

“Corn-App-Copia”: Development of a Smartphone Application for ET-based Irrigation Scheduling in Field Corn



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Rationale

- Increased municipal and agricultural withdrawals from the Upper Floridan Aquifer are causing large regional drawdowns reducing:
 - The groundwater contribution area to the Suwannee River Basin
 - Spring and stream flows throughout North Florida



Suwannee River on SR6 in H Hamilton County July, 2011

WMD	# Springs	Est. Historic Flow (MGD)	Current Avg. Flow (MGD)	Change Flow (MGD)	% Change
NWF	318	2,397	2,013	-385	-16
SJR	151	1,277	1,000	-276	-22
SR	314	4,745	2,449	-2,296	-48
SWF	238	2,070	1,691	-379	-18
Total	1,021	10,489	7,153	-3,336	-32

Objective

To evaluate the water use efficiency and application quantity of the corn app irrigation treatment in comparison to three irrigation treatments (soil moisture sensor, no irrigation, and calendar-based).

Methodology

Corn App Model

The corn app generates a root zone water deficit using:

- daily estimated actual evapotranspiration (ET_c)
- root depth
- soil water holding capacity.

$$RZWD(\%) = \frac{ET \text{ (in)} - \text{Rain} + \text{Irrigation (in)}}{\text{Plant Available Water (in)}}$$

