Use of soil moisture sensors for improving irrigation management

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Introduction

Sustainable management of agricultural water resources:

- Increasing population:



- Competing stakeholders:

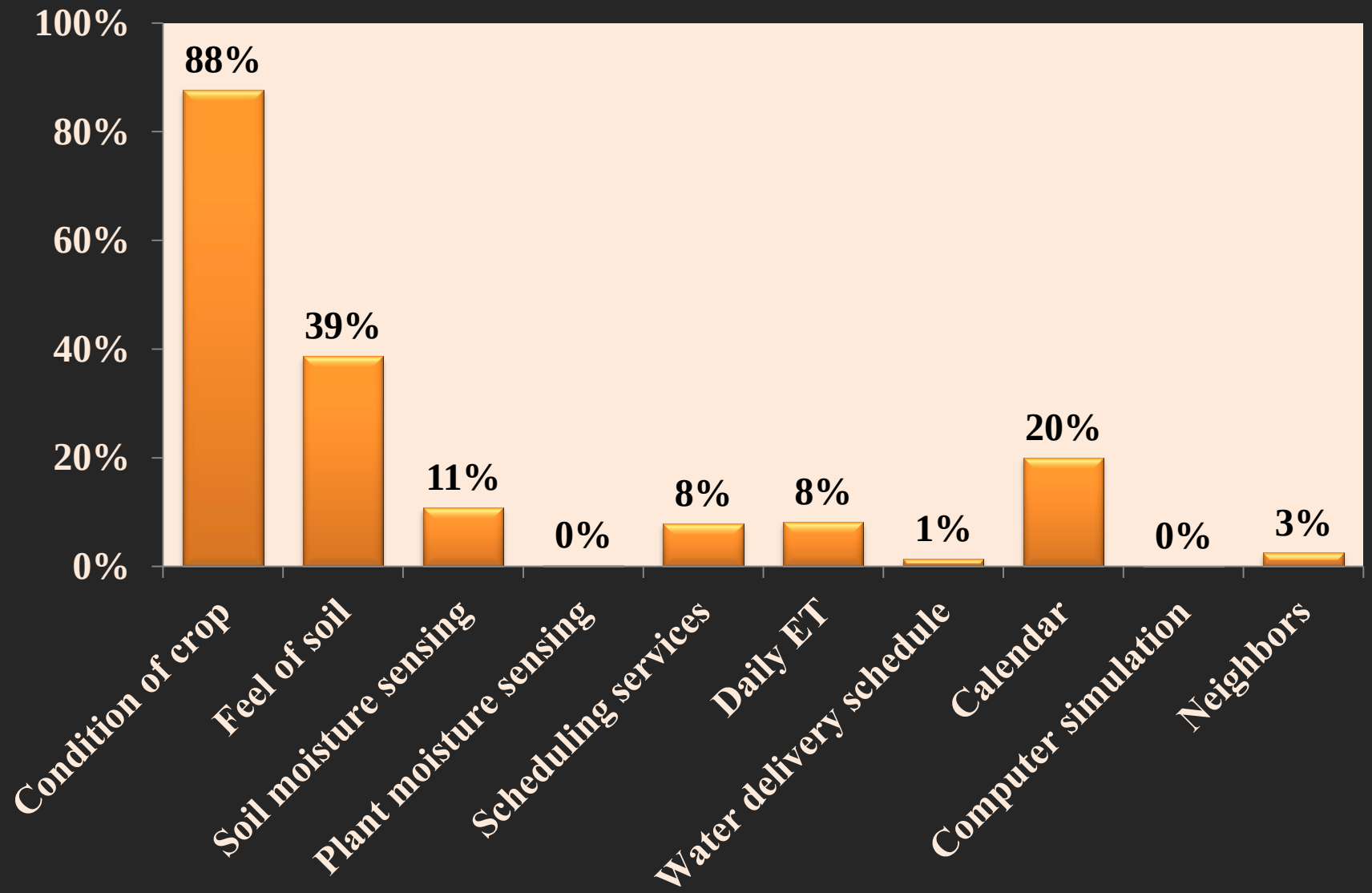




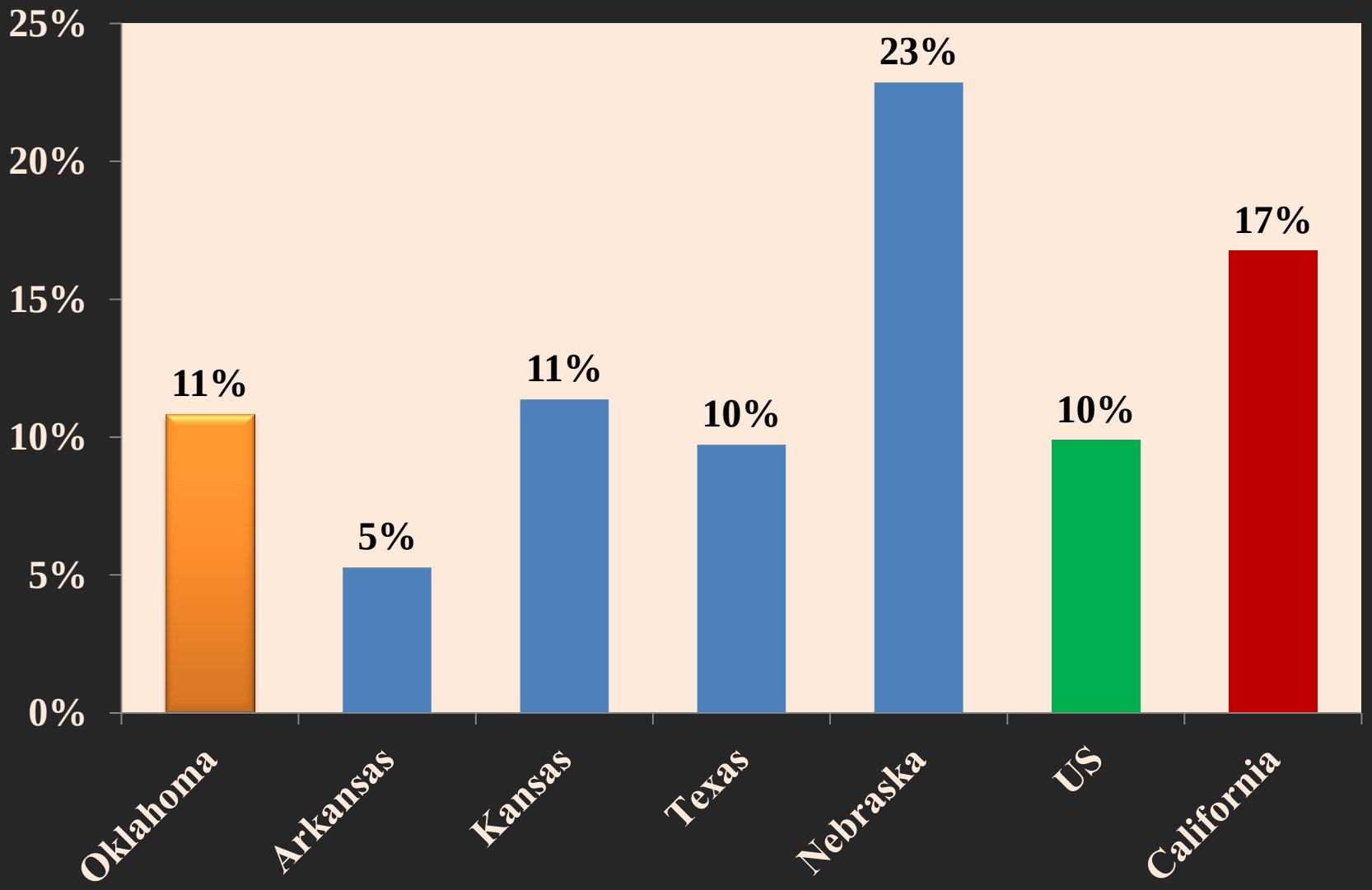

Irrigated Agriculture

- **Producers are looking for:**
  - ✓ **New sources of water**
  - ✓ **Advanced irrigation systems that could minimize losses, such subsurface drip irrigation (SDI)**
  - ✓ **Advanced irrigation management techniques**

Methods Used in Deciding When to Irrigate



Soil Moisture Sensing



Soil Moisture Sensing

- **Why soil moisture:**
  - ✓ **Based on information collected at the field**
  - ✓ **More sensitive to changes in operation**
  - ✓ **Can still be useful if the selected sensor is not very accurate, as long as it has acceptable precision**
  - ✓ **Engages growers and crop consultants**

Soil Moisture Sensing

- **Promoting the technology by establishing research and demonstration sites at:**

✓	**Stillwater,**	**Research farm,**	**Watermark**
✓	**Perkins,**	**Research farm,**	**Watermark**
✓	**Hydro,**	**Producer,**	**Watermark**
✓	**Martha,**	**Producer,**	**Acclima**
✓	**Goodwell,**	**Research farm,**	**CS655**

