

Irrigation TODAY



VOL. 1, ISSUE 3 | January 2017

Soil Moisture Sensing

*Comparing the Technologies
Use of Sensors for Irrigation Scheduling
One Water-Saving Sensor Too Many?*

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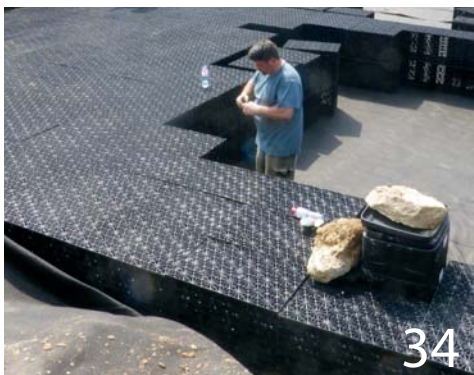


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President's Message



Continuing the Legacy

By Gregory R. Hunter

It is a privilege to be at the helm of the Irrigation Association. I am proud to hold a position that my father held back in 1989. When I spoke at the general session in Las Vegas in December, I mentioned how important this association's history is to me. My father and my grandfather have both been recipients of the IA's highest honor, the Industry Achievement Award. Our family has been, and continues to be, dedicated to this industry and the association that supports it. And, I am pleased to contribute as president this year.

I am also keenly interested in the future. During the Irrigation Show's keynote address, Dr. Peter McCormick talked about sustainable irrigation and developing sustainable sources of water. This is a challenge for the industry, but it is also an opportunity for the association. Facing these challenges together is why we exist as an organization. We can find solutions better together than we can individually.

In December, the IA Board of Directors approved a new strategic plan. We upheld the IA's mission to promote efficient irrigation and confirmed that paths to success remain through advocacy and professional development. These are the paths we have been following for some time now, but each year we add new efforts. In the first quarter of 2017, under advocacy, we will be investing more resources into public affairs to help share our message of the benefits of irrigated agriculture and landscapes. We will also be providing greater support to the Irrigation Foundation. The Foundation exists to promote careers in irrigation, and our professional development efforts will now include working more closely with our sister organization. And, of course, we will continue to grow our time-honored education, certification, government affairs and standards work.

This issue of *Irrigation Today* provides valuable content about moisture sensing products that help users manage their systems. It also includes discussions about hiring the right professionals to help you through your irrigation project – large or small. These, and other articles on the pages that follow, are meant to help our industry face today's challenges. They also show policymakers that irrigation companies and professionals are committed to efficiency, reducing waste and protecting our most precious natural resource, whether on farm or in your backyard.

I look forward to working with you over the course of the next year to further these efforts.



The 2016 Irrigation Show was a family affair for IA Past President Richard, wife Jan and Greg Hunter.

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From the CEO

A Global Industry

By Deborah M. Hamlin, CAE, FASAE

In November, I was invited to participate in the European Irrigation Association's 1st Irrigation Industry Forum, held in conjunction with EIMA, the International Agricultural and Gardening Machinery Exhibition in Bologna, Italy.

During the one-day forum, irrigation professionals discussed current and upcoming challenges and opportunities for the industry. Participants discussed regulatory issues, research-related topics as well as commercial developments. I was able to share information about IA's initiatives during this conference and at EIA's general assembly meeting.

The following day, conference participants joined 285,000 visitors from 140 countries at the exposition of "agricultural mechanics." Held every other year, this five-day event boasted 1,900 exhibitors in 22 buildings. Three of these buildings were dedicated to irrigation, and many IA member companies were present. Like the Irrigation Show, they were sharing their latest technologies in both agriculture and landscape.

The events provided great opportunities to make new acquaintances and grow existing relationships. I used the time to collect ideas to bring home to the United States and also to reflect on IA's international efforts. Although irrigation is local, and decisions about water are made on a local level, it is important to have allies across the country and across the world supporting best management practices and product standards. The association has always welcomed members from across the globe and encouraged international attendance at the Irrigation Show. In fact, in Las Vegas in December, our extra efforts resulted in a 44 percent increase over 2015 in international attendees coming from 52 countries.

This experience reminds me that it's time again to start looking at how we align ourselves with our irrigation partner associations around the globe. Whether it's more shared education and certification programming, joint efforts promoting smart irrigation or consistent messaging to regulators, we have a lot to learn from each other and a lot to share. When the economy retracted, we all focused on our own, local challenges. But it's time to reach out again and embrace the global industry that we live in. I hope to have more to share in this area in the coming months.

The EIA is a non-profit organization made up of 51 member companies from 19 countries representing the interests of the agriculture, golf and turf irrigation industries. EIA's members are manufacturers of irrigation equipment, as well as contractors, dealers, distributors and other irrigation professionals. The EIA is based in Brussels and has been active since 1991. For more information, visit www.irrigationeurope.eu.





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IA Staff on the Move

Irrigation Association staff are busy traveling the country and beyond to advocate for you. Deborah Hamlin, CAE, FASAE, CEO, traveled to Bologna, Italy, to attend the EIMA International Agricultural and Gardening Exposition and speak to the European Irrigation Association during its Irrigation Industry Forum.

Brent Mecham, CID, CLWM, CIC, CLIA, CAIS, industry development director, presented at WaterSmart Innovations in Las Vegas, Nevada, and presented a seminar for the Professional Grounds Management Society during the Green Industry Expo in Louisville, Kentucky.

John Farner, government and public affairs director, also presented at WSI, as well as participated in the National Association of Farm Broadcasters convention in Kansas City, Missouri. Farner had the opportunity to represent the association in numerous radio interviews this quarter. Farner and Elizabeth McCartney, senior policy and advocacy manager, also hosted a post-election webinar on what to expect at the state and federal levels. The archived webinar can be viewed on the association's YouTube site. To read more about their efforts, see the Legislative Update on page 10.

Professional Development

The Irrigation Association hosted a Landscape Irrigation Technician class at the IA headquarters in September. The class focused on the basics of hydraulics and irrigation system installation and maintenance and covered an overview of irrigation system components and how they operate. The class served as the recommended review for the certified irrigation technician exam.

Irrigation Show Wrap-Up

In December, the Irrigation Association welcomed nearly 9,000 participants and 600 exhibiting companies to Las Vegas, Nevada, for its annual Irrigation Show and Education Conference in conjunction with National Groundwater Week.

The Irrigation Show is the only national trade show for the irrigation industry, and this year's event included a partnership between IA and the National Ground Water Association. Professionals from both industries were able to see the latest industry technologies on the trade show floor, conduct business, attend education conferences and network with peers.

Debuting at this year's show was IA's Pitcher's Mound, featuring six entrepreneurs presenting their irrigation products to a panel of judges. Attendees also were treated to a screening of award-winning filmmaker Conrad Weaver's newest full-length documentary, *Thirsty Land*.

The 2016 show included opportunities to attend education classes, seminars and technical sessions focusing on agriculture irrigation, landscape and golf irrigation, and business basics. IA honored its many 2016 award recipients and the winners of the annual new product contest (see page 36).

IA and NGWA also co-hosted the second annual drought summit, which focused on technologies for a sustainable future. This year's featured speaker was Pat Mulroy, senior fellow in climate adaptation and environmental policy at the William S. Boyd School of Law, University of Nevada, Las Vegas, and former general manager of the Southern Nevada Water Authority.

Make plans now to attend the 2017 Irrigation Show, Nov. 6 – 10, in sunny Orlando, Florida.

Certification Exams

Make it a New Year's resolution to get certified in 2017! Visit www.irrigation.org/certification to learn more about each program's requirements, find resources to prepare for the exam, and view the exam schedule.

Education

The winter months are the perfect time to brush up on or learn new skills. IA has everything you need to enhance your expertise through classes and education resources. Check out www.irrigation.org/education to upgrade knowledge and skills, increase productivity and profitability, prepare for certification and earn continuing education units.

Bringing Water to Life

The "Bringing Water to Life" podcast is where IA staff members John Farner, Brent Mecham and Elizabeth McCartney share expertise and personal perspectives on issues surrounding water, ranging from discussing where water comes from to diving deep into state and federal programs around water. The goal of this podcast is to drive more discussion about water in general.

Listeners can access this podcast through SoundCloud, iTunes, Stitcher and Google Play. Contact information for the BWTL hosts is available at www.bwtlpodcast.com. Listeners are encouraged to submit ideas for future episodes and featured guests.



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Legislative Update



The "Bringing Water to Life" podcast team of Brent Mecham, Elizabeth McCartney and John Farner tell the story of water using their expertise and personal opinions on issues surrounding water.

The Irrigation Association continues to focus on influencing the national and state policy debate by promoting efficient irrigation. Throughout the year, the IA has engaged in ongoing conversations about water use and has worked to promote incentives for efficient technologies. The irrigation industry can offer unique solutions to current policy issues, and IA is focused on maintaining relationships with stakeholders in the broader agriculture and landscape industries to advance irrigation industry priorities.

What Effect Will the New Administration & Congress Have on the Irrigation Industry?

By Elizabeth McCartney

President-elect Donald Trump is now close to his inauguration. Immediately following the November election, Trump met with President Barack Obama to begin the transition process. Since then, current White House officials and Trump's team have been working to ensure a seamless transition of power.

The Trump administration must fill the approximately 4,000 government positions left vacant by the departing administration. About 1,200 of these positions need confirmation by the Senate, including cabinet officials and agency heads. Congress will begin considering nominees upon its return. These nominees will include the secretary of agriculture, secretary of the interior and the administrator of the Environmental Protection Agency.

Besides the critical cabinet confirmations, Trump will begin working with the Republican-controlled Congress to implement policies within his 100-day plan. Many of his immediate goals are reflections

of key campaign promises (e.g., building a wall, withdrawal from trade agreement). However, Trump has also signaled a swift movement away from the environmental policies of the last eight years.

As suggested by Trump during his campaign, his administration will focus on deregulation and limiting the number of new regulations. These goals could signal an end to the implementation of the EPA's Clean Water Rule. The Irrigation Association had been working alongside coalition partners to stop this rule, also referred to as "Waters of the United States." The goal was to get the agency to develop a more reasonable rule through a robust process with greater input from stakeholders, including industry groups. A Trump administration may also work to limit the EPA's power by requesting less money from Congress for the agency. It remains unknown how these possible budget cuts would affect the EPA WaterSense program. WaterSense is an irrigation industry-supported initiative.

Trump has been clear about his commitment to improving infrastructure in the United States. He also recently indicated his support for investments in water infrastructure. Water infrastructure appears as a priority within the document describing plans for the first 100 days of his

presidency. This was not a focal point of Trump's presidential campaign; however, he did align himself with agricultural interests on water issues that arose during the campaign.

As the 115th Congress begins its work in 2017, congressional members will begin working on the 2018 farm bill. Every five years, Congress must reauthorize the bill that shapes U.S. agriculture policies. What this means for the irrigation industry is that farm conservation programs will be under review. The IA will advocate for voluntary programs that support efficient irrigation, encourage the adoption of other water-efficient technologies and recognize IA-certified irrigation professionals.

To learn more about what a Trump administration may focus on in 2017 and how the IA will work on behalf of the industry, listen to the association's recent post-election webinar, which can be found on www.youtube.com/user/smartirrigationmonth. This webinar was part of the "Bringing Water to Life" webinar series that will continue in 2017. In addition to these webinars, a weekly BWTL podcast focused on telling the story of water is also available online at www.bwtlpodcast.weebly.com.

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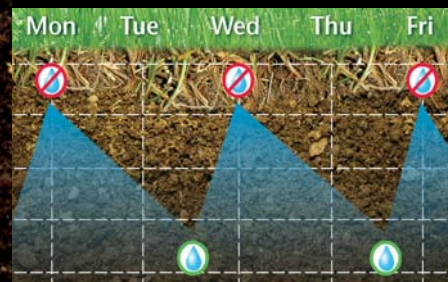
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Irrigation Foundation Scholarship Program

In an effort to support its mission to promote careers in irrigation, the Irrigation Foundation has launched a new annual Irrigation Scholarship Program.

By providing financial support toward the education of worthy scholarship candidates, the program will promote the study of careers in the irrigation field, benefit the community through a better educated workforce, reveal the ever-expanding irrigation industry to scholarship candidates, and strengthen the Foundation through a direct link to education.

The scholarship will be awarded in amounts ranging from \$1,000 – \$2,500 based on candidates' letters of intent, financial need, reference letters, resumes and transcripts.

