Irrigation Management in Olive Orchards for Oil Production

Leandro Ravetti - Modern Olives

OOCC Olive Oil Day
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Irrigation

Overview of the Project

- Why should we irrigate?
- How much water should we apply?
- When should that water be applied?
- What if we don’t have enough water?
- How can we monitor the system?

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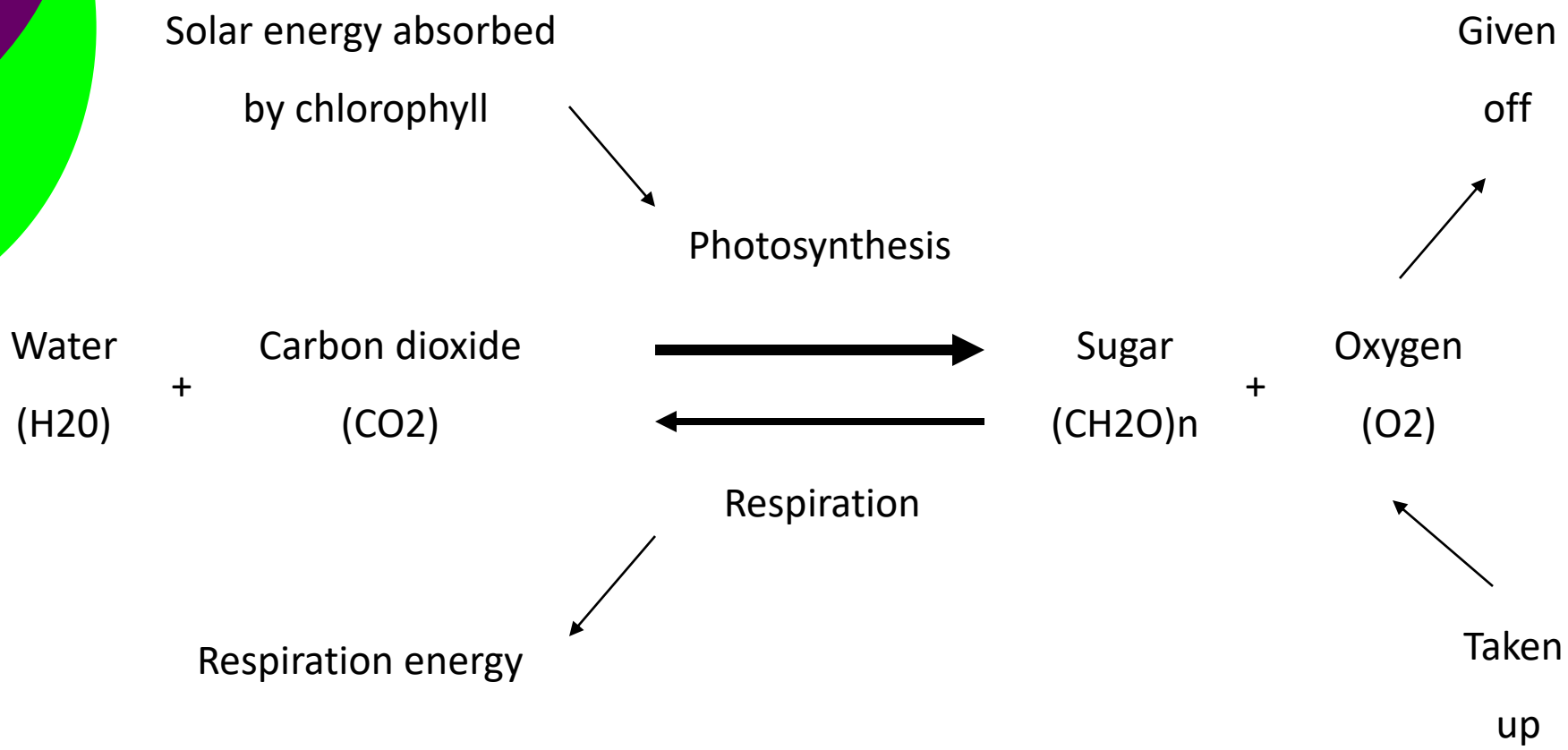
Why?


Solar energy absorbed
by chlorophyll
Given
off
Photosynthesis
Water
(H20)
+
Carbon dioxide
(CO2)
Sugar
(CH2O)n
+
Oxygen
(O2)
Respiration
Respiration energy
Taken
up

Why?

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Why?

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Why?

Impact on Profitability

Average oil yields (World):	~30 gal/ac
Average oil yields (California):	~120 gal/ac
Best performing groves:	~300 gal/ac

