resources and Regional Development has submitted a draft for public discussion that calls for a ban on the export of certain food products outside the customs area of the Eurasian Economic Union, excluding re-export, transit and humanitarian aid. This recommendation is based on the disruption to technological processes of 2021 spring agricultural work caused by a snowy winter and late spring in 2020 . Agricultural production and food security in the latter part of 2021 were also expected to be negatively impacted, due to forecasted dry summer months based on Agency of Hydrometeorology (Kyrgyzhydromet) data (SNG Today 2021).

The 2000–2001 drought in **Tajikistan** and its neighbouring countries has been the most significant natural disaster recorded . At a rough estimate, 89–90 per cent of the economic damage caused by all natural disasters in the country over the years can be attributed to droughts, which are also responsible for US$5.4 million in financial losses. In comparison, earthquakes are responsible for US$3.3 million in financial losses (Saidov et al. 2021).

Given that droughts affect countries in the region differently because of flow formation, neighbouring countries can exchange certain resources to fill gaps in what they lack. Following the 2021 drought in Kazakhstan and water shortages in the Syr Darya, Tajikistan was able to exchange 315 million m3 of water from its Kayrakkum (Bakhri Tojik) reservoir for equipment, fuel and lubricants to the benefit of both countries (Sputnik News Tajikistan 2021).

Severe droughts in **Turkmenistan** in 2000–2001, 2005–2006 and 2008 led to a drastic reduction in grassland, and as a result, in the number of livestock. In the dry years, shepherds were forced to sell about 20–40 per cent of their sheep, 17–34 per cent of goats and 10–13 per cent of camels. The drought also damaged agriculture, resulting in reduced crop yields. During the drought period, transhumance (on which the well-being of residents of deserts and remote settlements depends) became a vulnerable sector of the country's economy. In other years, the yield of lowland pastures ranged from 20 to 480 kg/ha. As a result of crops being grown on degraded and saline lands, direct economic damages in 2001 amounted to about US$140 million.[4]

According to the World Bank's regional assessment, financial losses from the 2000–2001 drought in **Uzbekistan** reached US$130 million (World Bank 2005). Other sources estimate the damage at US$38–40 million. According to scientists from Uzbekistan, the fallout of salts from the atmosphere reduces the bioproductivity of farmlands by 5–10 per cent, and that of pastures by 20–30 per cent (Republic of Uzbekistan, Cabinet of Ministers, Main Administration of Hydrometeorology 1999).

In total, 70 per cent of Uzbekistan's territory (31.4 million ha) currently includes arid and semiarid areas subject to natural salinization, the spread of quicksands, dust storms and dry winds. Drought and SDS management are therefore a priority in ensuring the country's sustainable development. The Aral Sea disaster has had a significant impact on the country, resulting in the formation of the Aralkum Desert, which has an area of more than 5.5 million ha. In addition to this, around 10 million ha of pastures are in need of reclamation. Overgrazing, forest clearance for fuel and other activities have also led to significant tree and shrubbery vegetation in the country's desert zone, with the total forest area having halved since 1965.

[4] Defined as the sum of products under-received.

Since 2018, the amount of work aimed at restoring forest landscapes has increased almost tenfold. This means that if the reforestation area of the dried Aral seabed amounted to 16,000–18,000 ha per year, more than 500,000 ha would have been reforested in 2019, and 700,000 ha in 2020. Altogether, the country's forestry agencies rehabilitated more than 1.56 million ha of forest landscapes from 2011 to 2020 (Green World Future 2021).

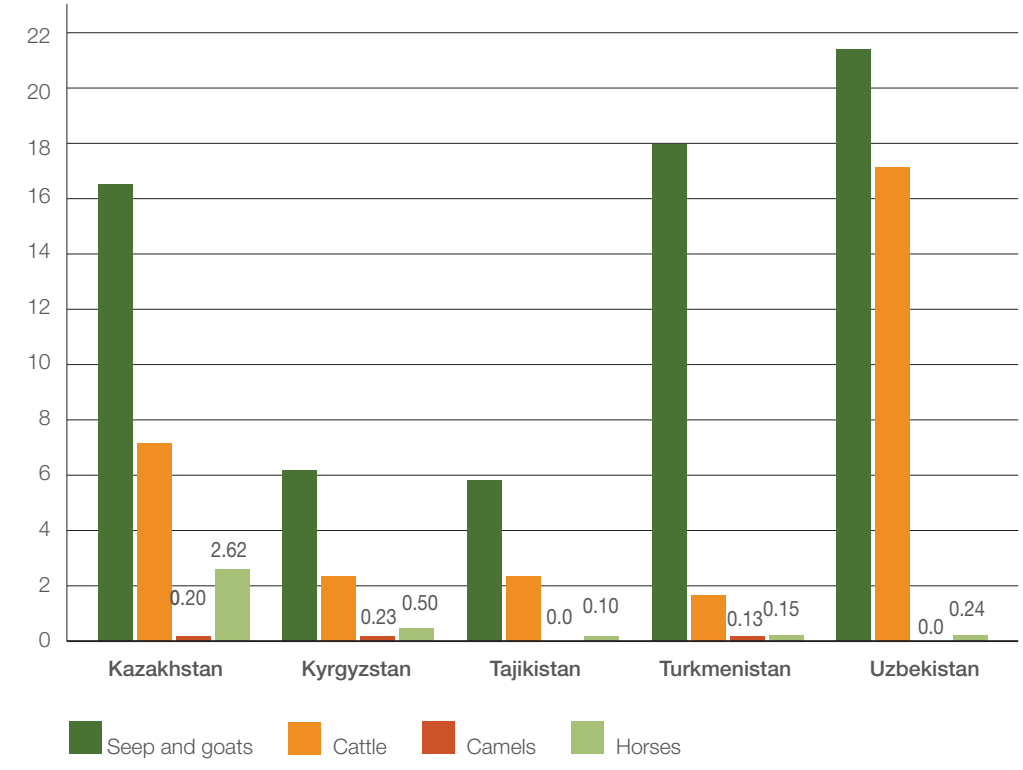
B. Pastures

About 250 million ha of rangelands are located in Central Asia, including China, Mongolia and the Russian Federation. In Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan rangelands occupy more than half of the countries' territory, with pastoralism comprising the main activity for most of the population (FAO no date). The semi-desert and northern and southern desert areas of Central Asia have been traditionally used as natural rangelands, as air droughts barely affect the vegetation of sandy plains and sands (only ephemeral vegetation is affected), making these areas more drought-resistant. Plants with medium and deep root systems are still able to obtain moisture, even during droughts.