In order to meet the eligibility requirements, applicants must be currently enrolled (undergraduate or graduate) at a U.S. technical or vocational school, community college, university or similar institution of higher learning and be a U.S. citizen. Applicants must have taken or currently be enrolled in a class with an irrigation-related curriculum and have a minimum of 2.5 cumulative grade point average, based on a 4.0 scale. They must also demonstrate financial need.

Scholarship applications are due by Feb. 15, 2017, via an online application process. The winners will be announced by April 1, 2017. To apply and for additional information, visit www.irrigation.org/scholarships.

Please contact Foundation Director Janine Sparrowgrove (janinesparrowgrove@irrigation.org; 703.536.7080) with any questions.

Faculty Academy — Save the Date

The Irrigation Foundation is offering both agriculture and landscape versions of its well-regarded Irrigation Faculty Academy again in 2017. Save the dates!

The Agriculture Faculty Academy will be held at the University of Nebraska — Lincoln Extension in Grand Island, Nebraska, June 8 – 9, with a manufacturer tour of T-L Irrigation.

The Landscape Faculty Academy, June 15 – 16, will be located at the Horticulture Services of Disney World in Orlando, Florida, and include a tour of the irrigation at Disney properties.

Irrigation E3 Program

The 2016 Irrigation E3 Program sent 23 E3 Learners (students) and three E3 Leaders (instructors) to the Irrigation Show and Education Conference in Las Vegas this past December. They focused on the three E's as they relate to the irrigation industry: exposure, experience and education.

The Toro Company has sponsored the program since its inception in 2012, and during the show, they presented the Foundation with a \$20,000 check for the 2017 Irrigation E3 Program. Ewing Irrigation will co-sponsor the event in 2017, also at the \$20,000 level. Through these sponsorships, irrigation E3 Learners and Leaders will receive an education and travel award for the 2017 Irrigation Show.

Excellence in Education Award

The Foundation is now accepting nominations for its annual Excellence in Education Award. The award recognizes

"I had a great experience attending the 2016 Irrigation Show. It offered an incredible breadth and depth of offerings, from the educational classes to the technical sessions and seminars. I saw an immense diversity in companies and products within the irrigation industry. The networking opportunities unveiled many career opportunities that I hadn't considered or even knew about."

*Gilbert Young, Utah State University,
2016 E3 Learner*

a person who is actively teaching, or has formerly taught, irrigation, water management and/or water conservation in affiliation with a two- or four-year institution. This person helps supply the irrigation industry with educated professionals who provide efficient irrigation solutions that protect water and the environment.

Students and colleagues are invited to nominate educators who have inspired those around them; nominations must be submitted by May 15. The recipient will receive an all-expenses-paid trip to the 2017 Irrigation Show and Education Conference, Nov. 6 – 10, in Orlando, Florida.

A nomination form can be found at www.irrigation.org/educatoraward.



2016 E3 Learners and Leaders

Soil Moisture Sensing

Comparing the Technologies

By Steven R. Evett, PhD

Soil moisture monitoring can be useful as an irrigation management tool for both landscapes and agriculture, sometimes replacing an evapotranspiration-based approach or as a useful check on ET-based approaches since the latter tend to drift off-target over time.

All moisture sensors, also known as soil water sensors, measure a response to a soil property that is related to water content and then use a calibration equation to convert the measurement into a soil moisture estimate. Often the calibration is internal to the sensor or sensing system. Although individual sensors are available, the market is demanding moisture sensing systems that feed data into a central point using either wired or wireless telemetry. Sensing systems may be tied into a decision support system that further processes the data to provide an irrigation recommendation or even control an irrigation valve or system directly. All sensing technologies are affected by the quality of sensor installation and location in the field.

There are four main types of sensing technology: neutron probes, resistance sensors, capacitance sensors and time domain sensors. Except for the neutron probe, sensed soil volumes are small, with the greatest response (90 percent or more) being to soil water within 1.5 inches or less of the sensor.

Neutron Probe Technology

The neutron probe counts neutrons slowed by collision with hydrogen atoms, most of which are in the soil water. The source of neutrons is slightly radioactive and is regulated such that safety training and licensing to possess a neutron probe are required and costly. Also, the neutron method is a manual method since the probe cannot be left

unattended. Due to its accuracy when calibrated, large volume of measurement, lack of interference from salinity and temperature, and easy measurement at multiple depths in the soil, the neutron probe is still used by some consultants, particularly for high-value crops and where the needed access tubes can be left in for multiple seasons.

Resistance Sensors

Granular matrix sensors and their cousins, gypsum blocks, are buried in contact with the soil at whatever depth(s) are of interest (e.g., root zone). The sensor body comes into equilibrium with soil moisture so that it dries as the soil dries and becomes wetter as the soil is wetted. An alternating voltage is passed through two wires embedded in the sensor but separated by part of the sensor body. The electrical resistance between these wires increases as the sensor dries and decreases as the sensor becomes wetter. The resistance readings can be manual or automated. The resistance is better related to the soil matric potential than to the soil water content. Because plant water uptake is in direct correspondence to the matric potential, these “resistance” sensors are fairly direct indicators of plant water need. But since the water content is not sensed, the data cannot be directly used to indicate how much to irrigate. Resistance sensors have been widely adopted in horticultural and landscape irrigation. Issues with loss of soil contact can occur in some soils.

Capacitance Sensors

The other two major types of soil water sensors respond to soil electrical properties, including the apparent permittivity (i.e., ability of an electromagnetic field, or EMF, to move through the soil) and the bulk electrical

conductivity (known as BEC). Both the permittivity and the BEC increase with water content, although the permittivity increase is nonlinear. The most common of these “electromagnetic” (known as EM) sensors operates by imposing an oscillating EMF on the soil and measuring a frequency response. These “capacitance” sensors essentially couple a capacitive element with the soil and monitor the frequency changes driven by changes in the soil electrical capacitance. Capacitance is calculated from the frequency measurements. The capacitance is influenced by both the permittivity and the BEC, as well as by the shape and extent of the EMF that permeates the soil around the sensor element.

The shape and extent factors are known as the “geometric factor” in the electrical engineering equation for capacitance, and they affect the value of the capacitance and the sensed frequency (see fig. 1). Except for uniform sands, agricultural soils generally have enough small-scale (inch scale) variability in structure, water content and BEC to substantially influence the geometric factor beyond the effect solely of bulk water content, resulting in biased readings. Also, changes in soil temperature directly influence BEC, as do changes in salinity that may occur during an irrigation season or even in response to a single irrigation. They provide useful information on general trends in water content, and when deployed at multiple depths, they can indicate the depth of wetting due to irrigation and precipitation. Irrigation managers may find these kinds of information invaluable as aids to timing and general management of irrigation operations. However, the capacitance sensors generally are not sufficiently accurate to allow successful irrigation management following the management allowed depletion paradigm (see fig. 2).

Time Domain Sensors

The other type of sensors that respond to soil electrical properties are those that measure the travel time of an electrical pulse along a probe in contact with the soil. The electrical engineering equations that describe how these sensors operate do not include a geometric factor, so the shape and extent of the EMF permeating the soil do not affect the travel time. Travel time is a linear function of water content in most agricultural soils but with some calibration differences between soils due to soil texture. Soil BEC and temperature have minor effects on the travel time, although very high BEC values can prevent measurement of the travel time. Until recently, the time domain sensors were mostly used only by scientists due to the complex and expensive time domain reflectometry, or TDR, equipment needed. However, the ubiquity of high frequency electronic chips in the cell phone industry has now allowed miniaturization of the TDR circuit to fit into the head of a sensor that can be inserted into the soil. This greatly reduced expense and eliminated the complex coaxial cabling and multiplexers needed for traditional TDR. Direct coupling of the TDR circuit and the sensor electrodes (metal rods) improved the accuracy of the method and expanded the range of BEC values over which the TDR method can reliably measure travel time and sense water content. These sensors are accurate enough for MAD-based scheduling and can be installed at depths as needed (see fig. 3).



Steven R. Evett, PhD, is a research soil scientist with the USDA Agricultural Research Service, Conservation and Production Research Laboratory, Bushland, Texas. Evett also serves as the ARS research coordinator for the Middle East Regional Irrigation Management Information Systems Project, which has research and extension partners in Israel, Jordan and the Palestinian Authority; and he co-leads the Water Saving Technologies Flagship Project – a USDA-China cooperative effort in advanced irrigation technologies.

Figure 1

Capacitance Sensor EM Field Geometry

- Sensor in uniform soil uniform geometry →
- But capacitance sensors obey Gauss' law:
 $C = g\epsilon_s\epsilon_0$
- Sensor in soil with structure and more or less conductive (wetter or drier) areas → geometry (g) changed
- Both soils have same mean water content but readings differ.

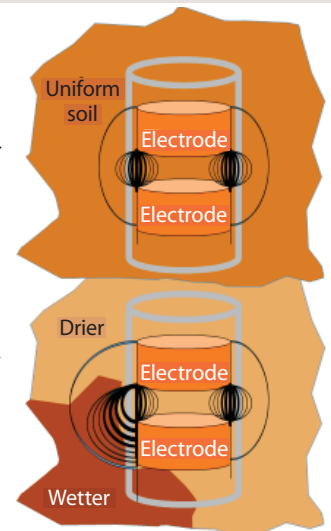


Figure 2

The MAD Irrigation Scheduling Paradigm

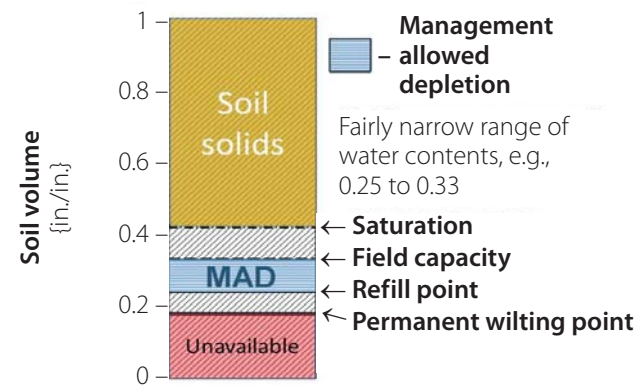


Figure 3

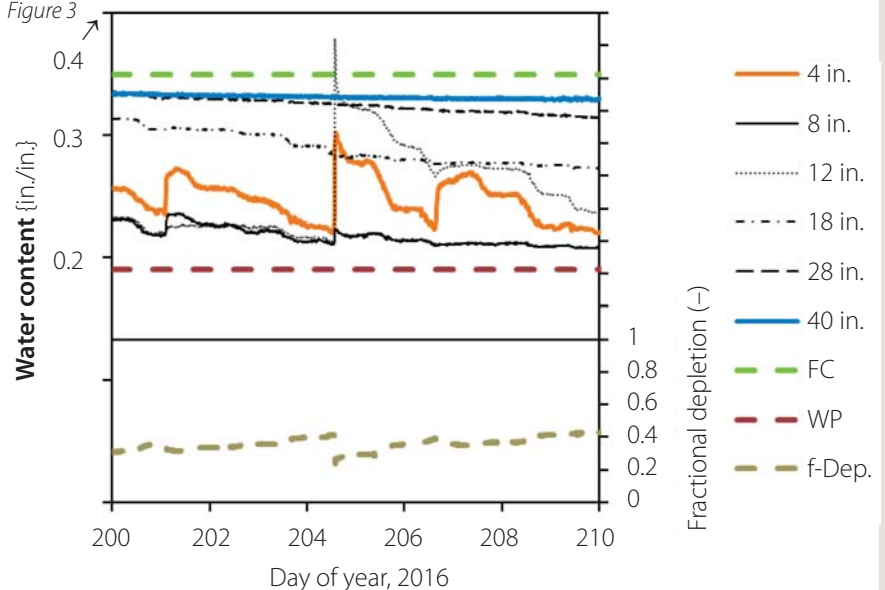


Photo credit: Steve Evett, USDA ARS

This work was supported in part by the Ogallala Aquifer Program, a consortium between USDA-Agricultural Research Service, Kansas State University, Texas AgriLife Research, Texas AgriLife Extension Service, Texas Tech University and West Texas A&M University.



