

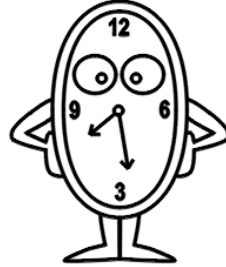


Variability reduction using variable rate drip irrigation (VRDI) in Vineyard

Dr. Itamar Nadav, R&D Netafim

IRRIGATION DILEMMAS:

1. When?



2. How much?



3. Where???

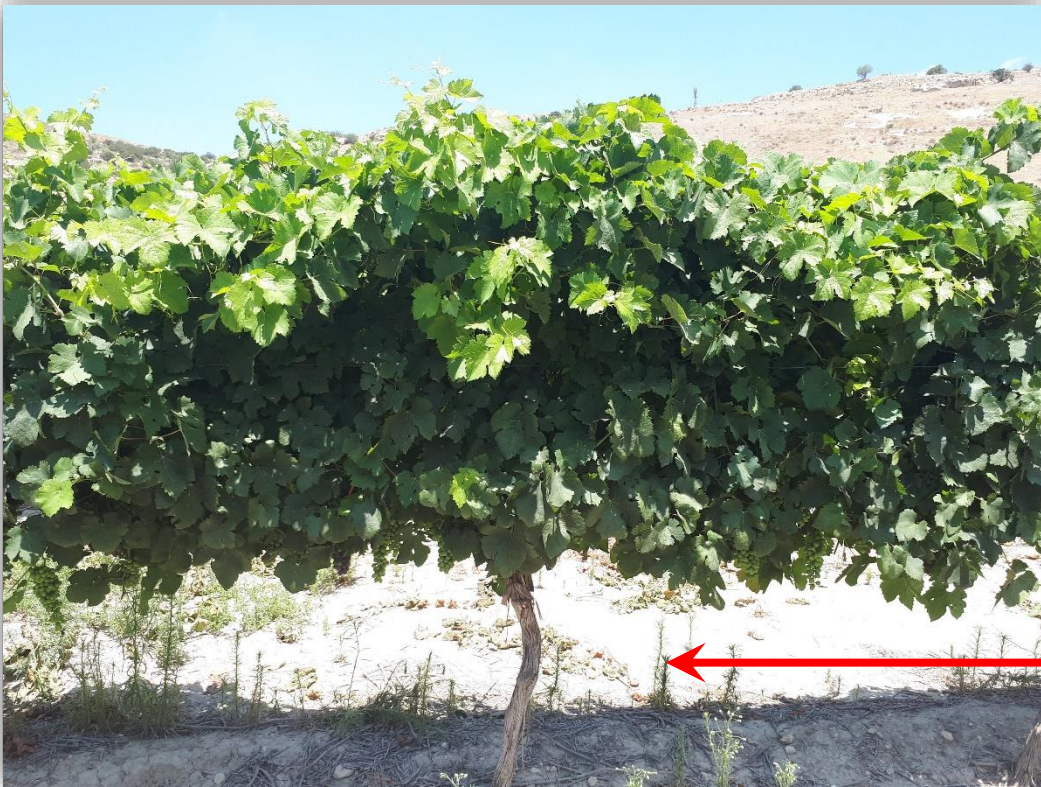


Vineyard in Bavaria (Dr. Daniel Heßdörfer)



