



**UDNP Regional project
"Climate change and sustainability in Central Asia"**

SUMMARY FOR DECISION MAKERS

**on existing climate change issues affecting key sectors of the Kyrgyz Republic, the Republic of
Tajikistan and the Republic of Uzbekistan
(water resources, energy industry, agriculture and disaster risk reduction)**

**recommended
PLAN OF ACTIVITIES**

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INTRODUCTION

Nexus approach is a fundamental transition from an exclusively sectoral approach to an intersectoral, approved and integrated way of social and economic development that can be implemented at all levels of governance and at any scale. This approach is the basis for informed decision-making and negotiations to find fair compromises and interactions between competing types of water, land and power consumption. When properly implemented, this approach allows not only to ensure environmentally sustainable use of vital resources, reduce potential negative impacts and possible conflicts, but also maximize benefits. This concept is especially important for the Central Asian region where there are a number of transboundary river basins and there is a tension in the common natural resources management. Integrating a nexus approach into planning and decision-making processes can bring significant benefits to Central Asia¹.

The global temperature growth rate for the period of 1976-2022 is 0.18 °C/10 years² while in the countries of Central Asia the rate of warming exceeds the average value for the planet. Thus, in Kyrgyzstan, the annual temperature growth rate for the same period is 0.25 °C/10 years, in Tajikistan - 0.20 °C/10 years, in Uzbekistan the most intense rates are observed - by 0.34 °C/10 years³.

Central Asia has already recorded water stress level of 87.9% and it is the second region in the world experiencing the greatest water shortage. Further flow decrease in Central Asia water basins is predicted due to reduced rainfall and simultaneous increasing evaporation in warm season as well as degradation of glaciers and reduced seasonal accumulation of snow in the mountains⁴. According to the Diagnostic Report⁵ the flow of the main rivers is expected to decrease in the Aral Sea basin by 2045 - maximum up to 3-4 km³ of water per year in the Amudarya river basin and up to 2 km³ in the Syrdarya river basin (according to a moderate scenario - up to 2.5 km³ and 0 km³ respectively). This means that less water will be available for irrigation, drinking, sanitation and energy generation.

At the same time, predicted population increase and economic growth will probably lead to increased demand for resources. Therefore, the increasing water shortage can have cascading consequences for such sectors as agriculture and water management, energy industry. Impact on water resources can reduce access to clean water that, for example, already affects more than 40% of the population in Tajikistan⁶.

Increasing number of climate emergencies, increasing drought of the region with inefficient agricultural methods have a negative impact on the food security of the region.

The current problems of the energy sector such as worn infrastructure, along with insufficient funding for the modernization of this sector, weak economic incentives to reduce the energy intensity of production and power consumption by the population are also intensified by the climate impacts such as cold waves or heat stresses. Moreover, changes in the water content and cycling of the main rivers have a negative impact on hydraulic power industry that is dominant in the head river countries.

The purpose of the summary is to provide decision makers with an understanding of how climate change in the Central Asian region affects the main sectors of the economy, what measures should be taken at various levels including taking into account the NEXUS approach.

Sectoral Summary

Water resources

Water resources in the Central Asian region are mainly provided by the transboundary rivers, and they play a key role in the economies of the countries⁷. For Kyrgyzstan and Tajikistan water in the mountains is the main

¹Analytical Note "Understanding the Water-Energy-Food Security Approach," RECA, 2019

https://carececo.org/publications/nexus/Policy_Brief_1_Why_Nexus_RUS.pdf

²https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series/globe/land/1/1/1976-2022?trend=true&trend_base=10&begtrendyear=1976&endtrendyear=2022

³Summary Annual Report on the State and Climate Change in the Territories of the CIS Member States for 2022

⁴ USAID (2018) Climate Risk Profile: Central Asia

⁵ Overview of the use and management of water resources in Central Asia. A discussion document. Publisher: GREEN ACTION TASK FORCE. OECD. Paris. 2020. 104p. <http://www.cawater-info.net/library/eng/overview-wm-ca-en.pdf>

⁶ USAID (2018) Climate Risk Profile: Central Asia https://www.climateintelinks.org/sites/default/files/asset/document/2018-April-30_USAID_CadmusCISF_Climate-Risk-Profile-Central-Asia.pdf

⁷ Manning et al., 2018

source of electricity produced (76% of the total) by operating and planned hydroelectric power plants⁸. Downstream, where agriculture plays an important role in the country economy, water is required for irrigation of crops⁹. Rate of annual fresh water intake for agricultural needs exceeds 90% in most countries of Central Asia (except Kazakhstan)¹⁰.



