

POLICY BRIEF

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Green Transition and Health Resilience in the Aral Sea Region: Spotlighting the Interconnectedness

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Background

While Central Asia moves toward a green economy, the region's climate and environment are under significant stress. The disaster in the Aral Sea is a stark example of what can happen when water management is not sustainable (Duan et al., 2024). Once the world's fourth-largest inland water body, the Aral Sea, on the border between Kazakhstan and Uzbekistan, has lost around 90 percent of its volume since the 1960s. This is mainly due to the intensified diversion of water from the Amu Darya River to the South and the Syr Darya River to the North for the irrigation of farmland used to produce cotton and various foodstuffs (New Scientist, 1989).

This evolution exposes a toxic lakebed, with intensifying dust storms, and transforming nearby landscapes into degraded, saline environments (Plotnikov et al., 2023). Rising temperatures, hydrological stress, dust and salt storms, chemical contamination, and ecosystem degradation are just some of the climate-related risks that people in the Aral Sea region now face. These risks affect people's health and their incomes, both directly and indirectly (Sternberg & Edwards, 2017). At the same time, Kazakhstan and Uzbekistan are advancing green economy strategies and climate policies that create new entry points to combine health resilience (Orynbassar et al., 2026).

Highlights

1. The Aral Sea disaster created serious and long-lasting health risks for people in the region, mainly the states of Kazakhstan and Uzbekistan.
2. Communities around the Aral Sea are exposed to dust storms, high salt levels, harmful pollutants, unsafe water, extreme heat, and stresses in their social and economic lives, all of which add up to a lot of physical and mental health burdens.
3. Central Asia's green economy transition offers a strategic opportunity to embed health resilience into climate adaptation and development strategies. However, current planning documents and initiatives reveal a critical gap: health outcomes remain insufficiently integrated into green economy frameworks.
4. A review of existing (climate and health) policies shows that Kazakhstan and Uzbekistan need to improve their climate-aware healthcare systems and to factor environmental and human health into planning and actions related to water, energy, and food systems.
5. Strategically aligning green economy transformation with climate-resilient health systems in the Aral Sea region could offer a pivotal opportunity to enhance community safety and adaptive capacity.

Aral Sea shrinkage (North: Kazakhstan; South: Uzbekistan.)

