

MOUNTAIN ADAPTATION OUTLOOK SERIES

# Outlook on climate change adaptation in the Central Asian mountains



UNEP



Mountain village, Kyrgyzstan

# Introduction

This Outlook is a product of the inter-regional UNEP led project “Climate change action in developing countries with fragile mountainous ecosystems from a sub-regional perspective” which aims to support mountainous developing countries in five sub-regions of East Africa, (Tropical) Andes, Dinaric Arc/Balkans, Central Asia and South Caucasus, to integrate climate change adaptation into their relevant development policies, plans and strategies.

This sub-regional Outlook synthesizes the knowledge on existing climate change adaptation responses in mountain regions of Central Asia and provides recommendations for policy action towards adaptation to climate change. It has been prepared by UNEP and its collaborating centre GRID-Arendal in cooperation with the Regional Mountain Centre for Central Asia (RMCCA) and several national and international experts of the five Central Asia countries.



Hissar Range, Uzbekistan

## The Central Asian region

All Central Asian states, namely Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, are landlocked countries located in the centre of the Eurasian continent. The region is dominated by high mountain ecosystems of the Pamir-Alai and the Tien-Shan. Central Asia's mountain ranges harbour rich and endemic flora and fauna and have been qualified as a biodiversity hotspot by Conservation International in 2005.

The high mountain ranges serve as climatic barriers and isolate the region from the moist air circulation, which has led to the establishment of an arid climate system and low volume of surface waters. The mountain ecosystems of the Pamir-Alai and the Tien Shan play an extremely important role in the accumulation and supply with water resources in all countries of the region during the vegetation season when water resources are scarce.



Markhor goat, Tajikistan



Moraine lake, Kyrgyzstan

# Vulnerabilities and impacts of climate change

The importance of mountain ecosystems as water towers in Central Asia is rising, especially in the light of the changing climate. Increases in temperature and changes in precipitation patterns are leading to changes in the hydrological regime and reduced water resources in some parts of the region. The problem with decreasing supply is exacerbated by increasing demand due to population growth. At the same time, climate change has had a significant impact on mountain ecosystems as well as on the mountain and downstream communities who depend on them. All five Central Asian countries are experiencing an increase of extreme weather events and natural hazards affecting human security and the countries' economies. Decreases in glacier and snow reserves are also having an impact on the availability of water resources essential for energy production and agriculture.

## Water resources

The region's glaciers will continue to shrink or in some areas completely disappear by the end of the century (Sorg et al. 2014; State Agency on Environmental Protection and Forestry 2009). Such drastic changes to the glaciers are likely to have a significant impact on water availability in the region as large amounts of water derive from melting glaciers and snow reserves of the Pamir-Alai and Tien Shan mountain ranges. Despite the current trend of increasing water flows due to melting glaciers and snow cover, long-term projections show decreasing water availability,

while the demand for water will continue to rise given the continuous economic development and increase of population.

## Energy

Changes in stream flow and water availability together with the increase of extreme events such as floods, droughts, mudflows and landslides in Central Asian mountains will also have an impact on the energy sector and related infrastructure in the longer term. This is in particular relevant for Tajikistan and Kyrgyzstan, which primarily rely on hydropower for energy production. Declining water levels and rising temperatures are also of concern in Kazakhstan, Turkmenistan and Uzbekistan, which are dependent on thermal power plants.

## Agriculture

Apart from water, agriculture has been recognized as one of the most vulnerable sectors in the region both due to increased water demand and climate change. However, the impact of climate change on yields throughout the region varies between negative and positive depending on variables such as type of crop, latitude, soils and agricultural management. While agricultural activity in high altitudes will mainly benefit from warmer temperatures, increased risk of water deficits is likely to decrease yields towards the end of this century.