Treatments

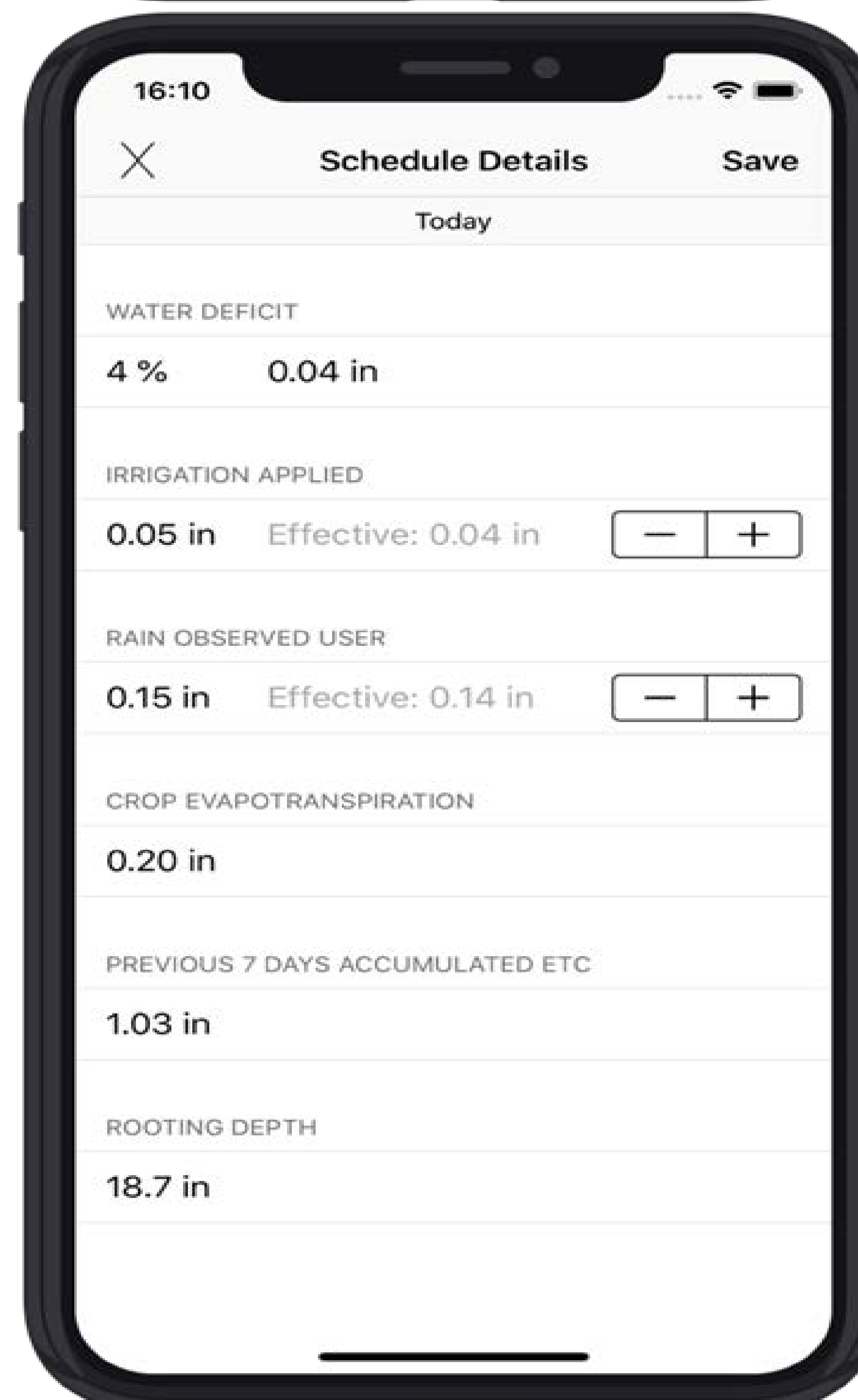
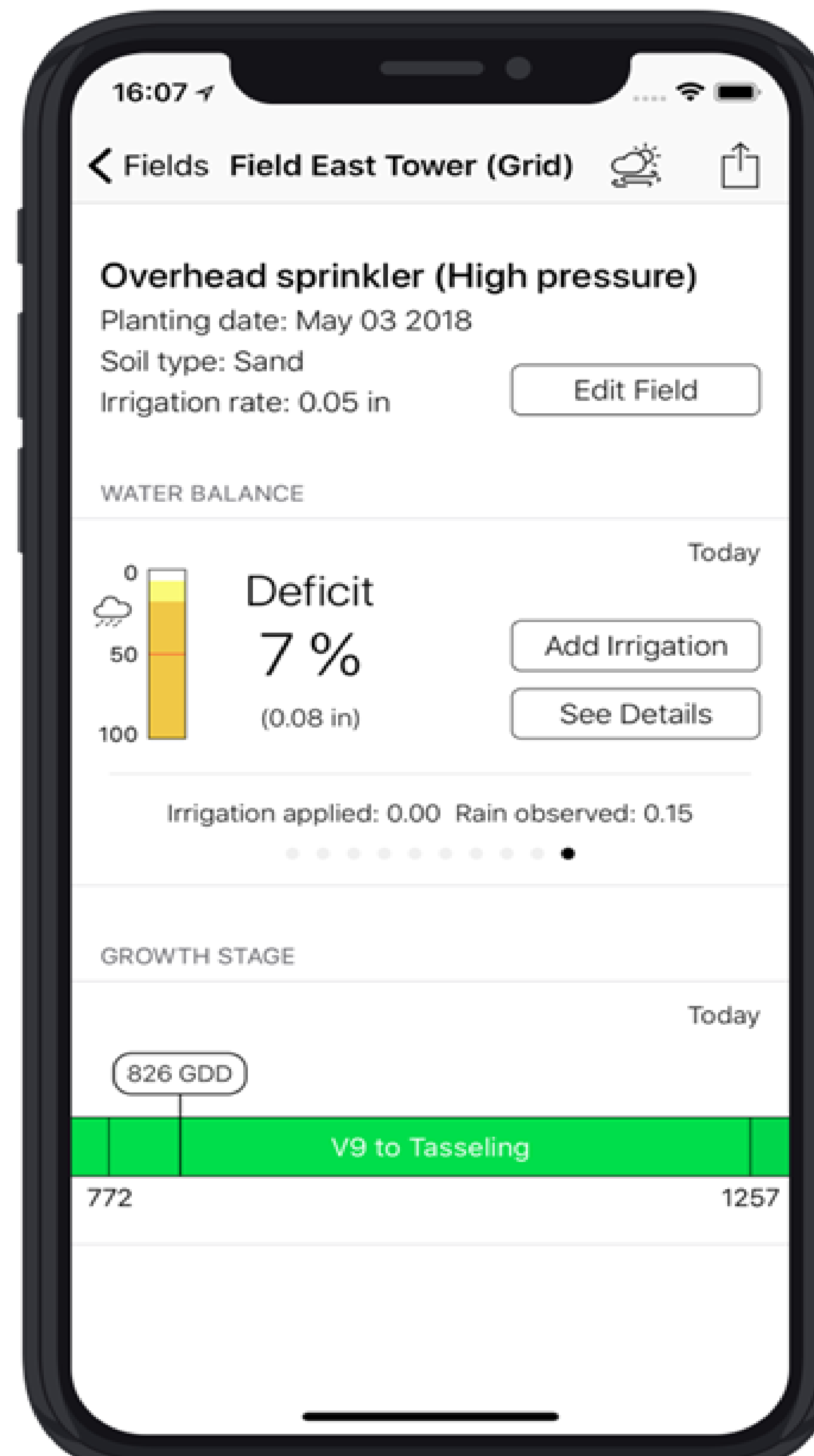
- I1 – Imitates growers practices
- I2 – Corn App
- I3 – Soil Moisture Sensors
- I4 – No irrigation