Soil Moisture Sensing

Use of Soil Moisture Sensors for Irrigation Scheduling

By Ruixiu Sui, PhD

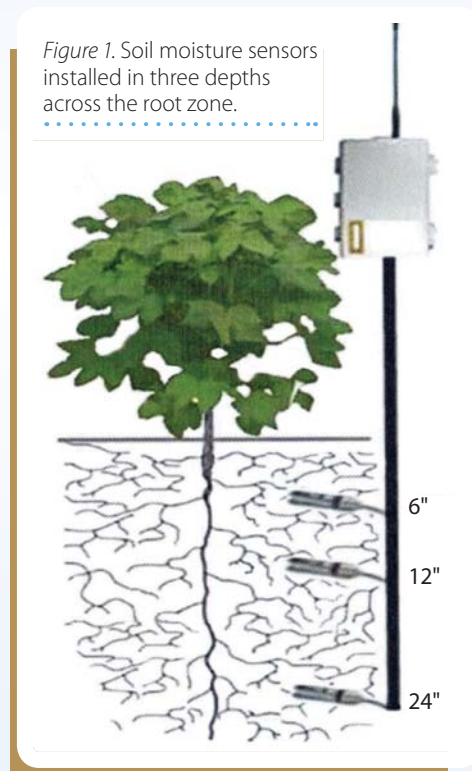
Irrigation scheduling determines the time and amount of water to apply. One of the most popular methods for irrigation scheduling is to measure soil moisture levels in the plant root zone and apply water if there is a water shortage for the plants. Soil moisture sensors are able to measure soil moisture content. Various types of soil moisture sensing devices have been developed and are commercially available for water management applications.

Each type of soil moisture sensor has its advantages and shortcomings in terms of accuracy, reliability and cost. The neutron probe has been shown to be a reliable tool for determining soil water content. However, its use of a radioactive source, the maintenance requirement and the cost have restricted its application. Meanwhile, resistive- and capacitive-based sensors and time domain reflectometry sensors have been rapidly developed and adopted for soil water measurement in recent years. Some of these sensors are integrated with wireless data communication devices, making them capable of wirelessly transferring the soil moisture data. Research shows that soil moisture sensors could be used as an irrigation tool for saving water. However, procedures for proper installation, calibration and maintenance of soil moisture sensing devices are critical for the success of soil moisture sensor-based irrigation scheduling. The following is an example of a practical use of soil moisture sensors for irrigation scheduling in a humid region.

The field is located in a research farm of the USDA-ARS Crop Production Systems Research Unit in Stoneville, Mississippi. The predominant soil type of the field is silt loam. Crops were grown under a center pivot irrigation system.

Sensor Installation & Maintenance

Soil water content sensors were installed in the predominant soil of the field to measure soil volumetric water content in the crop root zone. The sensors were installed at depths of 6 in. (15 cm), 12 in. (30 cm) and 24 in. (61 cm), respectively (see fig. 1). To install the sensors, a hole was drilled at the center of the crop row using a soil auger. Soil water content sensors were inserted horizontally into the soil at the designated depths. The sensors were connected to a wireless data logger installed near the sensors on the crop row.



Caution: When installing sensors, minimize disturbance of the soil and ensure the prongs are well in contact with the soil. Place the sensor to prevent it from being damaged during field practices and by wild animals. After the growing season, the data logger can be disconnected from the

sensors and removed from the field. The sensors can remain in the soil for use the next season.

Sensor Calibration

The sensors were calibrated with the soil from the field. Soil water content of the soil was measured using the soil moisture sensors and also determined by the gravimetric method. Sensor-measured water content was compared to the water content by the gravimetric method, and their relationship was developed and used to calibrate the sensors.

Caution: Soil types have an effect on soil moisture sensor measurements. The sensors should be calibrated with specific soils intended for measurement.

Data Acquisition & Interpretation

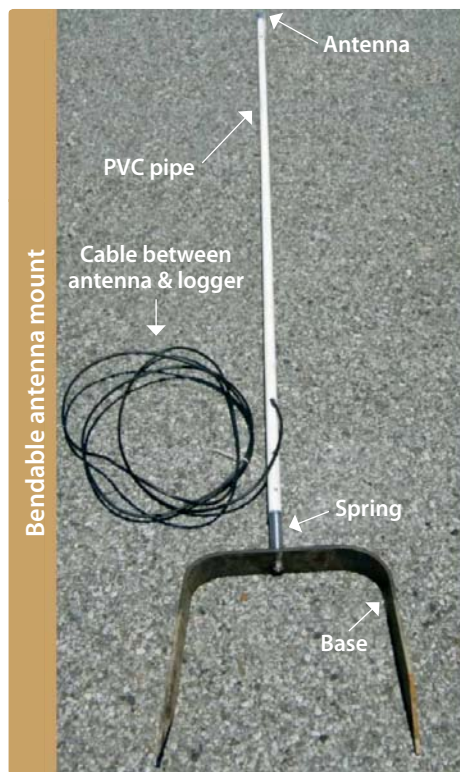
Data loggers were set up to continuously make one measurement of soil water content every minute and calculate the hourly average of the measurements. Readings of the soil water content from the logger were wirelessly transmitted online for download. A bendable antenna mount was developed and used to place the antenna above the plant canopy for wireless data transmission while not interfering with the operation of field equipment (see fig. 2). Soil water content measured at the three depths were interpreted using a weighted average method to reflect the importance of soil water in different depths across the plant root zone. A weight was assigned to each sensor measurement based on the sensor depth.

Caution: The weights assigned to the measurements at different depths should be adjusted according to crop type and crop growth stage due to variation of crop root distribution patterns in the root zone.

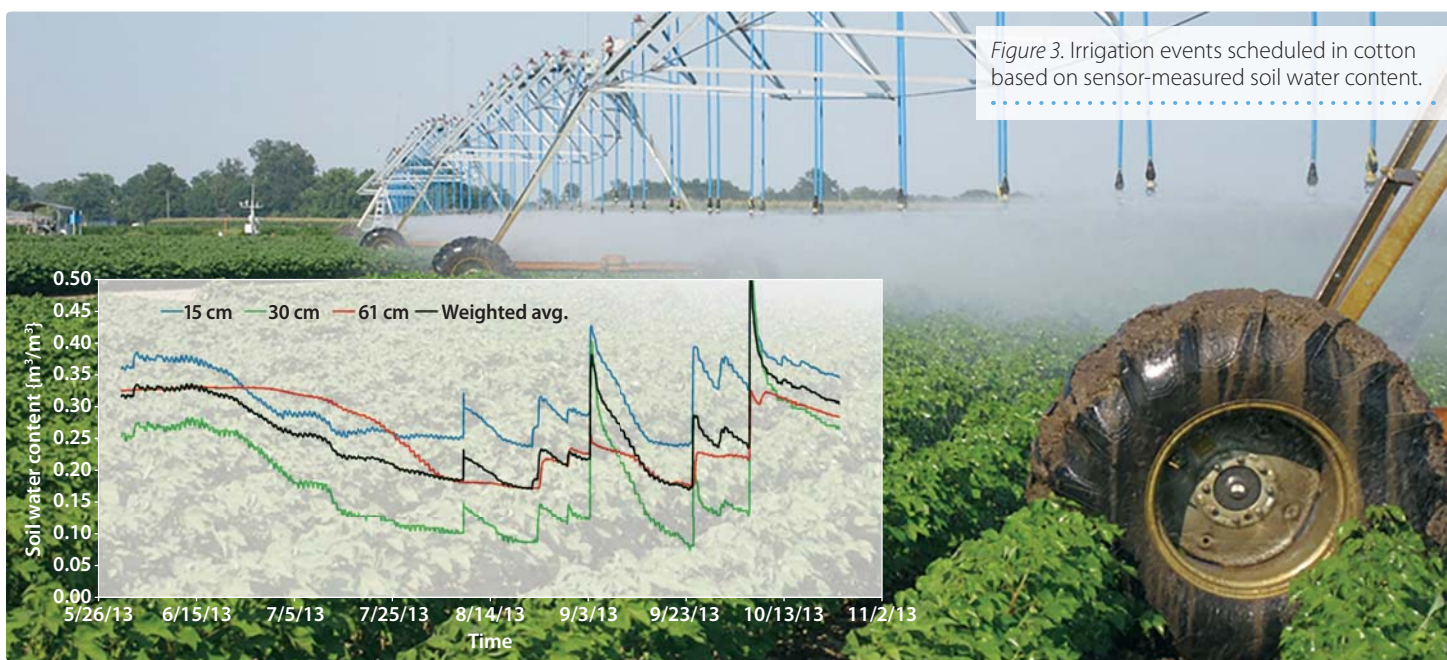
Irrigation Scheduling

The weighted average of the soil water content was used for irrigation scheduling. The weighted average measured by the sensors at 48 hours after the soil was saturated was used as the sensor-measured field capacity (FC). Irrigation was triggered when the soil water content (SWC) dropped close to the level of approximately plant available water (PAW) of 50 percent (see fig. 3). The plant available water is calculated as follows: $PAW = 100 \times [(Sensor\text{-}measured\ SWC) - (SWC\ at\ wilt\ point)] / (FC - SWC\ at\ wilt\ point)$.

Caution: This requires understanding the soil FC, PAW and soil water level to trigger irrigation events for different crops.



Soil moisture measurement device installed in field



Disclaimer. Mention of a trade name, proprietary product, or specific equipment does not constitute a guarantee or warranty by the U. S. Department of Agriculture and does not imply approval of the product to the exclusion of others that may be available.

Ruixiu Sui, PhD, is a research agricultural engineer and lead scientist at the United States Department of Agriculture, Agricultural Research Service, Crop Production Systems Research Unit at Stoneville, Mississippi. He holds three patents and has published 150 refereed journal articles and conference papers.





Soil Moisture Sensing

One Water-Saving Sensor Too Many?

This article was adapted from a University of Florida Institute of Food and Agricultural Sciences blog including a dialogue between water-use expert Michael Dukes, PhD, PE, CID, University of Florida professor, and Michael Gutierrez, UF/IFAS water resources technician, about a problem with multiple sensor installations in Florida. Gutierrez hosted the discussion about the “two sensors” situation in hopes that the industry could better understand the installers’ intentions and what went wrong.

During the summer of 2016, an area utility came to the University of Florida’s Institute of Food and Agricultural Sciences extension with a technology problem. Due to an incentive-based program, soil moisture sensors were being installed on new housing development irrigation systems. This is exactly the kind of best practice the irrigation industry loves to hear about.

In this instance, however, the installers elected to add rain sensors as well, which caused wiring issues.

The scenario led to discussions about what went wrong during the installation, as well as what — and how many — water-saving sensors are best for installation.

Rain Sensors vs. Soil Moisture Sensors

According to University of Florida Professor Michael Dukes, PhD, PE, CID, soil moisture sensors are more effective than rain sensors. “They’ll reduce irrigation two to three times more under the same conditions. And, longevity is better in soil moisture sensors,” Dukes said. To those familiar with research about these sensors, it makes sense to only use a soil moisture sensor.

However, because rain sensors have been around for a long time, they tend to be more readily used by contractors, practitioners and utilities.

Dukes says that one of the things at the forefront of a practitioner’s mind is not wanting to see an irrigation system running when it’s raining. A rain sensor would solve that issue, and they assume adding a soil moisture sensor would make their results even better.

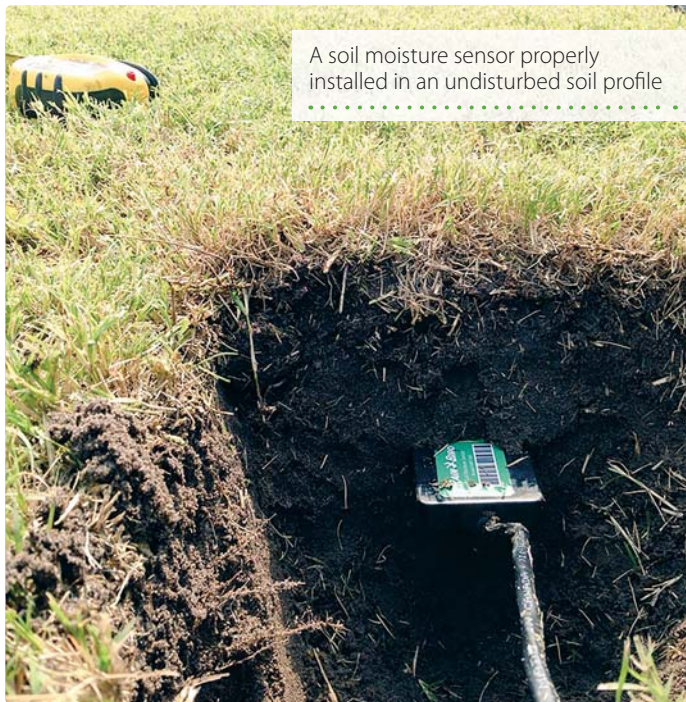
Two vs. One

Being in a profession that specializes in encouraging best practices, UF/IFAS Water Resources Technician Michael Gutierrez likes seeing practitioners install water-saving devices. In reality, Gutierrez realizes that having one well-installed, functioning device on a system is a rare thing, and he questioned the purpose behind installing two devices.