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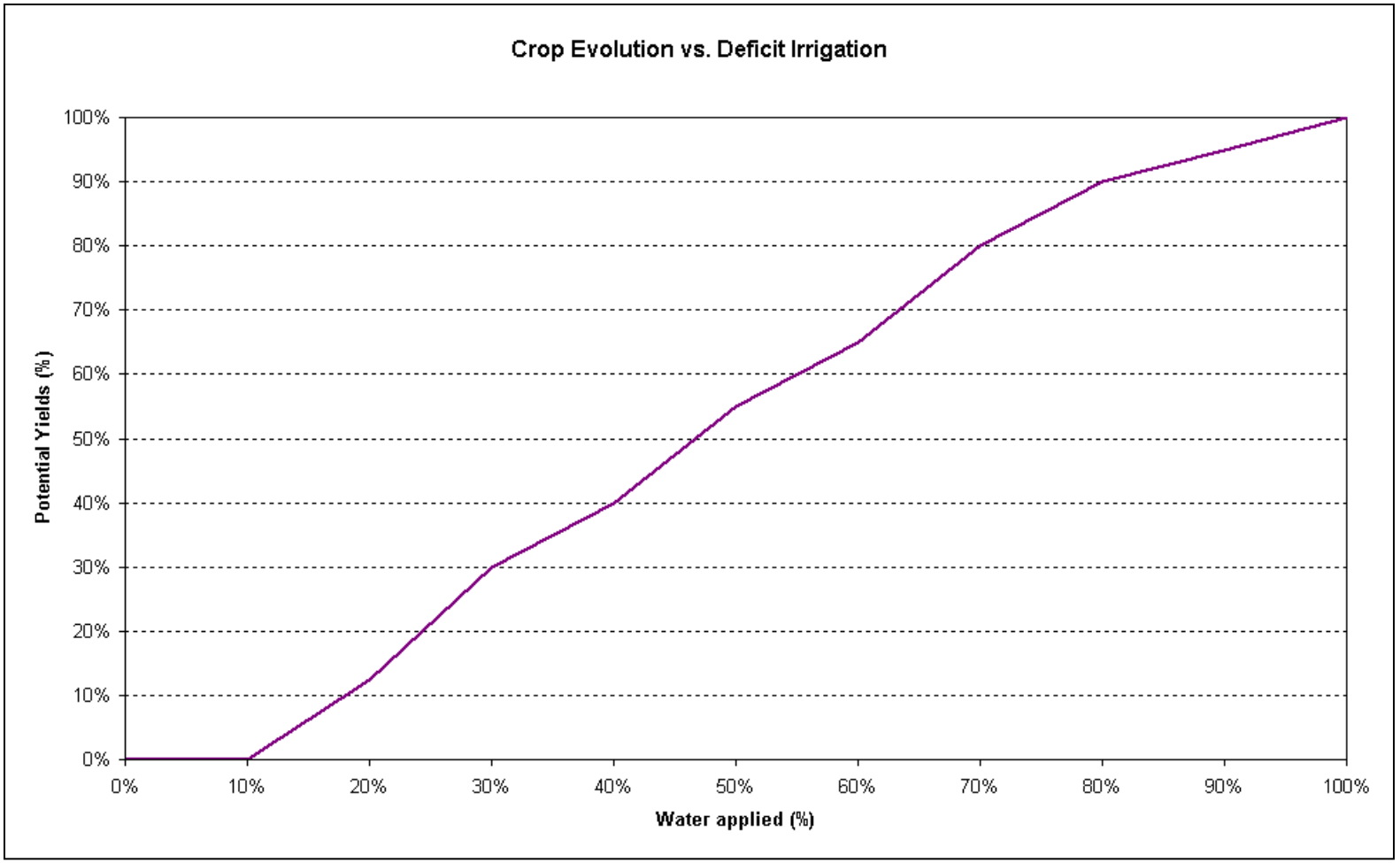
Why?



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How much?

- Irrigation (+)
- Rainfall (+)
- Evaporation (-)
- Transpiration (-)

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How much?

Irrigation requirements = ETo x Kc x Kr x L.R./ I.E. – E.R.

ETo:	Reference evapotranspiration.
Kc:	Crop factor.
Kr:	Tree size factor.
L.R.:	Salt leaching requirements.
I.E.:	Irrigation system efficiency.
E.R.:	Effective rainfall.

