

# Rainwater harvesting 'soaking in' as way to conserve Texas' water resources

June 3 2014, by Paul Schattenberg

---



The rainwater harvesting system at the Menard Public Library irrigates many plots of native plants and includes a rain garden area. A 2,500 gallon galvanized tank collects water from the library's roof. Credit: Justin Mechell

After a long dry period, many parts of the state have finally received some badly needed rain, and those with rainwater harvesting systems have been reaping the rewards of this belated gift from Mother Nature,

said Texas A&M AgriLife water resources experts.

"Rainwater harvesting is a time-tested and effective means of water conservation and irrigation," said Billy Kniffen, retired Texas A&M AgriLife Extension Service statewide water resource specialist and past director of the American Rainwater Catchment Association. "And with drought affecting much of Texas, interest in [rainwater harvesting](#) from industry, various levels of government and homeowners is increasing. People in general are becoming more receptive to implementing these practices."

As a long-time AgriLife Extension agent and water resource specialist, Kniffen has been involved in the planning, design and/or implementation of dozens of large- and small-scale rainwater catchment systems for offices, schools, community centers, libraries, hospitals and other facilities throughout Texas. Several of his many projects have been in his home county of Menard, with one notable example being the Menard Public Library.

Kniffen, along with Texas Master Gardener and Texas Master Naturalist volunteers, helped install a 2,500-gallon galvanized tank, along with drip irrigation and a rain garden to capture water runoff.

"One inch of rainwater dripping from a 1,500-square-foot roof can easily catch 600 gallons of water," Kniffen noted. "At the library, the metal rainwater harvesting tank collects rainwater from two downspouts, and the water is used to irrigate more than 50 plots of native plants common to the region. Runoff goes into a shallow, flat bottom pond that would catch a two-inch rainfall event and have it infiltrated into the soil within 24 hours. Rainfall over that amount would overflow into an irrigation ditch."

Another section of the library captured water using a "storm chamber"

that stores and gradually releases water into the surrounding landscape.

"For years, AgriLife Extension and Texas A&M AgriLife Research personnel have been involved with rainwater harvesting projects, demonstrations and education throughout the state," said John Smith, AgriLife Extension program specialist, College Station.

In Edinburg, Smith and the AgriLife Extension horticulturist for Hidalgo County, Barbara Storz, worked with World Birding Center manager Marisa Rodriguez on a rainwater harvesting system at the facility's education center.

"I designed the catchment system and the center employees installed it," Smith said. "It has a 5,000 gallon tank and a 3,000 gallon tank to capture water from the center's roof surface."

Smith said the rainwater harvested at the center is used for irrigating a large variety of native flowering plants and shrubs that help attract and support birds, butterflies, dragonflies and other creatures of interest to nature fanciers.

Storz said in addition to providing water for the plants, the rainwater harvesting system is used as an educational tool to teach about the need to preserve and conserve water resources.

"Furthermore, here in the Lower Rio Grande Valley, nature tourism is a major economic sector and facilities like this create interest and attract more people to the area, which helps our economy," she said.

Another Texas A&M AgriLife effort geared toward educating people about water conservation is the WaterSense home at the Texas A&M AgriLife Research and Extension Center in Dallas. The home, completed in March of last year in partnership with the U.S.

Environmental Protection Agency Region 6 and the City of Dallas Water Utilities, received a 2013 Texas Rain Catcher Award from the Texas Water Development Board.

"The Texas A&M AgriLife Research and Extension Center is to be commended for implementing new technology that promotes rainwater harvesting and the benefits of water conservation," said board member Kathleen Jackson.



his 5,000-gallon rainwater harvesting tank at the education building of the World Birding Center in Edinburg provides irrigation for flowering plants and shrubs that attract a variety of birds, dragonflies, butterflies and more. Credit: Marisa Rodriguez



This facility is the first of its kind in North Texas to receive certification as a renovation project and the first WaterSense home to have a rainwater harvesting system as one of its water-saving features, said Clint Wolfe, AgriLife Research urban water programs manager for the center. The system provides an efficient alternative source of irrigation by using captured rainwater for landscaping.

He said the rainwater harvesting system for the WaterSense home consists of a 1,000-gallon polyethylene tank with a first flush diverter and fill tube. The tank provides water to seven drip irrigation zones and two spray zones outfitted with a one-horsepower self-priming pump.

"The home's garden area consists of low-water-use native and adaptive plants, so the landscape has been designed to be sustained solely by supplemental irrigation from captured rainwater," Wolfe said. "The WaterSense Labeled Home has provided an exceptional opportunity for people who visit the center to learn about rainwater harvesting and many other indoor and outdoor methods of conserving water."

An example multi-family dwelling on the Dallas center grounds next to the home is equipped with a 1,500-gallon tank for landscape irrigation, along with individual 35-gallon rainwater barrels in small, enclosed backyard patio areas.