OVER AND UNDER IRRIGATED VINES

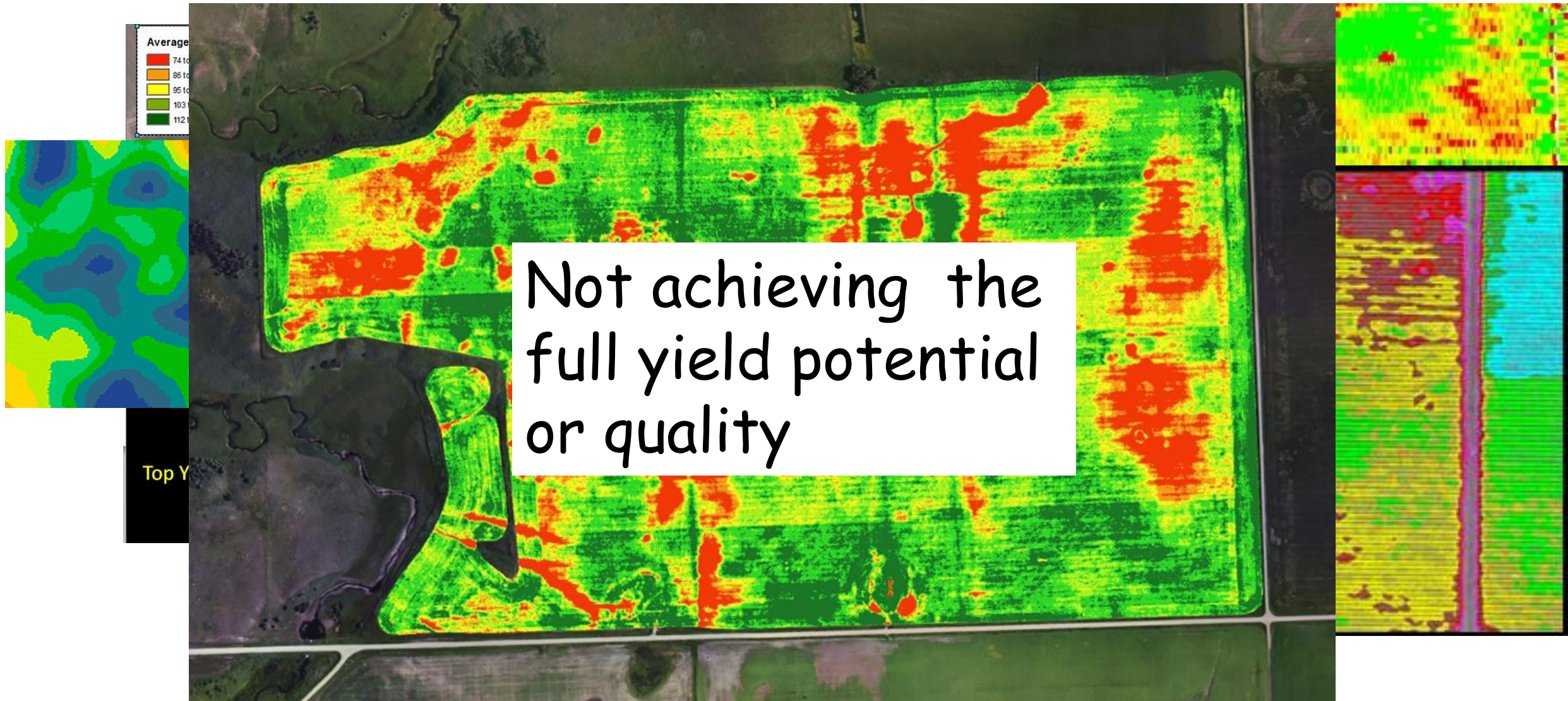
Well watered Vine



Stressed Vine



VARIABILITY



OBJECTIVES

- VRDI aims to eliminate/reduce spatial variability
- Variability in yield (increase yield)
- Variability in quality

Causes for variability:

- Sloped plots
- Different types of soils
- Soil depth
- other

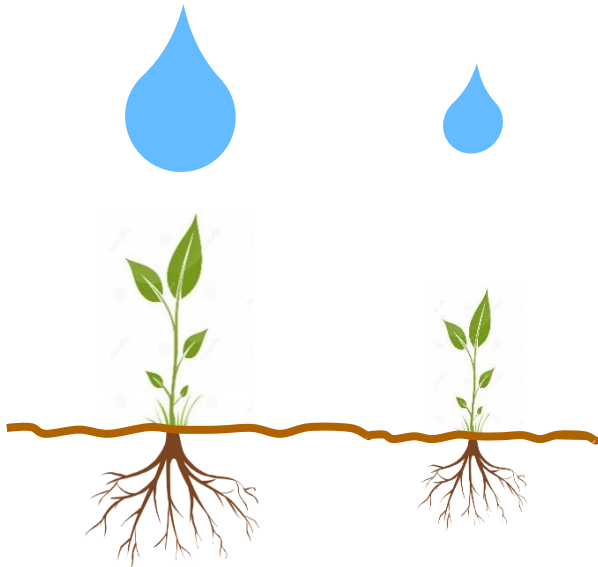
} Available water



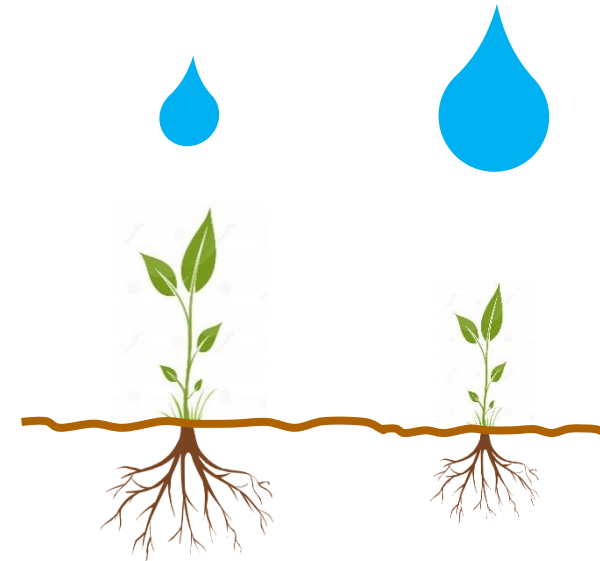
DIFFERENT APPROACHES FOR VRI



The capitalistic approach
(increase variability)