Agriculture, Alatau Mountains, Kazakhstan



## Natural disasters

According to UNESCAP (2010), the following decades will be characterized by cycles of natural hazards with increased intensity and frequency of floods, droughts, landslides, heat waves and avalanches. Over the past decade, 10 percent of the Central Asian population has adversely been affected by natural disasters (UNESCAP 2010). Floods are common throughout Central Asia. They are mainly caused by abnormally high and long lasting rainfall coupled with excessive water runoff from melting snow and glaciers in the mountains, as well as outbreaks of glacial lakes. The lack of vegetation in the mountains of Central Asia, as a result of arid climate conditions, increases the risk of water-related hazards and exacerbates these events.

Floods and glacial lakes outbursts are two of the main triggers of landslides and mudflows in the region. Central Asia has over 2000 river channels that are prone to mudflows (UNESCAP 2010). The risk of events like landslides and mudflows is becoming greater with increasing temperature. Apart from water related hazards, droughts have been greatly affecting the Central Asian population. Around 60 percent of people who experienced extreme events over the past decade were impacted by drought. This has had significant negative consequences for the agricultural sector and food security in the region (Pollner et al. 2010).



Pamir mountains, Tajikistan





Medeu skating rink outside Almaty, Kazakhstan



Backpacker at mountain lake, Tajikistan

## Tourism

Tourism in the mountain regions is progressively becoming recognized as a means for economic development in Central Asia. At the same time, climate change may create unfavourable conditions for this sector through sub-optimal weather conditions for winter tourism. Climate-related increases in natural disasters, combined with limited monitoring/early warning and emergency capacities, is a threat to tourists and personnel working in mountain tourism and related infrastructure.

## Human health and safety

Climate change is likely to have profound impacts on the health of human populations in Central Asia by posing new threats, and exacerbating existing threats. Climate-related threats include, for example, extreme events and natural hazards that are steadily increasing in frequency and intensity. These are for

example glacial lake outbursts, land- and mudslides, heat waves, droughts, and dust storms. Furthermore, heavy rain and flooding combined with warmer temperatures are likely to increase the population's exposure to a number of vector, food and waterborne diseases, such as tick-borne encephalitis, dengue fever, malaria, typhoid, etc. For example, malaria, which was eradicated during Soviet times has again become rife during the past decade in southern Tajikistan (Lioubimtseva and Henerby 2009). With an increase in temperature in mountain areas, diseases such as malaria are expected to move to higher altitudes.

At the same time, climate-induced health threats are aggravated by many non-climatic factors, such as poverty, food insecurity, and limited access to health and sanitary services. This is particularly true for mountain communities, who are more vulnerable and less capable to respond to such threats than communities in lowland areas.

# Key findings

Areas such as water resources, agriculture, public health natural ecosystems, energy, transport, and natural disasters have commonly been identified as a priority for the Central Asian region in terms of climate change vulnerability. All five Central Asian countries have taken steps to address impacts related to these areas at the national level. Although climate change issues concern a wide range of competent ministries and governmental departments of the Central Asian countries, climate change adaptation and mitigation are mainly the responsibility and competence of the environmental ministries and agencies. Given the limited influence of environmental governmental bodies, compared to other institutions, environmental considerations often receive insufficient attention from decision makers. Additionally, some Central Asian countries have no effective cross-sectoral coordinating bodies to provide general policy guidelines, define priority actions, allocate sufficient resources and monitor coordinated and systematic implementation of policies, programs and investments in the context of climate change adaptation and mitigation.

Special adaptation strategies or programs with specific recommendations and practical measures only appeared in recent years. However, they still face the challenge of integration into the national and sectoral development programmes. A further challenge identified for climate change adaptation is the lack of specific rules and the weakness of regulations on climate change adaptation and mitigation in environmental legislation. The lack of specialized laws on climate change in environmental

legislation leads to these issues not being regulated in by-laws.