Figure 1 - Water resources of Central Asia¹¹

General problems and challenges of the region in the field of water resources include:

- increasing water shortage featuring the lack of water supply to the Amudarya and Syrдарья deltas (from 40 to 60%) caused by frequent low-water years (2001, 2008, 2014, 2016, 2018, 2021)¹², as well as aging water management infrastructure, use of still low effective water use technologies, weak organizational potential of water management bodies;
- an increase in water requirements caused by the population increase in the region by 8-10 million people (1-2 km³),
- non-uniformity of stable water supply between individual planning zones and areas of regions determined by the results of space observations;
- large differences in water and land productivity between individual zones and districts;
- imbalance when using power capacities of hydroelectric power plants - there is a significant underutilization of capacities in summer and maximum use in winter that, nevertheless, does not cover winter energy shortages;
- rated distribution of river flow for all types of water users from the formation area to the downstream of the river basin according to the outdated standards that does not correspond to the actual needs;
- ineffective use of water resources for all types of water users (primarily agricultural water consumption, then water supply to large cities and settlements, industry and energy);
- insufficient efficiency of the water metering system at all levels and lack of water metering at the end user level;
- very low degree of water use planning at the level of regions and district and its complete

⁸ “Central Asia : Kyrgyzstan – The World Factbook,” 2019; The World Bank Group, 2018

⁹ Russell, 2018

¹⁰ The World Bank Group, 2019a

¹¹ Climate network "Zoy", 2019.

- absence at the level of water consumers;
- inconsistency in water use, weak legal and economic mechanisms at all levels of government, especially at the grassroots level;
- constant number of reclamation concerned lands as a result of insufficient volumes of reclamation works (drainage construction and operation, possibility of incorrect reclamation decisions, etc.);
- lack of a single and approved mechanism of management at the interagency level (drinking water supply, energy industry, agriculture, industry, fishing industry) both within the region and at the national levels;
- lack of mechanisms for compliance with environmental flows.

Agriculture

Agriculture employs almost half of the population of the Central Asian countries. Land degradation ranges from 4-10% of crop land, 27-68% of pasture land and 1-8% of forested land representing 40-100% of land in each country overall¹³. Irrigated arable lands in the Aral Sea basin are heavily saline and swampy. In the future, the recurrence and strengthening of desertification processes are expected¹⁴.

Changes in rainfall regime, heat stresses, increasing drought and water consumption, changes in agrometeorological indicators along with increasing negative impact from late spring frosts after winter and early spring thaws have a negative impact on agriculture. The influence features a decrease in crop yields and nutrient quality, an increase in the number of pests and plant diseases, changing the boundaries of areas suitable for agriculture.

Grasslands are primarily degraded due to excessive anthropogenic load and their condition and productivity get worse due to the climatic impacts, which in turn affects the production of dairy products and meat. Summer heat stresses, sharp temperature fluctuations, spring and autumn snowfalls affect livestock breeding conditions. Increasing expenses during climate threats increase the cost of product planting and producing that causes an increase in its prime cost and affects the availability of food, especially for socially vulnerable groups.

Farmers and pasture users have difficulties when accessing the weather hazards early warning system for preventive measures, as well as modern agroclimatic regime information which should be regularly updated and provide basic information when planning landings and, in general, for climate-sustainable and climate-based agriculture.

Diversification of crops to reduce dependence on water-intensive crops is still at a low level. Farmers have lack of access to knowledge, to financing, to climate-sustainable technologies.

Low productivity or inefficient use of water resources is caused by the use of outdated water-intensive production technologies, a high level of water losses during transportation, insufficient equipment level of water intake facilities and consumers with metering systems, moral and physical wear of individual objects of the water management infrastructure.

Lack of effective economic mechanisms stimulating water users and business to active expansion of progressive water-saving technologies, growing high-yield crops, implementation of recycling and reused water supply systems and water loss reduction.

Small-scale production is also a barrier to the sustainable development of the sector, especially in the context of the region insufficient water supply.

Energy industry

Although the region is rich in energy resources, these resources are unevenly distributed: about 90% of the region hydraulic power resources are concentrated in Kyrgyzstan and Tajikistan which are also most exposed and vulnerable to climate change and have limited adaptation capacities.

¹³ The economics of land degradation - Central Asia Regional Report: Broadening land management options for improved economic sustainability across Central Asia: A synthesis of national studies, 2016

¹⁴Regulation of the water and energy complex of Central Asia, analytical report. EDB, 2022

The main problems in the electric power industry of the three countries are:

- climate change resulting in changes in the regime of major rivers and their water content reduces water availability for hydraulic power industry that directly impacts on the national economies of the river head countries;
- infrastructure problems and the aggregate wear of power equipment and distribution mains cause unreliability of power supply and the need for modernization. Failure to take measures will lead to the subsequent rapid destruction of fixed assets of companies and an increase in accident rate, a reduction in power generation;
- lack of economic incentives to reduce the energy intensity of production and reduce the power consumption by the population that makes ineffective the entire system of electric power generation and distribution;
- when winter temperatures decrease or so-called cold waves related to climate change occur, the load on generating stations and power transmission and distribution networks increases leading to an increase in accidents;
- an increase in summer temperatures results in increasing demand for electric power for cooling premises;
- increasing frequency of extreme weather events and natural disasters (such as avalanches, landslides, mud torrents) increases infrastructure risks.