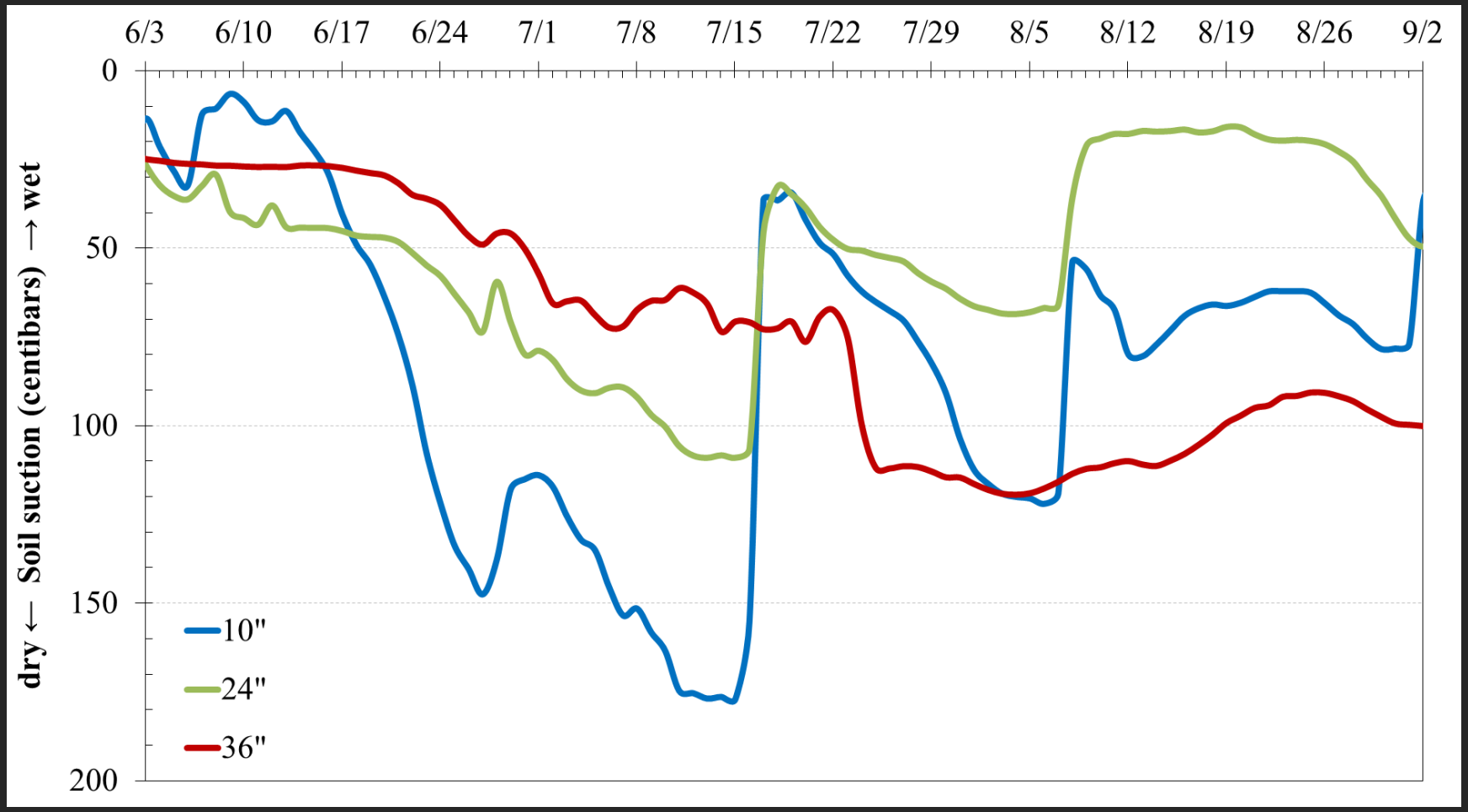
Soil Moisture Sensing

Stillwater; Corn; Surface drip

Soil Moisture Sensing

Stillwater; Corn; Surface drip

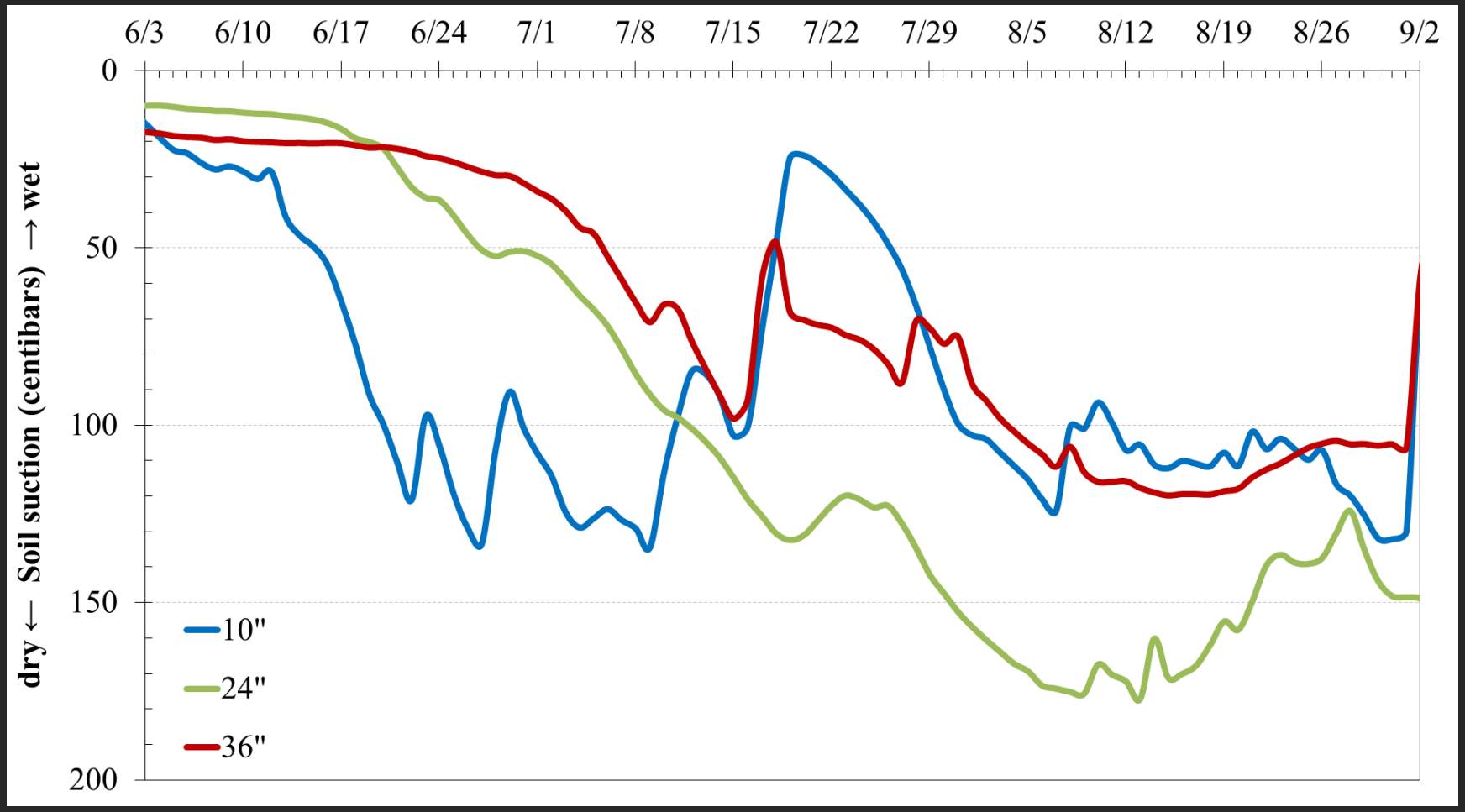
Dryland



Soil Moisture Sensing

Stillwater; Corn; Surface drip