However, due to the frequent recurrence and duration of droughts, vegetation on pastureland cannot remain productive enough for full transhumance. For example, in Turkmenistan, intense and long droughts in 1997–2006 reduced the performance of pastures by 35–45 kg/ha on average, which is 22–34 per cent of long-term observations (Nurberdiyev et al. 2009).

Sheep breeding is one of the animal husbandry activities carried out in the region, particularly in Kazakhstan, Kyrgyzstan, Turkmenistan and Uzbekistan. Cattle breeding is typical for suburban areas and densely populated oases in Central Asia (BRIF Research Group no date), with overgrazing the key factor in the pasture degradation process. According to experts, a rational use of vegetation will help ensure that pastures retain their productivity, with irrational use (overstocking, disrupted seasonality of grazing, etc.) resulting in their degradation and, in turn, their desertification. Excessive anthropogenic impacts on natural vegetation cause more intense processes of xerophytization, an increase of certain plant species in some areas and the complete disappearance of some plant species in others. Such degradation of pasture vegetation is observable around wells and settlements, where the species composition of plants is in decline (Cawater-info.net no date).

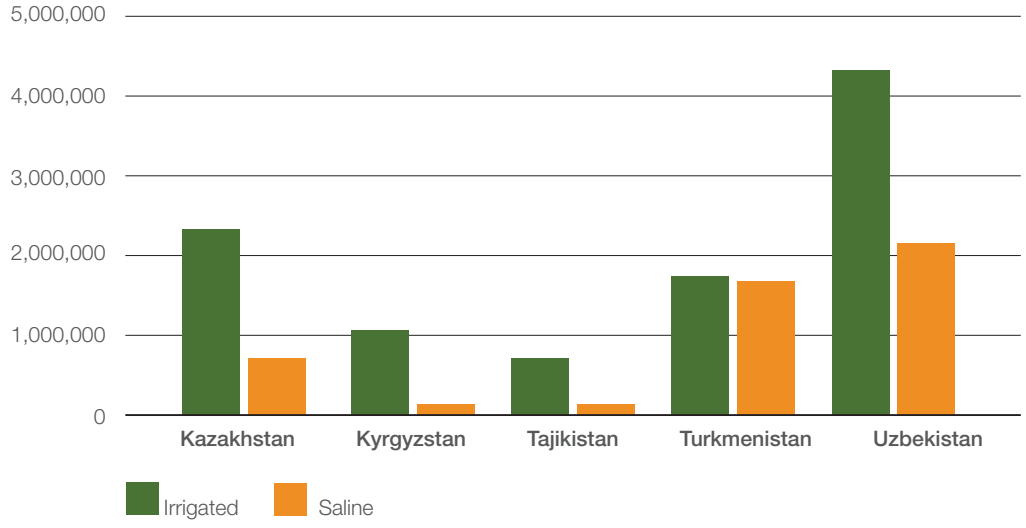
Figure 8 Livestock population in Central Asian countries, as at 2018 (million animals)



C. Soil salinization

An arid climate and droughts exacerbate the process of soil salinization, which is an extremely negative factor leading to the loss of land productivity and desertification. At present, the total area of irrigated lands in the region is 8 million ha, of which more than 60 per cent are salinized to varying degrees. Salinization varies in the Central Asian countries, and not only occurs in arable land but also in pastures and undistributed land.

Figure 9 Saline areas in Central Asia



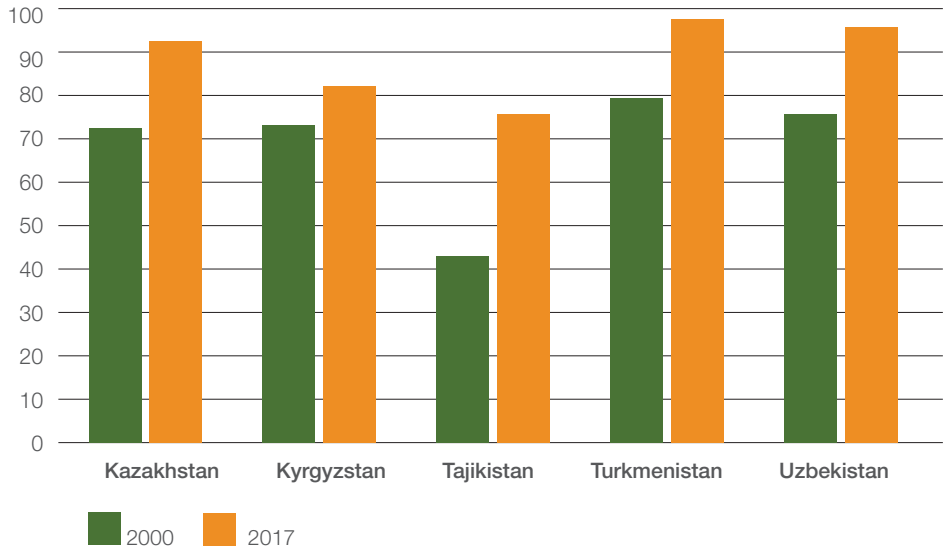
Source: *http:/www.worldbank.org/eca/environment,* World Bank

D. Population

Since the very beginning of agricultural development, the people of Central Asia have adapted their livelihoods to arid conditions and droughts. The wealth of traditional knowledge in housing construction, agricultural practices, water storage and livestock breeding are reputable and well documented. However, due to sedentarization and agricultural intensification, both in farming and livestock raising, many traditional practices have been abandoned.

Social assessments conducted by the World Bank (2002) and the Asian Development Bank (2005) note the high need for local communities to improve the quality of drinking water and water for cooking and sanitation during periods of severe drought. These communities are forced to spend a significant portion of their income on purchasing and storing drinking water. In addition to these monetary costs, the population bears significant social costs in the form of serious health risks and poor nutrition, among others.

Figure 10 Percentage of the rural population with access to clean drinking water



Note: Based on the World Health Organization (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP) data for 2000–2017.