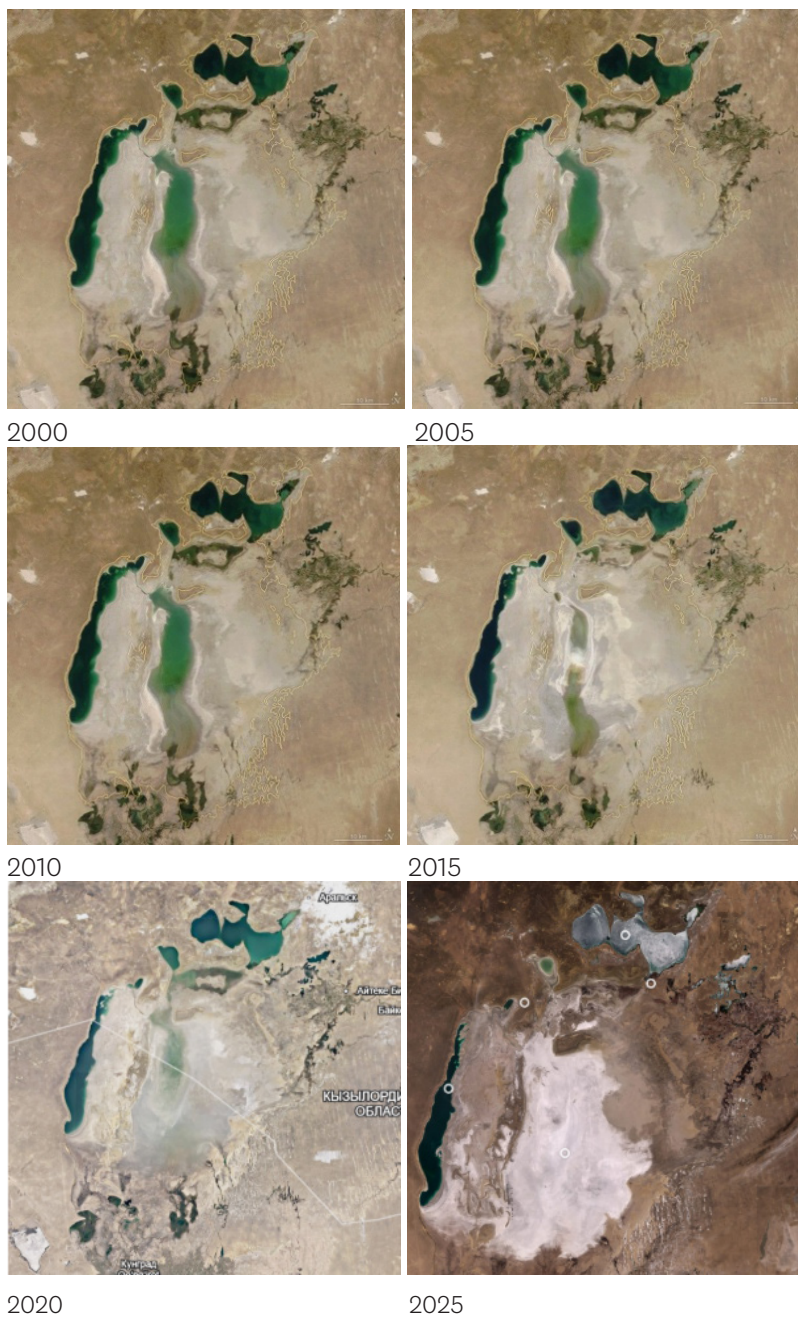


Figure 1: Aral Sea shrinkage timeline (NASA Earth Observatory, The European Space Agency and Google Earth). Satellite images: 2000, 2005, 2010, 2015. North Aral stabilization post-Kokaral Dam (2005); South Aral near-total desiccation.

Key Trends

Climate and Environmental Risks

New studies of the environment and climate show that Central Asia is warming up faster than the rest of the world. The Aral Sea basin is becoming hotter and drier, and water stress is ongoing (He et al., 2021). As the Aral Sea dried up and its bed turned into the Aralkum Desert, it released a large amount of dust rich in salts and agrochemical residues. This dust travels long distances and settles on towns, crops, and bodies of water (Liu et al., 2020). According to climate projections, the region will experience more frequent heatwaves, altered runoff patterns, and greater competition for scarce water resources if adaptation and cross-border water cooperation are not strengthened (Duan et al., 2024). This will make communities affected by the Aral Sea even more vulnerable to environmental and social problems.

Risk	Source	Health Impact
Dust storms	Aralkum Desert	Respiratory diseases
Salinization	Exposed seabed	Waterborne infections
Heatwaves	Regional warming	Cardiovascular stress
Toxic pollutants	Sediments	Cancer/reproductive issues

Table 1: Key climate risks in the Aral Sea basin
Sources : Liu et al. (2020); Sternberg & Edwards (2017)

Health Impacts and System Vulnerabilities

Environmental and climate stressors in the Aral Sea region are linked to higher rates of heart and lung diseases, infections from water and food, reproductive and developmental problems, and new mental health problems (Anchita et al., 2021; Okamoto & Nagabhatla, 2022). Chronic respiratory symptoms and hospital admissions are made worse by dust storms that carry fine and coarse particles, salts, and old pesticides. On the other hand, diarrhoeal diseases and other infections are more likely to happen in places with unsafe and salty drinking water, contaminated soils, and broken WASH infrastructure (Sternberg & Edwards, 2017). These risks interact with poverty, being stuck in the country, and limited access to good healthcare. This is because health facilities in Kyzylorda and Karakalpakstan often struggle with funding, staffing, building infrastructure that withstands extreme weather, and using weather and environmental data in their daily planning (Khaibullina et al., 2022).

