

MISSISSIPPI SOYBEAN PROMOTION BOARD

Row Crop Irrigation Science Extension and Research (RISER) Program 13-2020 Annual Report

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Rationale/Justification for Research:

Declining aquifer levels, coupled with impending well monitoring, serve as a catalyst to improve water use efficiency. The RISER program has identified several technologies and management practices that have the potential to eliminate the 300,000 ac-ft/yr overdraft on the Mississippi Alluvial Aquifer while ensuring that producers stay within permitted irrigation limits. However, the adoption of Best Management Practices (BMPs) by producers in the Mississippi Delta is minimal. The RISER (Row Crop Irrigation Science Extension and Research) Program can serve as the primary means to facilitate widespread adoption of the latest irrigation management research findings across the Mississippi Delta. The project aims to evaluate, demonstrate, and transfer innovative and proven technologies that can result in water conservation by conducting coordinated extension activities throughout the Mississippi Delta.

Objective 1: Identify, evaluate, and demonstrate sensor-based automation technologies

Each site was equipped with a pump controller and automated actuated valves to allow the remote start of the irrigation set and a seamless transition from one set to the next by opening and closing valves through a preset length of time. During the automated valves' evaluation stage, personnel was present during the start of irrigation and transition of each irrigation set.

The evaluation includes the actuated valves' functionality and monitoring and recording the actuated valves' failures throughout the season. For all three automation sites, each valve operated correctly in opening and closing when prompted. The predetermined templates set an irrigation time for each set and each field. This template was programmed to the software, and when the decision to irrigate was determined through field observations, soil moisture sensor reading, and weather outlook. The irrigation "spin" was initiated through the user interface. At each site for all irrigations, a successful run was made by the automated system. Yield is currently being obtained from participating growers, and total water use for the well and the associated fields are being calculated.

Total water use and yield was obtained from the automated sites and the "control" non-automated, farmer irrigated sites. This results are year one, and only show the average for the on-farm sites. Results are:

	Yield (bu/ac)	Water Use (acre-inches)	Water use efficiency (yield/irrigation applied)
Automated Fields	87.96	6.72	13.08
Non-automated Fields	88.30	10.11	8.73

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Objective 2: Conduct hands-on training and other learning opportunities with producers that have yet to adopt proven irrigation water management practices.

Mississippi Crop Situation Blog Post:

June 8, 2020- Irrigation scheduling using Soil Moisture Sensors.

<http://www.mississippi-crops.com/2020/06/08/irrigation-after-cristobal/>

June 19, 2020 – Surge Valves can increase irrigation efficiency.

<http://www.mississippi-crops.com/2020/06/19/surge-valves-update/>

June 22, 2020 - Soil Moisture Sensor Demo & Showcase

<http://www.mississippi-crops.com/2020/06/22/soil-moisture-monitoring-showcase/>

June 25, 2020 – Irrigation on "Sealing Soils"

<https://www.mississippi-crops.com/2020/06/25/sealing-soils-confusion/>

August 04, 2020 - How to Determine Soybean Irrigation Termination Timing.

<https://www.mississippi-crops.com/2020/09/04/how-to-determine-soybean-irrigation-termination-timing/>

December 12, 2020 - Polypipe Pickup by Request Only

<https://www.mississippi-crops.com/2020/12/12/polypipe-pickup-by-request-only/>

Mississippi Crop Situation Podcast:

1. Talking Irrigation with Drew. June 24, 2020 <http://extension.msstate.edu/mississippi-crop-situation/audio/2020/talking-irrigation-drew>
2. Mississippi Crop Situation Podcast. Irrigation Thresholds, Triggers, and Automation. 7-28-2020 <http://extension.msstate.edu/mississippi-crop-situation/audio/2020/irrigation-thresholds-triggers-and-automation>

Website:

Soil Moisture Sensor Showcase: <https://www.ncaar.msstate.edu/outreach/general.php>

Provides an opportunity for the Mississippi agricultural community to learn more about the soil moisture sensors and accompanying telemetry services currently on the market.

Soil Moisture Sensor Videos:

11 How-to videos produced. <https://www.youtube.com/channel/UCBsabAPApBf9HkyhUpvRg8g>

Popular Press Articles:

7 popular press articles discussing Irrigation water management practices.

Soil Moisture Sensors On-farm Demo:

The RISER program is training and assisting county extension agents to reach growers who have been hesitant to adopt soil moisture sensors. Eight farms participated in the soil moisture demo with sensors installed in soybeans fields. Working through the county extension agent, RISER installed sensors, setting up telemetry with grower access, and worked through in-season irrigation triggers with the producers.

A meeting was conducted individually with all 8 participating soil moisture sensors demonstration participants. The meeting covered a year-end review that went over season-long soil moisture graphs, rainfall, and irrigation events. The meeting aided in discussing how well the farmer did in irrigation scheduling, where they felt they could get better, and how we can help build knowledge in the sensors and understand the moisture readings. We went over any available resources and asked them to fill out a questionnaire on how they felt the demonstration went in year 1. We plan to increase the number of demonstrations for next year.

Soil Moisture Demo evaluation results:

100% were extremely satisfied with the program.

100% increase in knowledge when asked:

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- How to read the soil moisture sensors.
- Confidence in soil moisture sensors to reflect accurate soil moisture readings.
- Where to get information for guidance on soil moisture sensors.
- How soil moisture sensors can help me make better irrigation scheduling decisions.
- Understanding of soil moisture sensor telemetry options on the market.

When asked how many irrigations the sensors saved them in year 1: the average was over **2** irrigations saved.

100% plan to adopt soil moisture sensors.

1. MS Chapter of the American Society of Agronomy Annual Meeting. Soil and Water Relations Utilizing Moisture Sensors in Row Crops. Grenada, MS 11-11-2020
2. Newton County Grower Meeting. Using Soil Moisture Sensors to Schedule Irrigation. Newton, MS 12-15-2020
3. MSPB Research Round-Up. Evaluation of Automated Irrigation and Promoting Adoption of Soil Moisture Sensors. via Zoom. 12-09-2020
4. Gholson, D.M., L.J. Krutz, M. Henry, D. Roach. Year 1: Evaluating On-Farm Irrigation Automation 24th Annual National Conservation Systems Conferences. Virtual.
5. Henry, C., D.M. Gholson. Using Soil Moisture Sensors Across the Entire Farming Enterprise: Lessons learned from those who are doing it. 24th Annual National Conservation Systems Conferences. Virtual.

Trainings:

1. Inservice training for County Extension Agents. On-farm Demonstration. Stoneville, MS. 5 county agents attended.
2. Inservice training for County Extension Agents. On-farm Demonstration. Columbus, MS. 3 county agents attended.

Presentations

1. Gholson, D.M., L.J. Krutz, M. Henry, D. Roach. Year 1: Evaluating On-Farm Irrigation Automation 24th Annual National Conservation Systems Conferences. Virtual.
<https://nctd.net/?sfwd-topic=irrigation-automation-year-1-evaluating-on-farm-irrigation-automation>
2. Henry, C., D.M. Gholson. Using Soil Moisture Sensors Across the Entire Farming Enterprise: Lessons learned from those who are doing it. 24th Annual National Conservation Systems Conferences. Virtual. <https://nctd.net/?sfwd-topic=using-soil-moisture-sensors-across-the-entire-farming-enterprise-lessons-learned-from-those-who-are-doing-it>
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