Emergencies

Natural and weather hazards caused by climate change have a destructive impact on the livelihoods of the local population causing human and economic losses, potentially leading to social insecurity, large-scale displacement and labor migration. Poor and the most vulnerable segments of the population are the least resilient to natural disasters, capable of survival and recovery after disasters.

The dynamics of the number of emergencies in the Kyrgyz Republic shows a stable growth trend - over the past 30 years there have been 5770 emergencies, 2097 cases from the above mentioned have occurred over the past 10 years that is 1.5 times more than in the previous 15 years. About 70% of all emergencies are hazardous hydrometeorological phenomena related to climatic characteristics¹⁵. The most dangerous hydrometeorological natural hazards are mud torrents and floods caused by melting snow and heavy rains. They cause major economic damage (destruction of sections of auto roads and railways, bridges and protective dams, irrigation facilities, residential buildings, death of crops and pets), sometimes people die in mud torrents. In spring and summer the mud torrents and floods are recorded throughout Kyrgyzstan having the greatest frequency in Osh, Zhalal-Abad, Batken regions (Priferган regions).

Every year Tajikistan suffers from numerous natural disasters such as earthquakes, floods, avalanches, mud torrents and landslides. Over the past three decades, floods, earthquakes and droughts are estimated to have collectively affected 4.6 million people and caused more than \$1.1 billion in damage. In 2023 the reported natural disasters included 335 avalanches, 79 mud torrents, 47 earthquakes, 26 rockfalls, 22 landslides, 17 water level increases, 10 cases of increased wind, 12 cases of heavy rains, 3 thunderstorms and lightning as well as two cases of severe frost.

Uzbekistan is exposed to a number of natural hazards, such as earthquakes, floods, landslides, mud torrents and drought that can not only lead to significant economic losses but also affect the population in general. According to the 2018 National Note on Disaster Risk Financing for Uzbekistan¹⁶ is US \$92 million (in absolute terms, this is the highest figure in Central Asia). Severe floods in April-May 2020 caused the evacuation of 900 people in the Surkhandarya region and affected more than 70,000 people in several regions of the country.

In the Republic of Uzbekistan there are following risks of man-made, natural and environmental emergencies:

- insufficient seismic resistance of the most buildings and structures;
- arrangement of a number of farms of individual settlements in geologically and

¹⁵ Fourth National Message on Climate Change in the Kyrgyz Republic

¹⁶ Takeuchi K, Scalon T. and Gurenko E., 2018. National Note on Disaster Risk Financing: Uzbekistan, The World Bank

Group. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/513951591597853635/disaster-risk-finance-country-note-uzbekistan>

- hydrometeorologically dangerous areas;
- conditions for the spread of especially dangerous infections;
- location of a considerable part of water storage reservoirs in seismic zones;
- widespread operation of hazardous production facilities;
- extensive transport infrastructure, power system and utilities;
- zones of environmental emergencies as well as environmental disasters.

In Central Asia countries, an increasing risk of emergencies and vulnerability of the population can be caused by:

- increasing vulnerability of infrastructure and population from hydrological emergencies;
- increasing vulnerability of infrastructure and population to emergencies related to the activation and reactivation of gravitational processes;
- increasing damage from meteorological emergencies for infrastructure and the population.
- increasing threats of cross-border emergencies;
- low population coverage in the emergency training system;
- weak development of the population notification and warning system in emergencies;
- aging and high wear of process equipment at industrial facilities, utilities;
- intensive urbanization, non-compliance with the rules and regulations of urban planning during the construction of residential complexes and industrial facilities;
- misuse of water resources;
- insufficient development of transport networks and logistics.

