

A Mobile Irrigator Pro-Based Irrigation Scheduling Tool for Increasing Irrigation Water Use Efficiency and Yield in Peanut – Final Report

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Objective: Demonstrate and promote adoption of Irrigator Pro-based irrigation scheduling tools

Work Completed in FY2020:

Over the last four years UGA, NPRL, and the FRSWCD have pooled resources and worked together to develop a smartphone application for the new generation Irrigator Pro that we will hereafter refer to as the **App**. The new generation Irrigator Pro uses soil moisture and soil temperature to make irrigation scheduling decisions. Last year we improved the App so that soil moisture and temperature data automatically populate the model. The App now has the ability to import data directly from two automated soil moisture sensing systems that report soil moisture in terms of soil matric potential – the Trellis system and the UGA SSA system. The user selects one of the two systems (Figure 1), enters the soil moisture sensor ID, and thereafter, soil moisture and temperature data flow directly to the Irrigator Pro cloud server where the model runs. Decisions are then sent to the App on the user's smartphone where they are displayed as notifications. In addition to integrating the soil moisture sensor systems, we also integrated automated rain gages so precipitation is now also automatically recorded although it is not used by the model. These developments **eliminate the need to visit the field** several times a week to collect data.

For the 2019 and 2020 growing seasons, we participated in the UGA Extension AgWET project to promote adoption and use of the Irrigator Pro App. We paired 10 county agents with two growers (20 growers, 40 fields). In addition, four crop consulting groups used the App on two of their client fields (4 growers, 8 fields). A total of 24 growers with 48 fields participated in the project. All fields were equipped with a [Trellis](#) soil matric potential moisture sensing probe and rain gage. Overall, county agents, consultants, and growers were pleased with the App. However, there were several soil moisture sensor failures during the growing season that caused frustration with the users. There were consistent problems with data transmission from the field to the cloud server and as a result, the App did not update consistently making the irrigation scheduling recommendations problematic.

We also valued the performance of the App on plots at UGA's Stripling Irrigation Research Park (SIRP) by comparing it to seven other irrigation scheduling methods as well as to a rainfed treatment. The App performed well. The version of the model that uses only temperature to make decisions performed better than the soil moisture sensor-based version of the App (Table 1). Temperature was read automatically with a thermocouple embedded in the UGA SSA sensor nodes. Yield from the plots using the soil matric potential sensors and Irrigator Pro was lower than all other irrigation scheduling treatments in 2020 even though the plots received the same amount of irrigation. Precipitation during the growing season was 10.8 in which resulted in the rainfed plots producing good yields.

The project **leveraged** with more than \$200,000 in funding that the FRSWCD received from the National Fish & Wildlife Foundation to expand the footprint of the AgWET project. The FRSWCD has agreed to focus the expansion on peanut using the App and bore the **majority** of the project's cost. FRSWCD funds were used to purchase all of the Trellis soil moisture probes and rain gages installed in the 48 fields (approximately \$72,000) as well as cover the cost of 24/7 technical support for the App. Georgia Peanut Commission funds were used to partially support a UGA Research Scientist who worked on the project.

Table 1. Irrigation scheduling treatments results from SIRP. The App treatment is highlighted.

Treatments	Yield (lb/ac)	Irrigation (in)	IWUE (lb/ac-in)
Old Checkbook	5804	13.51	479
New Checkbook	5858	11.55	577
50% New Checkbook	6316	5.95	1388
Irrigator Pro (Temp)	6221	8.15	922
Irrigator Pro (SSA)	5773	8.15	855
SSA Dynamic VRI	6041	7.39	1008
SSA (Porter Method)	6405	6.64	1222
Peanut Farm	5871	8.15	870
Rainfed	6012	1.4	