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MICRO-CREDENTIAL

CLIMATE CHANGE FOR SUSTAINABLE LAND MANAGEMENT IN CENTRAL ASIA

1- Climate vs Weather and why Climate Changes Matters

Reading 2

Policy note from a Central Asian ministry or CAREC on climate and land/water challenges

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The following document, is a policy made by Central Asia Regional Economic Cooperation (CAREC) in 2024, titled "**Adapting resilient water management practices to climate change in Central Asia".** This policy brief contends that ensuring long-term water security in Central Asia requires an integrated adaptation strategy encompassing diversification of water sources, modernization of hydraulic and irrigation infrastructure, agricultural restructuring toward efficiency, and strengthened transboundary governance to mitigate the escalating hydrological risks posed by climate change.

Policy Brief

Adapting resilient water management practices to climate change in Central Asia

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Introduction

Climate change is negatively affecting water resources availability in Central Asia. Adapting water management practices to deal with the changed rainfall- and runoff patterns as well as temperatures due to climate change in Central Asia is crucial to address the region's vulnerabilities and ensure sustainable water use for its growing population, agricultural and energy production.

This policy brief integrates a review of academic literature, the analysis of current policy frameworks and the empirical evaluation of the current situation in Central Asia related to the water management practices.

Literature review

Central Asia is an increasingly important strategic geopolitical region. During the latest decades, the region has often been identified as close to potential conflict regarding water usage. The rapid population increase together with climate change impacts are likely to further aggravate the short- and long-term future precarious situation for water management in the region. Central Asia in general is water rich, however, implementing efficient and fair water management will be important in view of continuing population increase and climate change. Subsequently, water and natural resource development is a cornerstone in all the Central Asian republics, as water resources are, to a great extent, shared between all five republics. A common ground for water-sharing is, therefore, of utmost importance.[1]

Excessive reliance on water resources and their inefficient use are the primary reasons for Central Asia's vulnerability to the impacts of climate change, which is projected to increase variability and as such extreme conditions. In order to reduce water needs, countries should prioritize increasing water efficiency across sectors. Promoting less water-intensive sectors of the economy is a pertinent adaptation strategy. Given the interconnectedness of water, agriculture, and energy systems in Central Asia, regional cooperation is fundamental to enhancing climate resilience and could unlock multiple benefits for all parties.[2]

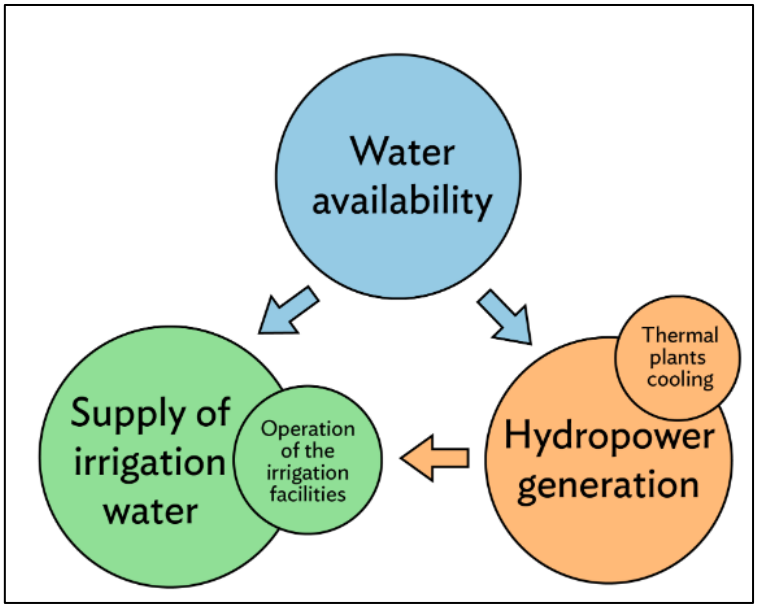
Inefficient water use in agriculture is a key concern. Much of Central Asia has high-quality soils suitable to produce horticultural exports, yet a large share of agriculture involves low-value, water-thirsty crops, and inefficiency limits the economic productivity of water. About 50 percent of irrigated lands are affected by salinization and waterlogging as a result of poor irrigation and drainage systems. The cumulative effects of climate change will have profound consequences. Warming in Central Asia is expected to exceed global averages, with temperatures rising by an average of 5-6 degrees Celsius by 2100. Higher temperatures are already leading to earlier snowmelt, shifting peak runoff into spring, and reducing irrigation season flows. Modelling suggests that by around 2050, the region will experience peak water availability, after which the water flows will decline. Both flood and drought extremes will increase, as will overall water stress.[3]

[1] Berndtsson, Ronny, and Kamshat Tussupova. 2020. "The Future of Water Management in Central Asia" Water 12, no. 8: 2241. https://doi.org/10.3390/w12082241

[2] Improving Central Asia's Climate Resilience through the Water–Agriculture–Energy Nexus article, 2023.