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ETo

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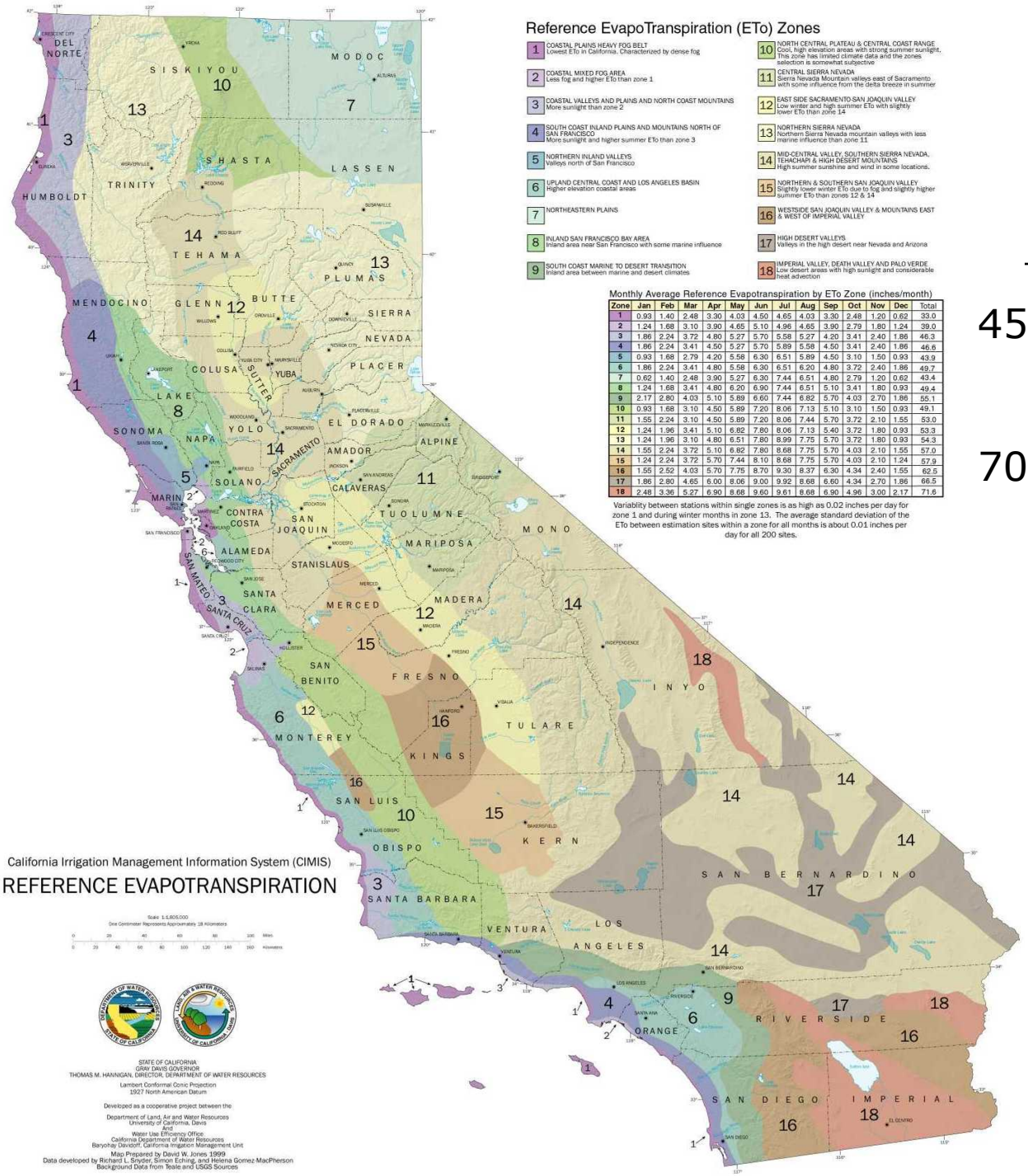

45 in/year

70 in/year

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Kc

Season	Semi-arid	Arid
Spring	0.65-0.75	0.45-0.55
Summer	0.50-0.55	0.50-0.55
Autumn	0.60-0.70	0.55-0.65
Winter	0.65-0.75	0.40-0.55

45 in/year x 0.70 = 32 in/year
70 in/year x 0.55 = 38 in/year

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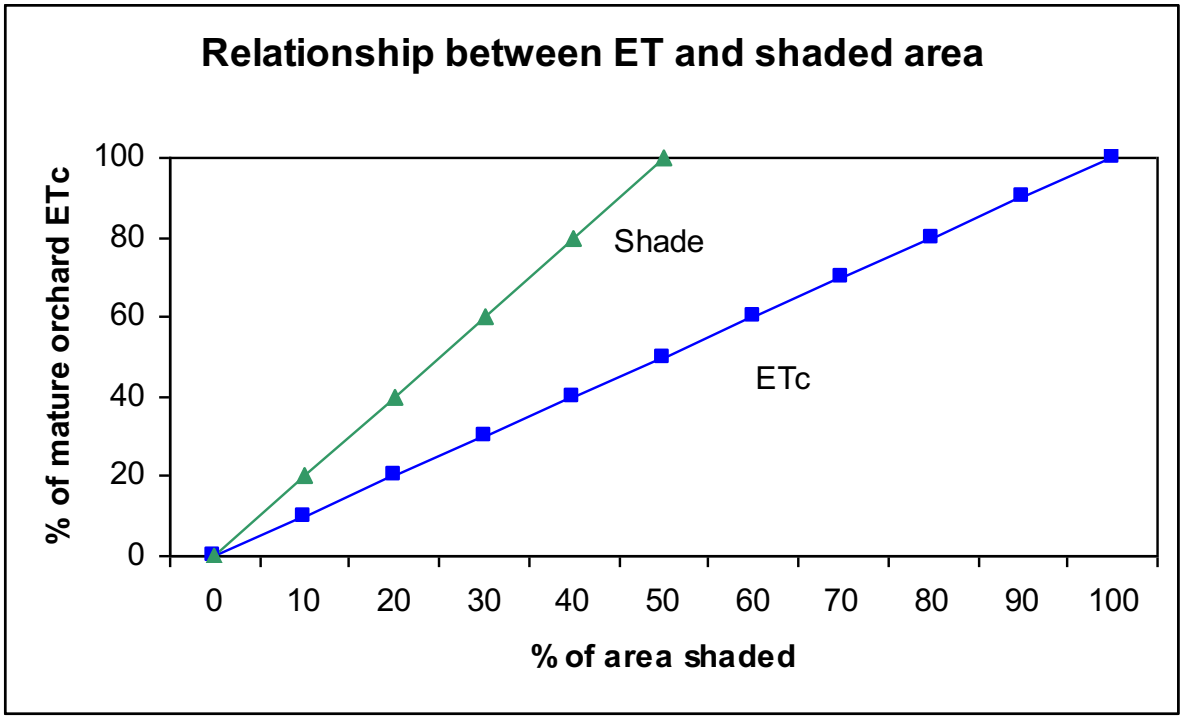
Kr



