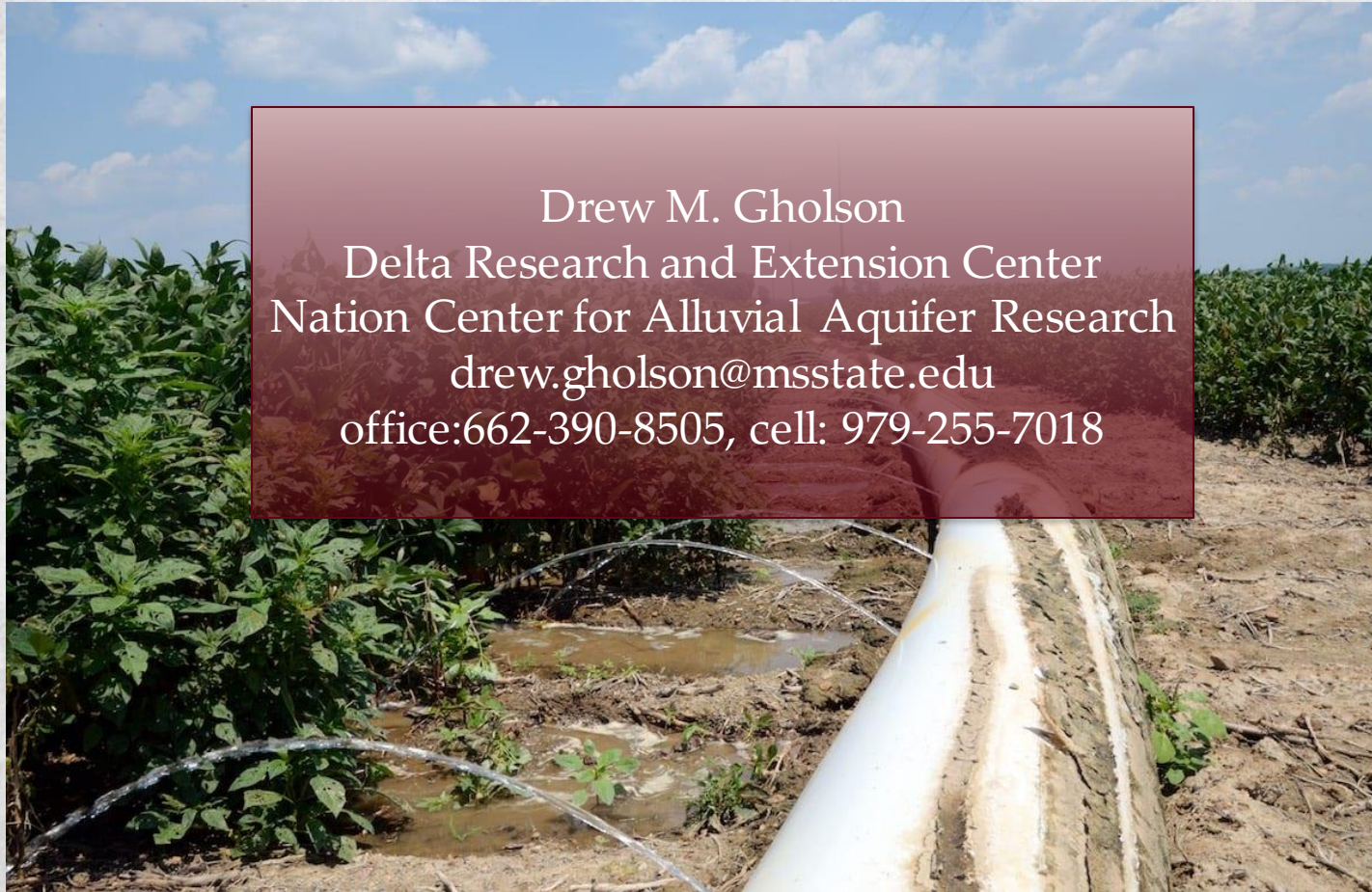


Increasing Water Use Efficiency And Adoption



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Change in U.S. acres of irrigated agricultural land by county, 1997-2017

