Irrigating in Texas is not easy. Climate and rainfall are highly variable throughout the state and from day to day; therefore, no one way of scheduling irrigation will work.

Dr. Guy Fipps and Charles Swanson are working to improve landscape irrigation practices in Texas by researching the water efficiency of smart irrigation controllers and educating irrigation auditors.

What does it take to be “smart”? Fipps, professor of biological and agricultural engineering at Texas A&M University and specialist for the Texas AgriLife Extension Service, and Swanson, AgriLife Extension program specialist, have been testing and evaluating smart irrigation controllers since 2007.

“In 2010 we completed the third year of testing, and this is now the longest time period and most intensive test ever done of smart irrigation controllers,” Fipps said. “We’re testing smart controllers that are currently actively marketed in Texas.”

Smart controllers are irrigation systems that use weather data to calculate the amount of water needed by a lawn or landscape. Ordinary irrigation controllers rely on timers and human help. However, researchers have discovered that some smart controllers still have a lot to learn.

“We’re finding that many of these controllers don’t offer any advantages in terms of promoting water conservation,” Fipps said.

The controllers’ irrigation run-times were compared to the recommendations of the Texas ET (evapotranspiration) Network, which is an Irrigation Technology Center (ITC) program that provides online weather information, current and average ET data, and customizable irrigation recommendations. ITC is partially supported through the Rio Grande Basin Initiative, which is administered by the Texas Water Resources Institute.
The testing, said Swanson, required all of the controllers to be programmed as similarly as possible for a single virtual landscape and then monitored to determine how many inches of water they would have applied according to their run-times. They then compared those amounts to Texas ET Network irrigation recommendations for the same time period.

“The methodology we’re using is much different than the smart controller testing that’s being sponsored by the manufacturers,” Fipps said. “Our testing is trying to get a handle on how these perform in real-world situations.”

They tested two types of controllers. The first uses on-site sensors to collect weather data and then calculates the amount of water needed. The other type receives data and run-times remotely, sent from the manufacturer.

“We found in the first two years of studies that the controllers using on-site sensors produced run-times much closer to the Texas ET Network recommendations,” Swanson said.

“However, most of the controllers are performing fairly poorly,” Fipps said. “So we are reporting that the state of this art is not very advanced and several of the controllers have problems when it comes to a water conservation perspective.”

The researchers are providing specific feedback to the manufacturers about the performance of smart controllers. With that feedback, they are seeing improvements in the products and expect to soon be able to fully recommend the technology to consumers, Fipps said.

What irrigators and homeowners can do

Fipps and Swanson predict that the selection of controllers designed for residential use, though currently fairly limited, will continue to grow, and the devices will eventually be beneficial for homeowners.

“I would recommend that users hold off on purchasing smart controllers at this time, but instead implement seasonal irrigation schedules and check the settings of their controllers on a monthly basis,” Fipps said. “Our test results are showing that if you do that, you’ll do better than most of the smart controllers.”

“Smart controllers are a growing industry; when we first started these studies there were only five smart controllers, and now we’re up to 11 actively marketed in Texas,” Swanson said.

For now, homeowners can use the ET Network website (texaset.tamu.edu) to help them irrigate efficiently.

“What people can do is go online to the ET Network and sign up for weekly irrigation recommendations,” Swanson said. “They can create a profile and log on weekly or however often they can, and it will say that their recommended irrigation is so many inches.”

“And they don’t need any technical information,” Fipps said. “If a homeowner is interested in having nice landscaping while conserving water, the ET Network is a great, easy tool.”

Fipps noted that if homeowners checked their irrigation run-times against the website’s recommendations just once this summer, their water conservation could be greatly improved.

Homeowners also need to watch out for irrigation system installers who offer low bids but poorly designed plans, Fipps said.

“In the design and installation process, I’d say the biggest mistake consumers make is going for the lowest bid, without finding out why that bid is lower,” he said. “Generally it’s because the installers are doing things they shouldn’t be doing—stretching the spacing of the sprinklers, not designing the system properly, having too small a pipe size. The consumer should ask questions and compare the plans of several bidders.”

In addition to poor system design and maintenance, the biggest problems they see are systems that are simply set to run too long, Fipps said.

To avoid this, homeowners can have irrigation audits done on their systems. Auditors can find the problems in home systems and help program them to conserve more water. Fipps said that some cities offer irrigation auditing services.

Educating auditors

The importance of these irrigation auditors has not gone unnoticed at Texas A&M.

Fipps and Swanson help teach the Landscape Irrigation Auditing Workshop through the School of Irrigation, which is part of ITC. The school is administered through AgriLife Extension and Texas A&M’s Department of Biological and Agricultural Engineering, and has been educating irrigation professionals since it was established in 1994.

“The auditing workshop was actually the first course we ever offered through the School of Irrigation, and it’s grown since then,” Swanson said. “Now we have our own software package that students can use to collect data, and we’ve made our own Aggie Catch Can—we’ve sold over 15,000 of those across the country since they were released about two years ago.”
The School of Irrigation provides continuing education for professionals employed by cities, school districts, parks and recreation departments, and more, Swanson said.

“With the drought, the school and our students have definitely been busy,” he said. “Many students have questions about how to schedule irrigation. At our recent San Antonio course, the day our course started was the day San Antonio started two-day-per-week irrigation limits because of the drought. So our students want to know how to create irrigation schedules that meet those requirements while also providing enough irrigation. We can help.”

**Partnering with WaterSense**

After years of successful auditing workshops, participants suggested that the program offer WaterSense certification, in addition to the AgriLife Extension certification already offered, to students who fulfilled course requirements. Fipps and Swanson listened.

WaterSense is a U.S. Environmental Protection Agency (EPA)-sponsored partnership program that promotes water efficiency and market enhancement for water-efficient products, programs, and practices.

“In August 2010, we began working with EPA WaterSense,” Swanson said. “In order to meet its requirements for accreditation, we rewrote our exam to cover much more detailed topics. And, long story short, January 1 of this year we were approved as a WaterSense accredited organization.”

AgriLife Extension is one of only nine organizations in the country and the only one based in Texas to offer the EPA WaterSense label to irrigation professionals, Swanson said.

Since its certification, the irrigation auditing course has had 47 participants in the last three classes; 27 of those students have become WaterSense partners, Swanson said.

“Becoming a WaterSense partner is beneficial and helps irrigation professionals with their business,” Swanson said. “It also opens the door to many green industry jobs that require WaterSense certification.”

For more information, visit [twri.tamu.edu/txH2O](http://twri.tamu.edu/txH2O).