ETc area factor (Kr) = 2 x shaded area

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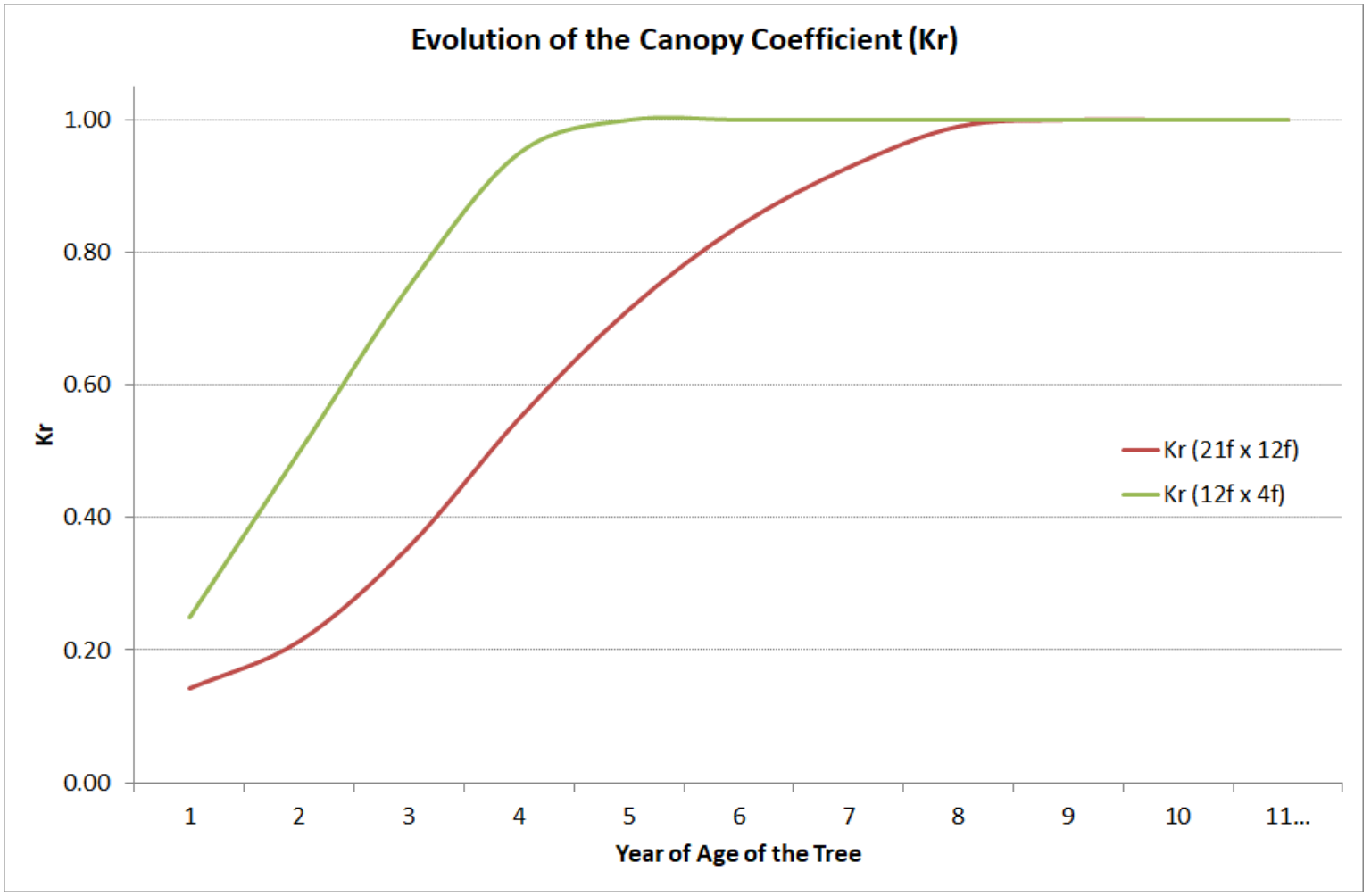
Kr