Plan of activities for elimination gaps and solving problems

Solutions in the water management sector

Key goals that can be recommended as a basis for action:

- Development of general principles as well as specific measures for the water resources management and protection which will ensure the achievement of water security indicators in the region;
- coordination and implementation of regional and national measures for the efficient use and protection of water resources in Central Asia;
- improvement of the water metering and monitoring system, improvement of the information exchange on water resources;
- development of a water saving system, taking measures to increase efficient use of water resources;
- strengthening regional cooperation and development of mutually acceptable mechanisms for the use of water resources of the Aral Sea basin;
- development of proposals for improving the organizational and legal basis for regional water cooperation;
- improving the capacity of water management organizations and the qualifications of water management personnel;
- forecasts of future water content in small rivers for justified decision-making on construction of water facilities (day and decade basins)

Solutions in the agriculture sector

Primary goals for adapting agriculture to climate change are:

- development and implementation of a number of measures to adapt agricultural production to climate change;
- optimal location of agricultural production considering the needs of countries for the required agricultural products and minimizing water resources use;
- creation of agricultural innovation systems providing consulting services to agricultural producers;
- development of the legislative basis taking into account climate change and other related legislative and regulatory acts;

- improving the legal basis of rural business communities for the development of their self-organization;
- implementation of measures to strengthen the human resources of analytical laboratories for environmental protection, land resources and hydrometeorological services, and their overtraining with modern methods of analysis results processing;
- comprehensive reconstruction of irrigated land;
- phytomeliorative works;
- development of programmes to combat desertification, soil erosion and restoration and further use of low productivity lands.
- improving access to weather forecasting, early warning systems for hazardous weather events
- preparation and wide distribution of agrometeorological regime information for planning plantings, reorientation of crops adapted to current climatic conditions

Solutions in the energy industry sector

- Diversification of electric power sources due to the impact of climate change on the hydropower sector of the river head countries
- financial stimulation of renewable energy sources purchase by the population and business entities;
- implementation of targeted measures for the use of alternative energy sources in buildings and administrative and utility facilities including settlements and households;
- the most widespread attraction of private investments in the industry by increasing the attractiveness of business projects for the construction of micro and small hydroelectric power plants;
- comprehensive support for business entities engaged in the production of solar and wind power plants as well as small hydroelectric power plants
- energy system of Central Asia, general frequency control as well as RES balancing using time zones, expansion to the Eurasian Economic Union is possible;
- development of the regional electricity market, at the moment within the EAEU.

Solutions in the emergency sector

- Improvement of the legal and methodological basis considering national interests and priorities in the field of disaster risk reduction;
- modernization of systems for emergency monitoring and forecasting, warning and notification;
- assessment and mapping of natural emergencies with identification of high-risk zones considering predicted climate change
- creation of efficient and effective mechanisms for disaster risk reduction, early prevention of threats to the life, health and property of citizens, sustainable operation of facilities and life support systems;
- Improvement of emergency response capacity, implementation of modern management methods and tools and the interaction of state bodies, civil society and the private sector in this area;
- development and implementation of the innovative ideas and technologies in the system of prevention and response to emergencies;
- development of rehabilitation systems for the population affected by emergencies as well as the restoration of living conditions in the disaster zone;
- increasing capabilities, awareness and training in emergency prevention and response for decision-makers and the population
- development of mechanisms for implementation of the climate risk insurance system

CONCLUSION

Early activities in adaptation to climate change will bring significant economic benefits and allow to minimize threats to ecosystems, human life and health, economic development and infrastructure. Cost-benefit analysis of adaptation activities showed that the overall rate of return on investment in improving climate sustainability is very high and the cost-benefit balance varies in proportions from 1:2 to 1:10. In addition, only improvement of the quality of meteorological forecasts and intensification of early warning systems can save the lives of about 23,000 people in the world every year¹⁷.

Updated Climate Change Documents/Processes "Nationally Determined Contribution" (NDC) developed and approved at the national levels in Kyrgyzstan, Tajikistan and Uzbekistan confirms the important role of structural reforms for ensuring long term policy changes with focus on energy efficiency measures and renewable energy expansion, implementation of resource-saving technologies in key sectors of the economy and social sector, both economically and in terms of climate change mitigation and adaptation.

Updated NDC goals do not impede the economic development of the countries because they do not imply an absolute reduction in greenhouse gas emissions. Achievement of the long-term goal is provided by the support of the international organizations and financial institutions, access to advanced resource-saving and environmentally friendly technologies and climate financing resources.

"Adaptation" section of the updated documents contains measures including on the adaptation of agriculture and water, energy industry, disaster risk reduction (activities to mitigate the consequences of the Aral Sea disaster for Uzbekistan)

Therefore, it can be summarized that three countries have considerably established a legislative and institutional basis for activities aimed to solve problems caused by climate change. However, when implementing the above mentioned strategies the decision makers should attach priority importance to the sustainability of the taken measures.

Governments, private sector, civil society and individuals - all of us need to make efforts to keep the future we aspire to in view. Narrow window of opportunities is still open but you can't lose a second.

¹⁷ Draft of Regional Strategy for Adaptation to Climate Change in Central Asia, GIZ, 2024

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