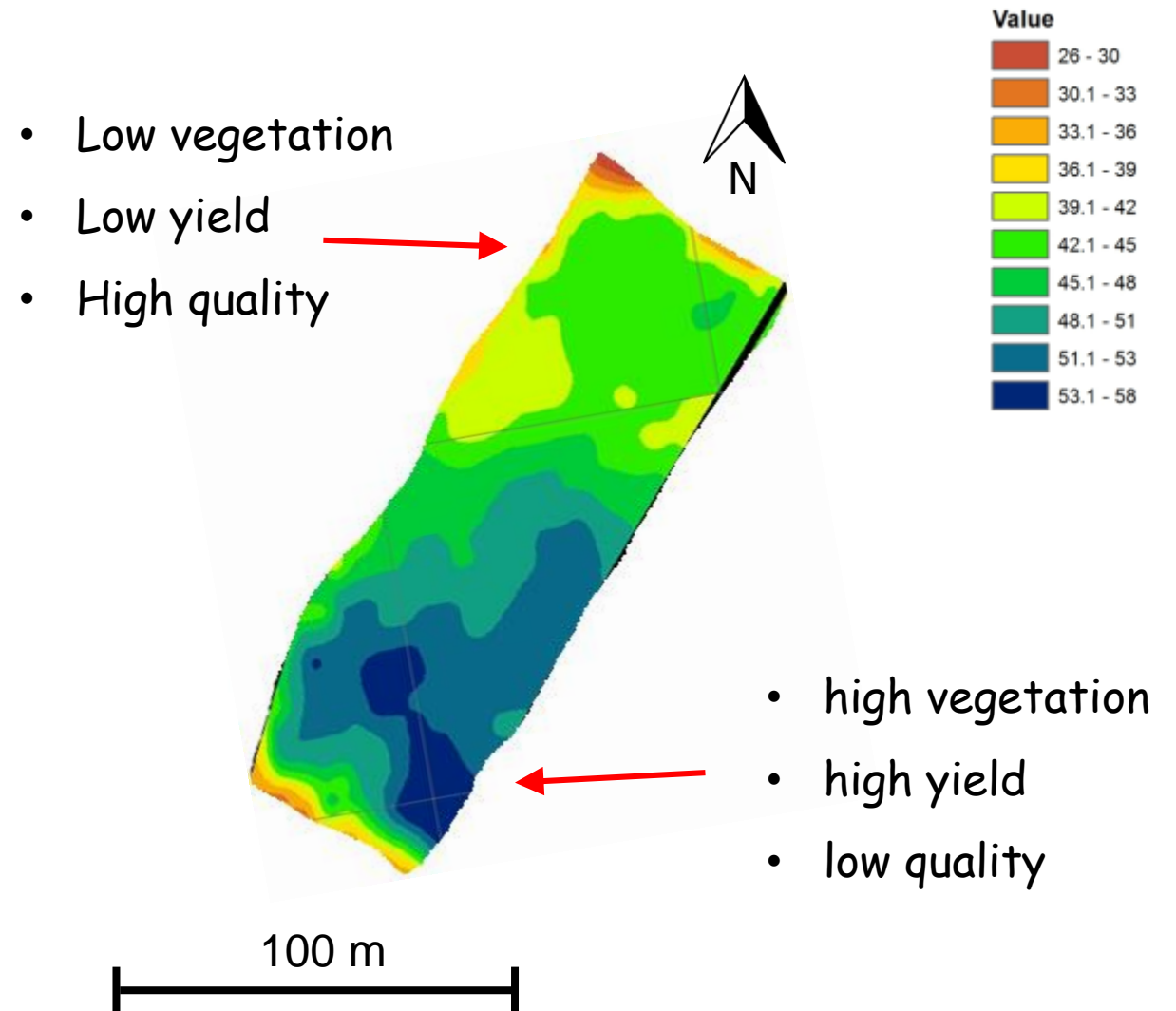


The socialistic approach
(reduce variability)



CASE STUDY: VINEYARD

- 2006 Syrah variety vineyard.
- 1.2 hectare.
- Variable vegetation, yield and quality at the same plot.

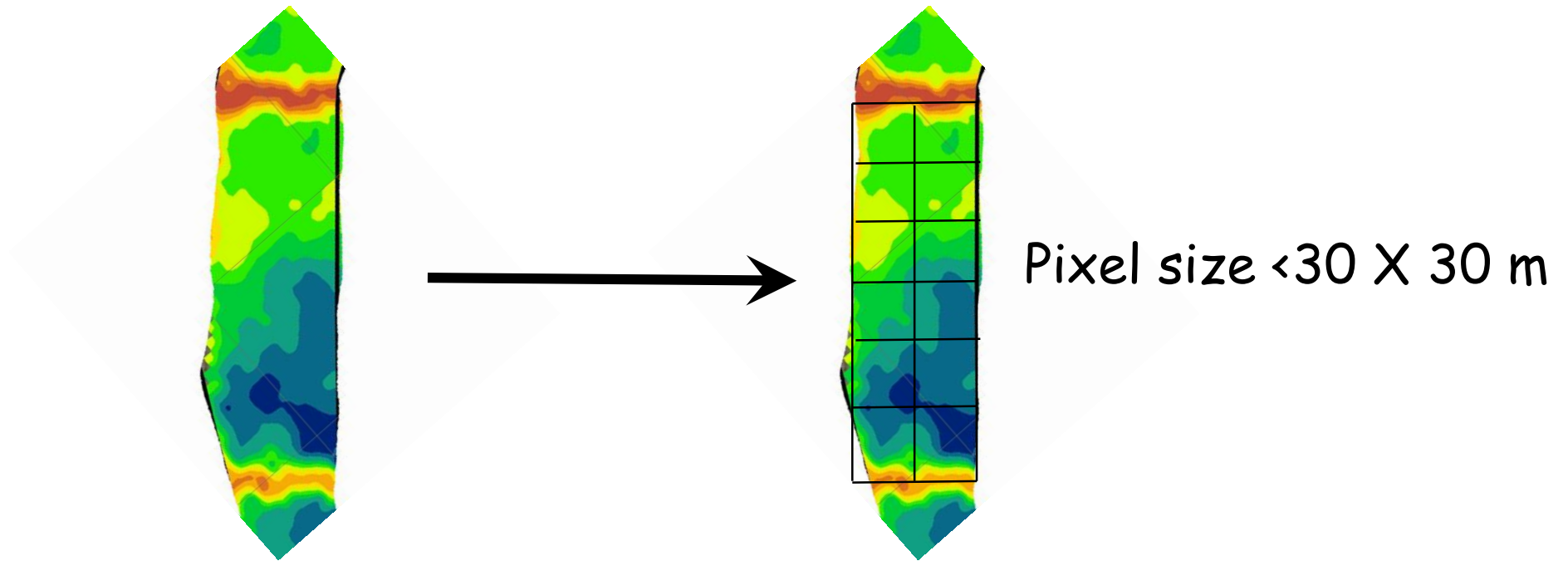


EXPERIMENT DURATION

- 2014- conventional drip irrigation (one zone)
- 2016- VRDI irrigation (12 zones)
- 2017- VRDI irrigation (12 zones)
- 2018- conventional drip irrigation (one zone)