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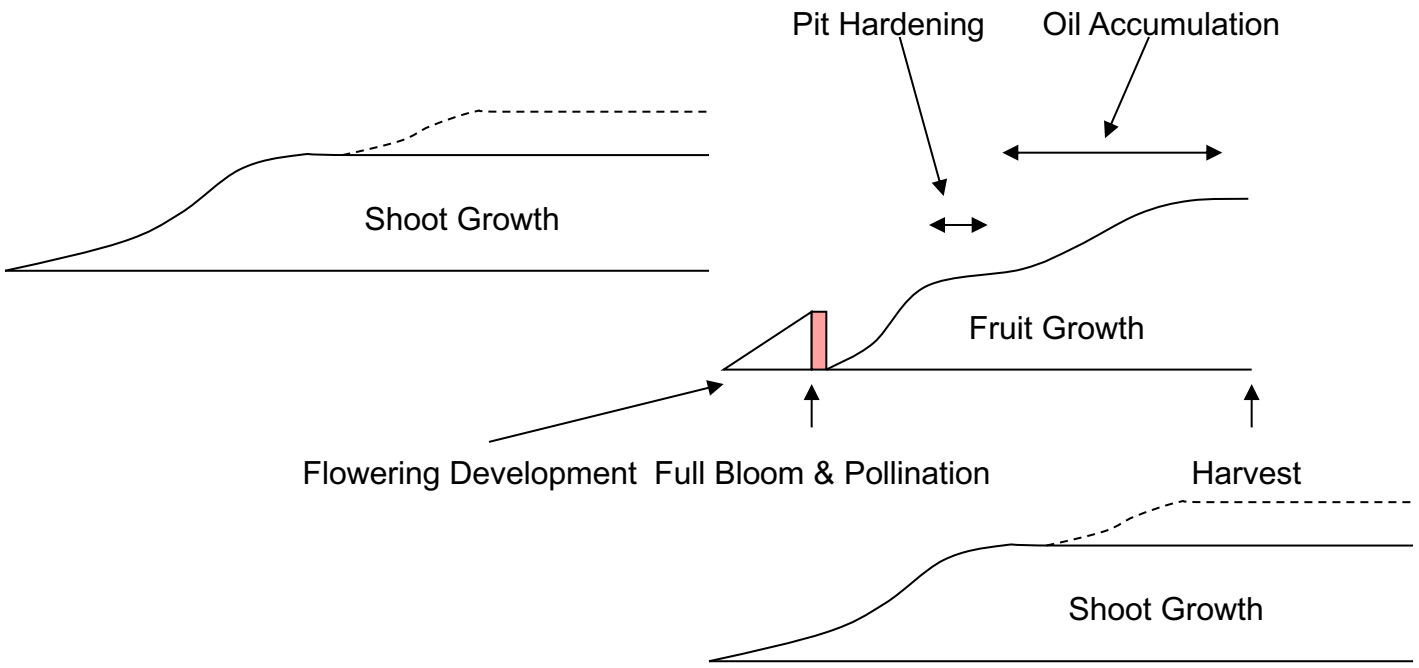
When?