Irrigated

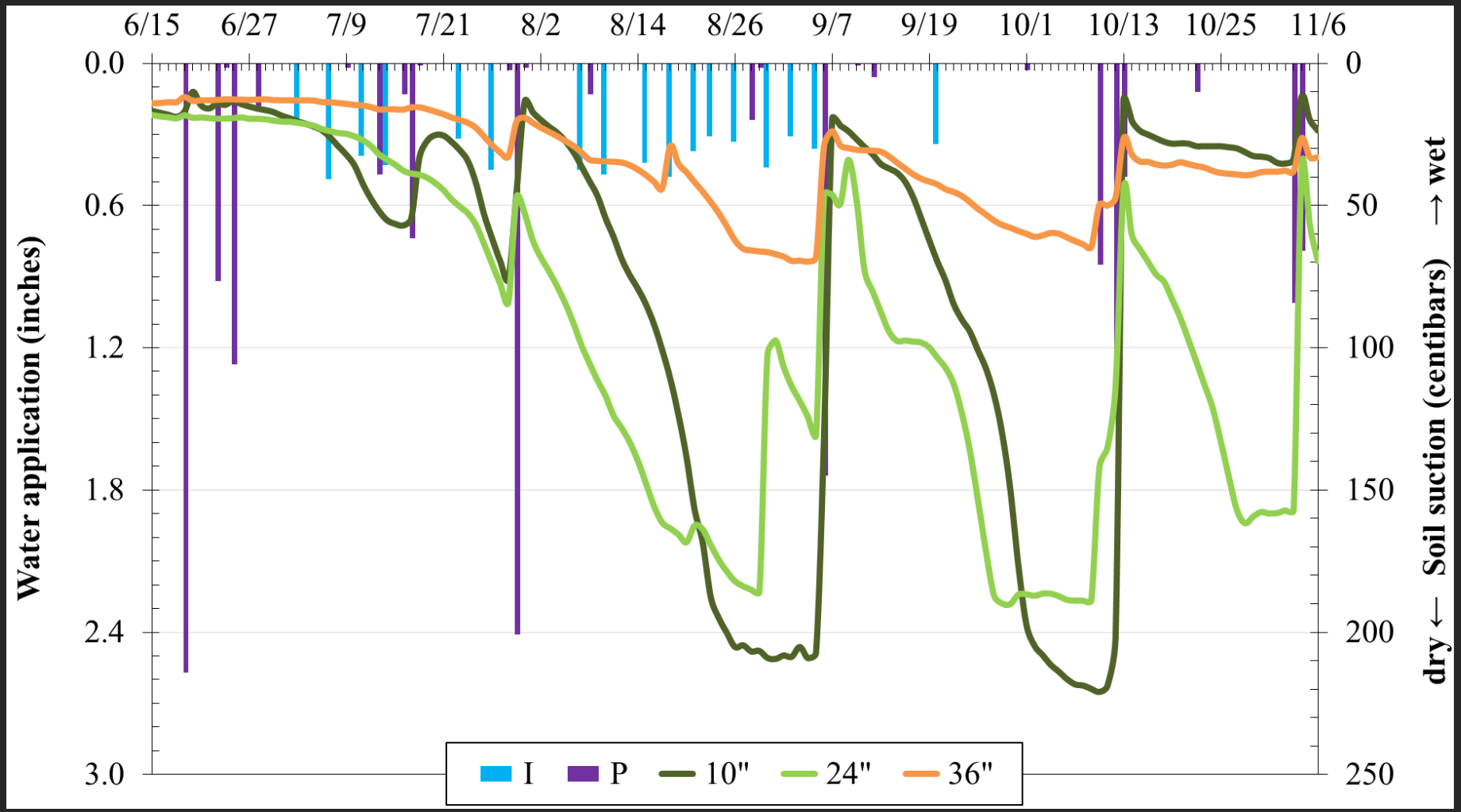


Soil Moisture Sensing

Hydro; Cotton; Center-pivot

Soil Moisture Sensing

Hydro; Cotton; Center-pivot



Soil Moisture Sensing

Hydro; Cotton; Center-pivot

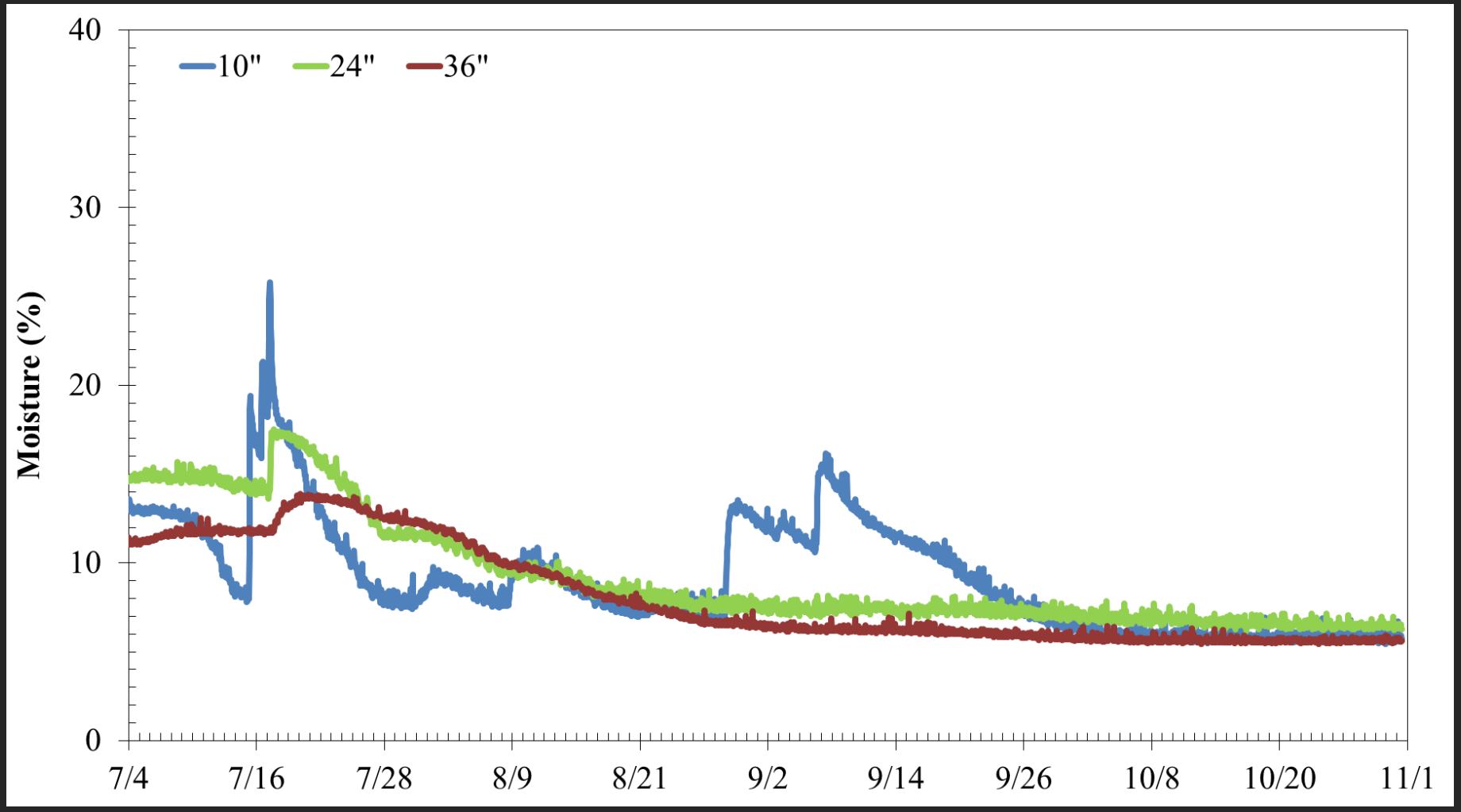
- **Precipitation:**
  - ✓ **100% = 15.6” 75% = 15.9” Mesonet = 15.6”**
- **Total Irrigation Depth:**
  - ✓ **100% = 6.6” 75% = 4.9”**
- **Avg. Irrigation Depth:**
  - ✓ **100% : Actual = 0.4” Programed = 0.8”**
  - ✓ **75% : Actual = 0.3” Programed = 0.6”**