Lawn irrigation accounts for a major part of water use in urban areas, so the center is also investigating rainwater harvesting efficiency related to this specific application.

The center has four free-standing rainwater harvesting test sheds each with a roof surface area of 150 square feet and an associated turfgrass area of 225 square feet. Three of the sheds collect rainwater into three 55-gallon barrels, which provide irrigation for the lawn. A fourth shed is also equipped with three barrels, but these are filled with city water, not

rainwater, for test control purposes.

"The purpose of these sheds is to provide a scaled-down version of the surface area of the roof of a typical urban home in Dallas and other metropolitan areas and the typical area of lawn," said Dr. Fouad Jaber, a specialist at the center with a joint AgriLife Extension and AgriLife Research appointment. We are investigating the efficacy of rainwater harvesting in conjunction with storm water runoff and pollution."

The water from the barrels is used to irrigate the turfgrass lawn by different irrigation scheduling methods, including soil moisture-based, evapotranspiration-based, and timed irrigation of the type used by the typical homeowner.

"This provides us with important data on how much water is needed, as well as the runoff reduction and water quality benefits of rainwater harvesting systems," Jaber said.

In severely drought-stricken Wichita Falls, AgriLife Extension water resource specialist Drew Gholson took the lead in planning, designing and installing a startup rainwater harvesting project at an area high school.

"I was approached last year by the agricultural science teacher at Iowa Park High School to design and install a rainwater harvesting system to help them with their horticulture class and their greenhouse water needs during this time of drought," Gholson said.

Gholson said he took measurements and "did the math," calculating that the building the system would be affixed to was 200 feet by 120 feet and even if rainfall was collected from only one side of the building it would amount to 7,200 gallons collected for every inch of rainfall.



Dotty Woodson, AgriLife Extension program specialist in water resources in Dallas, explains the rainwater harvesting system at the WaterSense Labeled Home to professionals at the recent Turfgrass, Landscaping and Irrigation event. Credit: Texas A&M AgriLife

"That got their attention," he said. "This part of Texas has been especially hard hit by drought and the idea of being able to collect and use that much water when needed was very appealing to them. We worked through how much they could collect and store, and the Iowa Park ISD school board approved an amount to install the system – PVC pipe, tanks, a pump and other components. They already had gutters in place, so we worked with those."

Gholson and his father installed the initial system on a Saturday,

ensuring correct placement of conveyance pipes and splitting rainfall collection distribution into two downspouts so the gutters didn't have to support too much weight.

"Since that day, they have doubled the storage and collection area to 12,000 gallons and there is a line connecting the rainwater storage system to greenhouse. Now the students will be able to use rainwater for their plants when they come back in the fall."

Gholson said while every system is different, he hopes more people throughout the state will see such systems and they will spark ideas for designing and installing their own.

"Of course, we practice what we preach when it comes to the Texas A&M University System," Smith said. "In addition to some large rainwater capture systems on the Texas A&M campus in College Station, we have them at several of our AgriLife Extension county offices and at other system facilities."

He said AgriLife Extension facilities with rainwater harvesting systems include agency county offices in Atascosa, Brazos, Colorado, Comal, Culberson, Denton, Fort Bend, Fayette, Grandbury, Hays, Hidalgo, Menard, Montgomery and Taylor counties.





The AgriLife Extension office in Kaufman County office has plastic containment tanks covered by wooden slats. The large unit holds 3,000 gallons and the two small barrels each hold 55 gallons. Credit: Justin Mechell

"One of our biggest statewide efforts is educating people on the use of rainwater systems and giving them hands-on demonstrations of how to construct their own basic home rainwater harvesting system," Smith said "Of course, we also have more advanced programs for those who wish to take on larger rainwater harvesting projects."

Smith said AgriLife Extension personnel, as well as trained Master Gardeners and Master Naturalist volunteers, provide instruction in rainwater harvesting education and hands-on demonstrations.

"We have rainwater harvesting demonstration programs in various

counties throughout the year," he said. "Over the years, we estimate that tens of thousands of people statewide have attended one or more of these programs, receiving instruction on how to build and maintain rainwater harvesting systems. While most of these are smaller workshops of 50 or less, we also participate in water conservation-oriented events that draw upwards of a thousand people."

Smith said publications on rainwater harvesting by Texas A&M System experts are available for a cost at the Texas A&M AgriLife Extension Bookstore website, [agrilifebookstore.org](http://agrilifebookstore.org). Enter the word "rainwater" into the search field on the home page.

One of the most popular publications, "Rainwater Harvesting: System Planning," has recently been translated and is now also available in Spanish," Smith said.

Provided by Texas A&M University

Citation: Rainwater harvesting 'soaking in' as way to conserve Texas' water resources (2014, June 3) retrieved 25 May 2024 from <https://phys.org/news/2014-06-rainwater-harvesting-texas-resources.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.