OLIVE GROWING CYCLE

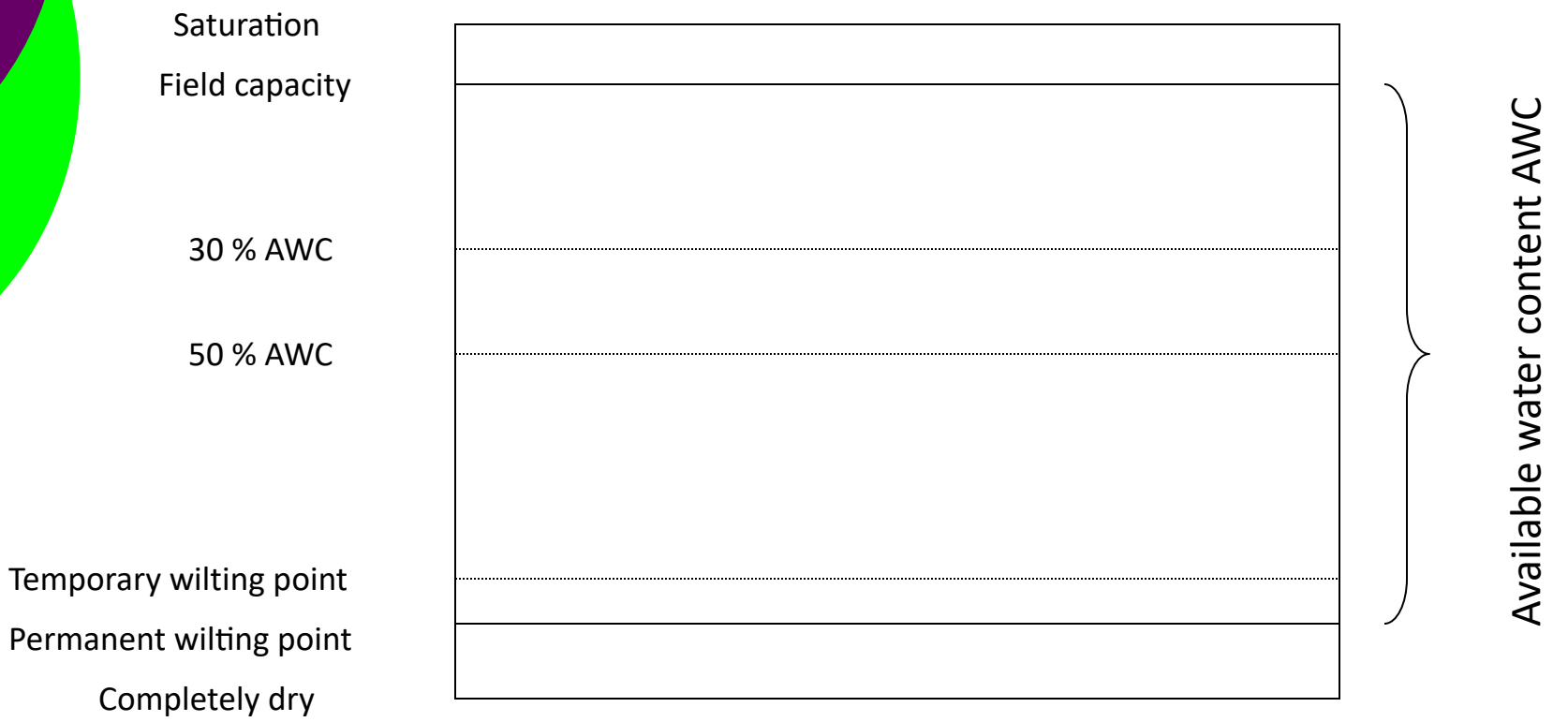


Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter

Year n

Year n + 1

Irrigation frequency



Soil moisture monitoring

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Soil moisture monitoring

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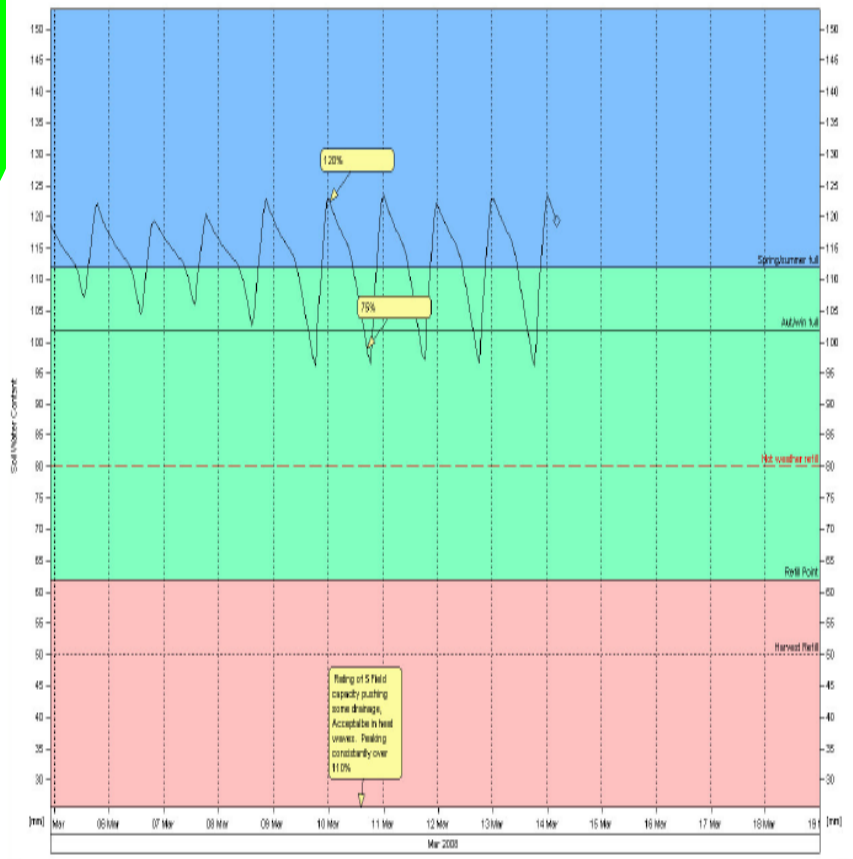
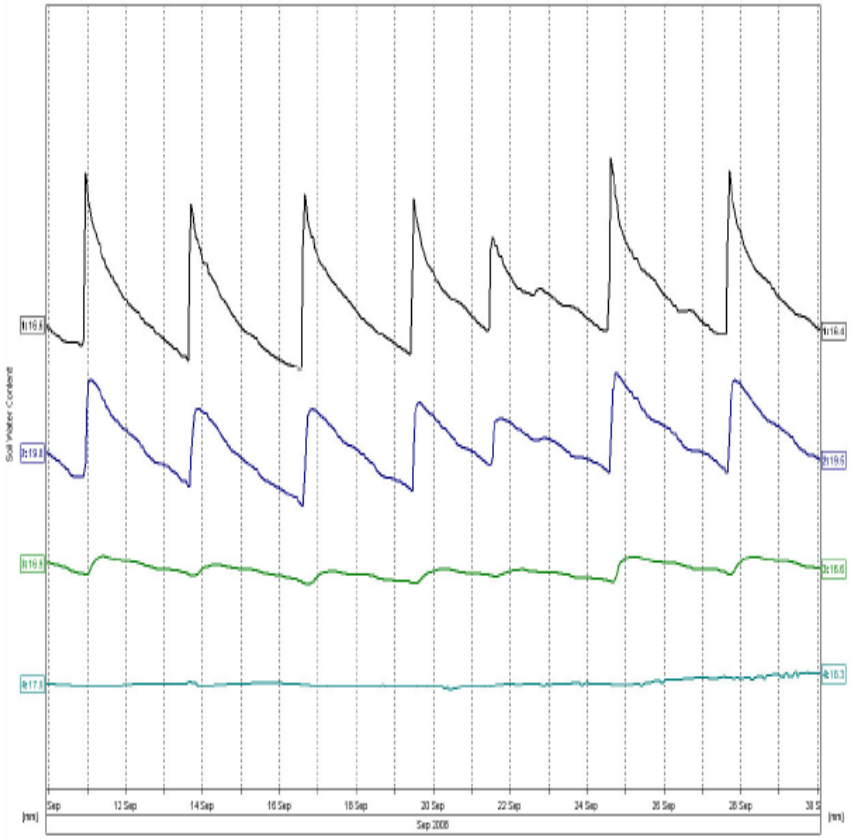
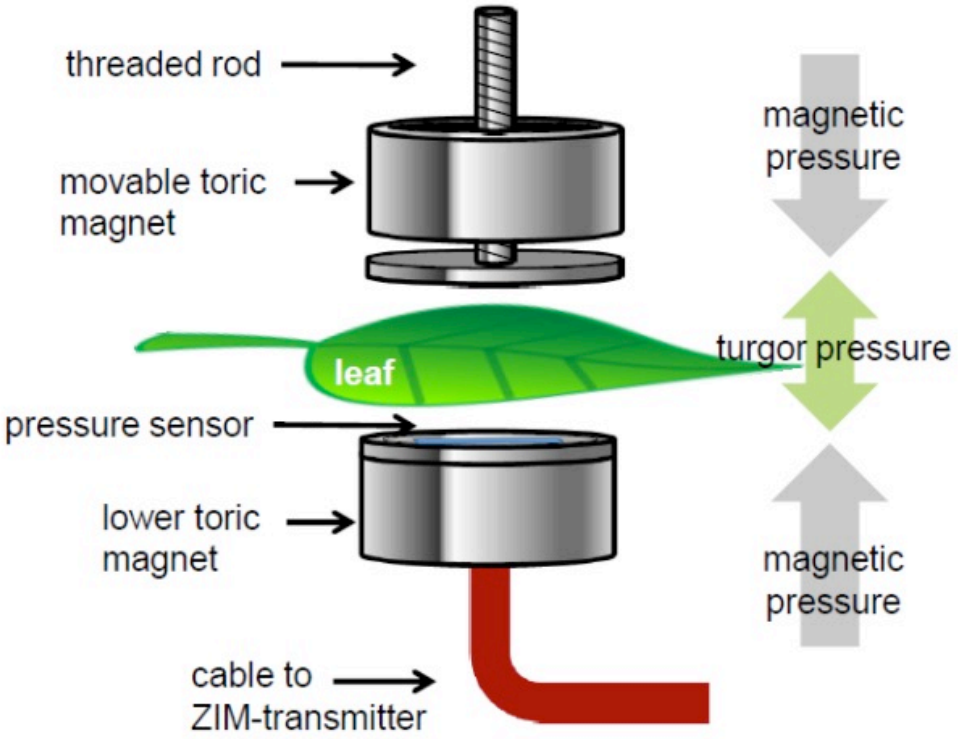
Soil moisture monitoring