Soil Moisture Sensing

Martha; Cotton; Center-pivot & SDI

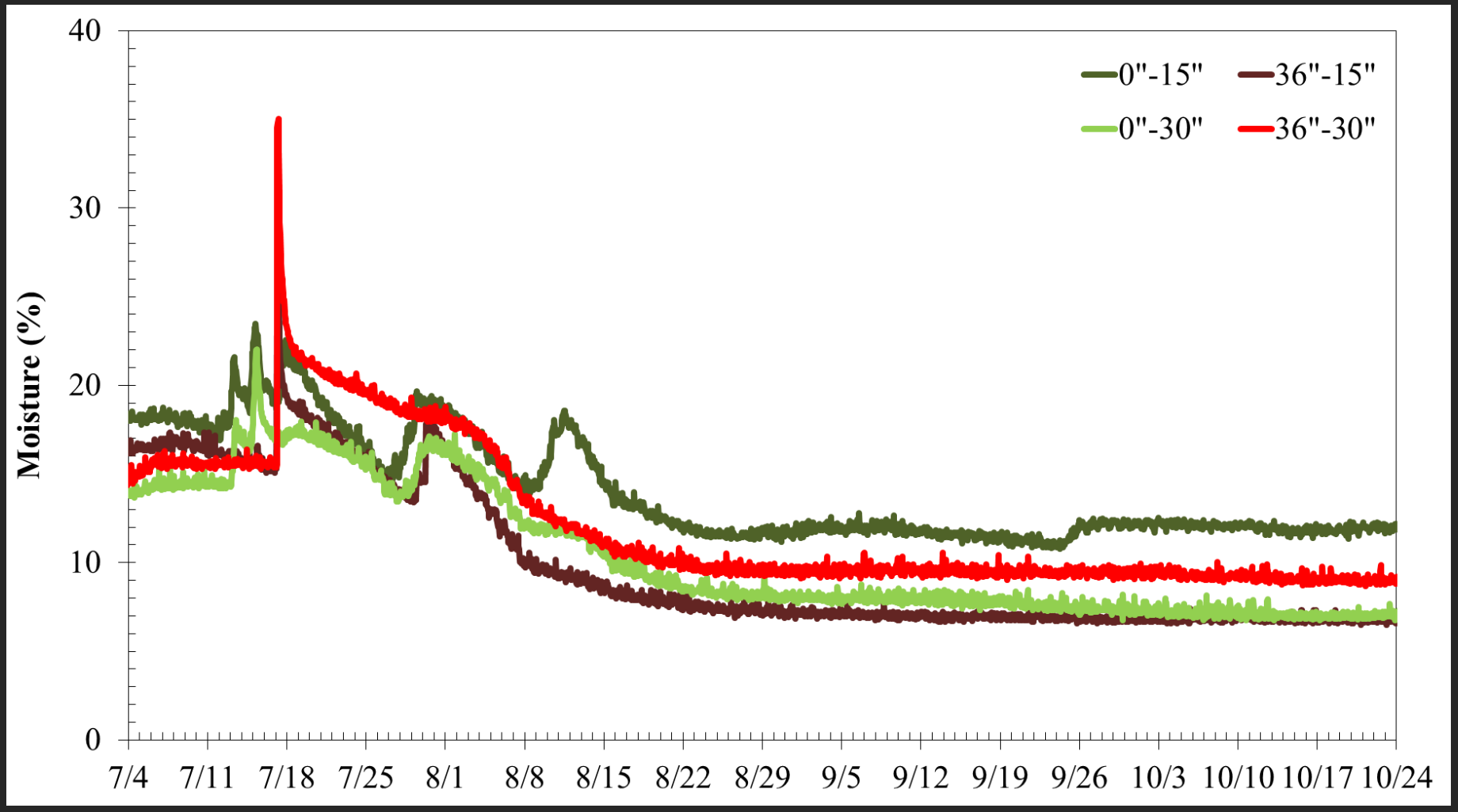
Soil Moisture Sensing

Martha; Cotton; Center-pivot



Soil Moisture Sensing

