Could excess water from oil and gas operations help farmers and reduce seismicity?

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Water pumped from deep underground during oil and gas drilling could help farmers weather water shortages. The trick is making sure the water is safe, legal, and economically feasible to move to fields, say two groups of scientists studying what's called "produced water" from oil and gas operations in New Mexico and Colorado.

One of the lesser-known facts about oil and gas drilling is that most of what comes out of wells is water—truckloads of non-potable water that has long been a major disposal problem for oil and gas drillers. The water is often loaded with salts and other compounds and falls under specific federal oil and gas regulations that do not apply to water from wells drilled specifically for water.

Some of that produced water has been recycled in recent years for use in hydraulic fracturing, which helps make that method of oil extraction more water efficient and reduces the competition for water between farms and oil fields. A lot of the excess produced water is also re-injected into the ground, but that approach has now been tied to increases in earthquakes in many locations. So making the water available to farmers could help solve several problems at once.

"Certainly as you get toward the arid West people get panicky about running out of water," says Andrea Blaine of the Colorado School of Mines. Two of her students will be presenting research projects in

Colorado that look into the safety and feasibility of using excess produced water for growing crops. "One of my students asks, 'Why can't we put these two together? Marry the two.' Research wise, what we're trying to say is, what's the risk?"

To find out, that student, Kaylie Haynes, is in the process of growing Triticum aestivum (spring wheat) and Helianthus annus (sunflowers) in a greenhouse using tap water, diluted raw produced water, and diluted treated produced water from oil and gas operations. She's looking for differences in how the plants grow and in their uptake of salts, metals, and organic chemicals. She will be presenting her preliminary results on Monday, 26 Sept., at the meeting of the Geological Society of America in Denver, Colorado.

Blaine's other student, Flannery Dolan, is looking at a Colorado town that is already using produced water. Wellington, Colo., is Dolan's case study, in which he evaluates the economic, social, legal, and technological barriers that were overcome in order to use produced water as a source of water for agriculture. The idea is to learn from Wellington and see what can be applied elsewhere in the state. Dolan's work will be presented on Wednesday, 28 Sept., at the same meeting.

Meanwhile in the neighboring and perhaps even drier state of New Mexico, a team of researchers has completed a comprehensive study of the use of produced water in Lea and Eddy counties of southeastern New Mexico.

"Lea County has no surface water," observed Robert Sabie of the New Mexico Water Resources Research Institute at New Mexico State University in Las Cruces. "Most of the water comes from the Ogallala aquifer and some water levels in wells there have dropped 100 feet in recent years." So alternative water supplies are urgently needed. Sabie's coauthor, Jeri Sullivan Graham of Los Alamos National Laboratory, will

be presenting their study on Monday, 26 Sept.

Sabie and his colleagues from Los Alamos National Laboratory, New Mexico Tech, and New Mexico State University have created detailed maps of Lea and Eddy counties showing the sources of produced water and their changing volumes over time. They have also explored the regulatory and water rights frameworks for using produced water, which is essential for getting farmers on board with the idea.

"A big part of this project is getting information for people who want to do it," says Sabie. "Jurisdiction of water made some growers uneasy and cautious. There are plenty of farmers who are interested but need the regulatory matter ironed out."

More information: Paper 119-7: gsa.confex.com/gsa/2016AM/webp … ram/Paper281250.html
Paper 295-5: gsa.confex.com/gsa/2016AM/webp … ram/Paper282994.html