In the new housing development scenario, the reason rain sensors were added was to get the instant shut-off they would provide during a rainfall event.

According to Dukes, “We only have a limited amount of research on testing a soil moisture sensor with a rain sensor together, and in that limited study there was a benefit. It wasn’t a great deal, but there was a benefit.”

Dukes encouraged practitioners to think about the conditions where a benefit is gained. For example, to benefit from installing a rain sensor there has to be irrigation during a rain event. If there



A soil moisture sensor properly installed in an undisturbed soil profile

Photo credit: Michael Gutierrez, UF/IFAS ABE



A rain sensor properly installed

Photo credit: Michael Gutierrez, UF/IFAS ABE

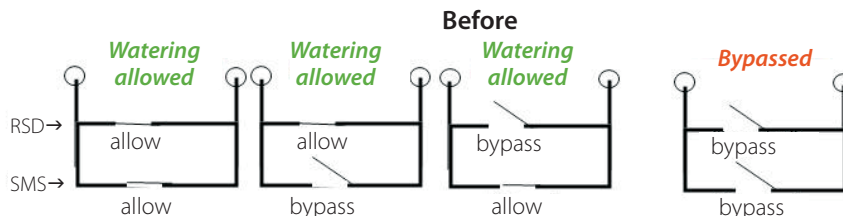
Incorrect and correct ways to wire dual sensors (i.e., rain shut-off and soil moisture)



Wiring dual sensors: Rain shut-off (RSD) + Soil moisture sensor (SMS)

Before: Both sensors were wired directly into single sensor port. **This did not allow the sensors to work properly.**

Why? If one sensor says "bypass" but the other says "allow," the signal could still travel a complete loop, and a scheduled irrigation cycle would still occur.



After: Sensors are now wired together "in series." The signal must travel a single complete loop through BOTH sensors. This allows **either** sensor to bypass an irrigation cycle.

Example: If one sensor was in "bypass" but the other was in "allow," the signal could NOT travel a complete loop, and a scheduled irrigation cycle would be successfully bypassed.

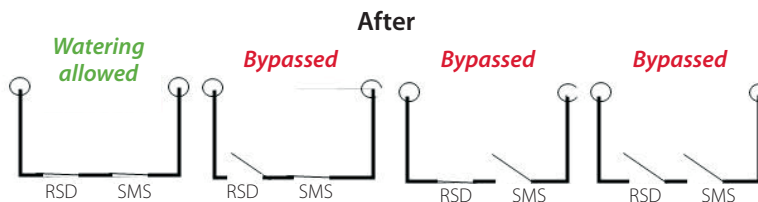


Photo credit: Francis Galdo, water conservation and efficiency coordinator at Pasco County Utilities

are several irrigation events scheduled per week, that means everything has to line up perfectly, which isn't likely. The benefits to adding a rain sensor are probably marginal because they also require more maintenance. "You're adding something that needs more maintenance for some perceived benefit, which is not all that great," Dukes said.

Perception vs. Reality

When it comes to water savings and homeowners, Dukes said, "Perception is reality." Surveys of homeowners involved in an Orange County Utilities research study showed that their perception of water savings was more important than the actual water savings in their attitude of whether they were going to continue using smart irrigation technology in the future.

Having a rain sensor to prevent a system from running when it's raining contributes significantly toward perception. Having a system with only a soil moisture sensor is probably not a real problem in the long run, day in and day out, throughout the year. But if a developer sees a system watering in the rain one time, it may mean the difference between these new homes continuing to get this technology or not getting it.

Parallel vs. In Series

The problem with the new housing development arose when something went wrong with two sensors connected to one timer. In this situation, the timers had a rain sensor port, and the

installers wired both sensors to that port. They intended an either/or scenario to interrupt irrigation. But, when both are wired in this way they are in parallel, so both have to trigger to interrupt irrigation. They needed to be wired in series so either/or would break the circuit.

Dukes offered the following advice for those insisting on using both a rain sensor and soil moisture sensor with a timer: "Know your wiring."

Michael Dukes, PhD, PE, CID, is a professor and irrigation specialist in the Agricultural and Biological Engineering Department at the University of Florida and director of the Center for Landscape Conservation and Ecology. He and his team conduct research and education on topics related to efficient irrigation and water conservation in landscapes.



Michael Gutierrez is a water resources technician and digital media specialist with UF/IFAS in the Agricultural and Biological Engineering Department. When he's not maintaining/training others on smart irrigation devices, he's shooting video of someone who is and tweeting about it.



Selecting a Consultant

Guidelines to Follow

By John Maxwell, CAIS, CID

Several times a year I get a predictable phone call. The caller begins by telling me about his problem. I ask questions, such as what are the results he is looking for and what methods have been used in an attempt to achieve those results. Most of the time these potential clients have talked to several other consultants before reaching out to me. My goal is to quickly establish if I can help and if we are a good fit.

There are many irrigation designers who have been designing systems for years. I have observed, however, that there is a disparity between designing systems and ensuring that those systems achieve the results that the grower needs. One company, with whom I am very familiar, has designed and installed thousands of acres of irrigation systems. Routinely clients ask me to evaluate the systems that this company designed to determine why they are not operating as they should. This company knows how to design a system; however, they do not have the knowledge nor the desire to implement what is needed to meet the farmer's needs.

How to Avoid Low-Quality Consultants

When looking to hire a consultant, how do you find one who is professional in both knowledge and service? Whatever the field, these principles will apply.

Insightful Questions to Ask

1. **What have you been reading recently?** If someone isn't reading current industry-related publications and information, he probably isn't learning or growing in his profession. If he isn't learning, he is losing. It could be slowly — but losing, nonetheless.
2. **What is the last training/industry event you attended?** In our industry, the Irrigation Association provides fantastic learning events. The consultant you want is one who attends conferences, continuing to learn and develop skills. If money is the reason for not attending these events, I can assure the consultant that by not learning, money will soon become more of a concern.

3. **What is your experience in the industry?** Combined with the previous questions, this one truly shows how much knowledge the consultant has. For example, consider the following two scenarios. One option could be a consultant who is new to the industry and heavily investing in learning, yet he still might not have what it takes to be the right person for you. The second option could be a consultant who has been working in his field for over 30 years yet isn't making the effort to continue learning. He also might not be able to offer the help you need if he is just a standard do-it-as-it's-always-been-done kind of person. I have risen to be one of the premier drip irrigation consultants in the United States because I am willing to challenge the way that "it has always been done." If I can calculate and prove it will work, we will give it a try. Because I am young and fairly new to the industry, I am agile and willing to adapt. To date, I have not come across a challenge that does not have a solution. Your consultant just has to stay open-minded and willing to investigate other options.
4. **What was the hardest problem you recently solved?** If a consultant cannot come up with an example of a difficult challenge and its solution, how do you know that he will be able to come up with a creative solution to your challenge? In other words, is he a good troubleshooter? This leads to an important point: I believe the most effective consultant will be able to troubleshoot your problem. Troubleshooting is the art of systematically working through a challenge to develop a solution.



5. *What certifications do you have?* In the irrigation industry there are many certifications available. For example, if someone is considering hiring a professional with a master's in landscape architecture to design a landscape irrigation system, a good question to ask is if the designer is a certified irrigation designer. If someone has a master's degree, he has simply shown the ability to go to school to learn. A designer with a CID has the experience and the knowledge to take what he has learned and make it practical.

Additional Considerations

Companies often determine whether it is beneficial to hire an external consultant or try to use in-house talent. In my experience, I have never come across a company that has good talent idly sitting, waiting for a project. Employees with extra time on their hands oftentimes are not quality employees. Do you really want a B-level employee handling a specialized project? Wouldn't you rather have a specialized consultant who has experience with this type of project?

For the Consultant

My advice to consultants: have confidence in your value. It is important to effectively and clearly communicate your value to potential clients. For example, communicate what you are good at and how you are better than the competition. One of the lessons I have learned is to never negotiate my rates. The rates I have set are equitable compensation for my services.

When hired for a job, give the client a 150 percent effort. This sounds cliché, but think about the last time you received an email from a client who needed something that same day. Did you reach for your laptop and send what they needed, even if it was late in the afternoon or evening? I have worked on projects until 1 a.m. just because a client needed it right away.

There is no shame in turning a potential client away. When interviewing a potential client, you are not only establishing if you have a solution for them but also if you are a good fit. If you do not believe in their company, the way they do business or how they interact, do not accept them as a client. You must be able to do your best for them. Having reservations about a company's ethics or business will likely inhibit your willingness to help them.

Selecting a consultant can either make or break your business. Hiring a good consultant will often push your company to new heights of success. The same goes for consultants. If you do not make your clients successful, your company will never be successful.

John Maxwell is an independent irrigation designer who designs irrigation systems worldwide. He is a certified irrigation designer, certified agriculture irrigation specialist, master plumber and master electrician.




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Selecting a Consultant

Irrigation Consultants: Offering Valuable Knowledge & Expertise in Projects

By Carol Colein

Professionals involved in the irrigation industry know that irrigation is often an afterthought in a project. Recent mandates have brought irrigation considerations and water use to the forefront when planning a project. The focus on responsible and defensible water use has put a new spotlight on irrigation as an integral part of a project.

Unfortunately, this is still not the norm. In many parts of the country, irrigation is still the tag-along amenity, often subject to budget cuts and low prioritization. Responsible and quality irrigation comes with an upfront cost that often needs explanation and defense.

Professional irrigation consultants are in the unique position to advocate for the industry in a way that others may not be able. As consultants, their role is that of an acknowledged expert and designated project team member. If they advocate for a more efficient and effective irrigation solution, often at a higher initial cost, they can do so without any conflict of interest.

The professional consultant passionately understands the need for efficient and effective irrigation and is in the position to communicate the value of irrigation and translate this zeal into actionable results.

As executive director of the American Society of Irrigation Consultants, I fully appreciate and understand the passion, concern and love of this industry exhibited by our professional members, although I am not convinced that the irrigation industry, including professional consultants, fully appreciate the role the consultant plays in the betterment of the industry.

Irrigation Consultant as a Profession

An irrigation consultant offers professional service that requires years of education, training and experience, as well as the ability to apply and clearly communicate knowledge on behalf of a client. They evaluate project needs and parameters, prepare appropriate design documentation and review construction work for

conformation to the project contract requirements.

This sounds rather mechanical; in reality, consulting is 50 percent heart and 50 percent technical, or perhaps even 60 percent heart and 40 percent technical. The driving force of a professional irrigation consultant is more than just providing a technically correct solution. Passion is an intangible but equally important element that is both powerful and real.

Client/Consultant Collaboration

Successful irrigation projects result from an informed client working closely with an irrigation consultant to clearly define and implement project irrigation requirements. The consultant and client work together to define project expectations, and the consultant then uses skill and experience to present thoughtful and effective solutions. Ideally, a trusted relationship between the client and irrigation consultant develops.

Professional irrigation consultants often work within the parameters of a long-term working relationship with a client spanning over several projects. Trust and understanding are cultivated, resulting in a productive and comfortable work environment. Friendships and close personal relationships often develop over the years, and for many consultants, this is one of the most rewarding aspects of their business.

Selecting the Right Consultant

When a client needs to hire an irrigation consultant for the first time or seek out a professional consultant with specific expertise, it is important to choose the best consultant for the project.



The first step is to clearly define the project's needs and scope of services. If the client does not have the expertise and understanding to fulfill the obligations of the irrigation portion of the project, the services of a consultant are necessary.

A client should consider the project type, size and complexity, and seek a consultant with a history of providing similar work, while meeting both the project timetable and budget. During the interview, there should be enough rapport that the client feels confident about working closely with the consultant over the coming months. The client should also inquire about the consultant's insurance and staffing resources. Checking references and asking for referrals is always important.

A consultant is likely also evaluating the client to ascertain whether there is a sense of mutual respect and open communication. A wise consultant may also seek a solid reference from fellow professionals who have previously worked with the client. A strong and trusting relationship between the client and consultant cannot be underestimated.