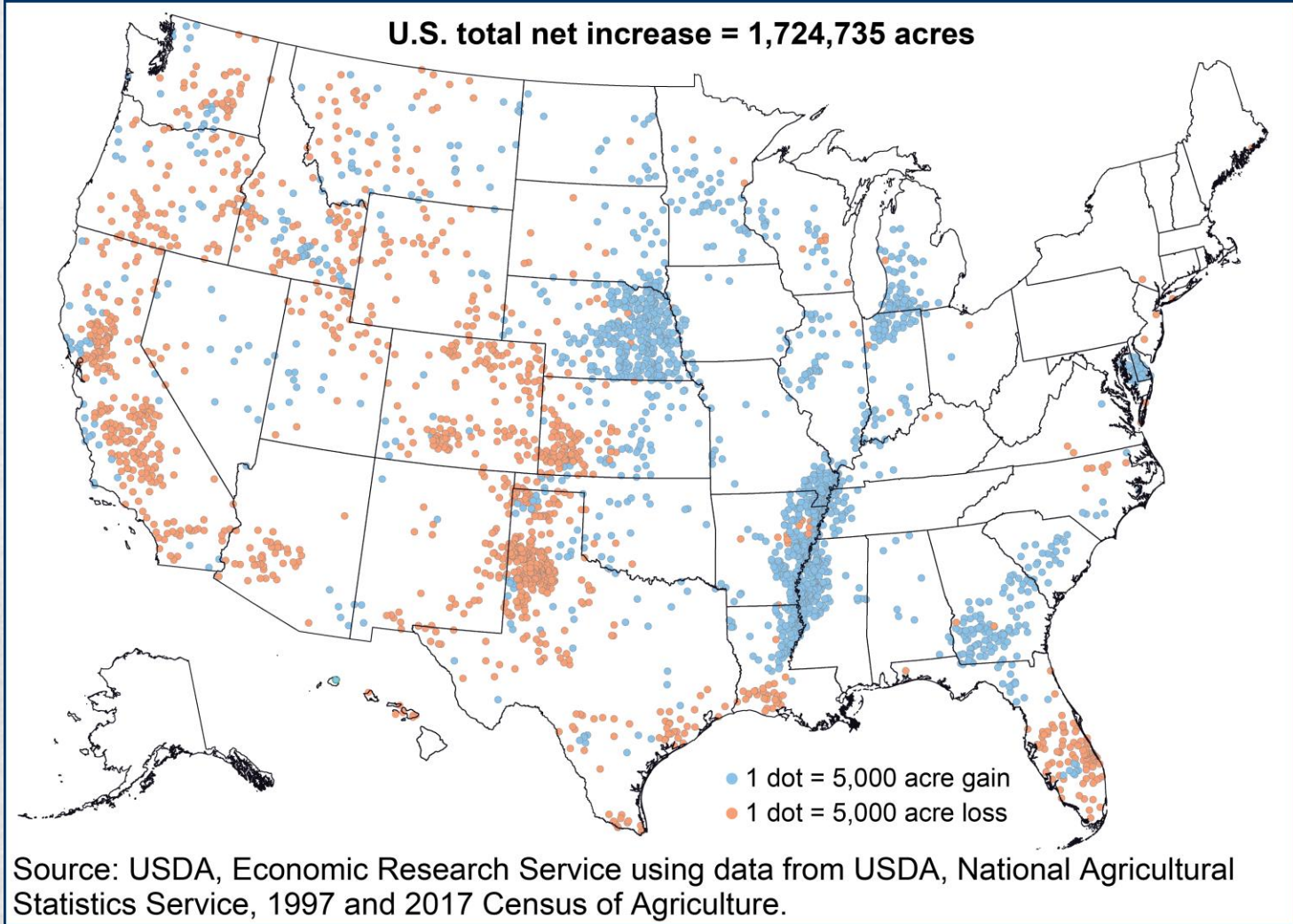
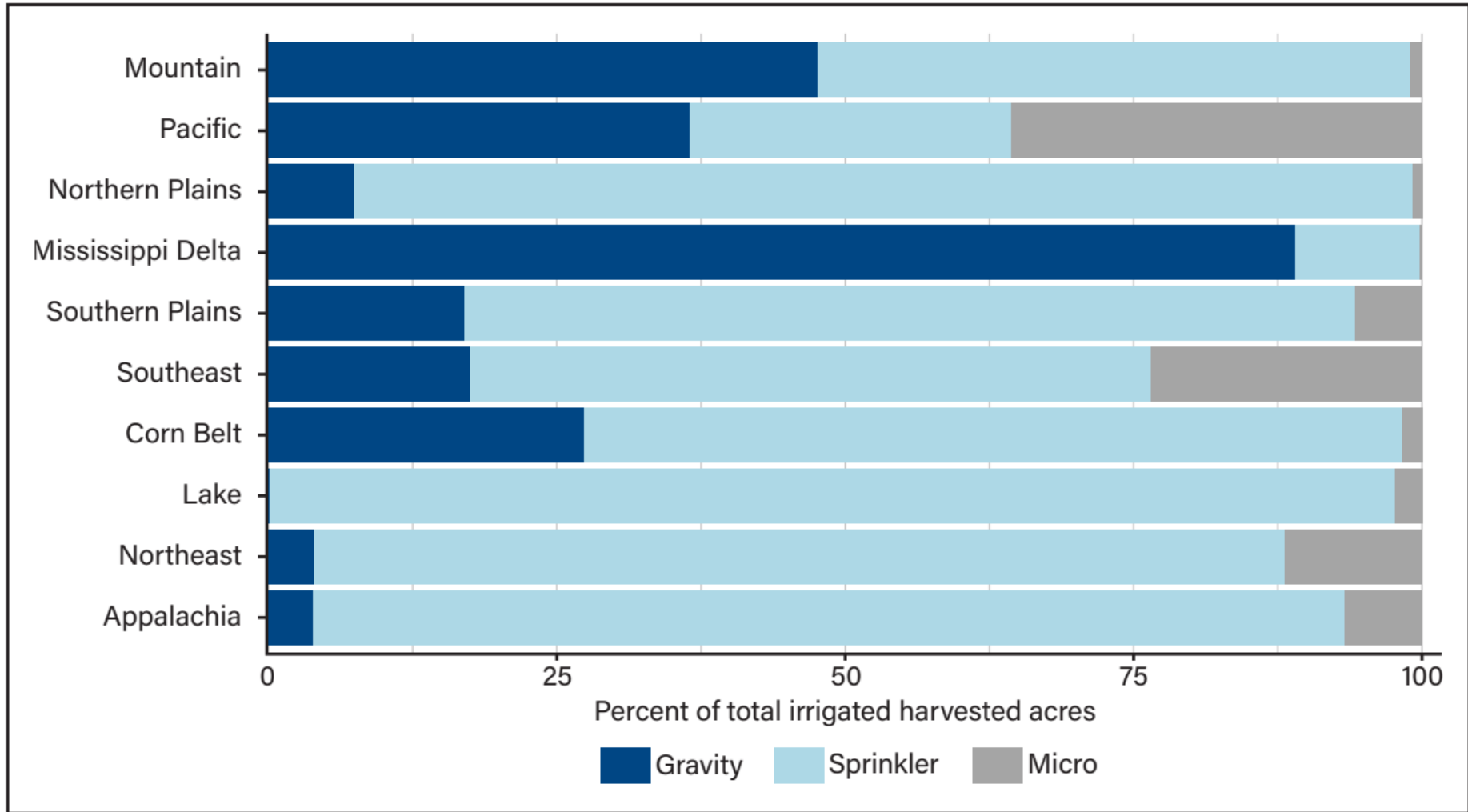


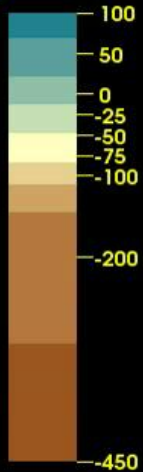
Figure 15

Regional variation in the use of gravity, sprinkler, and micro irrigation technologies, 2018



Modeling MRVAA Decline

Water level change from predevelopment, in feet



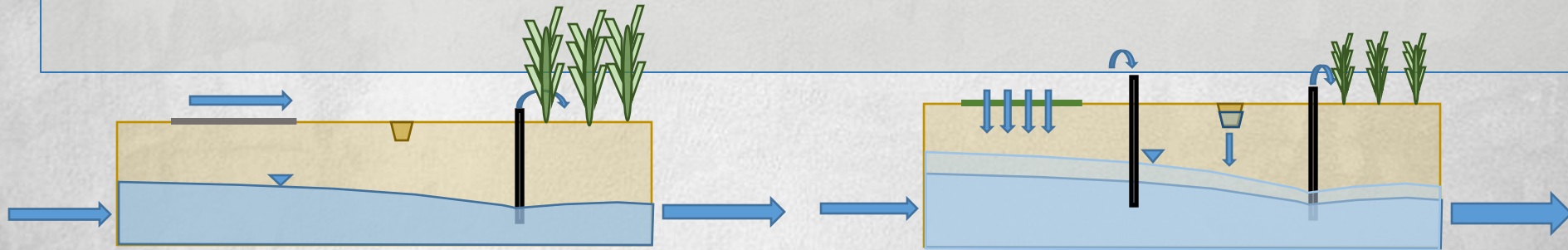
Mitigating Groundwater Depletion

Technological Approaches focus on bringing inflows and outflows into balance.