In Central Asia, around 12 million people live in areas with high drought probability, which covers about 40 million ha. The overlay of zones with a population density of more than 25 people per square kilometre and a map of the drought probability in Central Asia indicates areas that are socially vulnerable to droughts, i.e. hotspots. Most of these hotspots are located in the foothill areas of the source of the Amu Darya and Syr Darya deltas, extending to the transboundary areas of the Aral Sea region. This provides a basis for identifying areas where Central Asian governments must strengthen social support for people, since the residents of these areas are exposed to high drought risks and therefore need actions in place to prevent conflicts over water and other resources. Long-term impacts of drought may expose the population to high risks of morbidity and mortality, forcing some parts of the population to become environmental migrants, which would have an adverse effect on social stability in locations such as delta areas of the Aral Sea basin, foothills, highlands and semi-desert areas across Central Asia.

Figure 11 Areas that are socially vulnerable to droughts

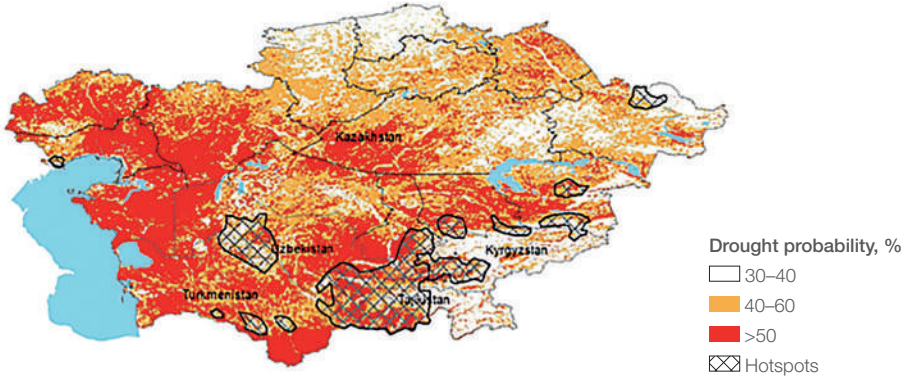


Table 4 An analysis of areas that are socially vulnerable to droughts

Country	Share of employment in agriculture, %*	Rural population, %*	Drought probability of 40% or more	Persons/km² living in hotspots	Area of hotspots, %	Area of hotspots, million ha	People living in hotspots
Kazakhstan	14.8	42.5	54.7	42.3	2.8	7.4	467,821
Kyrgyzstan	26.3	63.6	17.7	37.8	15.2	3.0	280,576
Tajikistan	44.9	72.8	27.6	66.5	42.9	6.1	5,148,563
Turkmenistan	22.6	48.4	77.9	50.6	13.4	6.3	751,612
Uzbekistan	33.2	49.5	69.6	58.9	38.4	17.1	5,064,944
Total						39.9	11,713,516

Analyses show that each country in the region is socially vulnerable to droughts, with their adverse impacts not only affecting agriculture and rural populations, but also urban populations. When food prices are taken into account, the effects of droughts can be felt further afield, outside a country or even a region. The issue should therefore not be ignored, as effects can lead to significant economic damages and losses in social sections such as education, public health, housing, social protection, water supply and sanitation, as well as livelihood sectors such as agriculture, livestock breeding and fisheries. Such impacts will eventually increase wealth disparity, and may even increase poverty.

Women and other vulnerable groups

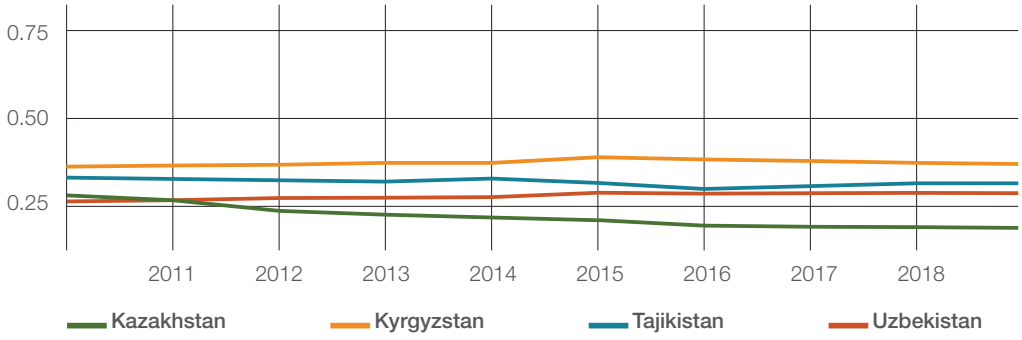
Rural women in Central Asia are exposed to natural disasters and climate change. The relatively difficult social situation in rural areas also stems from the low level and underdevelopment of social and technical infrastructure, as well as limited access to safe drinking water.

Involving vulnerable groups in action planning processes will help mitigate their vulnerability, increase livelihood resilience in the face of climate change and natural disaster risks and contribute to the sustainable development of the affected areas. Workshops, round tables and training sessions for residents of remote rural areas will have a positive cumulative effect.

One of the main principles of the 2030 Agenda for Sustainable Development is to ensure the participation of all population groups and their equal treatment (United Nations ESCAP 2018). So far, national environmental, climate change and disaster risk management policies across the region lack specific gender priorities or the interest of vulnerable populations, as well as gender-disaggregated data on climate change impacts (Fillo and Negruta 2020).

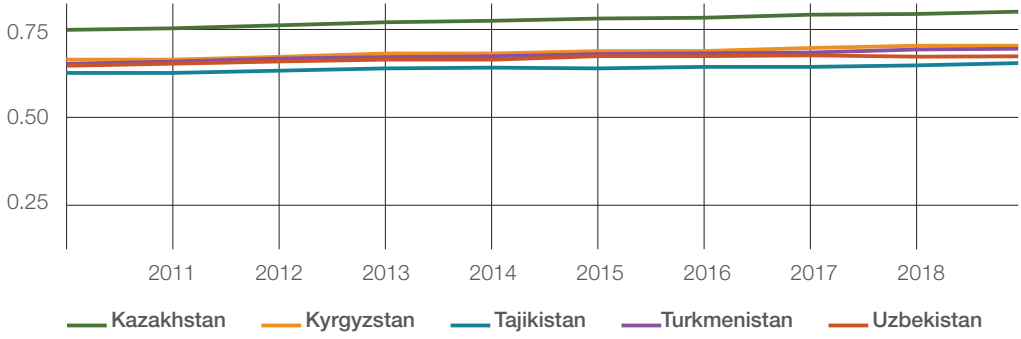
At the political level, all Central Asian countries have included gender issues in their legislative documents. The region demonstrates moderate levels of gender inequality and its countries are included within the groups of countries with either a high and/or medium level of human development. The region also has a remarkably high education level among women, and has seen improved protection of women's health over the years. Despite all this, Central Asian countries still have many challenges to address if they are to meet the core commitments of the Beijing Platform for Action and the 2030 Agenda.