Integrating the Consultant Into the Project

Once a consultant is hired, deciding when to bring a consultant into the project is an important factor. In a nutshell — as early as possible. Even if there seems to be little required activity for the consultant, early intervention can make a big difference in the success of the project. The consultant may want to start communication with the regulating authorities and project engineers to determine water source options, requirements and location. Realistic preliminary budgets can be established early in the planning phase; this is too often left to guesswork leading to some ugly surprises later. A consultant is also instrumental in providing required documentation to obtain permits or zoning approvals. Becoming an integral member of the team early on helps in building future relationship trust.

It is necessary to discuss and mutually understand the project requirements. This includes project use, size and any site constraints or unique issues. There should be a frank discussion regarding level of quality expected — both in the product as

well as services provided by the consultant. A preliminary project schedule and budget should be presented and agreed upon. The consultant should have a list of all key team players, including other outside consulting firms.

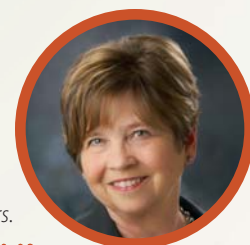
It is important to define the scope of services needs. Depending on the in-house expertise of the client, the scope of services needs to be customized for each project. A clear understanding of each service and who will be responsible is a critical step to ensure the project moves forward without unnecessary misunderstanding. Additional services may be required once the project is under way, and services may be added to an agreement at any time. Too often in our industry, providing technically correct plans and specifications is thought to equate to providing the services of a professional consultant. But the role is really so much more complex.

Once the project scope of services has been defined, the irrigation consultant prepares a compensation proposal. Compensation may be lump sum, percent of construction cost, hourly fee or a combination of all three. Finally, a written agreement can be forged based on the agreed-upon project scope, services, responsibilities, project schedule and budgets. By following these practices, the client and professional consultant can work together to finish a landscape project that both meets the expectations of the client while focusing on responsible and efficient irrigation practices.



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Carol Colein is executive director of the American Society of Irrigation Consultants. Prior to her current role, Carol worked as a professional irrigation consultant for over 28 years.



Common Services That Can Be Provided by an Irrigation Consultant

Evaluation and Planning

- Discipline coordination as it relates to irrigation (electrical, mechanical, civil, hardscape/softscape, etc.)
- Agency consulting for required permit documentation
- Preliminary budget analysis/preliminary cost estimates
- Water sourcing options/economic feasibility studies
- Zoning/permitting process assistance
- Planning meeting(s) participation and/or attendance

Design Services

- Design/documentation (conceptual through bidding)
- Specifications
- Budget estimate update including cost-benefit analysis

Bidding or Negotiating

- Bidding materials/documentation
- Respond to bidder's inquiries
- Addenda as needed
- Bidding/negotiating with contractor
- Analysis of alternates/substitutions
- Bid evaluation and recommendation

Contract Administration Services

- On-site visits during construction
- Inspection administration (observation and reports)
- Change orders
- Contract cost accounting
- Interpretations and decisions
- Project close-out

Facility Administration Services

- Maintenance protocol
- System programming
- Record drawings
- Warranty review/disputes

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Big Data Provides Unique Challenges & Opportunities

By Reagan Waskom, PhD

Big promises are being made for big data. The tsunami of data resulting from new technologies acquiring observations rapidly and inexpensively has created headaches, as well as intriguing opportunities.

Satellite images, wireless sensor networks, web-based photographs, and text, audio, and model output all produce data that must be stored, processed and analyzed to create useful and reliable information. Data in and of itself does not enhance our understanding or management decisions; it must be transformed into information that is accurate, timely and reliable to become truly useful.

Data acquisition capacity has grown to the extent that a new branch of information sciences has emerged, known as “big data.” Big data has been called a fad in scientific research, but perhaps it is more accurate to call it a “hot topic,” knowing that the cascade of data from ever-expanding new technologies will only continue. Numerous scientific conferences and papers on the topic of big data have occurred since the Obama Administration launched the Big Data Research and Development Initiative in 2012 to “greatly improve tools and techniques needed to access, organize and glean discoveries from huge volumes of digital data.”

Big data has been described as high-volume, high-velocity and high-variety information in excess of 1 terabyte, which is too large for a single machine to handle. Traditional techniques are insufficient in analyzing this amount of information.

This definition is fluid and may soon be described in petabytes, but it also includes the velocity at which the data is acquired from multiple independent data sources. Thus, cloud-linked servers are typically needed to adequately store and process the data. Real-time acquisition and processing that enable trend and pattern detection to provide actionable insight, improved decision-making and competitive advantage are the goals of businesses and government agencies seeking to exploit big data. In other cases, the goal may be to enable public access to useful, interesting or important information.

A number of questions must be resolved while developing new data technologies and capacity. For example, who owns big data when it is crowd-sourced or provided by multiple public agencies and private entities? How does the information remain secure and individual privacy protected? From a scientific point of view, what about data quality and veracity? How can sampling bias and misinterpretation be avoided? Again, data itself is not the goal — it is the information gleaned from the data that can enhance understanding of trends, processes, demographics, etc.

Ratepayer data aggregated from multiple public water systems might be an example of using big data to determine statistical patterns that suggest significant correlations and trends in water use and conservation, to forecast future demands

and ultimately to optimize coordination of resources. Water managers with multiple sources of water supply could also benefit from better data-driven forecasting and real-time operations decision support. Sensor technologies have arrived on the market to help water utilities survey underground pipes and detect present or potential leaks. Smart meters could help both managers and individual users fine-tune their systems.

In terms of academic research, both the National Science Foundation-funded National Ecological Observatory Network and the Consortium of Universities for the Advancement of Hydrologic Sciences, Inc. networks have been organized to provide big and open data to researchers. NEON represents the largest single investment in ecological research data ever made. This research infrastructure is transforming the ability to advance data visualization and statistical methods to understand patterns, and trends processes and detect outliers.

The value of big data is the opportunity to answer big questions. What is also exciting about big data and open data is the potential for innovations that can substantially improve decision-making capacity. As the data tsunami keeps coming, the power of that data to help solve big water and natural resource challenges is ours to capture.

Reagan Waskom, PhD, is the director of the Colorado Water Institute at Colorado State University, Fort Collins, Colorado. Waskom is a member of the department of soil and crop sciences at CSU, where he has worked on various water-related research and outreach programs for the past 27 years, conducting statewide educational and applied research programs on water quality, water quantity, water policy and natural resource issues related to water use.



IRRIGATION REDEFINED

Ingenuity and adaptability have long been a way of life for Eco-Drip, beginning with its founder, Hubert Frerich. In the late 1970's, his foresight in developing permanently installed subsurface drip systems would lead to doubled yields and the inception of Eco-Drip.

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was simple to program, simple to use, and adapted to deficit irrigation. Eco-Drip has added many features over the years, always keeping simplicity and convenience as a priority.

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Hubert Frerich, circa 1965

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Manufacturing Activity Should Pick Up in 2017, Even With Persistent Challenges

By Chad Moutray

There is a sense of optimism in the air as 2017 begins, especially since the election. Americans appear to be cautiously upbeat about growth moving forward, and equity markets have reached all-time highs, largely on a belief that the new administration will bring needed tax and regulatory reforms and a significant infrastructure package. At the same time, markets are also sensing that additional federal spending might bring about greater debt. Hence, the slumping bond market has sent yields up notably, even before the Federal Reserve raised interest rates in December. Likewise, the U.S. dollar has continued to strengthen — up more than 25 percent since June 2014 against major currencies — challenging manufacturers as they attempt to increase exports.

The strong dollar has been a major headwind to growth for manufacturers over the past two years, and as a result, production has been relatively stagnant over much of that time. U.S.-manufactured goods exports declined for the second straight year, as well, which is off 5.2 percent year-to-date through the third quarter. Nonetheless, there were signs of stabilization in the second half of 2016. Sentiment surveys have largely reported improved sentiment in recent months, with better demand and output data and modest growth. This includes the NAM 2016 Manufacturers' Outlook Survey, with the percentage of respondents who are positive about their own company's performance at nearly a two-year high.

Beyond manufacturing, consumers have begun to open up their pocketbooks once again after being very cautious at the beginning of 2016. In October, retail spending rose 4.2 percent over the past 12 months, its fastest year-over-year rate in nearly two years. At the same time, new housing starts jumped in October to 1,323,000 units at the annual rate, which is the highest level since August 2007. That pace will likely pull back in November,

but it continues movement in the right direction. Indeed, such growth should help provide a boost to economic growth moving forward.

The U.S. economy grew just 1.1 percent at the annual rate in the first half of 2016, but the second half of the year has looked somewhat better. Real gross domestic product rose 3.2 percent in the third quarter, and fourth-quarter growth should also hover near 3 percent. In the third quarter, consumer spending, net exports and inventory spending were bright spots. At the same time, drags on growth came from business spending on structures and residential investment, and overall nonresidential fixed investment continued to be more sluggish than desired.

I would expect real GDP to increase by 1.6 percent in 2016 despite the better data seen in the second half of the year. On the positive side, the current forecast is for 2.5 percent growth in 2017, with manufacturing production up 1.8 percent.

For much of last year, businesses — including manufacturers — were rather cautious about the economy. As a result, hiring and capital spending data were very weak. Through the first 11 months of 2016, manufacturing employment fell by 60,000 on net. Yet, job openings have remained quite elevated, and I would anticipate better hiring data moving into 2017, especially with stronger activity projected. Look for the unemployment rate to hover around 4.5 or 4.6 percent in 2017, with manufacturers adding around 80,000 workers.

Overall, even with persistent challenges, manufacturers remain upbeat about demand and production in 2017. After a couple years of significant headwinds, that news is entirely welcome.

Chad Moutray is chief economist for the National Association of Manufacturers, where he serves as the NAM's economic forecaster and spokesperson on economic issues. Prior to joining the NAM, Moutray was the chief economist and director of economic research for the Office of Advocacy at the U.S. Small Business Administration from 2002 to 2010. Moutray has also been the dean of the School of Business Administration at Robert Morris College in Chicago, Illinois (now Robert Morris University of Illinois).



Communicating the **Green** Language

By Kayli Hanley

Long live language. Understanding a new language forges bridges over treacherous rivers, tunnels under impassable mountains, pathways through dense forests and passages into locked doors. Green industry communicators take on the task of translating and communicating the language of the irrigation and landscape industries in order to weave together a story with a beginning and middle, but no end in sight.

Many green industry communicators have teamed up with like-minded professionals via the Turf and Ornamental Communicators Association to accomplish this shared goal. The following looks through the lenses of four different types of communicators, all brought together through TOCA. *Word by word*, they are communicating a language that works to improve and flourish the green industry.

Linda Beattie

Marketing and Communications Professional

Beautiful (adjective)

"As a communicator, you paint the picture. Landscape and irrigation provides a wonderfully colorful pallet."

Linda Beattie loves to communicate and is quick to add, "I want to change the world!" Her passion for talking to others brought her to a job opening in the green industry 15 years ago.

"Coming into the industry was kind of interesting because I didn't know it," Beattie said. Learning new things gave her the opportunity to write stories about what she was learning, which she enjoyed.

Having served as a green industry communicator on the manufacturer side of the business, Beattie thirsts for chances to keep her audience abreast of changes happening in the irrigation and landscape industries.

"Communication is important for a lot of reasons, but primarily in the green industry it is important to keep people informed about the latest and greatest advancements."

Beattie sees the positive effects that irrigation and landscaping can contribute to enhance and grow our **beautiful** ecosystem and wants others to be able to see that, as well.

"Irrigation alone helps you recycle water. Why wouldn't you want to be able to do that? I want to communicate all the good, and sometimes you have to communicate the bad, but you should do it in a straightforward fashion and be honest."

Beattie's history with TOCA goes back 12 years. For six of those years, she has served as a board member. "There are so many great communicators in this industry and they don't get a voice. We need to nurture the young people in this industry, and TOCA is a good way to do that."

Beattie also appreciates the broad membership of green industry communicators TOCA represents. "TOCA is a great avenue in this industry for veterans to share what they know and to learn from newbies. It helped me find my voice, my way."

Chuck Bowen

Editor and Associate Publisher for *Lawn & Landscape*

Vast (adjective)

"The average American has a basic concept of our industry, but they don't understand how big it is and the impact it has on our culture and society."

Chuck Bowen started out as a newspaper reporter in the Cleveland area. He enjoyed his profession but wanted a better way to support his family. This desire led to a job as an assistant editor for *Pest Control Technology*. He enjoyed working for the company and soon transferred to their flagship magazine, *Lawn & Landscape*, where he has worked for the last eight-and-a-half years.

