RESEARCH PROGRAM:
Climate, environment and health (SG-CEH)

Policy Brief | Project SG-CEH-03

Climate Change and Health Impacts: Using Satellite Data to Assess the Relationship Between Climate Factors, Water Quality, and Infectious Diseases in Chile

Country: Chile
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The challenge

Climate change is altering precipitation, temperature, and drought patterns in Chile, affecting surface water quality and increasing the risk of waterborne infectious diseases, such as salmonellosis. These impacts place pressure on public health systems and reveal gaps in environmental and health surveillance systems, particularly in areas with informal settlements and high socio-environmental vulnerability.

What was done

- Case study in the Maipo and Mapocho river basins (Metropolitan Region).
- Integration of satellite imagery, spectral indices (NDWI, AWEI), climate data, and water samples collected between 2019 and 2023.
- Assessment of the relationship between environmental conditions and the presence of Salmonella in water bodies.
- Analysis of opportunities and limitations for the development of low-cost monitoring and early warning systems.
- Dissemination of results in scientific and public policy forums, strengthening transdisciplinary networks.

Main findings

- Climatic and environmental variables influence water quality and the risk of pathogen presence.
- Spectral indices derived from satellite data show potential for identifying high-risk areas, especially under conditions of high water variability.
- Prolonged droughts and limitations in microbiological data hinder the immediate implementation of operational models.
- Available scientific information does not automatically translate into public policy due to gaps in inter-institutional coordination.

The approach

The project adopted an innovative and interdisciplinary approach, aligned with frameworks for climate-informed public health and evidence-based adaptation, integrating:

- Open-access satellite data (Sentinel-2) and climate observations.
- Water quality sampling in strategic urban watersheds.
- Statistical analysis and modeling to explore relationships between climate, the environment, and health risks.
- Linking science, public health, and environmental management.

Impact and application

- Generating evidence for the future design of integrated, climate-sensitive environmental and health surveillance systems.
- Contributing to the formulation of environmental health and climate change adaptation policies, with an emphasis on water and sanitation.
- Identifying priority areas for preventive action, supporting the strategic allocation of public resources.
- Strengthening national and international research networks and science–policy dialogue.

Key lessons

- Monitoring climate-sensitive diseases requires integrating environmental, climate, and health data.
- Remote sensing technologies offer cost-effective opportunities, but they must be complemented by local data and institutional capacities.
- Coordination across sectors (health, environment, water resources) is key to turning data into action.
- Investing in integrated monitoring systems strengthens public health resilience in the face of climate change.

Key message

Strengthening the response to dengue in a changing climate involves investing not only in technical capabilities but also in integrated, collaborative health systems adapted to each region.

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