

Making Water Insecurity Visible

Over one in four people worldwide still experience water insecurity, and climate change threatens to reverse recent improvements. New collaborations are needed to accelerate progress towards global targets for water security.

ASPECTS OF THE GLOBAL WATER CRISIS HAVE LONG GONE INVISIBLE

More than [two billion people](#) worldwide lack access to safe drinking water, and the realities of climate change [looming on the horizon](#) threaten to put millions more at risk in coming decades. Global warming is [on track](#) to reach the 1.5°C target in the early 2030s. If global warming climbs to 2°C, the proportion of the world population experiencing water scarcity will nearly [double](#).

Achieving [global targets](#) for water security could save the lives of [829,000 people annually](#) who die from diseases attributable to unclean water, inadequate sanitation and poor hygiene practices. Meeting these targets will also help foster global food security and improve nutrition for people across the globe. A [25-country study](#) found that people who are water insecure are two to three times as likely to experience food insecurity.

Water insecurity is often obscured by the indicators used to measure it. Examining water infrastructure provides valuable data on its availability but not the political or economic barriers to its accessibility, such as the time needed to collect or transport water or water costs posing undue financial hardships. People can also experience water hardship if its quality is unsuitable for consumption or other daily activities. Yet testing for contaminants like lead is often costly and inaccessible—leading the World Bank’s 2019 [Quality Unknown](#) report to call the water insecurity “invisible.” For governments worldwide to target resources to alleviate water insecurity, they must understand all its dimensions: water availability, accessibility, acceptability and reliability.

COLLABORATION DRIVES INNOVATION IN ADDRESSING WATER INSECURITY

Collaborations across disciplines, sectors and borders and bringing new approaches to addressing water insecurity. Among them is an innovative partnership between Northwestern University researchers and their partners tackling water insecurity in Latin American and East African countries. Established through a unique [Idea Incubation Process](#) led by the [Northwestern Roberta Buffett Institute for Global Affairs](#), the [Making Water Insecurity Visible Global Working Group](#) includes experts in medical anthropology, environmental law, chemical and biological engineering, civil and environmental engineering and more. The group will partner with universities, government agencies and nongovernmental organizations in the United States, Mexico and Kenya to produce new data on water scarcity and quality, from inadequate water infrastructure to water scarcity and contamination.

ILLUMINATING THE TRUE SCOPE OF THE GLOBAL WATER CRISIS

The group’s efforts are an outgrowth of their work to develop and validate the [Water Insecurity Experiences \(WISE\) Scales](#), which are simple survey tools to quantify how often people encounter problems with accessing and using water. Developed under the leadership of [Sera Young](#), Associate Professor of Anthropology at Northwestern University—who co-leads the Making Water Insecurity Visible Global Working Group alongside [Julius Lucks](#), Professor

and Associate Chair of Chemical and Biological Engineering—the WISE Scales offer critical insights into water stress among individuals and households worldwide, and its effects on their daily activities, health and wellbeing. Rather than measuring liters of water available per capita, the WISE Scales measure how often citizens experience water-related disruptions to their daily activities, such as cooking or bathing, and water-related disturbances to emotional wellbeing.

Governments, research institutions and civil society organizations in over 60 countries have adopted the WISE Scales to inform resource allocation and policy decisions. In spring 2023, members of the Making Water Insecurity Visible Global Working Group, including Professors Sera Young and Pablo Gaitán Rossi, Director of Universidad Iberoamericana’s [Research Institute for Equitable Development](#), led meetings in Mexico City that convened over 60 represen-

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tatives from governments, development banks, nonprofits and academic institutions in Latin America as well as officials from the United Nations Children’s Fund, the Food and Agriculture Organization and the World Food Program. Following the convening, Mexican policymakers in Nuevo León [committed](#) to building the WISE Scales into regular surveys of vulnerable populations in their state—effectively creating a [playbook](#) for other governmental entities in Mexico and globally.

DEVELOPMENTS TO WATCH

The Making Water Insecurity Visible group’s co-leads are now bringing their global expertise to Chicago. Awarded more than \$3 million by the National Science Foundation, their new [multi-](#)

[year pilot study](#) will provide 350 households in Chicago with kits to test for contaminants in their water using a single-drop sample from their faucet in new hand-held testing tools that give an easy-to-read positive or negative result. Lead and copper tests are based on [ROSALIND](#), a hand-held platform developed by [Professor Julius Lucks’ laboratory \(Lucks Lab\)](#) at Northwestern University with the same certainty and simplicity found in at-home COVID-19 tests but for water safety.

During the pilot study, Lucks will lead a team of researchers in developing a first-of-its-kind, at-home water quality test for per- and poly-fluoroalkyl substances (PFAS), also known as “[forever chemicals](#).” Even a tiny amount of exposure to forever chemicals causes [adverse health effects](#)—from decreased fertility to developmental delays, increased cancer risks and reduced immunity to infections. The U.S. Environmental Protection Agency [declared](#) forever chemicals unsafe, yet these chemicals often allude detection because of their low concentrations in water systems.

A breakthrough from the laboratory of Making Water Insecurity Visible group member William Dichtel, Professor of Chemistry at Northwestern University, may offer a new avenue toward eliminating forever chemicals from water supplies altogether. In 2022, the [Dichtel Research Group](#) discovered a simple and inexpensive approach to [destroying PFAS](#).

Across the world, partnerships involving local communities are [generating data on water insecurity](#) and shedding light on this “invisible” crisis. [Water funds](#) are also emerging to protect water sources in rapidly industrializing countries through public-private sector partnerships, which the [2023 UN Water Development Report](#) highlighted as critical for achieving global water security targets. New models of collaboration among researchers, policymakers and communities can continue to address the root problems of water insecurity worldwide.