As an editor, Bowen works diligently to communicate topics about irrigation and landscaping to his audience. "We see ourselves as the hub," Bowen said. "We try to help all the people in the industry understand all the other people in the industry. Our goal is to help as many people in the green industry as we can."

Bowen, a current TOCA member and past board member, joined the organization to meet other communication professionals in the industry who were dedicated to telling the green industry's story. He was not disappointed.

"It has allowed me to understand the communication side of the green industry beyond the editorial side," he said. "Something I've always appreciated about the green industry is everyone's willingness to share that knowledge."

From an editorial standpoint, Bowen feels the biggest challenge professional communicators encounter is being able to tell the **vast** amount of stories the industry has.

"There is no shortage of very interesting research and people," Bowen said. But it's a challenge he feels green industry communicators are up for. "It's a great problem to have. It's what makes it interesting for us."

"Something I've always appreciated about the green industry is everyone's willingness to share that knowledge."

Lacy Ravencraft

Director of Marketing and Communication for Ewing Irrigation and Landscape Supply

Opportunity (noun)

"To educate and create awareness in other industries about the value that the green industry brings to the world."

Lacy Ravencraft saw a need and stepped in to help satisfy it. She recognized an opportunity to promote the function of public relations and provide counsel on its value — and wanted to fill that role. That was over 13 years ago.

Opportunities within the green industry keep presenting themselves, and Ravencraft continues to pursue them.

"There is a challenge in learning about the issues, products and best practices within our industry because they are vast and evolving, and that makes it an exciting place to be."

Ravencraft is a green industry communicator for a supplier and sees communication as a valuable asset to the irrigation and landscape industries. "We offer people much needed information that allows them to make informed decisions about their businesses."

Issues are continually cropping up, and she believes green industry communicators have a responsibility to keep their customers abreast of that information. "As issues that directly affect our customers become more prevalent, as we've seen with water scarcity or insurance, there's a great need to keep people informed with a balance of information on those issues."

Ravencraft became a TOCA member 12 years ago and has served as a board member for 10 of those years. She will act as president-elect in 2017.

"It is important for communication professionals to collaborate in the space TOCA provides and contribute toward our collective knowledge of what matters to our customers. Sharing strategies and working toward resolving some of the communications challenges that are unique to our industry creates an information-rich environment to help professional contractors make better business decisions," she said.

For Ravencraft, TOCA has provided networking opportunities she doesn't believe she would have found otherwise. "TOCA has served as a shortcut to establishing relationships with other communication professionals that share common goals," she said.

The environment encourages green industry professionals to work together to communicate the green language and ultimately tell its story. "With so many outside factors influencing our industry, we have an obligation to share our story, perspective and collective contributions with people across the globe."

"With so many outside factors influencing our industry, we have an obligation to share our story ..."

Kristine White

Account Service Manager for Performance Marketing

Stewardship (noun)

"So many people in the green industry have a common goal of taking care of the landscape."

Kristine White grew up on a farm. Because of that, an interest in equipment and the environment has been part of her focus since she was a child. A job with Performance Marketing, an agency with multiple clients in the green industry, came to her by surprise — but it was meant to be. "Even though it was accidental, it was a good fit for me," White said. She has been with Performance Marketing just short of 10 years.

Working as a green industry communicator in an agency setting, White has her work cut out for her. Her biggest goal revolves around "trying to get our clients' messages out to the right audience in an appropriate and positive way."

"Green industry professionals are constantly looking for ways to pick up best practices," she said.

White works to help communicate about best green industry practices and promotes **stewardship** in multiple ways.

"One of the key ways we [agencies] facilitate this is through public relations and some of the newsletters we write. Creating quality content for public relations purposes can have a great return on investment for a client and continually establishes them as thought leaders in the industry."

White is a current TOCA member and joined their board in May 2016. She believes it is important for green industry communicators to be involved with TOCA and has personally seen it benefit her career.

"For me, there are education pieces that have come up that bring things forward that I'm not necessarily thinking about. I've really benefited from some of the education classes."

White believes that everyone gets better when they learn from each other. "TOCA is a really high quality group. It's been great for networking. It's been great for building relationships."

To learn more about TOCA and how you can become a part of this unique association, visit www.toca.org.

Kayli Hanley is a copywriter and content specialist for Ewing, focusing on delivering interesting, informative and valuable information to Ewing customers and other green industry professionals.



Irrigation & Lighting – The Similarities

By Kevin Smith

The need for irrigation and the need for lighting are so different ... yet so similar. Some people might consider both a “nice to have” while others would definitely consider one or both a “need to have.” Whether for convenience, safety or functional utility, irrigation and lighting do go together!

While sprinkler systems have nozzles with different spray patterns and precipitation rates, a good lighting system uses projection lamps in many wattages and beam angles.

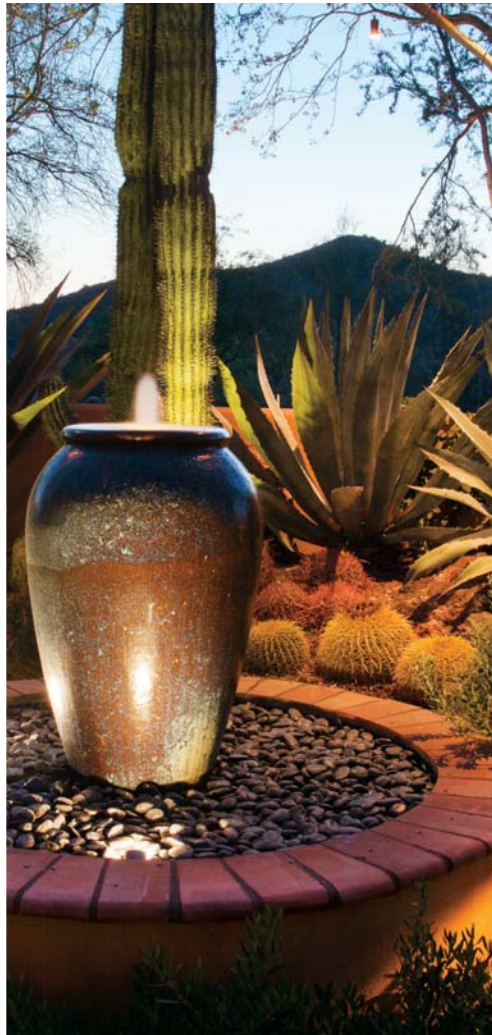
Most irrigation contractors use a precipitation chart with a sprinkler system design to ensure head-to-head coverage. Lighting contractors should use photometric charts to select the correct lamp for the job.

MR-16 2700K 30° 4W Candle Power = 692		
Distance		Foot-Candles
2 ft	1' 1"	173.00
4 ft	2' 2"	43.25
6 ft	3' 3"	19.22
8 ft	4' 3"	10.81
10 ft	5' 4"	6.92
15 ft	8'	3.08
20 ft	10' 9"	1.73
30 ft	16' 1"	0.77
40 ft	21' 5"	0.43
50 ft	26' 10"	0.28

The following reviews a few lighting basics. Beam angles in projection lamps are normally available in three styles: 15-degree, 30-degree and 60-degree. Some manufacturers are now also offering 100- and 120-degree lamps.

Replacement lamps are not the only source for beam angles. Back in the halogen days, contractors were taught to design using the lamp and beam angles to create the effect. Many manufacturers are now offering integrated LED fixtures with built-in and exchangeable optic packages.

From a design perspective, thinner objects such as pillars, some statuary and topiary trees may require a tight 15-degree beam angle or optic. This may also be used in some contemporary applications to create light beam sculptures on walls.



Flagpoles and tall trees may require a 30-degree lamp or optic depending on the height. The beam spread of the lamp will widen and soften as it rises. Wider trees and walls may require a 60-degree lamp or optic. Some contractors use the 60-degree lamp to achieve a dramatic “V” pattern on a wall. Wider beam angles such as a 100- or 120-degree can be used as wall washers to create backlighting effects. Since these wider beam angles have been introduced into the market, contractors are able to use a simple adjustable uplight for many applications.

Since there are so many options in lighting and irrigation, you need to be the expert! One of the biggest mistakes that can be made by a contractor is to simply drop off a lighting/irrigation manufacturer’s catalog and advise the client to “pick out what you like and I’ll install it.” Instead, it is important to advise them. Carry a notepad and keep customers talking to gain a clear understanding of their lifestyle and how they plan to use their outdoor spaces when professionally illuminated and/or irrigated. By asking appropriate questions, customers will be open to communicate how they feel about the task at hand. This will set you apart from the 10 other installers out there.

Lastly, consult with the lighting and/or irrigation manufacturer for additional design expertise and product guidance, if needed.

The simple table below points out the similarities between lighting and irrigation. This will help any landscape contractor understand the basic lighting and irrigation concepts.

Irrigation & Lighting – Technical Similarities	
Irrigation	Lighting
Water meter	Transformer/power supply
Vacuum breaker	Fuse or circuit breaker (on transformer)
Controller	Photocell and/or timer
Valve	Terminal block (on transformer)
Pipe	Cable
Pipe fittings	Cable connections
Sprinkler heads	Fixtures
Multidegree nozzles	Beam angles on lamps

Kevin Smith is the national technical support and trainer for Brilliance LED LLC, one of the original landscape retrofit LED companies that is dedicated to the landscape lighting industry.





Contractor/Small Business Corner

Time to Sweat the Small Stuff

By Robert Latham, CIC, CID, CLIA

Let's face it — there is no doubt we live in a world where quality tends to suffer at the expense of getting our wants and needs met at an incredibly fast rate. Consider how Amazon.com has changed the way we buy things. Not only can you order all your daily home needs online (e.g., toothpaste, paper towels, dish detergent), it can even be as easy as pushing a Wi-Fi-enabled button located in your laundry room simply labeled "Tide." In many large metropolitan markets, items are shipped and delivered the very same day. I won't even get into the drone delivery service, which is just plain mind-blowing.

However, Amazon does two things extremely well and efficiently: service and support. From doing a simple no-hassle return online, to chatting with a customer service representative, to making an exchange of incorrect products, they have made their "small stuff" something to brag about.

Catching Up With Technology

Let's consider our industry, the turf and landscape irrigation business, which is our livelihood. Generally speaking, we are a production/service-based industry that hasn't evolved nearly as fast as the technology industry, all things considered. But, there are increasing signs that the irrigation industry is slowly adopting technology into its sector, such as using Wi-Fi-enabled controllers, marketing through social media, working with various review sites to bolster credibility and utilizing GPS and service scheduling technology to increase efficiencies. Taking this into consideration, how do these advancements trickle down and subsequently benefit our customers? Those customers, OUR customers, have quickly become acclimated to Amazon-level service, and we should take every opportunity possible to "wow" them.



With all the advancements in technology where our industry tends to lag behind by 10 or more years, what simple things can we do as manufacturers, distributors and contractors to make that customer experience a great one? I firmly believe that our attention has to be on making every experience a positive experience, even in the smallest of forms. The following discusses a selection of these "small things."

Creating a Strong First Impression

First, let's consider image. Putting forth a professional image can and should be every company's number one goal. There's no second chance for a first impression, so why waste a perfectly good opportunity to show up the competition? For a contractor, this includes keeping clean vehicles and equipment. Don't show up to today's job sites with yesterday's mud on the trencher. It not only shows a sense of pride, but it also helps keep equipment running smoothly and makes locating potential serious issues much easier.

This also includes having a company dress code in place. Make sure employees are dressed appropriately for the work they are performing and in clean attire. I observe problems in this area repeatedly in the field. If I notice it while dropping off job site materials, don't you think customers notice it as well?

Eliminating Shortcuts

Leave customers with a quality product. The system you install is your fingerprint. Contractors tend to develop bad habits and shortcuts when installing irrigation over the course of many years, and most are not visible to the undiscerning eye of the homeowner. Simple details leave small imprints on the system reflective of a contractor that cares versus one that is merely there to throw material in the ground and get paid. These include tasks such as using a level to mount a controller instead of eyeballing it, mounting control wires in conduit or pipe instead of stapling or just hanging out of the controller, and

aqua-TECH[®]



squaring up valve boxes to features in the landscape so they aren't just randomly thrown in the ground. These little details reflect positively on the professional contractor and generally pay off tenfold in homeowner referrals, so why not take the extra time to make sure the installation is a reflection of the contractor's pride in the installation?