In order to initiate and strengthen science-based dialogue on adaptation to climate change and to improve environmental planning and management among key stakeholders, further evidence-based analysis of the nature and the extent of physical and biophysical impacts of climate change within different climate scenarios is required. In some Central

Asian countries, a vast amount of environmental information is collected. However, there is no coordinated database to facilitate access to accurate environmental data.

At the regional level, there is a sufficiently developed institutional network of regional organizations authorized to implement regional cooperation. These include the International Fund for Saving the Aral Sea (IFAS), the Interstate Commission for



Pamir mountains, Tajikistan



Water Coordination (ICWC) and the Interstate Commission on Sustainable Development (ICSD). However, until 2010 these cooperation mechanisms have mainly been focusing on water resources and environmental protection rather than on climate change issues per se.

Climate change has recently been included in the regional programs of IFAS as well as the relevant work of international organizations and

development cooperation agencies in the region. These organizations and agencies, together with the countries of Central Asia and other organizations and donor partners, have launched a number of regional projects and activities on climate change adaptation and mitigation. Mountain issues have been partially addressed in projects such as in a recent project on ecosystem-based adaptation in Central Asia high altitude regions, currently implemented by the German Agency for International Cooperation (GIZ)

with the funding of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

Other organizations are also engaged in regional cooperation and dialogue on climate change issues in mountain territories of Central Asia. These include the Mountain Partnership Central Asia Hub (CAMH) known as “Central Asia Mountain Hub”, the Aga Khan Foundation (AKF), the University of Central Asia (UCA), the Alliance of Central Asian Mountain Communities, and other regional projects and initiatives of various international organizations and donor countries.

Regional cooperation on climate change and sustainable development in mountainous areas has also been promoted by the Regional Mountain Centre in Central Asia (RMCCA), which was established as a structural subdivision within the ICSD IFAS framework. However, the initiatives in place for addressing climate change issues at the regional level lack attention from competent bodies and ministries and lack synergies with other ongoing activities.



Shelek River, Kazakhstan

# Recommendations

## Monitoring and research

- Improve monitoring and evidence-based analysis of climate change impacts within different scenarios which will promote a better understanding of the multiple impacts of climate change in the future, and provide the basis for a number of adaptation measures to be taken, including prioritization of actions, formulation of adaptation programmes and strategies, development of institutional capacities, and development of projects at the local, national and regional levels;
- Improve information management and access to data on climate change – crucial for better environmental planning and management in the region;

## Awareness and capacity building

- Provide access to information at the local community level in order to increase public awareness;
- Ensure capacity building measures for different levels and partners to equip them with up-to-date information and research results, and communication tools to reach wider audience;

## Institutional framework

- Countries would benefit from strengthened institutional capacity to support the establishment of a well-functioning climate change adaptation framework, in particular through strengthening existing or creating new climate change bodies as well as supporting cross-sectoral integration of adaptation to climate change at the national level;
- Establishing specialized cross-sectoral bodies would further ensure a greater coordination of activities and synergies of different bodies;

## Policy and law

- Introduce long term cross-sectoral policies (and involving civil society in their design) taking into account climate change trends and addressing key risks as well as proper enforcement of the legal framework related to climate change adaptation;

## Financial mechanisms

- Ensure timely measures are taken to adapt to climate change in order to reduce current and future costs resulting from climate change and to minimize threats to ecosystems, human health, economic development, property and infrastructure;
- Establish a robust financial framework for climate change adaptation and mobilize external funding such as through the Green Climate Fund (GCF) to help to overcome financial limitations in climate change adaptation;

## Regional level<sup>1</sup>

- Promote a regional approach to climate change adaptation, coordinated with other environmental and development frameworks, including exchange of data and information, methodologies for research assessments, monitoring on climate change, and coordination of relevant actions on the ground among the countries of Central Asia;
- Promote ecosystem-based approaches to climate change adaptation including building on the results and success of other relevant initiatives and projects.



Tajikistan

## Notes

1. Taking into account the respective political environment allowing for such an approach.

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