

Can gray water keep Texas landscapes green?

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Texas A&M University System personnel will be investigating the feasibility of gray water use for home landscape irrigation as a statewide initiative for conserving water resources. Gray water for irrigation is already allowed in some southwestern states, including parts of Texas, with some restrictions. This garden in El Paso is irrigated by gray water. Credit: Texas A&M AgriLife Extension Service photo

With water resources throughout Texas becoming scarcer, a Texas A&M

AgriLife Research ornamental horticulturist is working with others to determine the feasibility of using gray water to irrigate home landscapes.

"There has been interest in and discussion about the possible use of gray water for irrigating home landscapes, but so far little formal research has been done to validate its practicality," said Dr. Raul Cabrera, Texas A&M AgriLife Extension and Research Center in Uvalde.

Cabrera said gray water is essentially "soapy" water left after tap water has been run through a washing machine or used in a bathtub, bathroom sink or shower and does not contain serious contaminants.

He said while it is difficult to precisely estimate the statewide potential for water savings through the use of gray water and application of the technology needed, it may reduce household landscape water use by up to 50 percent, depending on the size, type of landscape plants used and geographical location.

"The average household uses as much as 50-60 percent of its water consumption for the landscape – grass, ornamental plants, trees, etc.," he said. "Considering that the average family of four produces about 90 gallons of gray water per day, if this was used to irrigate a landscape, it could represent a significant water savings."

Cabrera said this would be especially true for a large city such as nearby San Antonio, which has more than 1.3 million people in its metropolitan area.

"Implementing the use of gray water for landscape irrigation across the state could mean a tremendous water savings in terms of acre-feet of water, contributing to the water use and conservation goals of the recently released 2012 Water Plan," Cabrera said.

Using gray water is one of the easiest ways to reduce the need for potable water typically used in a home landscape, said Dr. Calvin Finch, director of the Water Conservation and Technology Center in San Antonio, which is administered by the Texas Water Resources Institute, part of the Texas A&M University System. The institute is participating in the gray water research, as well as providing funding.

Finch said the Texas 2012 Water Plan identifies more than 500 specific activities that, if implemented, would help meet the state's future water needs.

"One of the low-hanging fruit projects that is often overlooked is use of gray water from households," he said. "Research results indicate that with minimum precautions water from our showers, bathroom sinks and clothes washers could be used to meet up to 10-15 percent of our overall landscape water needs."



Helping preserve the state's water resources is one of the challenges being addressed by the Texas A&M University System. The research and practical application aspects related to the feasibility for statewide use of gray water for home landscaping irrigation is an example of collaboration by system entities to reach a common goal. Credit: Texas A&M AgriLife Extension Service photo

Gray water differs from reclaimed water in that it is not captured water from sewer drainage or storm-water systems and then run through a waste-water treatment facility, Cabrera said.

"Reclaimed or 'purple-line' water is used for irrigation by some large-acreage operations such as golf courses, sports fields and large businesses," Cabrera said. "But gray water is just potable water that has been used for fairly benign household activities and could be reused immediately or stored and used soon after its initial use.

"It is also not what is referred to as 'black' water, which is used water from a toilet or the kitchen sink, both of which have a higher potential for containing bacteria and other organisms considered hazardous for human health. In this regard, gray water poses a minimal risk, particularly if we look primarily at water generated from clothes-washing machines."

He said some southwestern U.S. states, including parts of Texas, already allow for the use of gray water under certain restrictions, such as irrigation through delivery by flooding, subsurface or drip irrigation.

"While gray water has little potential for containing hazardous organisms, such as coliform bacteria, these irrigation distribution methods are preferred to spraying in order to further ensure safety," he

said.

Cabrera said collaborating entities working to evaluate the viability of gray water use include AgriLife Research, the Texas A&M AgriLife Extension Service, Texas Water Resources Institute, Water Conservation and Technology Center and Texas Center for Applied Technology.

"Here at the Uvalde AgriLife center, we will be focusing primarily on evaluating the efficacy of gray water use on ornamental plants," he said. "We will establish a display plot of conventional and water-use-efficient ornamental plants that will simulate a typical Texas landscape, so we can evaluate the short-term and long-term effects of gray water on these plants and their surrounding soil."

Cabrera said one concern about using gray water on home landscapes is possible salt content.

"Some detergents may have a high salt content in the form of sodium, chloride or boron, which could potentially 'burn' a plant," he said. "Part of our research here will involve determining the salinity and specific constituents found in gray water and their effect on plants, plus determining the efficacy and function of irrigation systems."

He said there is also the concern that some of the constituents in soapy water might plug drip irrigation systems, thus requiring additional and periodic care and maintenance.

"Additional research will address how variations in water quality, such as soft vs. hard water, may affect the salt content and chemical constitution of the produced gray water and how it affects plant growth and quality" he said.

He said the Texas Center for Applied Technology, part of Texas A&M

Engineering, would "evaluate the plumbing and delivery technology needed to retrofit a household" so gray water could be used to irrigate a home landscape.

"They will evaluate the routing and, if allowed, the possible capture and short-term containment, as well as any filtration needed along with the means by which it can be delivered to the landscape," he said.

He added if essential aspects of the initial research are positive, additional involvement might include microbiologists and health officials to address any perceived health issues or concerns.

"If the totality of the research validates the use of gray water, AgriLife Extension personnel would provide educational outreach to inform water management entities and the public about its potential utilization and the water savings it could represent at the local and statewide levels," Cabrera said.

Initial gray water testing and evaluation will take from nine months to a year, he noted.

"We hope the results will support the launching and development of a statewide initiative to conserve [water](#) resources that will involve many additional partners," Cabrera said.

Provided by Texas A&M University

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