Martha; Cotton; SDI



Soil Moisture Sensing

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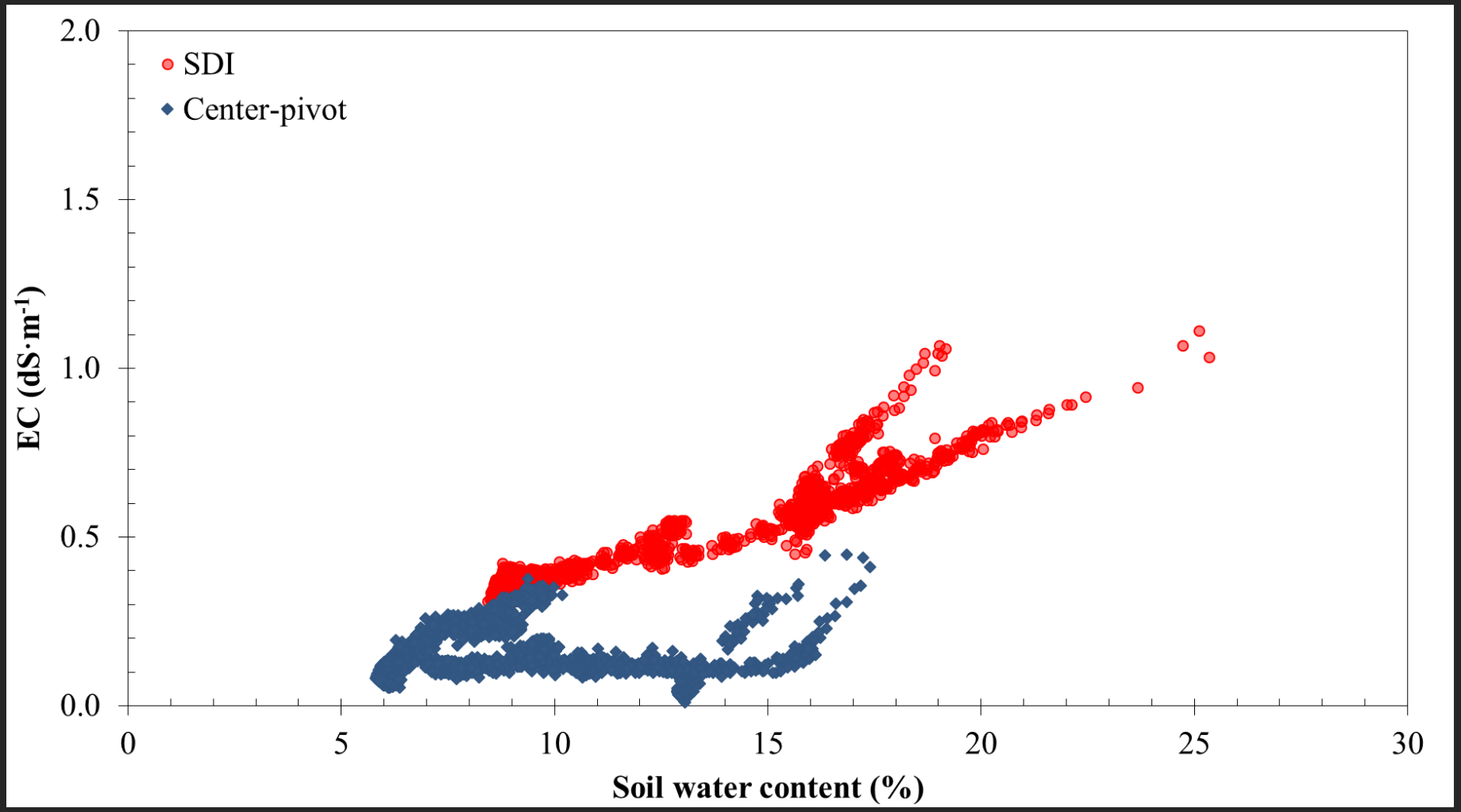
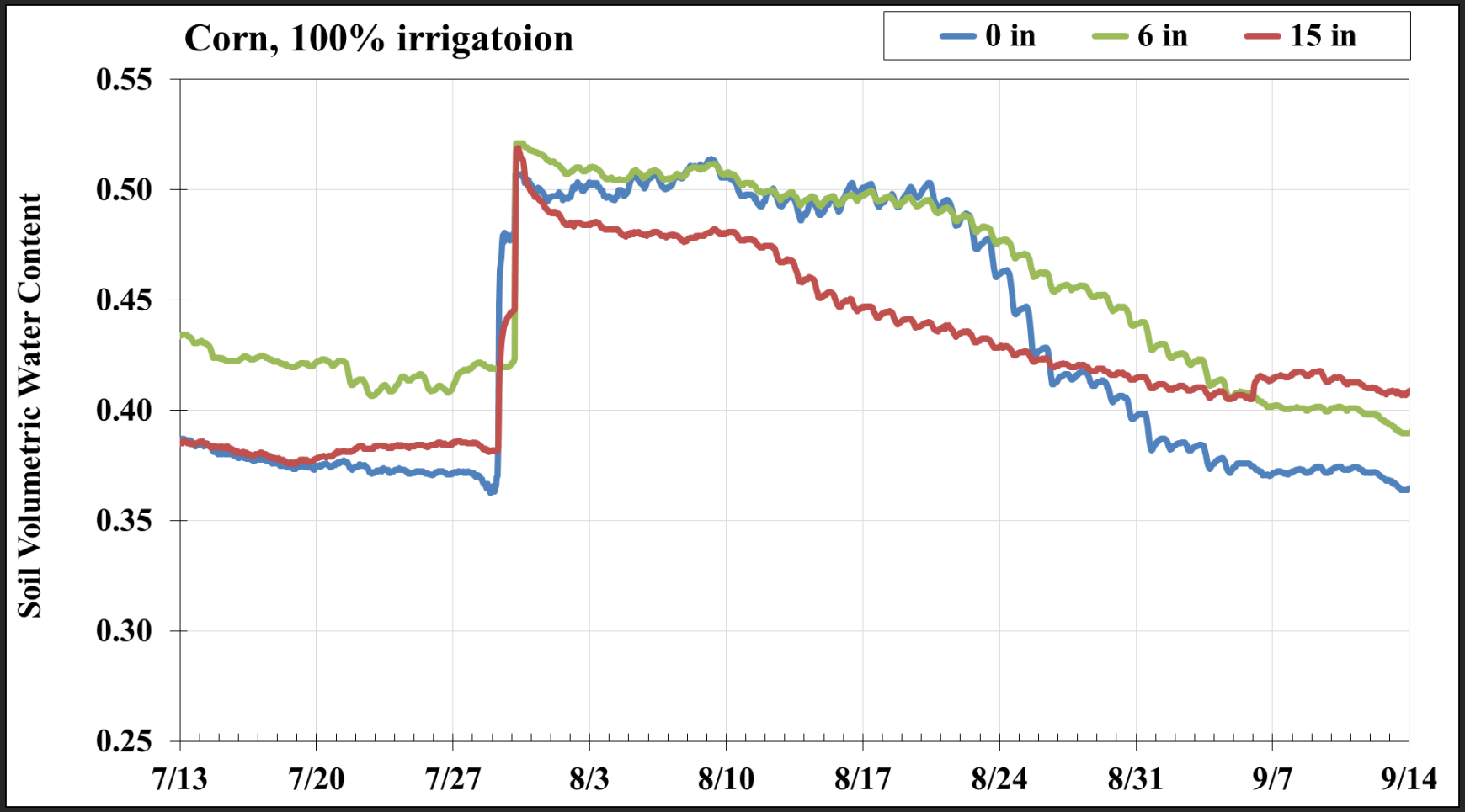