Being Available & Accessible

Make yourself readily available to the customer. As a distributor, our contractors rely on us to get materials for them when needed. As a contractor, your customers rely on you in the same fashion. Remember that many homeowners don't understand irrigation and all the details that go into making a system work efficiently and correctly. Go through the system with your customer and explain everything to them at turnover and final walk. Start with opening a valve box and explaining how it basically works and what their role is in the system. Then, explain the difference in the irrigation emission devices in their system, where they were used and why.

Finally, make sure the customer has your phone number. Email can be very impersonal these days, so providing your cell or office number — then answering or returning those calls promptly — in most cases completes the circle of service and support for the customer. Also consider making follow-up calls to your customers a month or so after the system has been running just to check in and see how it's performing for them. Exceed their expectations.

Take these simple suggestions to task, add a few specific to your firm to differentiate yourself from the others, and then watch your business grow and thrive!

Robert Latham has been in the turf irrigation industry for over 20 years and is currently the regional business development manager for Atlantic Irrigation covering the Mid-Atlantic region and Georgia.



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Rainwater Harvesting: Improving Lives in Impoverished Areas

By Jennifer Zuri

Water is Earth's most precious resource, covering 70 percent of our planet. We can't survive without it as the average adult human body is comprised of 50 to 65 percent water. Health authorities recommend drinking eight 8-ounce glasses of water per day, but not everyone has access to that measurement of clean drinking water.

Enter the Aquascope Foundation, whose mission is to provide clean drinking water to impoverished areas around the world. Although the majority of the Earth is covered by water, only 3 percent is fresh water and just a third of that amount is available for use. Poverty-stricken areas are especially in need of adequate drinking water. Indeed, two million people die each year from exposure to water-borne illnesses.

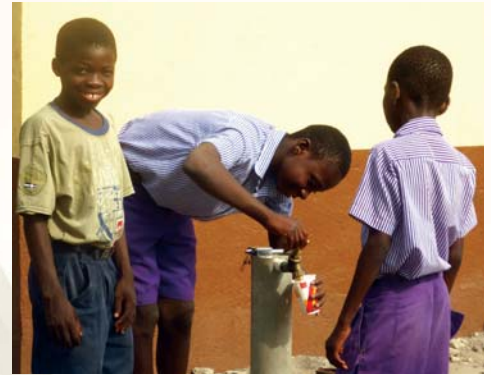
The Aquascope Foundation works with the International Needs Network in Hudsonville, Michigan, to locate areas of the world with the greatest need for clean drinking water to alleviate health and socio-economic concerns. Once a location is identified, the Aquascope Foundation assembles a team of volunteers to install an Aquascope Rainwater Harvesting System that captures and filters rainwater for re-use. Most of the volunteers are professional water feature installers, but others are welcome to join the team.

One of the more notable projects that addressed a dire need was the International Needs Network School in Kanuwloe, Ghana, in February 2014. The main source of drinking water for the community was a marshland shared with the cattle they herded. The cattle contaminated the water, and it was highly unsafe for human consumption, leaving residents exposed to numerous water-borne diseases.

A team of 14 Aquascope Foundation volunteers installed a 25,000-gallon Aquascope Rainwater Harvesting System at the village's local school, providing clean drinking water for approximately 700 school children and their families year-round. Access to the captured and filtered water provides the ability to prepare one hot meal per day at the school.

Ed Beaulieu, vice president of field research for Aquascope, Inc. and board member of the Aquascope Foundation, designed the rainwater harvesting collection system to capture runoff from the village's elementary and junior high schools, while Aquascope Technical Agent Chuck Catton managed construction of the project.

Using Aquascope Rainwater Harvesting System products, rainwater is first treated through downspout filters at the school



buildings before traveling to a subsurface chamber created with underlayment, liner and AquaBlox water storage modules. The rainwater passes through a solar-powered pump, UV filter and micron filter into a 750-gallon storage tank. The stored rainwater is gravity-fed to a faucet for easy access.

"The Kanuwloe village has no direct source of water nearby so the ability to capture, filter and reuse rainwater is critical to the life and health of the people in this area," said Carla Wittstock, president of the Aquascope Foundation. "We're so grateful to have a dedicated team of volunteers who traveled and labored to make this live-saving project a reality."

Now, two years later, the results of the rainwater harvesting project are significant. School attendance has increased due to better health of the children. Prior to receiving the rainwater harvesting system, many children complained of headaches in the afternoon, particularly during the dry season. Medical outreaches to the community no longer result in reports of headaches in children since they have adequate hydration. In addition, children





no longer need to spend time away from school traveling long distances to fetch and transport water.

Reports of water-borne illnesses have declined, as well. Some people who suffered from and were treated for bilharzia would become re-infected upon drinking the polluted water. Now that the village has potable water, there have not been reports of re-infection after treatment.

Clean drinking water, improved health and increased school attendance have all created a sense of hope and joy in the Kanuwloe village and surrounding communities. The Aquascape Foundation has provided clean drinking water in other areas such as Uganda, the Dominican Republic and Colombia.



The next rainwater harvesting project is slated for January 2017 when the Aquascape Foundation travels to Buikwe, Uganda, with another group of volunteers. For more information about this and other projects, visit www.aquascapefoundation.org.



Jennifer Zuri is the marketing communications manager at Aquascape, Inc., the leading manufacturer of water gardens and water features across North America. Aquascape's vision focuses on an ecosystem approach to water features that relies on the most natural balance of circulation, filtration, plants, fish, and rocks and gravel to ensure sustainability.





Irrigation Association Honors 2016 Award Winners

During the 2016 Irrigation Show and Education Conference, four individuals and two organizations were honored as recipients of Irrigation Association or Irrigation Foundation awards. Award winners received plaques on stage during the general session on Thursday, Dec. 8.

Excellence in Education Award

Ronald Sneed,
PhD, PE, CAIS, CIC, CID, CLIA



The Irrigation Foundation Excellence in Education Award recognizes a person who is actively teaching or has taught irrigation, water management and/or water conservation in affiliation with a two- or four-year institution. This person helps supply the irrigation industry with educated professionals that provide efficient irrigation solutions that protect water and the environment.

Ronald Sneed, PhD, PE, CAIS, CIC, CID, CLIA, professor emeritus of biological and agricultural engineering at North Carolina State University, has been involved in the irrigation industry for more than 56 years, 32 in the North Carolina State Biological and Agricultural Engineering Department and the remainder as a consultant.

He is a lifetime technical member of the Irrigation Association where he has served on a number of committees and on the Certification Board for over 20 years. He was one of the authors of *Irrigation, Fifth Edition* and was very involved in *Irrigation, Sixth Edition*, co-authoring four chapters.

After attending and teaching at the Irrigation Show and Education Conference for decades, he is now often referred to by his peers as the father of many IA courses.

"Ron has been an active instructor with the IA for more years than anyone can remember. His passion for irrigation, both ag and turf/landscape, is infectious to anyone who meets him or learns from him," said Lynda Wightman, CGIA, CLIA, industry relations manager at Hunter Industries.

"Dr. Sneed has taught more Irrigation Association courses than most can remember," added Bob von Bernuth, PhD, PE, CID, CLWM, CIC, former technical advisor at the Irrigation Association.

Sneed also chaired the North Carolina Licensing Board for irrigation licensing. He helped start the North Carolina Irrigation Society Inc., and in 1992, the society established the Ronald E. Sneed North Carolina Irrigation Society Inc. Scholarship Endowment, which provides an annual scholarship to a BAE student.

Sneed was active in the American Society of Agricultural and Biological Engineers, serving on and chairing a number of committees in the soil and water division. He also was involved in helping form what is now the Carolinas Irrigation Association, and in 2011 the CIA established the Dr. Ronald E. Sneed Excellence in Irrigation Award to honor dedicated service to the irrigation industry.

"It can safely be said that very few people have had the impact on the irrigation industry that Dr. Ronald Sneed has had," added von Bernuth.

"Education is my life," Sneed said. "Learning is a lifelong occupation; you can never get too old to learn."

His advice on being a leader in the industry to up-and-comers is to "surround yourself with good mentors who are going to lead you the right way while also being honest with you and correcting you when you are wrong."

Crawford Reid Memorial Award

Andrii Gogolev



Established in 1979 and named for Canadian Crawford Reid, the second president of the Irrigation Association, this award recognizes individuals who have significantly advanced both the irrigation industry and proper irrigation techniques and procedures outside the United States.

Andrii Gogolev founded his own company, Terra Ltd., in 1998 to become a mainstream supplier and was the first to introduce thin-walled laterals into the Ukraine with T-Tape.

He was a pioneer in the development of drip irrigation, at first as a dealer of T-Systems, promoting and selling T-Tape drip tape in Ukraine, Russia and neighboring countries.

"I taught growers how to use SSDI to be successful," Gogolev said. "Irrigation with T-Tape changed the infrastructure of the region; T-Tape became a standard for quality."

"Andrii's fast-growing business in the distribution of T-Tape in Ukraine, Russia and Commonwealth of Independent States countries allowed T-Systems and today's Rivulis Irrigation to become leaders in the drip irrigation market in these territories," said Kelbert Fabien, general manager of Europe, the Middle East and Africa, chez Rivulis Irrigation.

In 2011, Terra Ltd. merged with the biggest Turkish producer of specialty fertilizers, Doctor Tarsa, which is part of the SQM Group (global producer of specialty fertilizers based in Chile). The new company, Terratarsa Ukraine, is the biggest national distributor of specialty fertilizers, and it continues to play an important role as the irrigation agent for Rivulis Irrigation.

"Andrii is an amazing and vibrant force in irrigation in the Ukraine, extending to Uzbekistan, Russia, Bulgaria and other countries," said Charles Burt, PhD, PE, CAIS, CID, chairman of the Irrigation Training and Research Center in San Luis Obispo.

Gogolev's heavy involvement in the commercial side of irrigation is not to be outshined by his obvious passion for the proper development of water user associations and for the legal framework and policies that guide water development and operation on a state and national level.

He is also heavily involved in various working groups that provide input and guidance for the present process of government reform.

"Andrii has an excellent business acumen, he's able to catch new opportunities in a complex environment, while leveraging the support for key stakeholders and partners," Fabien said.

"What particularly impresses me is his strong sense of ethics and the desire to change the system for the good of all, even at the expense of his personal gain," Burt said.

Gogolev said he was surprised by the award but looks forward to the affect it will have on the future promotions of his new technologies in agriculture.

His advice to up-and-comers in the industry is very simple: "Love your job, your clients and your country, be honest with yourself and don't be afraid to share your knowledge with growers."

National Water & Energy Conservation Award

Texas Alliance for Water Conservation



Established in 1982, this award honors a company, organization or other group entity that has made significant achievements in the conservation of water and energy due to irrigation procedures, practices, equipment, methods and techniques.

The Texas Alliance for Water Conservation began in 2005 after a grant from the Texas Water Development Board was passed.

The project uses on-farm demonstrations of cropping and livestock systems to compare the production practices, technologies and systems that can maintain individual farm profitability while improving water use efficiency.

"I believe the TAWC has been one of the best projects to be put together in many years," said Glenn Shur, president of the TAWC Producer Board. "[The project] has helped us recognize trends of water use, effects of drought, and changes in cropping patterns not only from a market's price function, but from water use and efficiency."

TAWC Communications Director Samantha Borgstedt raves about the obvious effort and passion when it comes to conserving land and water that she has noticed through her association with the project.

Through the use of soil moisture monitoring equipment, producers in the project can see exactly when the soil moisture profile has been filled on their fields and are able to turn off their irrigation to save water and money.

All production-related decisions are made by the more than 20 producers involved in the project. As part of the TAWC, these area producers partner with researchers, data collection technologies and collaborating partners that include industries, universities and government agencies in an effort to determine the best practices for managing their water.

"I believe the key to TAWC's success is its close relation to its producers. All production decisions are made by the farmer, making the project more credible to other producers," Borgstedt said.

Producers within the TAWC have played an important role as conservation leaders and models that other area producers are following.

Project Director Rick Kellison attributes the ongoing success and growth of the project to the team's specific focus on growing a relationship with these producers. "We bring information to them," Kellison said. "Instead of telling them what to do, we focus on putting a multitude of tools in their hands to be successful."

Kellison advises others to do the same by being specifically cognizant of what the industry is in need of.

"In the end, you can come up with outstanding ideas but if the production side doesn't see a need to use your idea to help them create awareness of what's going on in the field, then your brilliant idea isn't going to get any traction," he said.