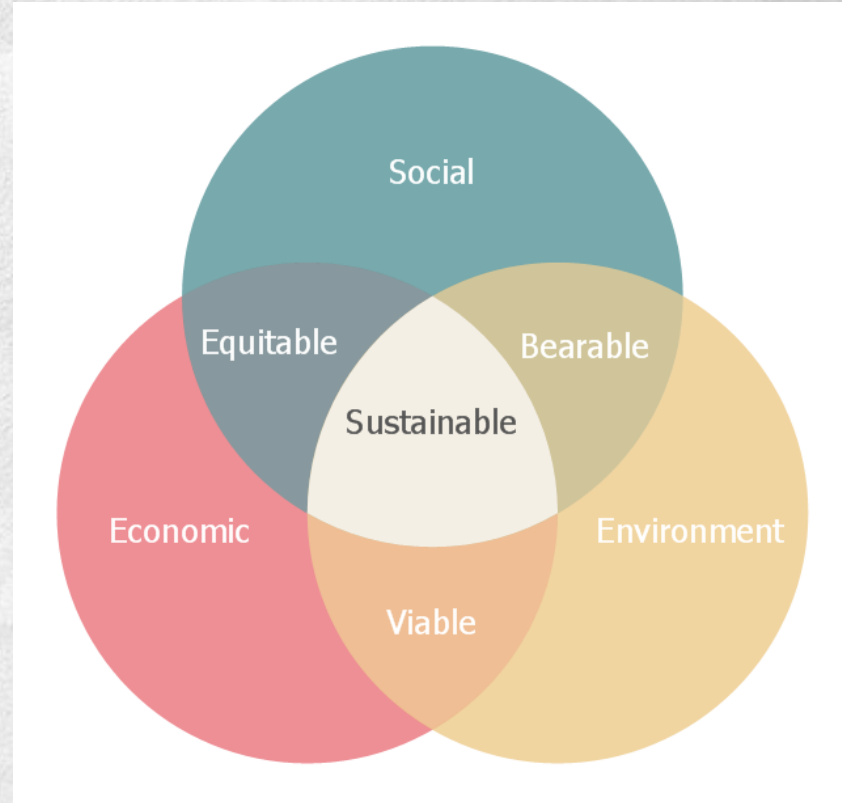
This can also include methods to decrease the amount of water pumped from an aquifer through the use of:

- Irrigation efficiency
- Instream weirs to increase surface-water availability
- Tailwater recovery and onsite farm storage

This can include attempts to increase the recharge to an aquifer, often referred to as Managed Aquifer Recharge (MAR), e.g. ASR, PR, and use of Green Space



Sustainable Agriculture

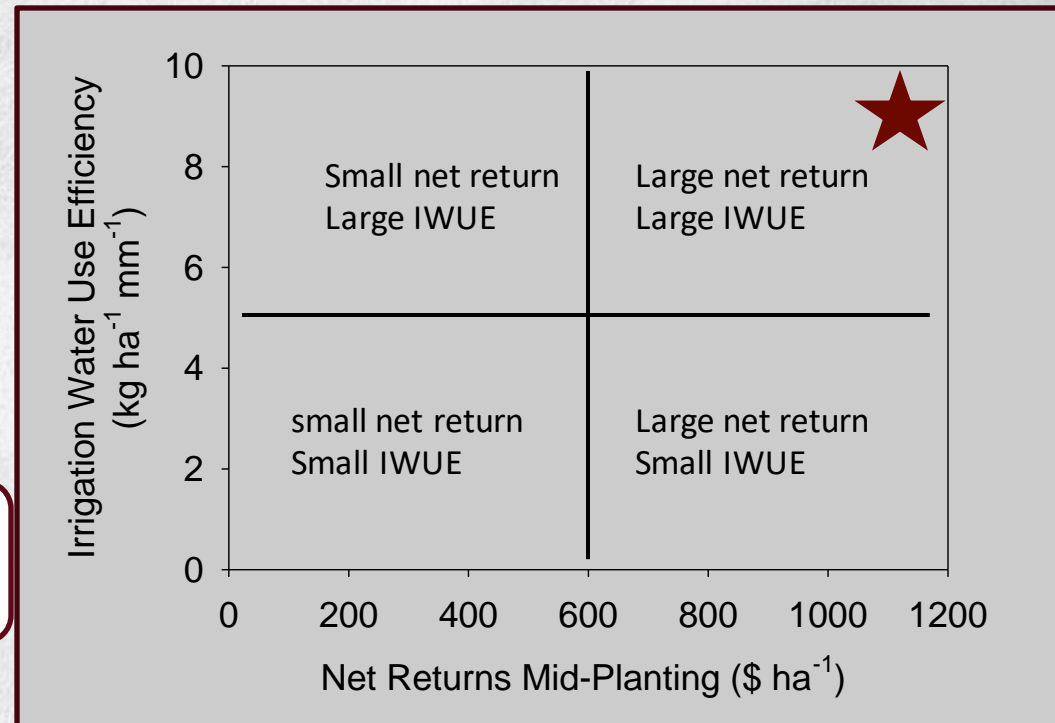


- Economically Viable: If its not profitable, its not sustainable
- Socially Supportive: The quality of life of farmers, farm families and farm communities
- Ecologically Sound: We must preserve the resource base that sustains us all

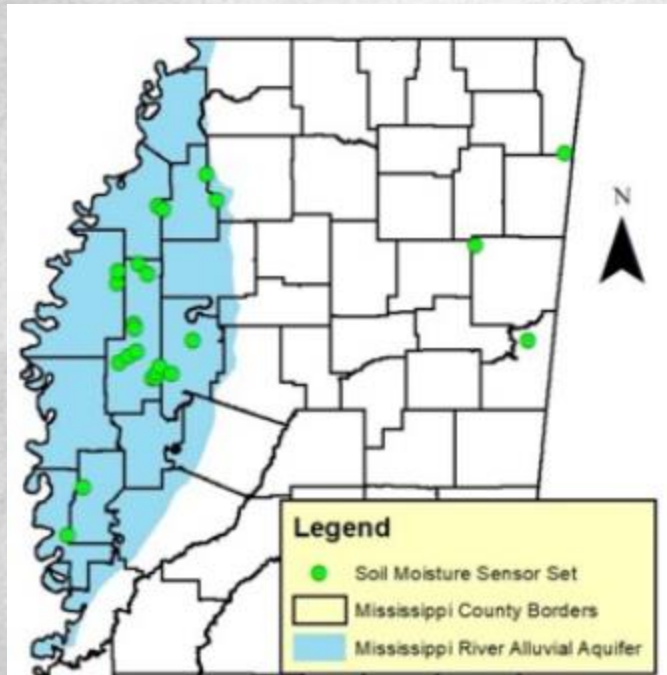
PROVEN PRACTICES TO IMPROVE WATER USE EFFICIENCY