Figure 12 Gender Inequality Index



Source: United Nations Development Programme (UNDP) (2020)

Figure 13 Human Development Index



Source: UNDP (2020)

Regardless of the fact that men and women have equal rights by law in all countries of the region, they are impacted differently due to their different social roles in public and private spheres. In general, such differences are most prominent among rural communities. Rural women who are engaged in rural activities and household chores are most vulnerable to climate change, land degradation and desertification due to challenges that result from male labour migration. At the same time, women also increasingly recognize their capacity for more proactive community involvement (Stulina 2012).

Table 5 Coverage with technical and vocational education, total (thousand), and percentage of women, as at 2010

Country	Total coverage (thousand)	Percentage of women
Kazakhstan	113	30
Kyrgyzstan	23	27
Tajikistan	22	15
Turkmenistan	-	-
Uzbekistan	1,623	48

Source: United Nations Educational, Scientific and Cultural Organization (UNESCO) (2012).

Ensuring gender equality is an SDG, and all Central Asian countries have committed to achieve it. The 2019 Human Development Report (UNDP) also recognized other vulnerable groups in Central Asia, including young workers, migrants, long-term unemployed persons, disabled persons, historically vulnerable communities and residents of rural and remote areas. Along with ensuring equality for other vulnerable groups, gender equality also directly relates to the achievement of the rest of the SDGs.

The elderly rural population is yet another potentially vulnerable group. In 2012–2017, the share of the over-60 population had increased by 1–2 per cent in all the countries. Rapid ageing of the population is further expected in Kazakhstan, Turkmenistan and Uzbekistan, where the share of the over-60 population will exceed 20 per cent (United Nations ESCAP 2018). Migrant workers are another potentially vulnerable group. Labour migration occurs due to high unemployment rates, which stem from the inability to cultivate fields as a result of land degradation, climate change and related factors. To a certain extent, migrant workers from Central Asia can be classified as environmental migrants (International Organization for Migration [IOM] 2004).

According to research data, 2012 saw about 700,000 migrants from Kyrgyzstan (National Institute for Strategic Studies of the Kyrgyz Republic 2016), 744,000 migrants from Tajikistan and about 2 million migrants from Uzbekistan (Poletaev 2014). Most of these migrants left their countries to work in the Russian Federation and occasionally in foreign countries outside the CIS. In the 2000s, Kazakhstan's status changed as it became the labour migrant hub in Central Asia (Sadovskaya 2013).

Despite this, the emigration flow from the country still persists, albeit to a smaller extent than other countries in the region. According to statistical data, migrants mostly comprise rural residents, as it becomes increasingly difficult for them to feed their families. This is largely due to land degradation, higher risks of natural disasters as a result of climate change, a lack of water resources for agricultural development and a lack (or the low affordability) of state-of-the-art water-saving technologies.

Given the growing unemployment and economic stagnation, migration has become the most effective way for women and men in Eastern Europe and Central Asia to support their families, mainly through remittances. According to official data, remittances to Tajikistan amounted to 41 per cent of the country's GDP in 2010, making it the most remittance-dependent country in the world at the time. Migration from three Central Asian countries (Kyrgyzstan, Tajikistan and Uzbekistan) in 2010 exceeded 50 per cent of the total official migration flow to the Russian Federation (Rocca, Bosciani and Giuseppe 2015).

According to forecasts made by the United Nations Environment Programme (UNEP), climate change-induced droughts may become more intense, regular and longer. This will significantly impact rain-fed areas, which will become more arid and less productive. Such forecasts are primarily typical for the northern regions of Central Asia, and in particular, for the north of Kazakhstan. The higher risk of soil aridity in this region may lead to a decreased crop yield (by 30–50 per cent), which, in turn, may affect bread prices and undermine food security in Kazakhstan and other countries in the region. This risk will mostly exacerbate the situation of vulnerable groups: women, the elderly population, rural residents, workers and environmental migrants. Droughts that affect food production and subsistence farming and nutrition have increasingly negative impacts on all vulnerable population groups. For example, in Tajikistan, which has the lowest level of food security in Central Asia, the scarceness of calories and variety of products consumed is an especially acute issue among children, women and the poor (OSCE 2017).

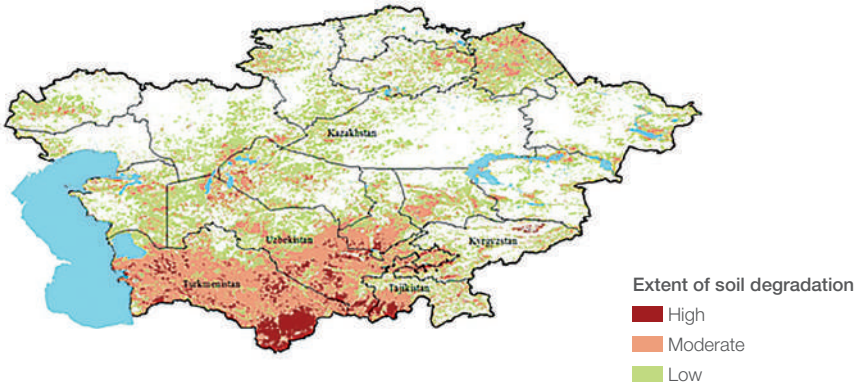
Given the vulnerability of rural populations (especially women and girls) to the effects of adverse climate events, raising awareness and gaining hands-on knowledge, both in agriculture and in housekeeping, is a top priority. To solve these problems, Central Asian countries must engage in proactive efforts, since their social, cultural and historical basis allows for similar approaches in the region, and will help ensure the universal achievement of SDG 3 "Ensure healthy lives and promote well-being for all at all ages" and SDG 5 "Achieve gender equality and empower all women and girls" in all of the Central Asian countries.

Droughts and the degradation of natural ecosystems, including biodiversity

Climate change, drought and powerful anthropogenic effects are among the main drivers of ecosystem degradation and loss of biodiversity throughout the region. Over the past 50 years, the population of the five Central Asian countries has tripled and now stands at an estimated 72 million people, with about 50 per cent dependent on agriculture for their livelihoods (FAO 2018). Central Asia has a high degree of soil degradation due to the region's biophysical conditions, which includes mountainous terrain and an arid climate. Key factors of soil degradation include population growth (in the deltas of the main river basins) and climate change (aridification).