[3] Sara, J. J., & Proskuryakova, T. (2022, June 7). Central Asia: at the confluence of global water action and climate resilience Dushanbe conference to emphasize role of water in sustainable development. World Bank Blogs

Figure 1: Key Connections of the Water–Agriculture–Energy Nexus in Central Asia[4]



Policy context

The current water management practices from Central Asia are not ready for the challenges that climate change is bringing to the region. Changes must be made to build resilience of the water management sector.

Analysis of findings

Most of the water resources in Central Asia come from rivers, glaciers and rainfall. In view of the expected changes in precipitation patterns and melting of glaciers, it is necessary to diversify water sources as a means to increase resilience. This could involve investing in alternative water supply sources such as groundwater extraction or rainwater harvesting systems with respective storage at a scale that allows to substitute missing river water at least for domestic use. By reducing the dependency on glacier-fed rivers and surface water bodies, diversification of the water sources can mitigate the impacts of climate change-induced water scarcity.

Water storage capacity and infrastructure management need to be enhanced in order to buffer against climatic variability and secure reliable water supplies for the larger water users including irrigated agriculture and hydropower. Some examples include building new water reservoirs, dams and groundwater recharge facilities that will capture and store water during times of surplus for use during dry periods. The upgrading of irrigation systems together with improved drainage networks can minimize losses from evaporation as well as leakages, hence improving overall efficiency of water usage.

Efforts should be made towards addressing inefficiencies in water use in the agricultural sector. For instance, promoting the adoption of modified crops and water saving techniques such as precision agriculture can reduce the water use while crop yields remain constant or even increase. This can

[4] Used from Development Asia's article "Improving Central Asia's Climate Resilience through the Water–Agriculture–Energy Nexus" by Atabek Umirbekov : https://development.asia/summary/improving-central-asias-climate-resilience-through-water-agriculture-energy-nexus

further be achieved through investment in soil improvements as well as moisture monitoring systems and selecting crops based on their suitability for the prevailing moisture conditions.

These measures will support the sectors' ability to cope with future challenges of increasing water demands and the effects of climate change. Central Asia further needs integrated approaches which focus on linkages between its energy, agriculture and mining sectors to build resilience and minimize the effects of climate change on the economy.

Recommendations

For Central Asia to handle the effects of climate change on its water resources, several actions must be prioritized. Firstly, climate change impacts have to be understood in the context of an environment with overall increasing water demands due to population growth. Climate change is an additional factor that leads to increased water variability as well as increasing demands due to increasing temperatures. Secondly, adaptation options need to be considered that can deal with the increasing water demands and -variabilities by reducing consumption, and by tapping on different water resources. This could mean seeking sustainable ways of reducing water demands due to e.g. less water consuming crops, employing water saving technologies through e.g. canal lining or improved irrigation systems, extracting groundwater, promoting rainwater harvesting and exploring potential uses of treated wastewater as a means to reduce dependence on glacier-fed rivers. Further, increased water storage capacity through new and expanded reservoirs and updated irrigation infrastructure add resilience to variable conditions.

Promoting water-efficient agriculture has great potential to reduce water use. Incentives for high-value crops that require less water, precision irrigation technologies, and research into drought-resistant varieties will enhance the efficiency with which this crucial sector uses this resource.

Lastly, regional cooperation is crucial in managing shared river basins in the face of changing climates. It is necessary that existing agreements on sharing waters among the Central Asia nations are reviewed considering climate impacts to fully utilize the countries synergy potential. To monitor the changes in the availability of water resources, a joint methodology for water accounting needs to be developed. In formulating strategies for regional water cooperation in Central Asia, it's crucial to acknowledge the roles of external actors, such as the Russian Federation, Afghanistan and China.

Way Forward / consulting mechanisms

Central Asia faces a complex task in adapting its water management to a changing climate, but with proactive measures like water sources diversification, infrastructure upgrades, and regional cooperation, the region can overcome these challenges.

<u>Building water diversification strategies</u>

- Understanding quantity, location and timing of water demand and availability;
- Evaluating all water resources for their potential conjunctive use (river-, rain-, groundwater) for sustainable exploitation;
- Experiment with rainwater harvesting systems in urban centers and rural areas;
- Conduct viability studies into reusing treated wastewater to ensure safe practices and public acceptability.

<u>Infrastructure enhancement</u>

- Mapping current irrigation systems to identify the locations where the infrastructure needs to be upgraded;
- Raise funds for major infrastructure projects by involving international development banks and the private sector.

Agricultural transformation

- Provide incentives (subsidies, preferential loans) to farmers who switch over to low water intensity, and/or high value crops;
- Provide opportunity by facilitating technology transfer on precision irrigation systems using training and demonstration sites;
- Expand agricultural research focusing on drought tolerant crop varieties suitable for Central Asia.

A regional working group will be necessary to coordinate the new proposed water management practices across Central Asia.