



[INFORMATION AND COMMUNICATIONS TECHNOLOGY
AND DISASTER RISK REDUCTION DIVISION]

Managing in-land water disasters in the Aral Sea: Building a sub-regional co-operation mechanism for adaptation and resilience



Summary of Key Results

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Executive Summary

The desiccation of the Aral Sea Basin is well studied for its causes and devastating impacts in the surrounding countries, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Over the decades the Aral Sea catastrophe has transformed into a transboundary hazard that has affected the arid and semi-arid regions of Central Asia. It's important to recognise that teleconnections exist between natural resources and natural ecosystem services in a transboundary hazard. While economic and social linkages alter this teleconnection, climate change substantially contributes to the imbalance.

ESCAP's Committee on Disaster Risk Reduction at its 7th session in August 2021 recommended a scale-up of regional and subregional cooperation strategies on disaster risk reduction and climate resilience to complement national efforts in implementing the 2030 Agenda for Sustainable Development. Further, the fifth session of North and Central Asian Multi-Stakeholder Forum on Implementation of Sustainable Development Goals (SDGs) in October 2021, while discussing the implementation of SDGs 14 and 15 in a changing climate recommended subregional cooperation mechanism for addressing transboundary challenges. It's in above context that ESCAP undertook a solutions oriented analytical research on creating regional mechanisms to study, mitigate and minimize disasters in endorheic (inland) water basins of the Aral Sea.

ESCAP's analytical work is organized in two parts. While Part I titled 'Aral Sea, Central Asian Countries and Climate Change in the 21st Century' deals with water management perspectives, it unfolds the processes that led to complete depletion of water resources, i.e. water use exceeding available resources. It also highlights that by 2030-2050, the countries of the region will also reach the limits of irrigated land expansion because of its limited availability. Despite the depletion of water and irrigation resources in the region, in their national strategies and programs, each country plans for further growth of water use for irrigation and hydropower in the future. Therefore, a coordinated regional water policy is needed to balance the water resources use and improve the ecological situation in the subregion. It recommends (i) developing new mechanisms and instruments for cooperation in transboundary river basins, based primarily on deep economic integration of countries, (ii) Accelerating gradual and a holistic reconstruction of water management infrastructure with a widespread transition to water-saving technologies and reduction of wastewater, (iii) promoting cultivation of drought-resistant crop varieties, (iv) Introducing green and low-water usage technologies, water recycling systems, and developing new wastewater treatment technologies, (v) Improving the accuracy and efficiency of regional hydrometeorological services for climate change adaptation and disaster risk management in Central Asian countries, (vi) creating sub-regional mechanisms for adaptation to climate change, risk assessment, early warning and prevention systems for transboundary hazards in the Aral Sea basin, (vii) organizing a network on the ESCAP platform inclusive of the existing networks of experts on water resources, ecology, climate, disaster resilience and socio-economic sector in the region with the aim of strengthening regional cooperation and attracting investment for implementation of projects concerning the Aral Sea and related ecosystem and (viii) involving educational institutions and students on issues like water resources management and environment protection in order to ensure participation of youth in solving present day challenges and threats.

Part II of the analytical work - 'managing in-land water disasters in the Aral Sea: sub-regional pathways for adaptation and resilience' capitalizes on state-of-the-art climate modelling, data science, geo-spatial tools, digital elevation models and analytics to present the risk in the region. It zooms in on the Aral Sea as a transboundary hazard and visualizes the climate risk

scenarios in the near (2021-2040) and long-term (2081-2100) perspectives. The key indicator of climate change in Central Asia is the state of glaciers and snow cover, as well as growing desertification in the region. The changing climate scenarios project a decrease in summer rainfall in the Aral Sea, increasing the number of dry days as well as temperature, resulting in higher aridity. On the contrary, there are likely to be increasing winter rainfall with increasing number of rainy days. The elevation of the Aral Sea also contributes to the changing patterns of the climate scenarios. Further, land use changes and water management practices are likely to result in many clusters of agricultural risk hotspots. It is key to note that warming climate in the Aral Sea does not pose just one risk, but multiple, interacting risks. The complexity of these interactions among multiple drivers of climate and other forms of the risk compound and cascade in the Aral Sea. Hence, the focus of physical science research for these “compounding” risks is to integrate and understand the multiple interactions among drivers of exposure, vulnerability, and response.

The taxonomy of solutions for climate change adaptation and disaster resilience must take into account the compounding risk scenarios that characterize the Aral Sea. Considering a transboundary hazard – the Aral Sea that represents shared vulnerabilities and risks, adaptation measures must include integration of the climate change scenarios into various medium and long-term plans, programs, etc., both at the national and sub-regional levels. It is in this context that the study introduces a set of adaptation priorities – (i) strengthening multi-hazard risk assessment and early-warning systems; (ii) improving dryland agriculture crop production; (iii) making water resources management more resilient; (iv) nature-based solutions; and (v) making new infrastructure resilient. Derived from its unique compounding and cascading risk profiles, adaptation priorities for managing and mitigating in-land water disasters in the Aral Sea also support simultaneous progress on multiple SDGs. It’s crucial for the adaptation priorities of transboundary Aral Sea hazard to be risk informed, especially on the regional specificities. For example, multi-hazard risk assessment and early warning systems are highly useful in mitigating all types of cropland exposure to multi-hazard, particularly drought, and flood. Early warning monitoring is necessary to plan and reduce the impact of multi-hazard on agriculture, which is directly linked to food security, and the impact on the people. Analysis results show that adaptation measures like strengthening multi-hazard risk assessment and early warning systems as well as improving dryland agriculture crop production have the highest priority score in all 5 Central Asian countries in the various climate change scenarios.

Recognizing the context of the United Nations Special Programme for the Aral Sea basin, ESCAP’s comprehensive study using a multi-sectoral and multi-disciplinary disaster risk reduction approach aims to devise a regional mechanism involving all concerned countries of the Aral Sea. On 14th March 2022, ESCAP organized a regional meeting of experts on the Aral Sea to discuss the key findings of this study. Considering ESCAP’s mandate and comparative advantage, the experts recommended organizing a policy dialogue on managing the risk of in-land water disasters in the Aral Sea on the side-lines of sixth North and Central Asian Multi-Stakeholder Forum on Implementation of Sustainable Development Goals. The objective would be to further shape and refine the proposed subregional cooperation framework with a suggested action plan. Accordingly, ESCAP plans to organize a policy dialogue at the upcoming forum in 2022. The proposed framework will help factor transboundary risks of the Aral Sea in national Adaptation Plans, Disaster Risk Reduction strategies, and Voluntary National Reviews. The feasibility study and expert recommendations can also serve as an important scientific input in case Turkmenistan decides to table the above resolution at a future Commission session.