In Central Asia, water erosion and wind erosion affect more than 30 million ha and 67 million ha, respectively. In Uzbekistan, up to 80 per cent of agricultural lands are affected by water erosion, with this level ranging from 60 per cent to 97 per cent in Tajikistan, according to various sources (Central Asia Initiative for Land Management [CACILM] 2006).

Figure 14 Degree of vegetation cover and topsoil degradation



The nominal disposable incomes of rural residents make up about half of all incomes of urban residents. Most rural residents therefore not only rely on cash earnings from agricultural products but also on in-kind income from their plots of land and on the use of natural resources such as fish, game and firewood. Land degradation processes affect the overall productivity of crops and livestock.

The Pamir, Ural and Tien Shan mountain ranges are sources of the main rivers in Central Asia, and are also home to thousands of species of flora and fauna. In addition to climate change, more intense melting of glaciers and permafrost could change the structure of water flows, thereby affecting the stability of ecosystems and biodiversity. More than 60 per cent of water resources in the Central Asia region are formed by high mountain glaciers in Kyrgyzstan and Tajikistan. Two thirds of terrestrial vertebrates in Turkmenistan live in the mountains and foothills, with some species such as the snow leopard and the saiga antelope are on the verge of extinction. Changes in the temperature profile and precipitation patterns will affect the habitats of animals and plants, along with the structure and density of mountain forests. However, it should also be noted that some wild species have a high level of adaptability to a wide range of climatic conditions and diseases, which may lead to their proliferation.

Diverse forest ecosystems in Central Asia, with a large number of varieties of broad-leaved fruit and nut species, taiga forests and shrub bogs forming the basis for ecosystem vitality. Changes in climatic and seasonal parameters will lead to higher temperatures and decreased vegetation productivity, which will in turn result in an increased number of wildfires. Forest degradation has intensified in the past decade, a trend that is expected to increase further due to warmer temperatures, more intense droughts and potential changes in wind patterns. Wildfires threaten the lands used for agricultural production, as well as human health due to higher smoke concentrations.

The Sendai Framework for Disaster Risk Reduction (2015–2030) is a successor instrument of the Kyoto Framework for Action 2005–2015 that contributes to enhancing the resilience of nations and countries to disasters. Central Asian countries have worked to review and revise their national disaster risk reduction plans based on Sendai Framework guidance, update their legislation, enhance institutional and coordination mechanisms for disaster risk assessments and increase their disaster preparedness. At the national level, the Sendai Framework promotes the design and implementation of plans to develop rural areas and, in particular, mountain regions, river basins, coastal floodplains, drylands, wetlands and all other areas prone to drought and flooding. This involves identifying areas that are safe for human settlement while also preserving ecosystem functions that help reduce risks (United Nations Office for Disaster Risk Reduction [UNDRR] 2016).

1.5 Drought mitigation and adaptation measures

Crop diversification through the introduction and integration of various agricultural practices in saline and degraded lands contributes to increased agricultural productivity, which can significantly increase farmers' incomes. The mobilization and introduction of high-yielding, salt-, drought- and frost-resistant varieties of cereals, legumes and industrial and other crops is an efficient way to improve reclaimable properties of saline soil and increase their productivity.

Achieving LDN through the targets and measures that help avoid and, where possible, reverse land degradation processes play an important role in the region's sustainable development. Measures to increase the productivity of agricultural lands and introduce economic mechanisms to tackle land degradation and drought could effectively reduce the poverty level and raise the standards of living for the Central Asian population.

The analysis shows that almost all countries in the region are taking similar measures to counter droughts and water shortages, and to reduce their impact on agricultural producers. These measures depend on the level of facilities and resources, as well as the laws and regulations of each country. In general, the main actions that countries are taking include the following:

Proactive actions:

- Climate change adaptation measures as part of national programmes and projects being implemented by international development partners, which aim to restore forest-steppe zones, upgrade irrigation systems, introduce advanced energy-efficiency technologies and improve the regulatory environment.
- Forest restoration and afforestation, and the consolidation of sandy areas.
- The creation of storage and drainage lakes (oases).
- The streamlining of international financing and public-private partnerships (PPP) in food production and marketing.
- The provision of subsidies and incentives for the purchase of equipment, seeds, fertilizers and water-saving systems.
- Forecasting of climatic deviations in the countries.

© Konstantin Kikvidze. Sand and dust storm in a Central Asian village

Post-drought actions:

- Insurance for all agricultural sectors (not in every Central Asian country).
- Monitoring of climate-related phenomena by national hydrometeorological services.
- Programmes and projects to support farmers and agricultural producers affected by adverse natural phenomena.

While acknowledging that governments are involved to some extent in supporting agricultural producers, it should also be noted that not all countries are capable of or ready to provide both reactive and proactive countermeasures. Given that no Central Asian country takes direct and indirect losses from droughts and water scarcity into account, the promotion of proactive actions for drought management and mitigation is quite complex.

Currently, the International Fund for Saving the Aral Sea (IFAS) and its structures have an inter-State mandate to strengthen a region-wide intersectoral dialogue on environmental protection and sustainable development, as well as the rational use of water resources. The region therefore has an institutional capacity to build a dialogue and establish a framework for drought risk management and mitigation.

It should be especially noted that all Central Asian countries are prone to droughts and annually suffer direct and indirect losses and economic damages. Successive droughts undermine the economic, environmental and social foundations of the five countries' well-being, and hinder their social and economic growth. The countries' close connections with respect to common river basins, markets, border regions and migration flows, along with their historical and cultural ties, means that they are able to work together on coordinated action to counter DLDD and minimize economic and social problems.

© Marina Bazarevskaya. The Dune

Regional Drought Management and Mitigation Strategy in Central Asia for 2021–2030 and Midterm Action Plan for 2021–2026

Vision: Countries achieve their long-term social, economic, technical and institutional development goals for effective and sustainable drought management and improve their ability to address other natural hazards, especially those arising from anthropogenic factors contributing to DLDD through regional cooperation and collaborative action.

Strategic goal: Increase the region's resilience to periods of drought and water scarcity based on the transition from a reactive to a preventive approach and regional integration.