Sustainable Production

-
3. Soil sensors
 2. Surge irrigation
 1. Computerized hole selection

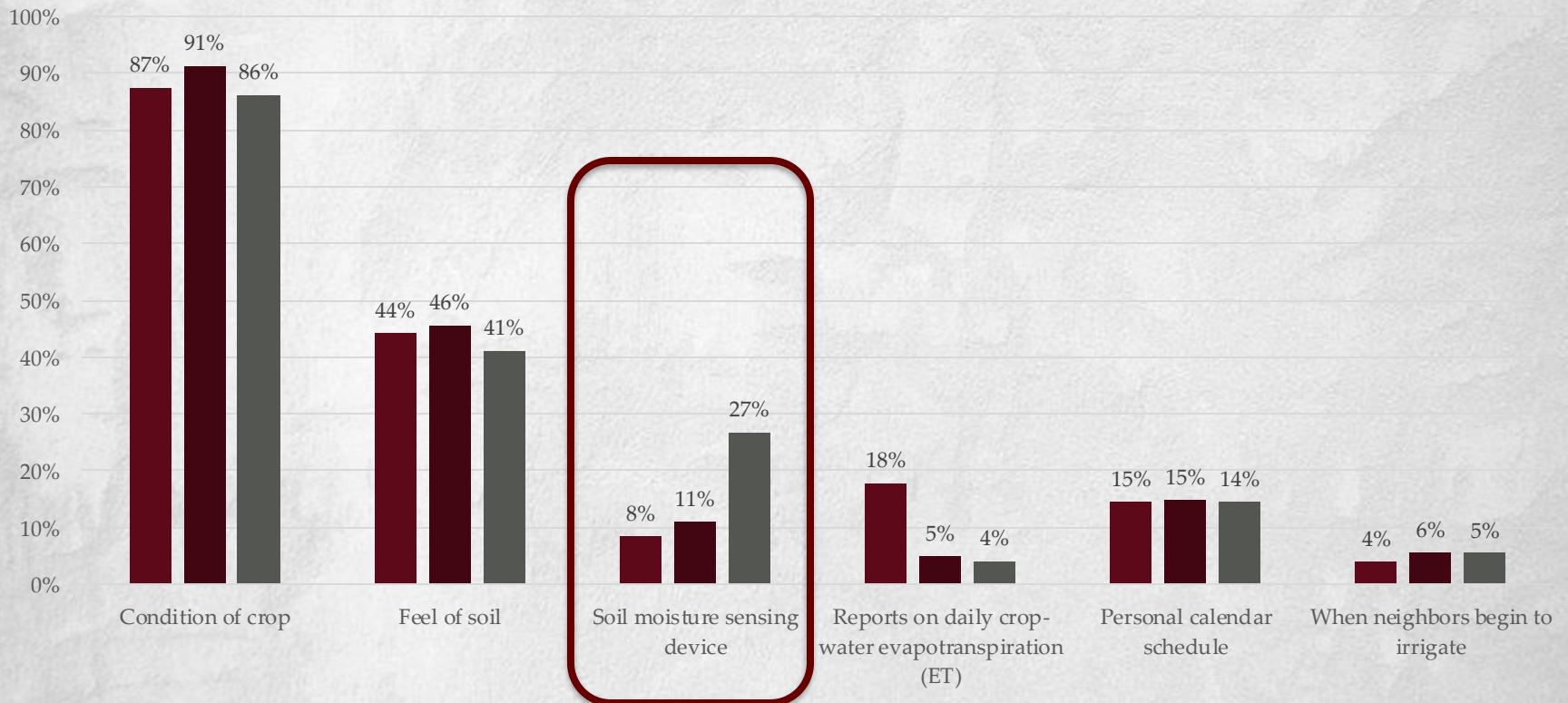


Advancing Adoption of Soil Moisture Sensors Through On-Farm Training and Demonstration

