

Rational irrigation scheduling of annual row crops and perennial crops

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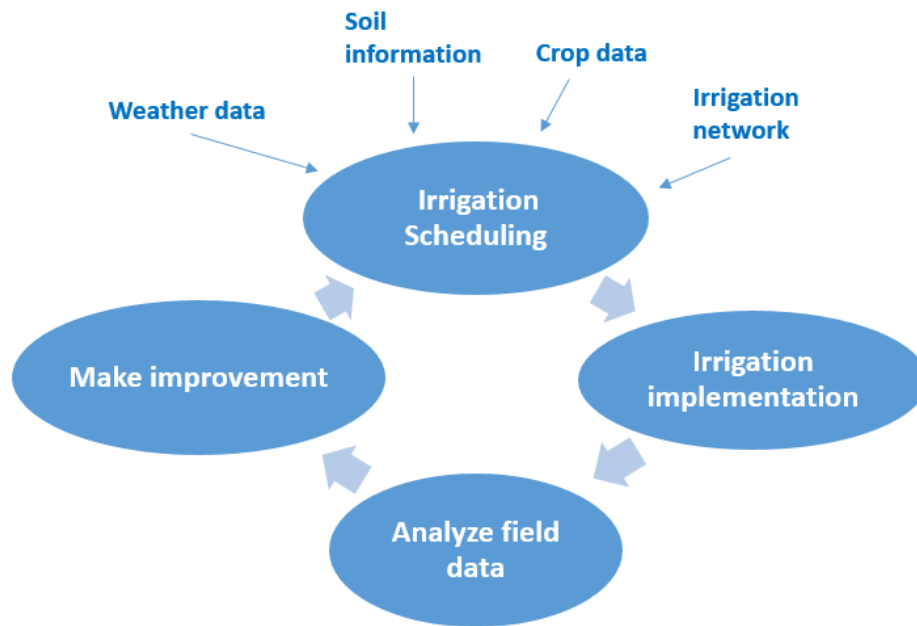
Rational irrigation scheduling frame-work:

- **Question: How can data collected from in situ sensors and other field measurements be used to guide irrigation strategies that:**
 - Increase water use efficiency
 - Maintain or increase crop yield
 - Reduce energy consumption

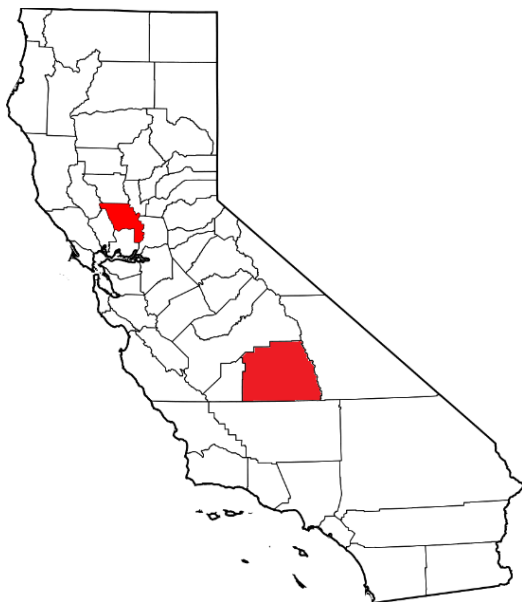
- **Goal**
 - Determine the proper amount of water to be applied.
 - Identify frequency and time-duration depending on soil parameters

- **Approach**
 - Based on discussions between the farmers and project team members, an irrigation strategy has been selected to be tested for each site (see table below). Goal is to save 20% in water and energy from baseline.
 - We interact weekly with each site and check water application data to track progress and check any signs of stress.
 - Irrigation scheduling is based on Evaporation and Transpiration (ET) with support provide by measurement of soil moisture and plant water status (or some combination of these). Partial ET schedules are offered as an option for some crops (increase solid content or control disease outbreak).

▪ **Strategy**



Commercial and demonstration field locations



- **Study area:**
 - ✓ Yolo County: 3 farms
 - ✓ Tulare County: 2 farms
- **Crops**
 - ✓ Tomato
 - ✓ Alfalfa
 - ✓ Pistachio
 - ✓ Almond
- **Irrigation Methods**
 - ✓ Drip irrigation (Almond and Pistachio)
 - ✓ Subsurface drip irrigation (Tomato)
 - ✓ Surface irrigation (Alfalfa)

Overview of irrigation strategy tested at each site.

		Alfalfa	Tomato	Almond	Pistachio
Irrigation method		Check flood	SDI	DI	DI
Field sensing tools	ET data	Tule	Tule	CIMIS	CIMIS and Tule
	Soil water content	IRROmesh/ Watermark	IRROmesh/ Watermark	-	IRROmesh/ Watermark
	Plant water status	-	-	Pressure chamber	Pressure chamber
Water application tools	Flow meter	Flow meter	Flow meter	Smart meter	Smart meter
	Water advance sensors	Temperature sensor	-	-	-

Field sensing tools

- ET station (crop requirements)

Actual ET station (ETa)



Reference ET station (ETo)
CIMIS



$$ET = K_C \times ET_0$$

- Soil Moisture Sensors (soil water content)

IRROmesh system, Watermark sensors.



- **Stem water potential (Plant water status)**

Pressure chamber



Water application tools

- **Applied water from smart meters, or flow meters**



- **Water front advance sensor (Shut off time in surface irrigation)**

