



UCLA Institute of the Environment and Sustainability

IOES: WATER

We forget that the water cycle and the life cycle are one.
-- Jacques Cousteau

PUTTING TOGETHER SCIENCE, LAW, POLICY & TECHNOLOGY TO SOLVE OUR WATER CHALLENGES

Water — its quality, quantity, and equitable distribution — is fast emerging as one of the critical global issues of the 21st century.

But solving today's water challenges cannot rely on just science, or law, or policy, or technology. We need solutions that combine all these disciplines and that make sense economically, can be implemented through strong institutions and address the needs and underlying values of every community and culture that relies on the resource.

Creating those kind of interdisciplinary, synthetic approaches? That's the DNA of UCLA's Institute of the Environment and Sustainability (IoES).

UCLA WATER RESOURCES GROUP: A SOLUTIONS NETWORK FOR WATER

Headquartered at IoES, **UCLA's Water Resources Group (WRG)** connects more than 35 UCLA faculty with expertise in water quality, supply and resources to create a solutions network for water challenges.

This network of expert faculty addresses complex water supply and quality problems, focused on questions of water sustainability in California and the world. The WRG engages with public agencies and other stakeholders to frame its research questions for maximum practical impact and public and policymaker uptake of findings.

The WRG is currently developing potential "one water" approaches to urban water supply — how stormwater can be captured, groundwater managed, recycled water made available and water systems and customers can become more water efficient.

APPLIED RESEARCH THAT MAKES A DIFFERENCE TO CALIFORNIA & THE WORLD

IoES researchers are also working on water-related challenges with solutions such as:

- Nanotechnology to bring portable water purification to small poor communities in California's Salinas Valley;
- The impact of changing climate for flood risk and hydrology in the Western United States;
- How urban groundwater rights evolve over time — and what that means for future urban water management in the face of climate change.
- How household greywater recapture could be mainstreamed and result in substantial water and energy savings for Los Angeles and other world cities.

CASE STUDY/SALINAS VALLEY: SELF-ADAPTIVE WATER PURIFICATION SYSTEMS

The water in many small communities in California's Salinas Valley is often so polluted with nitrates that it is not safe to bathe in, much less drink. Residents of these communities — who are often poor farm workers — often use expensive bottled water for washing up as well as drinking.

Yoram Cohen, UCLA and IOES professor of chemical and biomolecular engineering, and Madelyn Glickfeld, director of the WRG, are



part of a team that will use a portable water treatment system Cohen developed for desalinization to bring safe drinking water — and real-time information about the quality of that water — to three small communities in the valley.

Called the Salinas Valley Distributed Water Treatment Project, the pilot project will use a two-step treatment system: water from wells is first filtered to remove solid pollutants and then treated by reverse osmosis (RO) to remove dissolved pollutants, including nitrates. The project relies on a semi-permeable membrane to separate water from salt and bacteria in high salinity situations.

UCLA will install the systems, then remotely operate and monitor them through the Internet. Water quality will be monitored continuously by the system's sensors and also tested periodically by a lab. Each treatment system will be overseen by the Salinas County Public Health Department. The State of California is paying for all costs of the pilot project, and the community will have the option to assume ownership of the treatment systems after the project ends.

The goal of the project: to determine if UCLA can create a "Virtual Water System" of many small, poor communities — all run together by expert managers, at an affordable cost.

UCLA'S FIRST GRAND CHALLENGE PROJECT: THRIVING IN A HOTTER LOS ANGELES

UCLA's first campus-wide Grand Challenge Project, *Thriving in a Hotter Los Angeles*, is designed to accelerate a solution to the seemingly unsolvable societal problem of sustainability in the Los Angeles region through a mega, multidisciplinary research effort.

Thriving in a Hotter Los Angeles aligns interdisciplinary groups of scientists and scholars to develop a plan by 2020 to transition the Los Angeles region to 100 percent sustainability in energy, water and biodiversity by 2050. More than 140 UCLA faculty from dozens of campus departments are involved, including several faculty associated with the UCLA Water Resources Group such as Mark Gold and Alex Hall.

How can Los Angeles County meet 100 percent of its water needs locally? UCLA researchers are looking at solutions such as the following:

- The way we manage water will be modernized, including new water delivery infrastructure and enhanced water recycling capabilities.
- Buildings and open spaces will be designed to capture and re-infiltrate water.
- Roads, rivers and flood prevention systems will also be redesigned to maximize groundwater infiltration and opportunities for storm-water capture and reuse.
- Education and social outreach activities will promote a cultural appreciation for water as a resource to be valued and protected, because every drop matters.
- Smart-metering of water will enable residents and businesses to maximize conservation while meeting their needs.

La Kretz Hall, home of the UCLA Institute of the Environment and Sustainability (left), is the University's first LEED Certified building—a structure that meets stringent environmental guidelines.