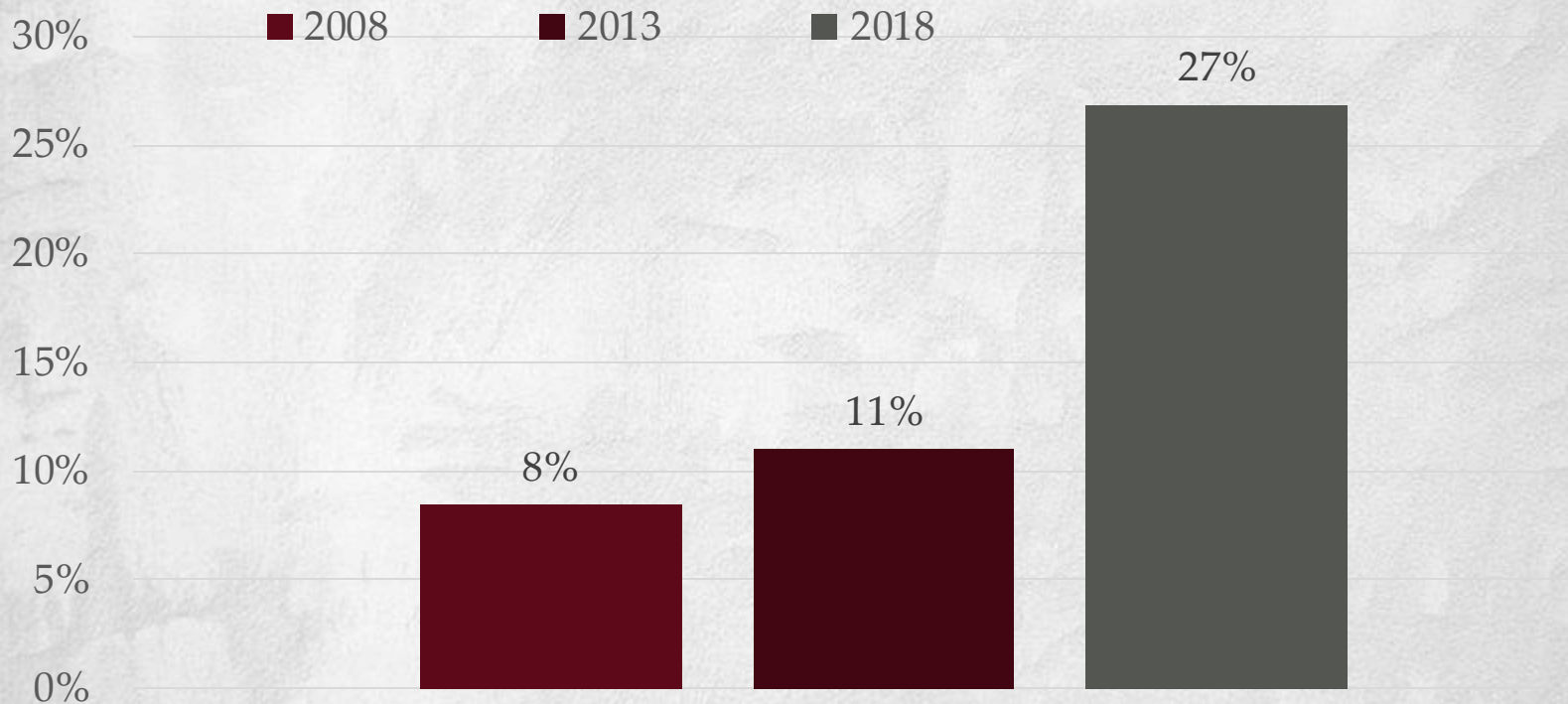


METHODS USED IN DECIDING WHEN TO IRRIGATE IN MISSISSIPPI

■ 2008 ■ 2013 ■ 2018



USING SOIL MOISTURE SENSOR TO SCHEDULE IRRIGATION



BARRIERS TO ADOPTION IN MISS

2018 FARM & RANCH IRRIGATION SURVEY

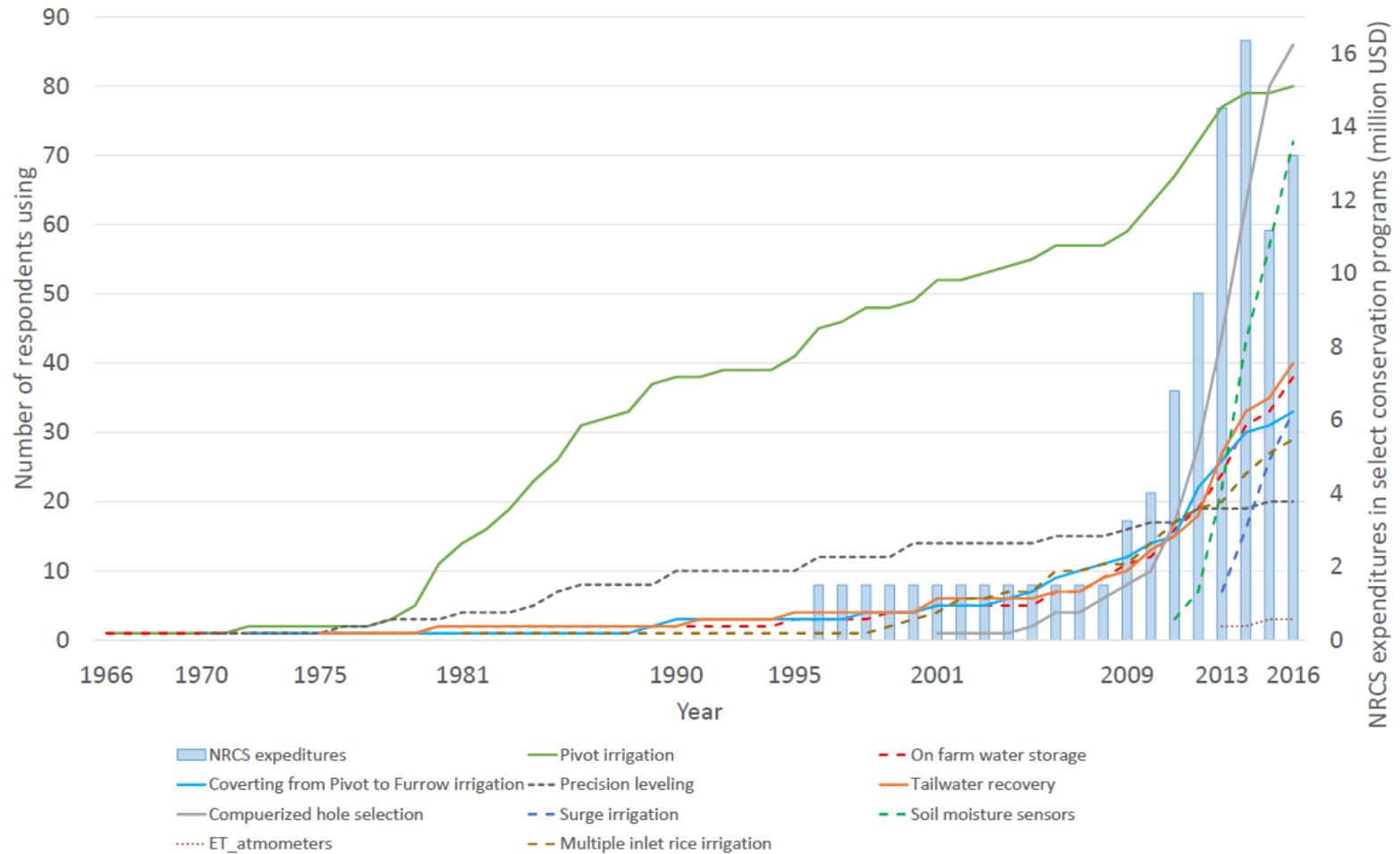
1. Investigating improvements not a priority (36%)
2. Can't finance improvements (31%)
3. Improvements don't cover installation costs (22%)
4. Risk of reduced yield (14%)
5. Water availability uncertainty (4%)
6. Physical barriers limit (13%)
7. Improvements increase mgmt. time & \$ (13%)
8. Won't be farming long enough to justify (11%)
9. Landlord won't share in cost (20%)

BARRIERS TO ADOPTION IN MISS

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Adoption of Conservation Practices in Mississippi Delta



NEW TECHNOLOGY EVALUATION

Irrigation Automation



What is furrow irrigation Automation?

