A glass half empty: Hydrologist calls much-needed attention to California's dwindling groundwater supply

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Jay Famiglietti, UC Irvine Earth system science professor, measures groundwater levels in California and beyond using satellite technolog

(PhysOrg.com) -- It may have been a rainy winter, but there's still cause for concern about California's water supply. Just ask Jay Famiglietti, UC Irvine Earth system science professor and founding director of the new UC Center for Hydrologic Modeling, which aims to help the state tackle its drought-induced water crisis.

Famiglietti recently made headlines when he and NASA scientists discovered that groundwater levels in California's Central Valley and northern India are receding at an alarming rate. Because of such research, he's a sought-after expert statewide and nationally on shoring

up water reserves.

From UCI — where last fall he organized a public forum with local water officials in Aldrich Park — to the U.S. Congress — where in January he touted new satellite technology for measuring groundwater — Famiglietti has called for more investment in hydrologic prediction, observation and research to keep the taps flowing. On Tuesday, April 6, U.S. Congresswoman Grace Napolitano (D-CA) will visit with Famiglietti and other UCI researchers to learn more about the hydrology program and how to bridge the gap between policy and science.

"The need to understand the highly complex workings of the water cycle and to project its changes has never been greater," he says.

But will his words be heeded in time? Here, Famiglietti discusses his work and the global implications of dwindling water supplies.

Q: How worried should Californians be about running out of water?

A: Our water future is highly uncertain. Right now, we're spoiled. We can turn on the tap and get a cold, refreshing glass of water. But in many parts of the world, there's a severe shortage of potable water. Because of global warming, we're looking at a huge decrease in the state's Sierra Nevada snowpack — most will be gone by the end of the century. There will be changes in precipitation patterns and higher surface-water evaporation rates. It's not pretty. We need to take action now.

Q: Why did you testify earlier this year before the House Subcommittee on Water & Power?

A: They're interested in our research group's work because we're

monitoring groundwater changes using satellite technology called GRACE — the Gravity Recovery & Climate Experiment. Our group has shown that groundwater is being depleted at a rapid clip in the Central Valley. It's lost the equivalent of about two-thirds the volume of Lake Mead. Water has reached the crisis stage, and government officials need answers. I was asked to demonstrate how advanced technologies like GRACE could help improve water management in California and around the nation.

Q: Why would a federal panel be concerned about what's happening in California?

A: The Central Valley is the country's fruit and vegetable basket. It's one of the most productive agricultural regions in the world, so it's a larger issue than people realize. Because of the drought, farms have lost their primary source of water — the runoff from the Sierra Nevadas. Many growers have had to rely — in fact, over-rely — on groundwater to make up the difference. They've also had to cut way back on their planted acreage because their wells are drying up. They're pumping groundwater at rates that are no longer sustainable. When everyone drinks from the same cup, it runs out.

Q: How did you become interested in the farmers' plight?

A: I drive through the valley every summer on the way to my son's scout camp. Five years ago, I saw a sign: "Food grows where water flows." That piqued my curiosity. Now there are signs that say: "State-mandated dust bowl." The farmers need a reliable source of water to produce food for our nation — and to survive economically. They can't pay their bills or make their mortgages without income. Growers the world over face the same challenge.

Q: How can GRACE aid farmers and others confronting water shortages?

A: GRACE has proven highly effective at quantifying groundwater. The twin satellites orbit the globe tracking differences in water supply by measuring the gravitational pull. The message we want to get to policymakers and water managers is that we have this advanced technology that we can use to develop models to predict changes in surface and groundwater storage. This can help them make better water management and allocation decisions.

Q: What's the mission of the UC Center for Hydrologic Modeling?

A: We plan to build a sophisticated computer model of the state to show the past, current and projected future state of the snowpack, surface water and groundwater. Water is being redistributed around the planet. It's migrating from the midlatitudes, which are drying out, to the Arctic and the tropics, which will get more rainfall. We need to predict where water in California is going so that managers can move it to where people live and have enough to supply our growing population. We're way behind, and we have a lot of work to do.

Provided by UC Irvine