Direct Plant Monitoring



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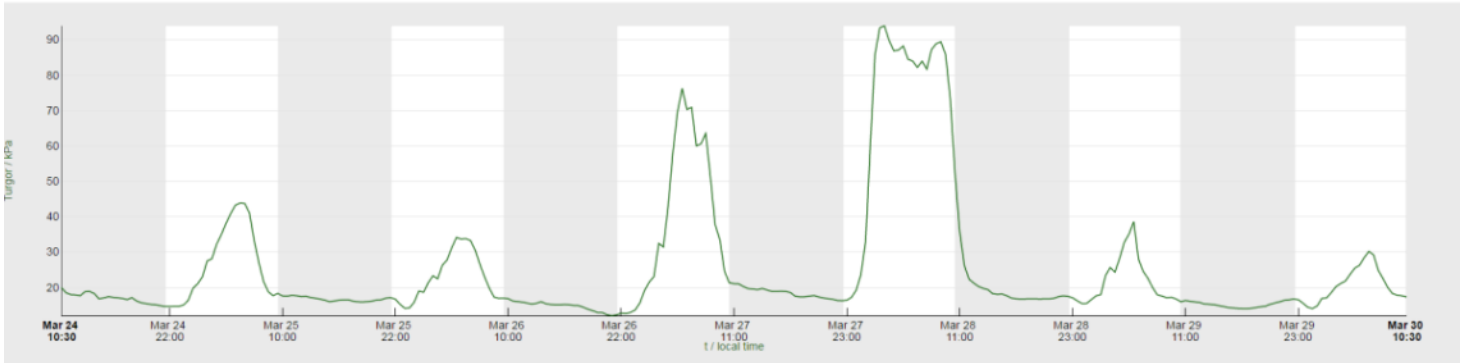
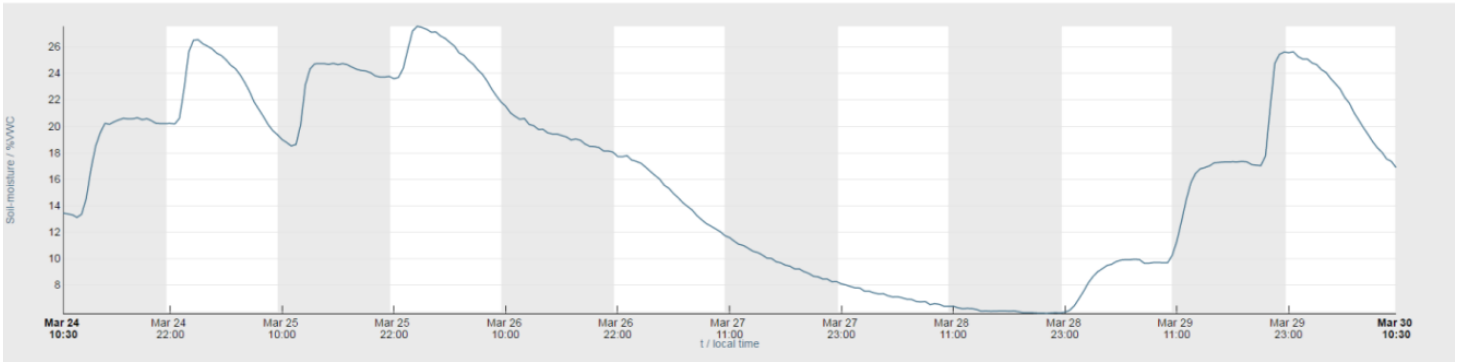
Direct Plant Monitoring