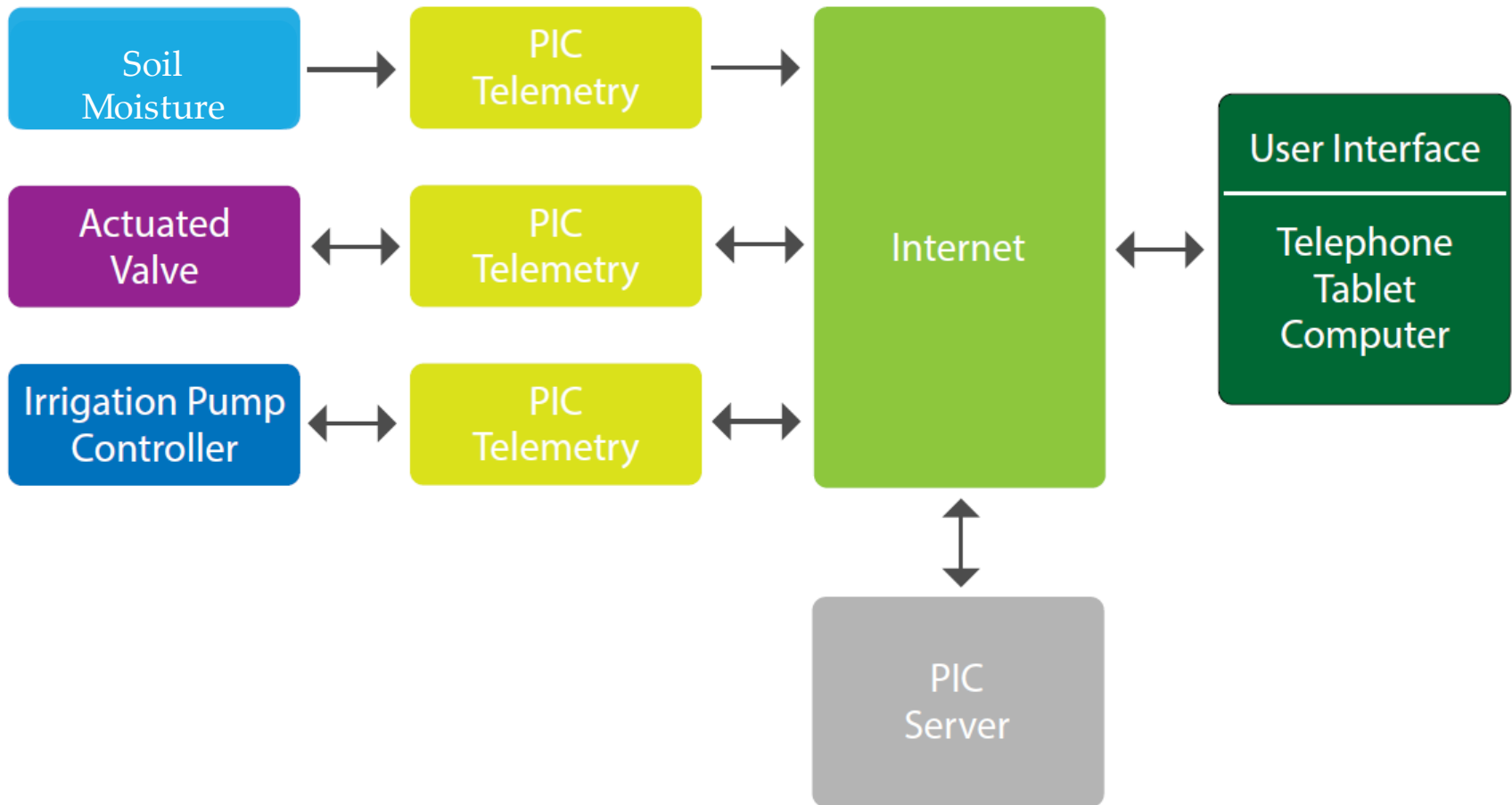
- Well automation is utilizing the available technology to control the irrigation well pumping station
- Connecting valves, sensors, and pump controls to a user controlled interface
- Growers ability to control pump station and complete the “Spin” remotely can save time, money and water



Components

- Pump Controls
- Actuated valves
- Soil Moisture Sensors

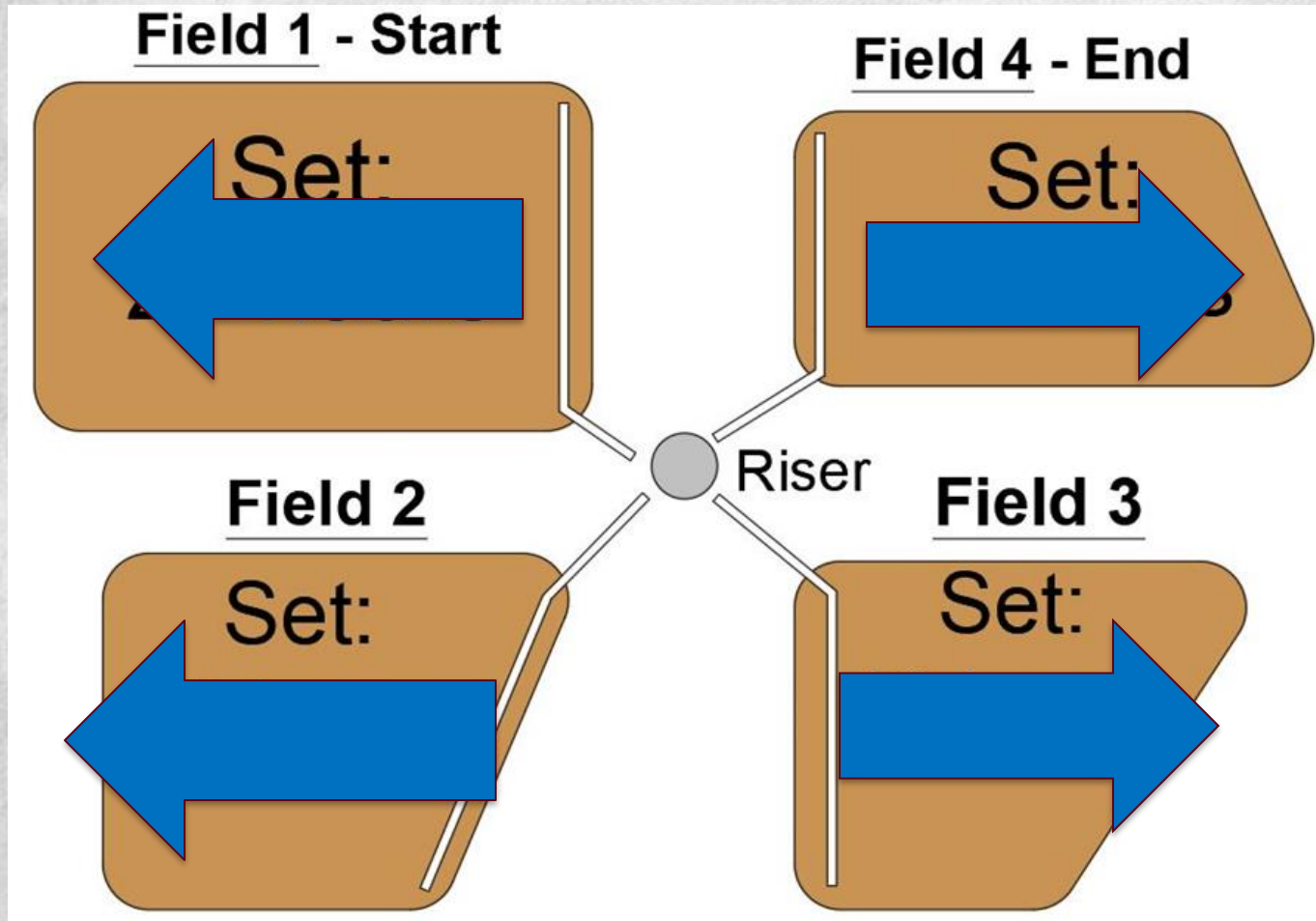




Scenario

7 am – 11am (next day)