2.1 Focus areas

Based on the situation analysis, the following focus areas are proposed to help reduce the risks and consequences of droughts and water shortage periods in the region, and serve as a basis for implementing the drought-related tasks reflected in REP4SD-CA 2021–2030 and in UNCCD-supported activities.

© Marina Bazarevskaya. Altyn Emel National Park

Area 1 Building monitoring, risk assessment and drought prevention capacities

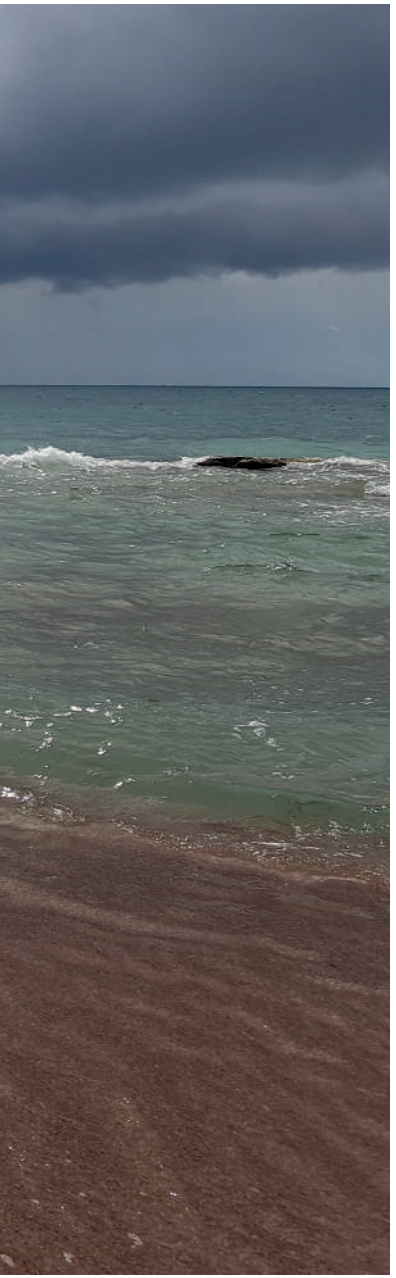
As monitoring and forecasting of hydroclimatic and meteorological phenomena are the domain of hydrometeorological services in the region, **it is necessary to upgrade their material and technical capabilities and to implement innovative solutions for drought monitoring and forecasting**. In its initial stage, this could be based on publicly available databases and involve calibration and testing in pilot areas, but should be supported by national and regional hydroclimatic and meteorological data. The development of a drought monitoring and early warning system for Central Asia will improve planning and risk management decision-making with regards to drought impacts on food and water security in the region.

Data-sharing should be established between data collectors, academia, experts and governments, since preparedness for droughts and water shortages means implementing risk mitigation and institutional actions before their onset so as to effectively address related impacts and minimize any negative effects on the population, economy and environment. These measures are consistent with national objectives, provided that there are data available and that best practices and advanced technologies are used.

The Central Asian governments are usually reluctant to commit funds for such measures unless there is reliable information on costs and losses resulting from inaction. A political decision to monitor the impacts (both indirect and direct) from droughts and periods of water shortage in each country should therefore become a key indicator in triggering such funding commitments. A common approach and methodology should be applied across the region to communicate on drought impacts, and should include a gender-responsive drought impact analysis.

Furthermore, the countries are already fully engaged in implementing the priority areas set forth in the Sendai Framework and the REP4SD-CA Action Plan, as well as actions to achieve the SDGs.

© Marina Bazarevskaya. The lake Issyk Kule.



Area 2 Strengthening drought mitigation, the development of plans to address water scarcity and data dissemination

Due to variability in precipitation patterns and dynamics, as well as reduced flows of glacial meltwater, climate change and increasingly extreme weather events are expected to negatively impact the capability of the existing drinking water infrastructure to provide a stable water supply.

Further promoting the introduction of drought-tolerant crop varieties and water-saving irrigation technologies, as well as the institutionalization of integrated water resources management (IWRM) concepts will contribute to increasing knowledge and changing traditional farming and ranching practices. The interest of the scientific community in drought and climate change suggests that research work in the fields of breeding, seed production and the growth of climate-resistant crops with high yields in laboratories and nurseries could become the basis for addressing the negative impacts of DLDD and climate change, while also facilitating the exchange of best practices with neighbouring countries.

In addition to drought and water resource management plans (which depend heavily on the availability of funds), special emphasis should be made to support agricultural producers in providing meteorological and climate-sensitive data at no cost, and to raise their awareness of alternative crops and innovative drought management solutions.

Financial solutions for drought preparedness (such as drought insurance) should be explored to help protect farmers from financial losses.

© Mikhail Dovlatov. Thorns and rusted ships

Area 3 Building capacity and raising awareness

It is important to raise awareness among the rural population (including women) on climate change adaptation and efficient farming practices, and to increase their involvement and participation in decision-making processes for area development, especially given their role in passing on knowledge gained to their children. In the long run, this may lead to behavioural changes both in specific rural communities and across the whole region.

Consideration should also be given to conducting awareness-raising activities on tackling desertification and land degradation, especially in arid regions. These activities could involve local and national media, as well as accessible social communication channels. Such action would also help enhance regional integration and drought management, as it will provide border area populations with enough information to understand the importance of joint action.

Given the context and the core group of beneficiaries, implementation of this task could be supported, both financially and thematically, by international development partners possessing extensive experience in this area.

It is also necessary to integrate the issue of increasing the institutional capacity of academic and research institutions dealing with climate change and forecasting water shortage periods and droughts in the region. The development of facilities and methodologies for DLDD research in the region should be one of the most important areas of focus.

Area 4 Ensuring regional cooperation

Given the transboundary nature of drought impacts, cooperation between the region's countries is crucial not only to reduce the pressure on the environment and minimize factors affecting regional security and stability, but also to carry out proactive joint actions for climate change adaptation and the management of adverse natural phenomena associated with climate change.

Measures taken by the Central Asian countries' governments at the regional level to introduce the principles of rational and sustainable use of natural resources, restore degraded lands, tackle desertification and preserve biological diversity must be enhanced. The implementation of such measures could involve integrating the priority projects of the fourth Aral Sea Basin Programme (ASBP-4) and REP4SD-CA objectives, with a special emphasis on mitigating the impact of droughts on Central Asian economies, into the projects and initiatives of international development partners. Special consideration should also be given to monitoring, forecasting and countering droughts, dry winds and water shortage periods.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2.2 Coordination mechanism of the Regional Strategy

In 2019, ICSD members approved REP4SD-CA 2021–2030, which aims to ensure regional cooperation for environmental protection issues in Central Asia through the coordination of national priorities and development programmes in transboundary and related areas.