Field: Plot 1 , ZIM-probe (turgor): 6321 , Channel : 2



Field: Plot 1 , Soil-moisture probe: 773 , Channel : 1



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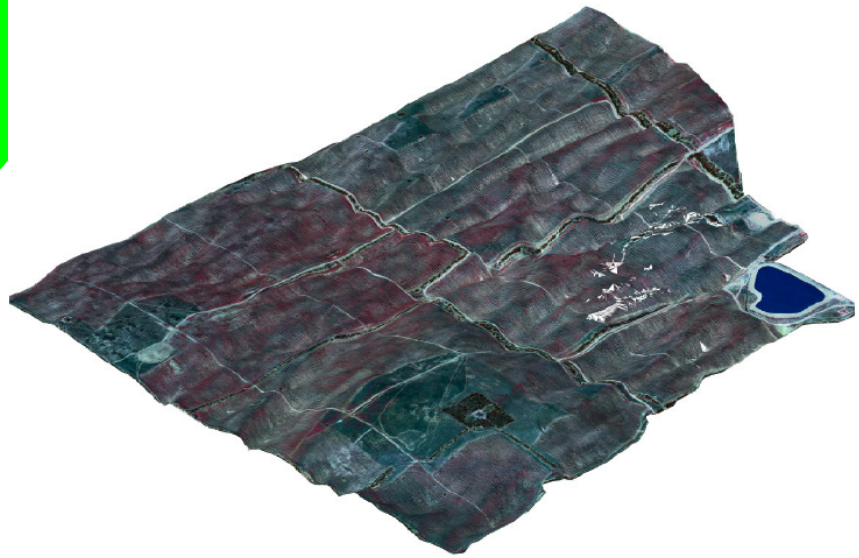
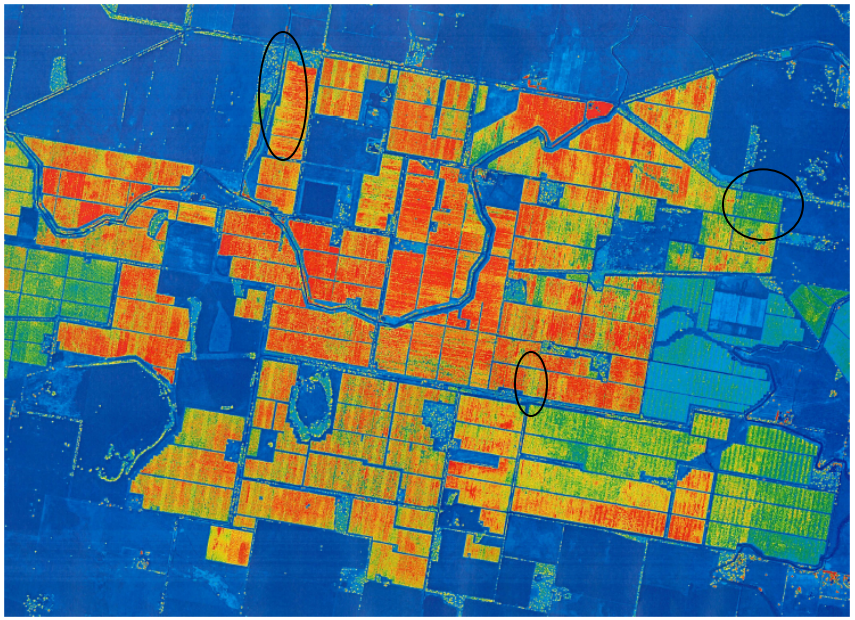
Satellite/aerial monitoring





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Irrigation Best Management Practices Summary for Growers

- Rate irrigation highly within the management system.
- Get to know the soils on the property.
- Design and maintain irrigation systems correctly.
- Monitor all aspects of each irrigation event.
- Use objective monitoring tools to schedule irrigation
- Use more than one tool for scheduling irrigation.
- Retain control of irrigation scheduling.
- Remain open to new information.

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Practices that enhance profitability

- Careful site (environmental) selection.
- Careful varietal selection and grove design.
- Technically sound irrigation scheduling and monitoring.
- Technically sound fertilization scheduling and monitoring.
- Adequate canopy management.
- Adequate integrated pest and disease management.
- Efficient and timely harvest operation.
- Efficient and well managed processing operation.

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Thank You

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