3 am – 9 pm



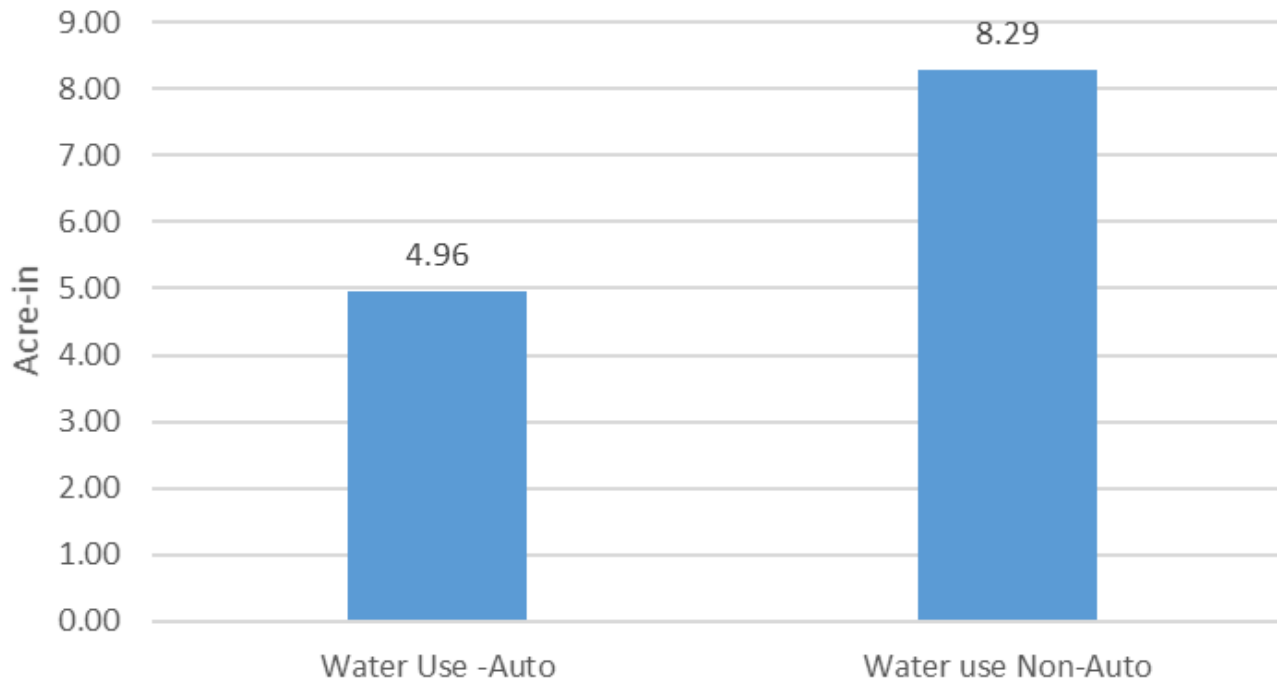
11 am – 11am (next day)

11 am – 3am (next day)

Well Automation – Soybean

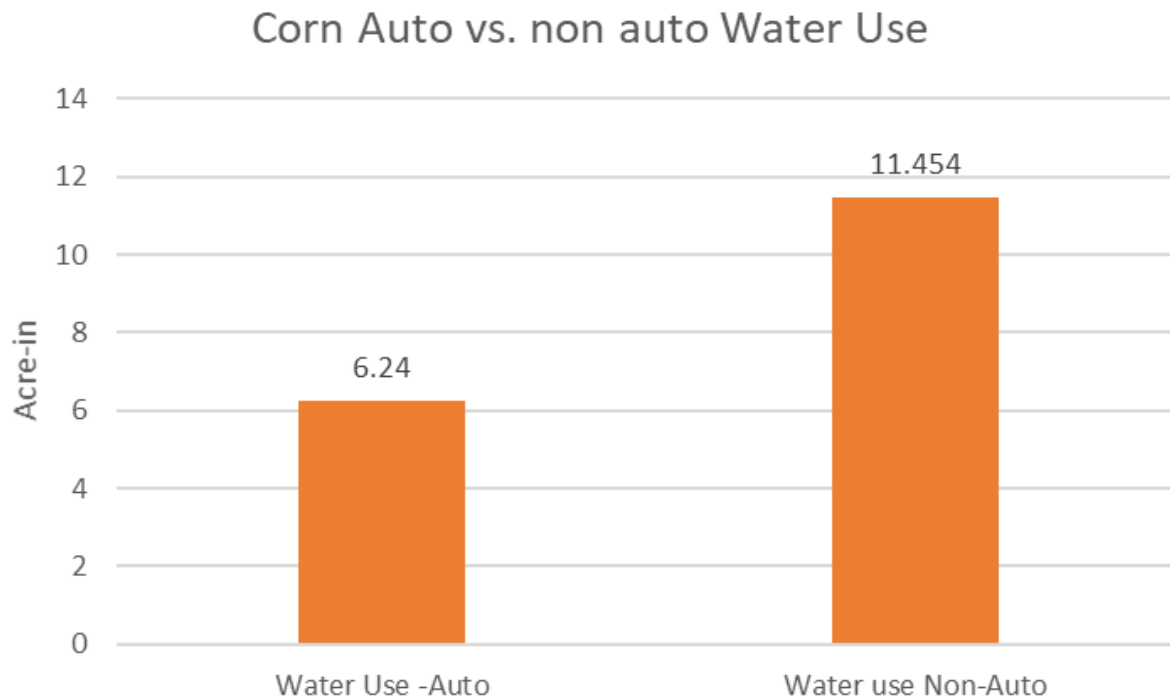
8 sites over 2 years of on-farm sites

Soybean Auto vs. non auto Water Use



Well Automation – Corn

5 sites over 2 years Automation



Benefits

- Tying practices together
- Efficient swapping of sets
- Auto shutoff with rainfall
- Management
- Surge opportunities



NEED FOR TRAINING

- One of the biggest risks to user adoption is lack of sufficient and customized training.