It is suggested that the priority activities of the Regional Strategy be integrated into REP4SD-CA and further coordinated through policy advocacy and partnership building. Furthermore, the drought agenda should be consistently included in messaging and presented at the high-level meetings organized within the framework of ICSD, during which REP4SD-CA activities are reported back to the countries and donor community.

It is important that ICSD and other international partners working within the framework of the priority areas identified in the Regional Strategy collaborate with the UNCCD, UNFCCC and UNDRR to ensure proper climate-, DLDD- and disaster risk reduction-related synergistic activities.

Midterm Action Plan for 2021–2026

Area 1 Building monitoring, risk assessment and drought prevention capacities

Objective	Actions	Expected outcomes	SDGs affected
Institutional reforms	Consider including drought and dust transfer issues in the Central Asian countries' by-laws to enhance the potential for regional integration.	- More attention paid to drought issues at the government level. - Conditions provided for data exchange and the planning of joint actions. - Each countries' tasks and problems approached from a regional standpoint.	SDG 9 SDG 10 SDG 13 SDG 14
	Prioritize climate change and drought issues at the national level through assessments of damages incurred by droughts and inaction.		
	Promote regional integration to ensure joint action on preventing and mitigating drought and water shortage periods.		
Transfer of technology and establishment of a drought monitoring and early warning system	Expand gauging stations (each agroclimatic zone is to have several stations) – contingent upon equipment capabilities of hydrometeorological services in each country.	- Governments and end users to receive more accurate data and timely forecasts.	SDG 9 SDG 11 SDG 13
	Gather information and develop early warnings. Forecast and warn of droughts and water shortage periods	- Timely dissemination of high-quality forecasts to enable the population and agricultural producers to improve their preparedness and enhance their resilience to droughts and water shortage periods.	
	Enhance data exchange and interaction between hydrometeorological services and emergency agencies, as well as expert communities in Central Asian countries.	- Outlined basis for the development of environmental and food security plans.	

Objective	Actions	Expected outcomes	SDGs affected
Development of instructional guides and tools for the profiling of climate risks and adaptation measures	Identify and adapt best practices for drought monitoring and prevention. Document and disseminate lessons learned and good practices to support future learning and provide information to support policies, strategies and programmes. Integrate publicly available and internationally recognized tools and information sources into the regional database of hydrometeorological and climate indicators.[1]	- Development of methodological manuals and recommendations with a unified approach to data collection and analysis. - Facilitation of data exchanges between countries. - Capacity-building and knowledge improvement. - Access to international data in the context of the region, with appropriate indicators.[5]	SDG 5 SDG 6 SDG 9 SDG 11 SDG 13
Enhancement of collaboration between the expert community, government agencies and hydrometric service providers	Develop uniform standards, monitoring indicators and mechanisms for the economic assessment of drought losses and put them into practice at the national level. Develop/adapt and test mechanisms and tools for drought management and preparedness. Design a data-collection and analysis algorithm to make reports and memorandums. Disseminate the data obtained and test them in Central Asian countries.	- Obtained data used to promote proactive approaches. - Indicators used to develop national action plans. - Reports on international framework conventions supported with ample statistical and factual data. - Improved interaction between all responsible services. - Best practices in drought preparedness and management help reduce risks and losses from droughts and water shortage periods.	SDG 5 SDG 6 SDG 11 SDG 13

[5] Drought Toolbox, World Overview of Conservation Approaches and Technologies (WOCAT), National Aeronautics and Space Administration (NASA), FAO, International Center for Agricultural Research in the Dry Areas (ICARDA) and WMO.

Area 2 Strengthening drought mitigation, the development of plans to address water scarcity and data dissemination

Objective	Actions	Expected outcomes	SDGs affected
Integration of innovative solutions into national plans on drought and water shortage management and mitigation, and on IWRM	Update and finalize national emergency plans and drought and water shortage management plans, taking into account innovative and adapted practices. Learn practical knowledge and integrate the results obtained into global databases to share the best practices. Synchronize objectives and activities under UNCCD and UNFCCC NAPs, SDGs and other national development plans, as well as global commitments. Set up watering points for wild animals and birds on their migration routes. Ensure the sustainable functioning of wetlands. Improve the regional IWRM system to level peak loads during seasonal water use.	- Implementation of integration processes that are based on universal and adapted methods of drought and water shortage management. - Commitments under international agreements correspond to the countries' objectives and are contemporized.	SDG 5 SDG 6 SDG 7 SDG 8 SDG 9 SDG 11 SDG 13
Increased resilience of agriculture to climate change and diversification of agricultural practices and climate-resilient plants	Identify key vulnerable areas and economic sectors related to agriculture and food security. Identify available financial resources. Identify the best alternative agricultural practices. Propagate sustainable agricultural practices through educational and government programmes. Reuse low-salt drainage effluents to cultivate salt-tolerant plants and develop transhumance.	- Use of a hydrometeorological data and science-based approach to enable agricultural producers to plan their crops and take actions to mitigate the impact of adverse natural phenomena.	SDG 5 SDG 7 SDG 8 SDG 9 SDG 11

Objective	Actions	Expected outcomes	SDGs affected
Awareness-raising among the public and agricultural producers about droughts, management measures and planning techniques	Forecast and warn of drought probability. Provide farmers with assistance in reaching out to new food markets. Provide access to agricultural insurance against drought and water shortage period risks. Set up a network of watering points in natural pastures using solar and wind energy. Carry out an extensive public awareness campaign on measures suggested for drought mitigation, land, pasture and hayfield management, as well as the management of other natural resources.	- Population enabled to respond to potential droughts and water shortage periods, with financial protection capabilities.	SDG 5 SDG 6 SDG 9 SDG 13