Policy Landscape and Green Economy Transition

Kazakhstan's updated Nationally Determined Contribution (NDC) and Strategy for Achieving Carbon Neutrality by 2060, as well as Uzbekistan's green economy transition strategy and NDCs, recognise the health risks of climate change and put water, energy, and agriculture reforms at the top of the list (Orynbassar et al., 2026). Health is often seen as a secondary benefit, though, and there aren't many specific, costed plans for climate-resilient primary care, surveillance, environmental health services, and community-based adaptation in the Aral Sea regions (Okamoto et al., 2023). The International Fund for Saving the Aral Sea (IFAS) (1993), with support from the Asian Development Bank alongside the World Bank and other multilateral agencies, the Interstate Commission for Water Coordination (ICWC) (1992) and the Germany-backed Green Central Asia initiative (2020) are examples of regional efforts that encourage cooperation. However, transboundary health-environment monitoring and cooperative climate - health programming remains underdeveloped (Narbayev & Pavlova, 2022).

Way Forward

The Aral Sea crisis stands as one of the world's most visible examples of how environmental mismanagement and climate change converge to create long-term, intergenerational health risks. As Kazakhstan and Uzbekistan advance their green economy transitions, this brief highlights a critical, time-sensitive opportunity: aligning climate action, environmental rehabilitation, and economic restructuring with a coordinated health resilience agenda. The emerging evidence shows that health impacts - ranging from chronic respiratory illnesses and cardiovascular stress to waterborne diseases and mental health challenges - will intensify unless health systems, environmental monitoring, and community adaptation capacities are strengthened in an integrated manner.

Moving forward, a strategic shift is needed toward climate-informed health governance, backed by robust financing, cross-sectoral collaboration, and regionally aligned early warning systems. Embedding climate-health indicators in green economy plans, reinforcing climate-resilient primary care, ensuring safe water infrastructure, and empowering communities with knowledge and protection mechanisms will be central to safeguarding populations in Kyzylorda, Karakalpakstan, and the broader Aral Sea basin. Equally important is the expansion of regional cooperation under platforms such as IFAS and Green Central Asia to harmonise data, build shared risk intelligence, and coordinate transboundary responses.

The transition to a green economy offers Central Asia a unique policy window to redefine the future of the Aral Sea region—not only by restoring ecosystems and reducing emissions, but also by shaping healthier, safer, and more resilient communities. Investing now in climate-resilient health systems, WASH infrastructure, and community preparedness will ensure that the region's transformation becomes a model of integrated environmental and public health recovery. By grounding decisions in evidence and prioritising vulnerable populations, Kazakhstan and Uzbekistan can turn the legacy of the Aral Sea disaster into a pathway toward sustainable, inclusive, and health-secure development.

Policy Recommendations

From a Planetary Health perspective, which recognises the interdependence of human health, ecosystems, and climate systems, the following evidence-based strategies outline priority measures that can help Aral Sea populations and communities, as summarised in Figure 2.

1. Integrate Health into Green Economy and Climate Policies

- Support Kazakhstan, Uzbekistan, and the whole region in explicitly embedding climate–health goals, indicators, and budgets within national green economy strategies, NDCs, and adaptation plans, with particular attention to Kyzylorda and Karakalpakstan, the most affected Aral Sea regions.
- Fund and steer climate and health impact assessments for major investments in water, energy, agriculture, and land restoration across the Aral Sea basin to prevent unintended risks and maximise co-benefits for local communities.

2. Strengthen Climate-Resilient Health Systems

- Develop heat–health action plans, dust-storm preparedness protocols, and climate-informed disease surveillance systems within primary care and public health services.
- Accelerate the upgrade of health facilities to ensure reliable WASH services, sustainable energy supply, and building designs capable of withstanding extreme heat and persistent dust exposure.
- Focus on capacity by training healthcare workers to identify and manage climate-sensitive health conditions, including respiratory illnesses, cardiovascular stress, and waterborne diseases

3. Improve WASH Security and Client-Resistant Water Management

- Mobilise investment in climate-resilient WASH systems to provide safe drinking water to rural communities facing high salinity, contamination, and ageing infrastructure in line with the argument from (Liu et al., 2020).
- Promote efficient irrigation, sustainable groundwater use, and rehabilitation of degraded seabed areas to reduce dust emissions and protect water quality across the Aral Sea basin (Duan et al., 2024).

