Photo: Casey Cox

More Crop Per Drop:

A Resource Guide

Irrigation scheduling and soil moisture sensors can help maximize your crops' yields and improve your bottom line.

Too much or too little water can have a negative impact on yield. So how do you hit the sweet spot?

Irrigation scheduling and **soil moisture sensors** are powerful tools that help farmers decide the optimal amount of water to apply and can help save time and energy. This investment in a farm's irrigation system can maximize yield and provide a significant return on your investment (ROI) for the upgrade. There are several options to consider when looking at the most effective ways to improve how you irrigate. With smart phones and tablets bringing real-time irrigation information to you on the go, now is the perfect time to consider all your options.

Use this guide to learn more about how irrigation scheduling and soil moisture sensors can help save you time and money. Then be sure to schedule a time to meet with an irrigation expert who can identify the next steps to enhance your current efforts while keeping budget in mind.

THE BASICS OF KICKING THE DIRT AND THE CHECKBOOK METHOD

Walking in the fields and simply kicking the dirt to evaluate soil moisture condition is one place a lot of farmers start. It offers a surface-level view. However, it doesn't always give you a complete view of the soil root zone. Such limited control and feedback can hinder a grower's ability to reach yield potentials.

The checkbook method, a proven but time intensive technique, requires the farmer to keep a handwritten ledger or computer spreadsheet. The farmer inputs daily temperature, rainfall amounts collected from gauges in fields, emergence levels, root depths and other measurable factors. Using that data, you can calculate the daily amount of water removed from the soil and how well the plants are growing to determine if watering is needed.

APPS OFFER IRRIGATION MANAGEMENT ON THE GO

Smartphones and tablets have proven themselves when it comes to making decisions about irrigation. There are several free apps developed by the University of Georgia that

Consider the countless hours and tanks of gas, driving back and forth to fields to check the soil or to gather data. Now think of what you could do with that saved time and money, thanks to irrigation scheduling and soil moisture sensors.

Apps can create more efficient irrigation methods by providing more precise information. One of the most useful time-saving features of an app is the ability to receive notifications when irrigation is needed or when rain events are happening in the field area.

are easy to use and will fit seamlessly in your watering schedule. You simply input the same basic information you'd gather for the checkbook method, and the app does the calculating for you.

There are other apps that use more advanced technology and offer more information but require a range of financial investment. These apps work with additional software you can purchase and download, as well as equipment such as in-field sensors.

Not sure if you are applying the most efficient irrigation methods on your fields? It may be time to contact a member of the Southeast Aquatic Resources Partnership (SARP). They work with local farmers and agencies to offer tailored advice on all forms of irrigation scheduling.

Using apps to measure real-time field data provides more information, so farmers can make better decisions about precisely when to schedule irrigation, which can ultimately provide a return on investment.

SOIL MOISTURE SENSORS CAN REDUCE WATER USE BY 15% ON AVERAGE WHILE MAINTAINING YIELD

Soil moisture sensors monitor field data such as soil moisture, soil temperature, crop growth stage and local evapotranspiration (water moving from the soil or plant to the atmosphere). Availability of this data can help you determine how much water is available in the root zone, the area around the roots that plants draw water from most easily. Using this information, you can schedule irrigation to deliver the **right amount** of water at the **right time** to the **right field zone**. Because you are receiving more precise measurements, you can irrigate more precisely, and since soil moisture sensors are doing more of the work, this means a time savings for you.

Soil moisture sensors are an investment in the health of your soil and your crops, which in turn is an investment that can improve yield. In fact, "compared to the checkbook method, on average, the yield gains from using sensors will pay for the capital investment multiple times over," says Dr. Adam N. Rabinowitz, assistant professor of Agricultural and Applied Economics at the University of Georgia.

Research trials conducted over the last four years on peanuts at the C.M. Stripling Irrigation Research Park in southwest Georgia looked at irrigation scheduling methods, yield and water use efficiency. Dr. Rabinowitz has developed economic models to simulate capital expenditure and ROI using a distribution of temperature, rainfall and yields.

The findings show the average return of the soil moisture sensors compared to the checkbook method will increase net revenues on average about $56 per acre. When comparing that to the capital investment, it's about a 200% ROI in year one.

"On average, it will pay for itself the first year, so soil moisture sensors offer multiple years of potential return with very minimal additional costs," Dr. Rabinowitz explained. "The results in cotton are very similar with slightly less returns, but they are still significant, nonetheless."

There are ways to get started with sensors that are not cost prohibitive and can give you a good idea of how they will work in your fields. If you are ready to increase your irrigation efficiency, let local crop experts help you:

1. **Determine a good test field.**
2. **Work with local experts to design a test solution.**
3. **Run test and keep track of savings.**
4. **Evaluate if it's a good idea to adopt on all fields.**

More Precise Irrigation Can Increase Crop Yield

GROUND LEVEL

Kick the Dirt Method – No Tools Needed

- Lacks precision and control.
- Provides limited feedback on available soil moisture in the root zone.
- Consumes a lot of a farmer's time.

1 Checkbook Method – Commonly Used

- Uses mathematical calculations to keep moisture below holding capacity, without overwatering, to prevent water stress or runoff.
- Doesn't account for many of the environmental factors that can impact irrigation needs.
- Requires your time every day to capture information, calculate and stay up to date.

2 A Variety of Apps – Easy for Immediate Implementation

- Provide more detailed information that can potentially save you money through lower energy costs.
- Range in price from free to requiring some upfront investment.
- Require the user to input the data.
- Apps not connected to a moisture sensor still lack precision and detailed information on what is happening beneath the surface.
- Contact the Southeast Aquatic Resources Partnership (SARP) to learn more about the available apps that will easily work with your irrigation system and method.

3 Soil Moisture Sensors – Reduce Risk with Real-time Data Right from Your Field

- Determine when to irrigate, where to apply and precisely how much water is needed.
- Accessed via any internet-enabled device, so your data is viewable anytime, anywhere.
- Can increase crop yield while saving hours and hours of your time.

Let your local irrigation experts help you make the most efficient irrigation decisions for your farm operation. To request a **free on-farm consultation** from the Southeast Aquatic Resources Partnership and the Flint River Soil and Water Conservation District, call 913-438-0771 or email SARP@trustinfood.com today.

To learn more about conservation irrigation practices such as irrigation scheduling and soil moisture sensors, visit www.trustinfood.com/irrigationstation

SARP is a regional collaboration of natural resource and science agencies, conservation organizations and corporations working together to strengthen the management and conservation of aquatic resources in the southeastern United States.

The Flint River Soil and Water Conservation District is a state agency based in southwest Georgia dedicated to the stewardship of natural resources for future generations and the exploration of conservation-driven technologies and strategic partnerships that enhance agricultural sustainability.

This project is made possible through funding provided by the National Fish and Wildlife Foundation's Southeast Aquatics Fund. This conservation content is brought to you in partnership with Trust In Food, a Farm Journal Initiative. This material is based upon work supported by the Natural Resources Conservation Service, U.S. Department of Agriculture (USDA), under number 1906.18.062128. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the USDA. USDA is an equal opportunity provider and employer.