Area 3 Building capacity and raising awareness

Objective	Actions	Expected outcomes	SDGs affected
Enhancement of the social protection systems within drought management	Involve local self-governing bodies in the use of natural resources and the development of environmental and adaptation messages.	- Greater involvement of local communities in environmental protection and an awareness of the opportunities and risks associated with drought and climate change.	SDG 5 SDG 6 SDG 9 SDG 13
Capacity-building of women, local communities, national academic institutions and decision makers to monitor, evaluate and understand the direct and indirect impacts of drought on the social and economic development	Improve the material and technical capacities of hydrometeorological services in Central Asian countries through updating, upgrading and expanding the monitoring station networks. Prepare information about alternative crops and innovative water-saving solutions. Involve women and community elders in advocacy work. Enhance the professional capacities of hydrometeorological services in Central Asian countries through workshops, sharing of experiences and the application of the world's best practices. Stimulate top-down and down-top information exchanges for better decision-making and adaptation measures.	- Hydrometeorological services are capable of making highly accurate forecasts. - Collection and processing of data in accordance with international standards. - Establishment of a basis for the exchange of data, experience and knowledge at the regional level. - Prompt and efficient provision of accurate climate-related data and analyses to stakeholder ministries by hydrometeorological services. - Local communities understand the provided data and make educated decisions about their agricultural practices.	SDG 6 SDG 9 SDG 10
Improved knowledge of persons making decisions on climate change and drought, and on their impact on various economic sectors	Arrange workshops and study tours for representatives of European countries to exchange experiences in the implementation of proactive approaches at the national level, with science-based facts and data taken into account. Support local women via woman forums in making their voices heard.	- Decision makers understand the relationship and impact of drought on different economic sectors. - Environmental protection, climate change adaptation and anthropogenic impact on ecosystems are addressed at the regional level.	SDG 6 SDG 8 SDG 9 SDG 10 SDG 15

Objective	Actions	Expected outcomes	SDGs affected
Establishment of strong collaborative partnerships between providers and users of hydrometeoro-logical services, regional and national government agencies and the private sector	Assess the drought impact on key economic sectors (water, energy, food export) in monetary terms, and disseminate these data at all levels. Set up a data exchange channel between agricultural producers and analytical centres as part of the digitalization process in the agricultural sector. Provide especially vulnerable groups with an opportunity to receive hydrometeorological information without impediment. Involve local communities (especially those residing in remote mountain areas) in climate monitoring.	- Monetary expression of economic losses facilitates proactive approaches in the management of droughts and water shortages. - Sectoral ministries advocate for drought prevention efforts. - Involvement of local communities in collecting and sharing data with hydrometeorological services. - Practices of sustainable and rational use of natural resources are conveyed to a wide range of stakeholders.	SDG 5 SDG 6 SDG 17
Joint actions on gender-sensitive and youth-centred approaches to drought management (social integration)	Involve local communities and non-governmental organizations working on youth issues and women's rights in project implementation at the national and regional levels. Engage local media in information-sharing.	- Coherent actions may contribute to an understanding of the needs for regional integration and joint actions related to environmental issues at the transboundary level.	SDG 5 SDG 7 SDG 8 SDG 9 SDG 11

Area 4 Ensuring regional cooperation

Objective	Actions	Expected outcomes	SDGs affected
Institutionalization of coordination, communication and partnerships in countries	Determine the basis for regional cooperation at the national level through public authorities and local government bodies. Promote the establishment of transboundary units to address local issues related to drought and climate change through the exchange of experiences and knowledge.	- Drought and climate change issues take on a national character, but their solution contributes to regional stability and integration.	SDG 17
Establishment of a regional database of agrometeorological and hydroclimatic indicators	Prepare a complete analysis of regulatory norms to establish a regional database of agrometeorological and hydroclimatic indicators. Establish a regulatory framework for regional data exchanges. Analyse the readiness of hydrometeorological service systems to exchange data. Develop an electronic register of drought occurrence and distribution in the Central Asia region, taking drought frequency, duration and strength into account. Initiate a pilot project.	- The regional database of agrometeorological and hydroclimatic indicators helps reduce drought vulnerability and risks	SDG 9 SDG 11 SDG 13 SDG 14 SDG 15 SDG 17

Objective	Actions	Expected outcomes	SDGs affected
Integration into REP4SD-CA	Coordinate actions and propagate objectives. Implement joint actions. Mobilize resources.	- Implementation of Regional Strategy drought management and mitigation proposals.	SDG 6 SDG 9 SDG 14 SDG 15 SDG 16 SDG 17
Establishment of the information message “one region, one ecosystem”	Jointly with the UNCCD national consultant and the UNFCCC, develop a message to shape the region’s common vision on climate change, drought and land degradation. Coordinate actions and disseminate objectives.	- Each country’s challenges, issues and opportunities are viewed as regional objectives and presented globally as shared objectives.	SDG 6 SDG 8 SDG 9 SDG 10 SDG 13 SDG 14 SDG 15 SDG 16 SDG 17
Strengthened integrated planning for the management of natural resources, including water, land (pastures, plantations, etc.) and energy, i.e. including the water, energy and food nexus	Hold multisectoral and multi-level discussions and decision-making, taking the needs and capabilities of economic sectors hit hardest into account. Discuss objectives at regional and international platforms.	- Coordinated actions across the region with both costs and benefits of joint coordinated actions taken into account.	SDG 17


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List of acronyms

CA	Central Asia
ASBP	Aral Sea Basin Programme
AVHRR	Advanced Very High Resolution Radiometer
CACILM	Central Asian Countries Initiative for Land Management
CAREC	Regional Environmental Centre for Central Asia
CESDRR	Center for Emergency Situations and Disaster Risk Reduction
CIS	Commonwealth of Independent States
DLDD	Desertification, land degradation and drought
EM-DAT	Emergency Events Database
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross domestic product
GHGs	Greenhouse gases
GWP	Global Water Partnership
ICSD	Interstate Commission for Sustainable Development
ICWC	Interstate Commission for Water Coordination
IDMP	Integrated Drought Management Plan
IFAS	International Fund for Saving the Aral Sea
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated water resources management
JMP	Joint Monitoring Programme for Water Supply, Sanitation and Hygiene
LDN	Land degradation neutrality
NAMA	Nationally Appropriate Mitigation Action
NAP	National action programme
PPP	Public-private partnership
REP4SD-CA	Regional Environment Programme for Sustainable Development in Central Asia
SDG	Sustainable Development Goals
SDS	Sand and dust storms
SLM	Sustainable land management
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
VHI	Vegetation health index
WMO	World Meteorological Organization

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Regional Environmental Centre
for Central Asia
40, Orbita-1, 050043, Almaty,
Republic of Kazakhstan
www.carececo.org
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