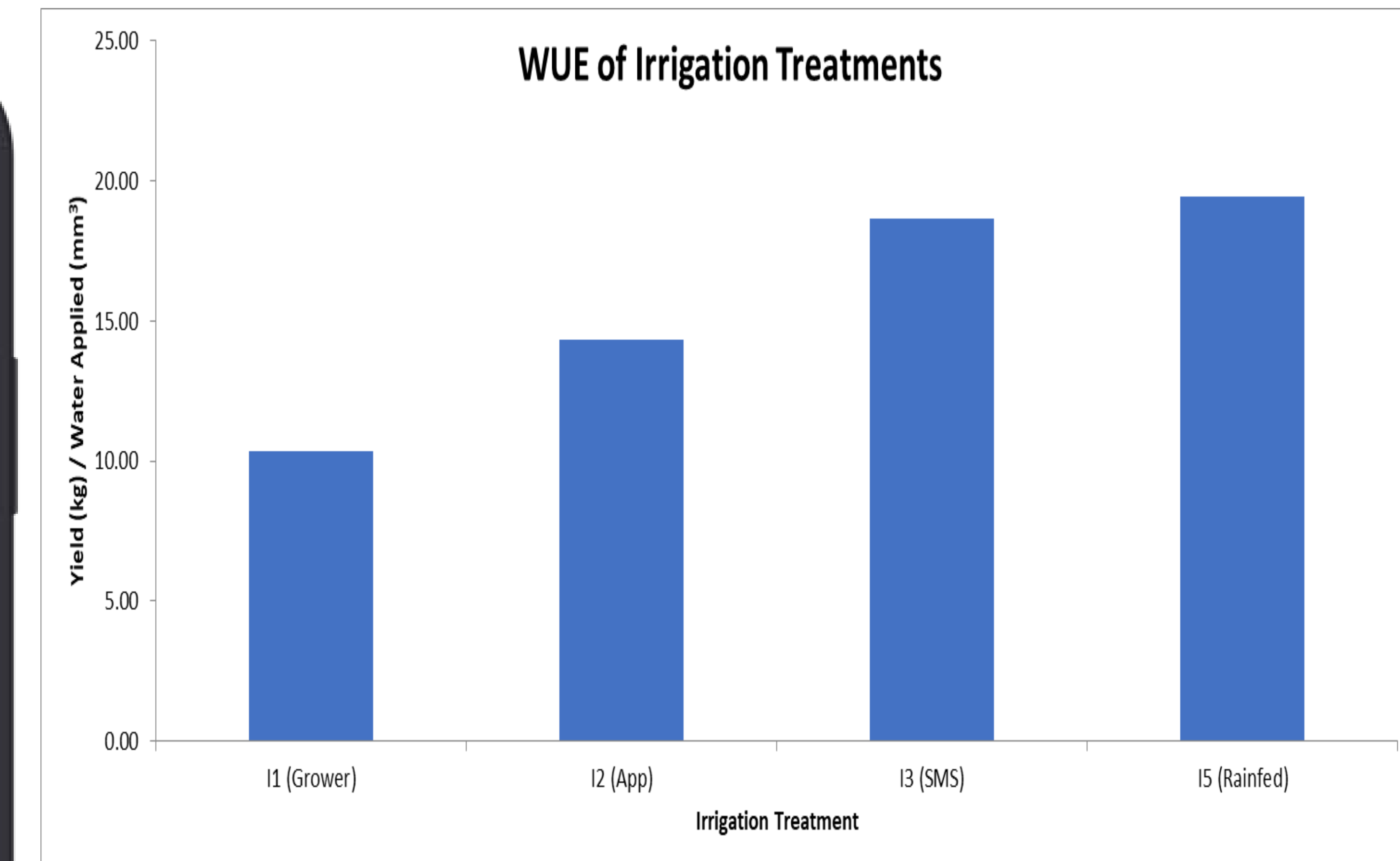
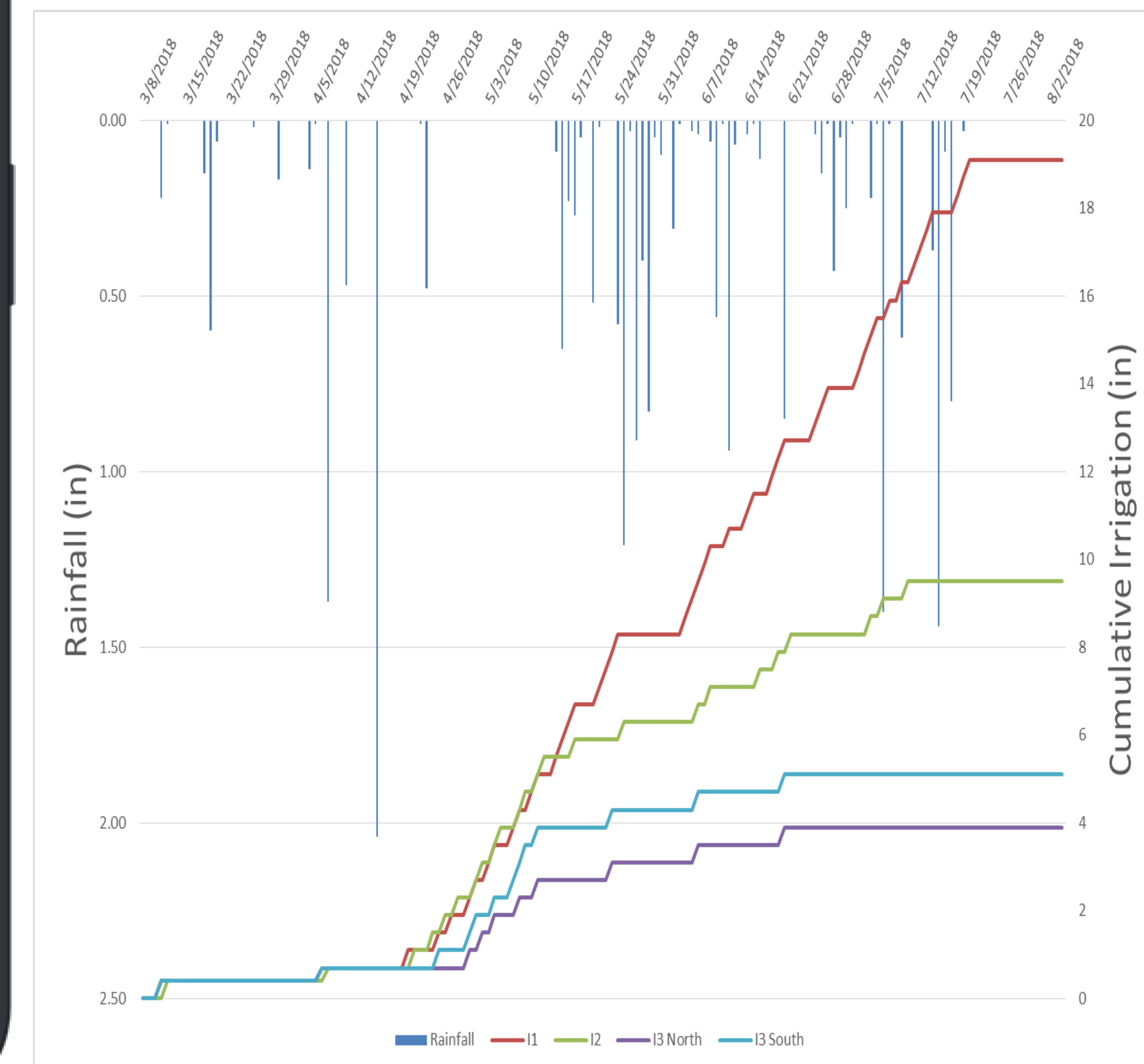
Water Use Efficiency (WUE)

Water use efficiency (WUE) for each treatment will be determined as the ratio of crop yield to irrigation water applied

$$WUE = \frac{\text{yield(Kg/ha)}}{\text{Total water applied}(cm^3)}$$



Results



Irrigation Treatment	% Increase in WUE compared to I1 (Grower)
I2 (App)	28%
I3 (SMS)	44%
I5 (Rainfed)	47%