4. Empower Communities and Expand Social Protection Mechanisms

- Support community-led health education, participatory risk mapping, and local adaptation responses targeting heat exposure, dust hazards, and unsafe water (Anchita et al., 2021).
- Strengthen social protection systems for the most climate-vulnerable groups - especially women, children, elderly residents, and low-income households in Aral Sea-affected areas—ensuring they have access to safety nets during environmental and economic shocks.

5. Enhance Regional Cooperation and Climate-Health Data Systems

- Establish integrated early warning systems for dust storms, heatwaves, and waterborne diseases across the Aral Sea basin, combining meteorological, hydrological, and public health data (Orynassar et al., 2026).
- Leverage platforms such as IFAS and Green Central Asia to coordinate research, build technical capacity, and mobilise funding for cross-border climate-resilient health interventions.

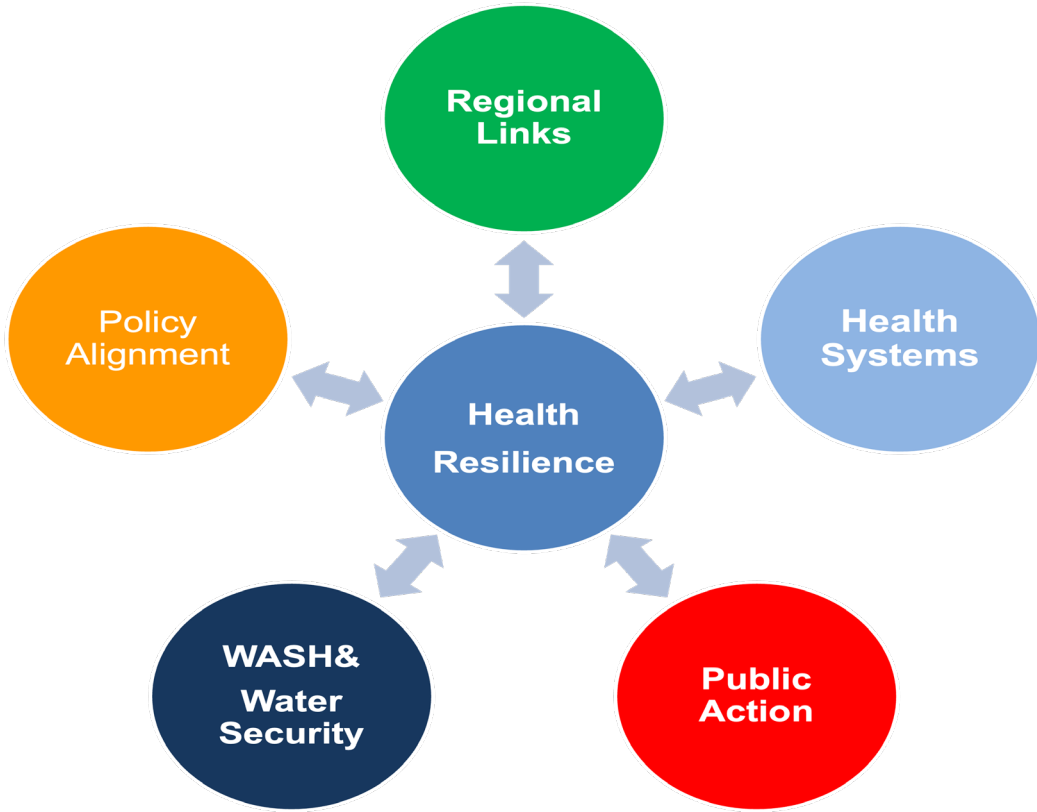


Figure 2: Five Pillars Framework for Aral Sea Health Resilience

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