Partner of the Year

Irrigation Training and Research Center

Established in 1995, this award honors a person or group making exceptional contributions or distinctive accomplishments to irrigation as part of an organization that is allied with, related to or an integral part of the irrigation industry.



The Irrigation Training and Research Center at California Polytechnic State University is recognized for providing innovative irrigation teaching, research and technical assistance to projects that blend on-farm irrigation needs with improved water delivery service, protection of the environment, and reduced energy consumption.

ITRC has helped to modernize over 200 irrigation districts in the United States, has evaluated or provided training in over 40 projects outside the United States and has trained thousands of technical specialists on the relationship between field irrigation and water delivery systems. ITRC supports the largest irrigation bachelor's/master's teaching program in the United States at Cal Poly, and the Cal Poly graduates and ITRC short-course students form a core professional irrigation group in the Western United States.

ITRC is the most active university-based organization that works with irrigation district modernization programs. Most of the irrigation districts have sent their operators, engineers, managers and, in some cases, boards to ITRC for training in flow measurement, modernization of irrigation projects, etc.

ITRC provides about 60 short courses per year for the irrigation industry, covering topics such as flow measurement, landscape drip design, evaluation of on-farm irrigation systems, irrigation scheduling and salinity, pumps, hydraulics, supervisory control and data acquisition specifications/troubleshooting, soil-plant-

water relationships, fertigation, row crop drip and irrigation district modernization.

The center was a driving force in getting the IA certification program started. As they continue to attack the gaps in irrigation issues, they share the results of their efforts with the IA and its members.

"The classes that they have prepared and continue to offer are impeccable for irrigation designers and the irrigation industry and, in particular, the irrigation districts," said Mike Grundvig, senior engineer at Rain for Rent.

ITRC has created a partnership with IA to provide online landscape irrigation design classes and teach numerous other classes at IA's annual Irrigation Show. Each year, the center waves the IA flag both in the community and in their booth at the Irrigation Show and Education Conference.

"I have personally been a part of the training and have taken many classes at ITRC and received the educational foundation for my IA certifications. We regularly send our employees to their top notch short courses for irrigation training," said Aric Olson, CID, CAIS, CSSBB, CPIM, CSCP, president of Jain Irrigation, Inc.

Chairman and founder of ITRC, Charles Burt, PhD, PE, CAIS, CID, wrote almost all of the initial materials (study and exam) for the drip, sprinkler and surface irrigation certification.

Burt said he is honored to be recognized by an organization that he described as "unique across all countries." He spoke to the importance of being a consistent provider while discussing how to maintain a successful partnership over time.

"You can't just take, you have to give also," Burt said. "You have to constantly contribute rather than being briefly involved. We really try to give back in a meaningful way."

Person of the Year

Richard Allen, PhD



Established in 1952, this award is presented to a person outside the commercial irrigation industry who has made outstanding contributions toward the acceptance of sound irrigation practices. This might include the development or implementation of irrigation or water management policies or principles. Award recipients receive a lifetime technical membership to the Irrigation Association.

The Irrigation Association is proud to honor Richard Allen, PhD, as its Person of the Year. Among his vast list of publication accomplishments is the major world book on agricultural evapotranspiration for the United Nations Food and Agricultural Organization.

Lately Allen has focused more on remote sensing and works with almost all national and international organizations on the subject. He has provided documentation and training on the metric process (using remote sensing) to numerous organizations.

Building on the surface energy balance algorithm for land to create metric, Allen has operationalized the necessary means to investigate and reveal patterns of water consumption at large temporal and spatial scales, facilitating a necessary debate among policymakers based on facts rather than assumptions and opinions.

This process is proving valuable in the United States, and it will be critically important in areas of the world where infrastructure and institutions make it virtually impossible to generate such information through conventional means.

Chris Perry, emeritus editor-in-chief for *Agricultural Water Management*, alluded to the idea that Allen was one of the first to see beyond the narrow paradigm of increasing irrigation efficiency.

"He pointed out that the objective of 'efficient' irrigation is increased local consumption of water — and that it is consumption of water that must be reduced to release water to alternative uses, including the environment," Perry said.

Allen has also played an instrumental role in aiding the IA educational effort by developing the center pivot training materials and by teaching classes.

Industry Achievement Award

Inge Bisconer, CID, CLIA



Established in 1966, this award recognizes an individual employed by or retired from an irrigation-related company and whose career demonstrates outstanding contributions to the advancement of the irrigation industry and its products and programs. The nominee's career ideally reflects contributions to a combination of industry products, practices, education, research and/or professionalism.

Inge Bisconer, CID, CLIA, technical marketing and sales manager for Toro's Micro-Irrigation Business, is the 2016 recipient of the Industry Achievement Award.

In her 35 years in the industry, Bisconer has established herself as a leader at both the state and national levels in helping agricultural

growers improve profitability and sustainability through improved water and resource use efficiency.

"She has worked hard at educating the public about microirrigation. She also is an excellent writer, producing documents that my agency uses regularly," said Clarence Prestwich, CAIS, CID, West National Technology Support Center irrigation engineer.

"[Bisconer] is an excellent technical writer and her recent publishing of the *Toro Micro-Irrigation Owner's Manual* and chapter 11 of Irrigation Association's *Irrigation, Sixth Edition* fully demonstrates those qualifications," said Claude Phene, PhD, former water management research laboratory soil and irrigation scientist.

The *Toro Micro-Irrigation Owner's Manual* is a comprehensive guide for both new and existing row, field and perennial crops and an example of Bisconer's irrigation knowledge, interest and technical publishing capacities.

In addition to her written accomplishments, Bisconer is also a past president of the California Irrigation Institute, which is the oldest independent water and irrigation forum for California. She also served as the chair of the IA Drip/Micro Common Interest Group from 2006 to 2008 and vice chair from 2004 to 2006.

"Obviously, all those positions, assignments and achievements did not happen by chance, but were the results of outstanding qualities," Phene said.

"In the years that I have known Inge, I have found her to be one of the most knowledgeable and qualified people in the irrigation business," said Philip A. Burkart, former IA president.

IA President Jackie "Jay" W. D. Robbins II, PE, TSP, CAIS, CID, described his 30-plus years being associated with Bisconer in the professional world as a privilege.

Bisconer alluded to how humbling it was to be singled out among so many "deserving" people, as she put it. She places great emphasis on trying to work with others collaboratively toward common goals.

"I have found that in business people buy from people who help them, and challenges are rarely overcome by one person alone," Bisconer said. "I would also caution that technology alone is only part of the solution to our many irrigation and water challenges — we must find a way to change behavior as well. Education, as always, will be the key, and the way we educate and learn is quickly evolving along with technology. It's an exciting time to begin one's career in irrigation!"

Nominations for the 2017 Irrigation Association and Irrigation Foundation awards will be accepted through May. More information can be found at www.irrigation.org/About/Award_Programs.aspx.



New Product Contest

More than 80 percent of Irrigation Show attendees report that seeing new products, technologies and services is their top priority while attending the annual show.

During the 2016 new product contest, attendees had the opportunity to view 46 new products and technologies in five categories. Judges were experienced professionals from the industry with technical knowledge within the various aspects of the industry. Products were evaluated based on innovation, design quality, increased water/resource use efficiency, ease of use and product life expectancy.

Products submitted for acceptance in the agriculture irrigation and landscape irrigation categories had to be an integral part of an irrigation system in order to deliver, disperse or manage water for irrigation. Products submitted for acceptance in the lighting and specialty categories were ancillary products that are not used in an irrigation system.

The first-place winners were announced Thursday, Dec. 8, during the IA general session.

While presentations and products were judged by a panel of experts, attendees again had the chance to cast their own votes for their favorite product in each category for the People's Choice Award. A ballot was included with each attendee badge, and the winners were announced on the show floor Thursday, Dec. 8.

Agriculture Irrigation

Dragon-Line LLC Dragon-Line

Dragon-Line combines the efficiency of drip technology with the flexibility of mechanized irrigation. Dragon-Line utilizes specialty designed drip tubing with pressure compensation emitters anchored to the pivot structure for precise and uniform water application.

Specialty – Agriculture Toro Microirrigation

Toro Drip Irrigation Recycling Program

The Ag Plastics Pickup mobile app allows growers to recycle their used drip tubing and tape products by collaborating with Revolution Plastics and Delta Plastics to divert plastic waste into EPA-compliant trash can liners.

Landscape Irrigation

Hydro-Rain Inc.

Hydro-Rain HRC 400 B-hyve Pro Wi-Fi Controller With Smart Meter Link

This SWAT-tested and EPA WaterSense-labeled controller takes smart watering to a new level with an integrated irrigation audit tool and Smart Meter Link, which gives water usage reports to help customers make better water-saving decisions.

Specialty – Landscape MiniTrencher

GeoRipper

The GeoRipper is a handheld portable trencher that can cut trenches up to 1.5 inches wide and 27 inches deep. It is ideal for short and hard-to-reach places that are difficult for normal trenchers saving time and labor.

Landscape Lighting

Illumicare Group Ltd.

LED MR 16 Single Lens with Replaceable Optics

Using 85 percent less energy than traditional lamps and lasting 15 times longer, this MR 16 LED single lens lamp has the option of four beam spreads and two color temperatures.

People's Choice Award

Agriculture Products

SupPlant an AWL Group Brand

SupPlant GBI

Automated growth-based irrigation technology closes the irrigation loop between internet-based sensors (monitoring soil, climate and plant data) and irrigation controllers, for real-time responsiveness to crop needs.

Landscape Products

Netafim USA

Techline HCVXR

Techline HCVXR is a revolutionary new dripline that provides superior root intrusion resistance, and a check valve holds back 8.5 feet of water while the anti-siphon feature protects against debris entering the emitter at system shut down.

Landscape Lighting

Sollos Landscape Lighting

DecoStrand

DecoStrand is a decorative accent strand lighting for indoor and outdoor applications. The string lighting is 52 feet long with 25 medium base sockets with more than 60 lamp options available.





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- Access up-to-date industry news through *IA Times*, IA's monthly e-newsletter about upcoming industry events and other timely news.
- Locate IA members through the IA online membership directory. Included is a broad range of companies and professionals who specialize in agriculture, landscape and golf irrigation.
- Consider IA your source for updates on policies and legislation that affect your business, industry news and new member programs and services.

IA certification offers a competitive advantage.

- Gain recognition for exceptional commitment to efficient water management and irrigation best practices through IA's certification program that sets the bar for industry professionals.
- Earn one or multiple designations through IA's seven different certification programs for irrigation professionals.
- Represent the best in the irrigation industry together with other IA-certified professionals. They are committed and capable, and they have proven it where it matters most — in the field.

IA gives exposure for your company's products and services.

- Meet with key players in the world's top irrigation companies, and network with potential customers and industry peers during the annual Irrigation Show and Education Conference.
- Enhance your company's reputation for innovation through new product contest participation. Showcase your new products and services and reach thousands on the show floor.
- Expose your company, products and services to more than 5,000 industry professionals by advertising in *Irrigation Today* or the annual show guide.
- Make new contacts by participating on an IA committee or common interest group.

IA provides high quality education and training.

- Enhance your expertise, whether you are new to the industry or a seasoned professional, with classes, webinars and online learning focusing on agriculture and turf/landscape topics.
- Learn real-world applications with state-of-the-art techniques, field-tested information and best practices taught by experienced instructors at the annual Irrigation Show and Education Conference.

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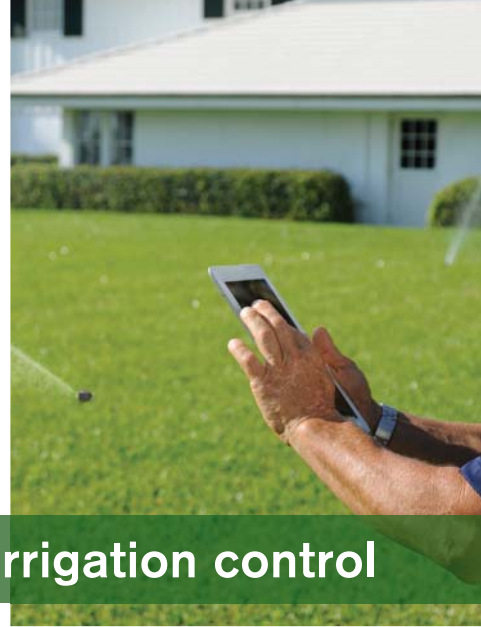
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