

The Groundwater Project: Democratizing Groundwater Knowledge

by John Cherry

We are in a global water crisis right now and groundwater is at the core of it because 99% of the Earth's liquid freshwater is groundwater, and groundwater is the buffer of the world water system. Nearly 50% of the world population depends on groundwater for domestic use and many more on its irrigation benefits. An inevitable increase on this dependence is coming as the population swells. Groundwater is used locally but transferred around the world in food and products. There are unprecedented rates of change to the water cycle and much is out of balance. Unfortunately, this elusive and invisible groundwater resource is commonly misunderstood, mismanaged, and abused. A key limiting factor is that the immense advances in groundwater science of the past 50 years are not being put to work in solving today's problems. The science is not being converted into widely recognized benefits to humanity and the environment. Why? Scientific knowledge is not sufficiently democratized.

Knowledge democratization means full accessibility to it around the globe. Accessibility to knowledge has been limited by a number of impediments. First is the peer-review journal publication process. Although successful as the gatekeeper for scientific advancement, it is a tragic restriction presenting only fragments of incremental insights. By design, journals communicate short, ongoing, often inconclusive, and site/time-specific research findings that do not filter and synthesize the exploding literature into the essence of scientific advances needed for education and into actionable knowledge useful to policy makers and resource managers. Second is the flawed judging of science. Journal citation statistics are the main criteria for career advancement in universities and strongly influence who receives research funding, resulting in funding of established ideas, not new ones. Pressure to publish has caused the fragmented groundwater literature to become immense, making synthesis incredibly challenging. The

third limitation is financial. Research is conducted using primarily public resources through university and government salaries supporting the researchers, journal editors, and reviewers, yet to finance the journal, the journal's copyright restricts access to only those who are willing to pay. The unintended consequence is that science created using public money for the public good is severely restricted in serving its constituency, the public. The fourth limitation is lack of incentives for conversion of the journal outputs into synthesized knowledge for understanding beyond the narrow expertise of its origins. Time spent on writing a book or article of long-term benefit to the broader scientific community, users of science (policy makers, managers), and benefactors of science (the public) does not get administrative support and can restrict career advancement. The fifth limitation, a corollary from the previous ones resulting from the ignorance of groundwater benefits to humans and ecology, is lack of funding for field testing of many of the new concepts, models, and technologies to assess advantages to serve societal needs.

As a giant step toward overcoming these impediments to democratization of groundwater knowledge, The Groundwater Project (GW-Project) has been initiated, which is an online platform for groundwater knowledge. At its core is a comprehensive and living e-book series, free to all, in many languages, to represent quality syntheses from elementary to advanced levels for our state-of-knowledge on all aspects of groundwater science and engineering, with regular updating as the knowledge grows and evolves. It is written and edited by expert scientists and practitioners with many decades of experience volunteering their time to realize a noble shared vision: knowledge should be free, and free knowledge should be the best knowledge synthesized in a unifying framework.

Motivated by the textbook "Groundwater" (Freeze and Cherry 1979), and with more than 300 participants from 14 countries on 6 continents, the GW-Project is ushering in a new era for understanding groundwater and its vital role in the freshwater cycle. The team is answering humanity's call to service, to transcend college campuses, national boundaries, language barriers, and

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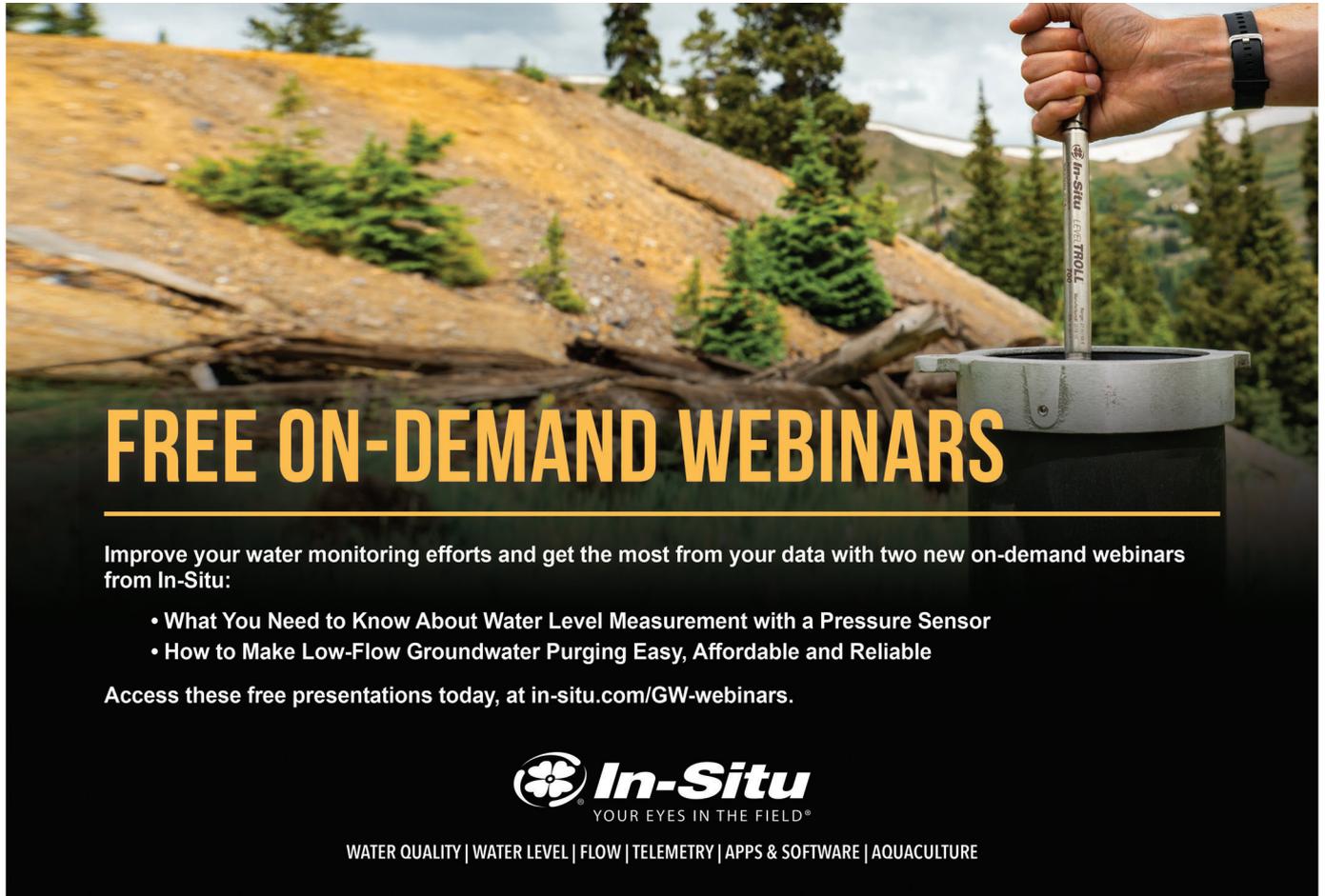
socioeconomical ladders, enabled by the Internet. To help facing our global water crisis, we invite you to join our community as we embark on our journey. Check <https://gw-project.org> for more information.

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Reference

Freeze, R.A., and J.A. Cherry, 1979. *Groundwater*. Englewood Cliffs, New Jersey: Prentice-Hall.



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