Watermark Fundamentals & Application

1. Scientific Background
2. Measurement Devices
3. Sensor Construction
4. Sensor Location
5. Sensor Installation
6. Irrigation Triggers

MISSISSIPPI STATE UNIVERSITY EXTENSION
IRROMETER WATERMARK SERIES: Irrigation Triggers

This publication series provides a granular matrix sensor common other types of soil moisture sen

Introduction
 An irrigation trigger is the point at starts. Starting too wet wastes water too dry reduces yield. In this publi how to select an appropriate trigge and how to schedule irrigation usi

Interpreting Watermark Dc
 Watermark data can serve as a gau tank" of the crop. Figure 1 illustra weighted average centibars (cb) wt Centibars are low when wet and hi

Introduction
 This publication provides a step-by-step guide Watermark sensor construction. Following th the sensors easier to install at the intended dep remove at the end of the season.

Preparation
 The tools and supplies pictured below will be i sensor wires is usually convenient.

Introduction
 Where sensors are installed affects the likelihood that the readings are suitable for irrigation scheduling. This publication provides a step-by-step guide to selecting an appropriate sensor location for a field.

Representative Area
 The first step is choosing a representative area within the field. Such an area can be identified based on past experience and observations, along with soil, yield, and aerial maps. The table below suggests criteria for consideration and the associated reasons.

Recommendation	Reason
Place sensors in an area with the major soil type, typical terrain, and average yield.	Avoid meadow irrigation decisions based on abnormal areas.
Place sensors in 1/3 of the way down the furrow.	Avoid over-irrigated areas near the crown and the tail end of the field.
Place sensors at least two planter passes seaward from the field edge.	Avoid edge effects (e.g., see lines, pesticide drift).

Ideal Crop Rows
 The second step is choosing a crop row that is least disturbed by field operations. Installing in a wrong row minimizes the risk of sensor damage by tractors and implements. Also, wheel traffic produces compacted, "hard" furrows, which infiltrate less water than uncompacted, "soft" furrows.

For example, if a field is typically farmed using a tractor with dual rear wheels and 8-row implements, the ideal crop rows for sensor installation would be the first and last rows of each 8-row pass.

<https://www.ncaar.msstate.edu/outreach>

Calculate

Results

Cost	\$/Acre	Total
Pumping	\$8.04	\$1045.20
Labor	\$0.38	\$49.85
Capital	\$1.20	\$156.00
Total Irrigation Event	\$9.62	\$1251.05

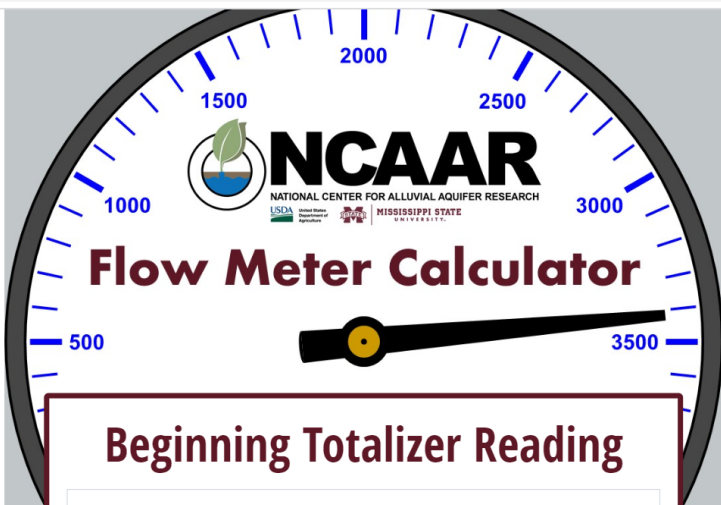
Compare the cost of another irrigation with the expected benefits of additional irrigation; you can expect to profitably irrigate if the next irrigation event will result in the following yield gains:

Commodity	Yield
Corn	1.92 bu/acre
Cotton	9.62 lbs/acre
Soybean	1.07 bu/acre



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Delta Research and Extension Center



Beginning Totalizer Reading

0

Ending Totalizer Reading

0

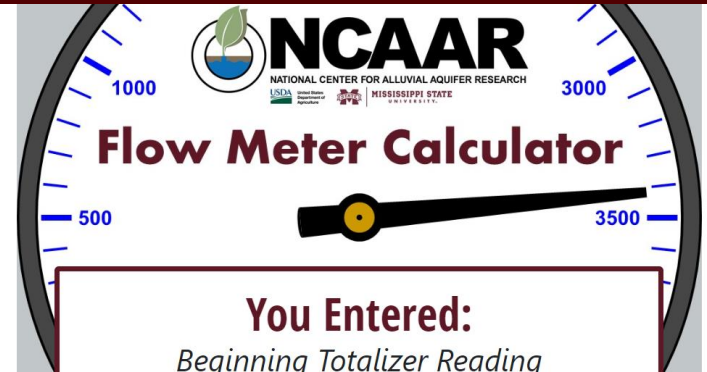
Totalizer Units

~choose units~ ▾

Acres Irrigated

0

Calculate!



You Entered:

Beginning Totalizer Reading

200 acre-inches

Ending Totalizer Reading

600 acre-inches

Area Irrigated

150 acres

You Irrigated:

Gross Water Volume

400 acre-inches

33.333 acre-feet

10861714 gallons

Gross Water Depth

2.67 inches

Reuse Inputs

Reset Inputs



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**National Center for Alluvial Aquifer Research
Delta Research and Extension Center**

What is Mississippi Master Irrigator?

A 24-credit hour formal education course designed to educate producers on **water-related** topics which include but are not limited to:

- Agronomics
- Irrigation Scheduling
- Types of Irrigation Systems
- Economics
- Soil Health
- Policy and Management

How will the course be offered?

The course will be offered as a hybrid system which will include online video modules and in-person sessions.

- Video modules and in-person sessions will be conducted by individuals/entities with specialized experience in each of the listed topics. This includes personnel such as:

- **MSU Extension Specialists**
- **YMD**
- **USGS**
- **EPA**
- **Delta F.A.R.M**
- **Farm Bureau**
- **Delta Council**



Anticipated Course Timeline:

Completion of videos	Nov. 2022
Completion of online video modules	Jan. 2023
Begin offering course	Mar. 2023
First in-person meeting	Nov. 2023
Second in-person meeting	Feb. 2023

New Irrigation Survey

- See Adoption Rates
- Understand and address barriers
- Types of Outreach needed



SCAN CODE TO PARTICIPATE

- Prizes for Participation
 - YETI Coolers
 - YETI travel mugs
- Winners will be announced at Row Crop Short Course



Thank You

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