Soil Moisture Sensing

Goodwell; Corn; SDI

Soil Moisture Sensing

Goodwell; Corn; SDI



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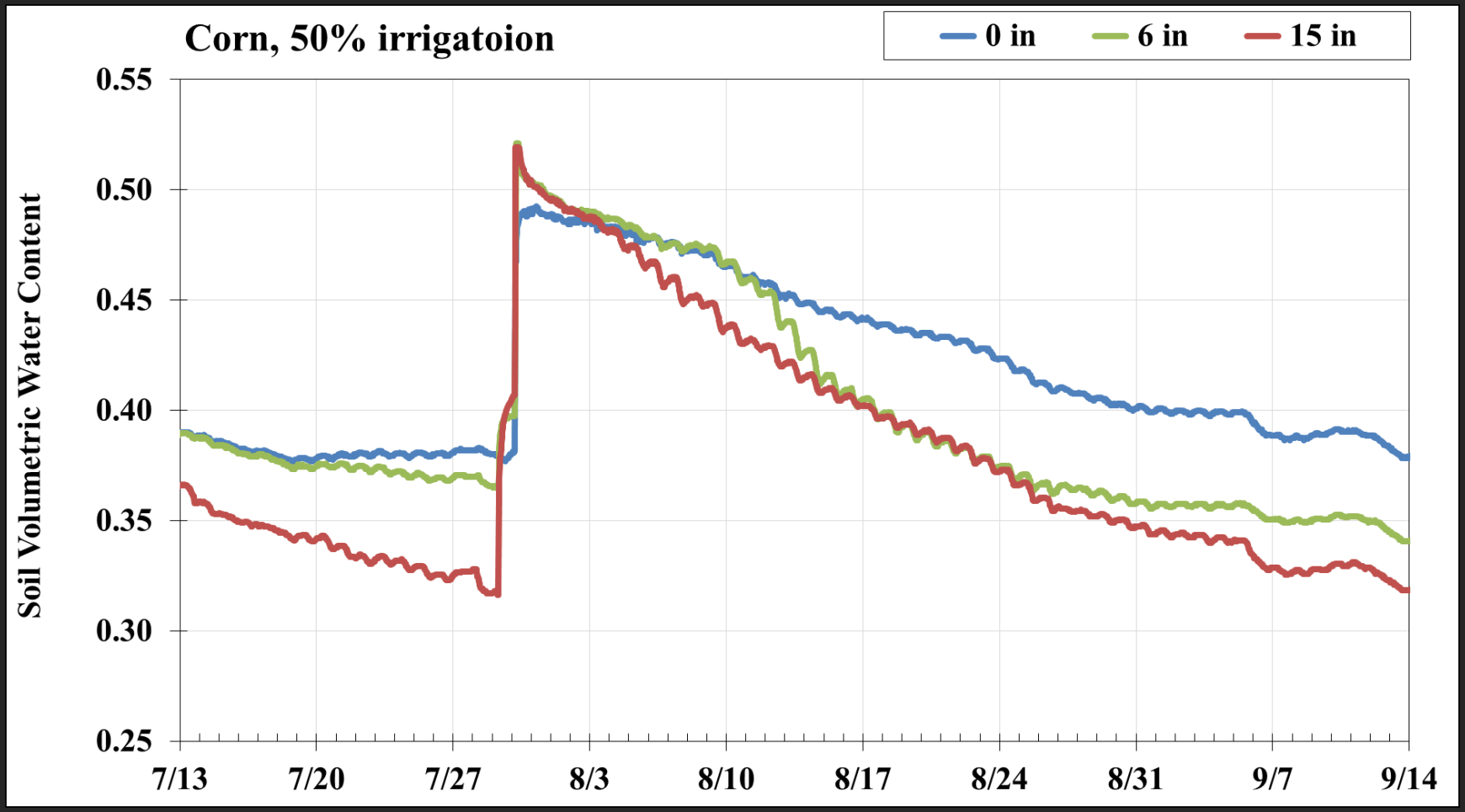
Goodwell; Corn; SDI



Soil Moisture Sensing

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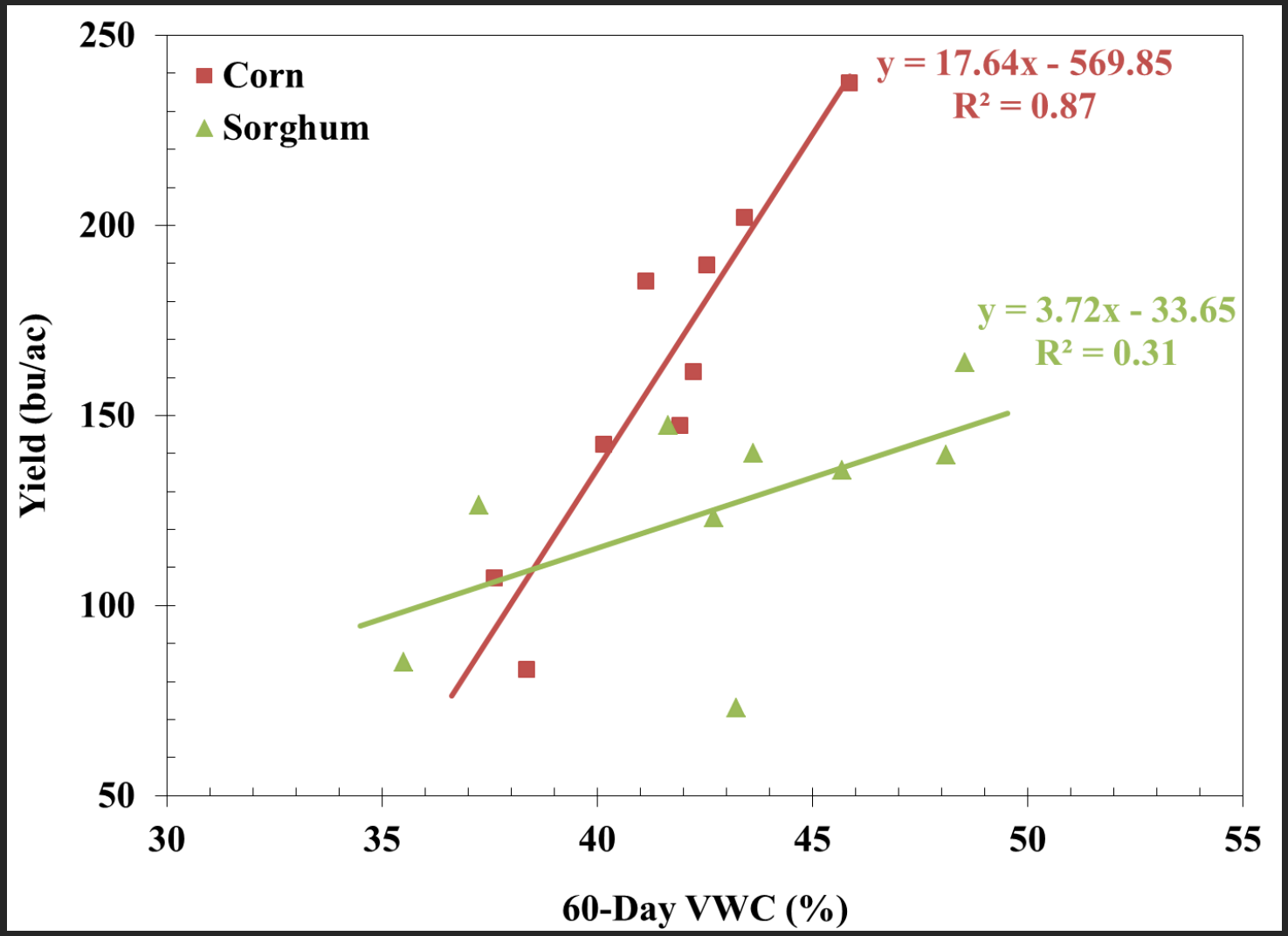
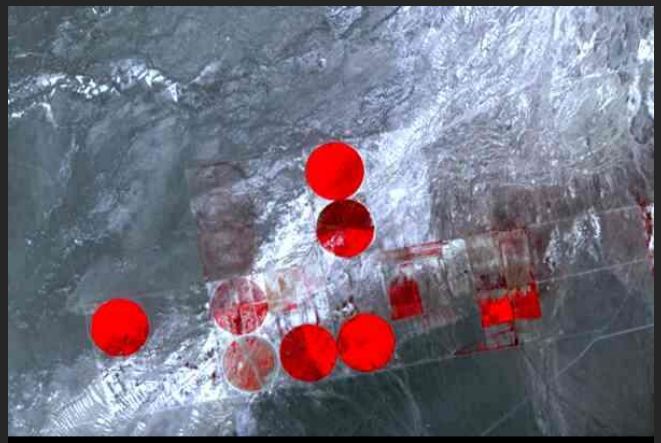
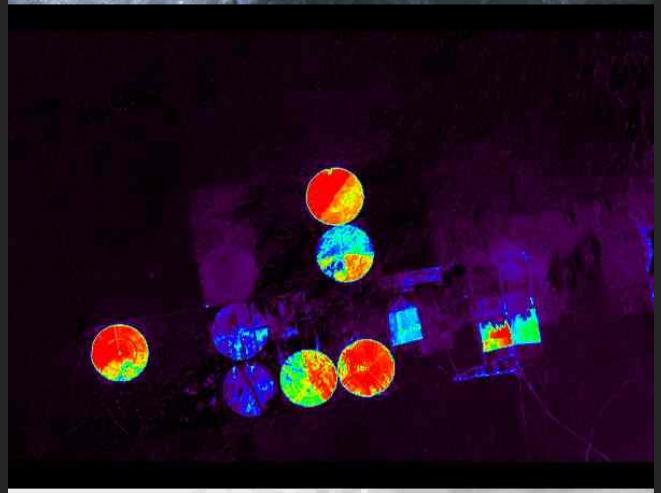


Soil Moisture Sensing

Challenges

- Sensor selection
- Installation:
  - ✓ Ensuring a good contact
  - ✓ Backfilling the holes
  - ✓ Protecting the wires
- Selecting representative locations
- Interference with farm operation
- Data access and interpretation





Thank You!