THE PROBLEM: VARIABILITY

The solution: VRDI

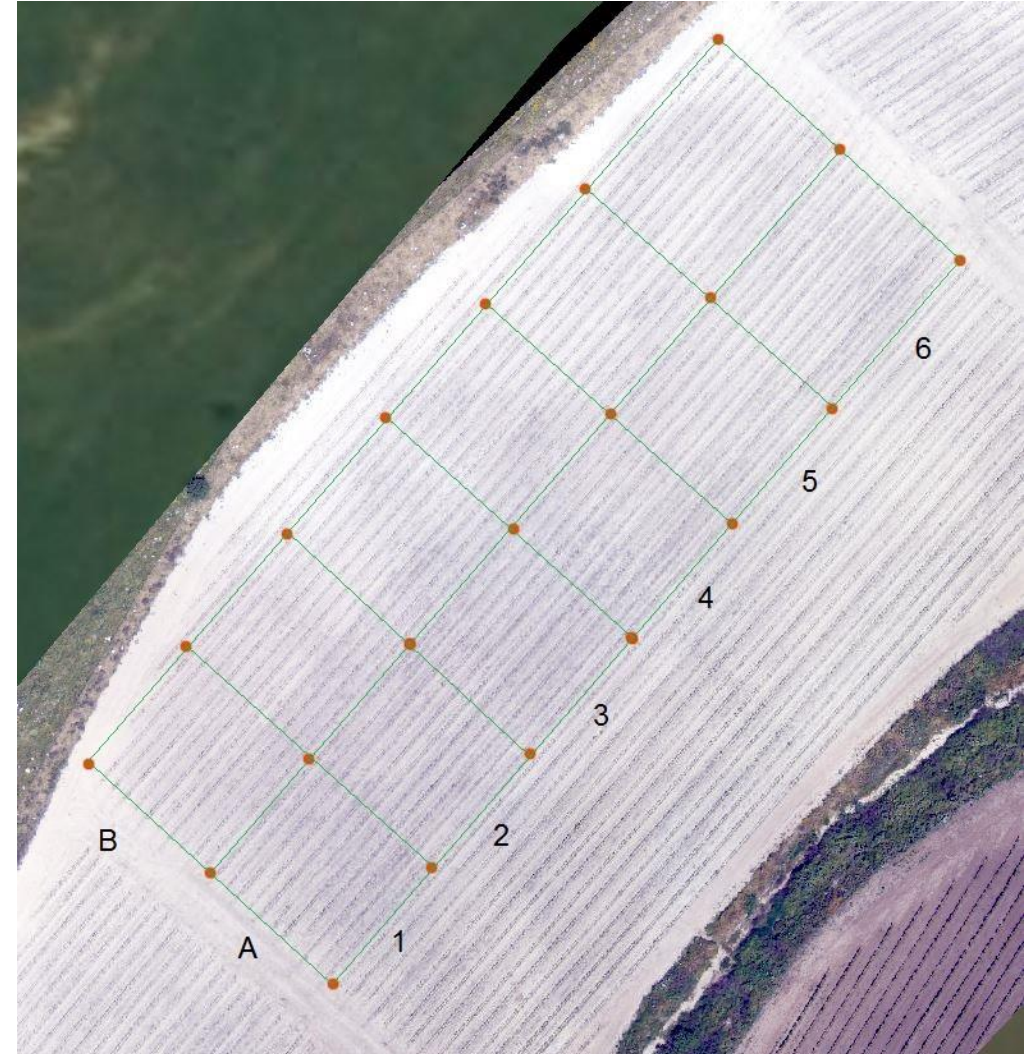


1 irrigation zone

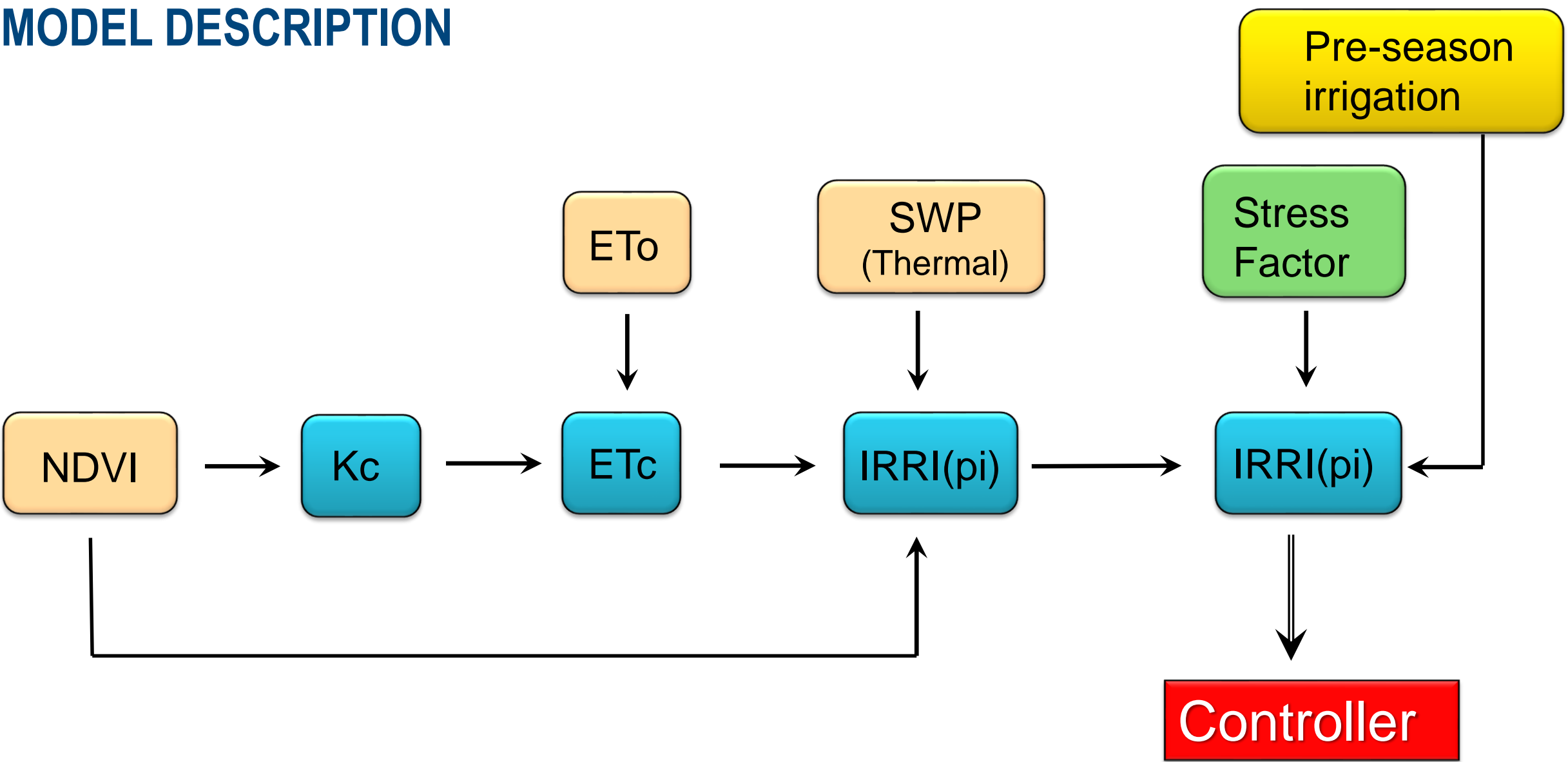
12 irrigation zones

VRDI SUB PLOTS

- Dividing the plot into 12 sub irrigation zones (A1...A6; B1...B6).
- Each subplot can be irrigated separately.
- Each irrigation subplots is irrigated to achieve goal yield and quality.

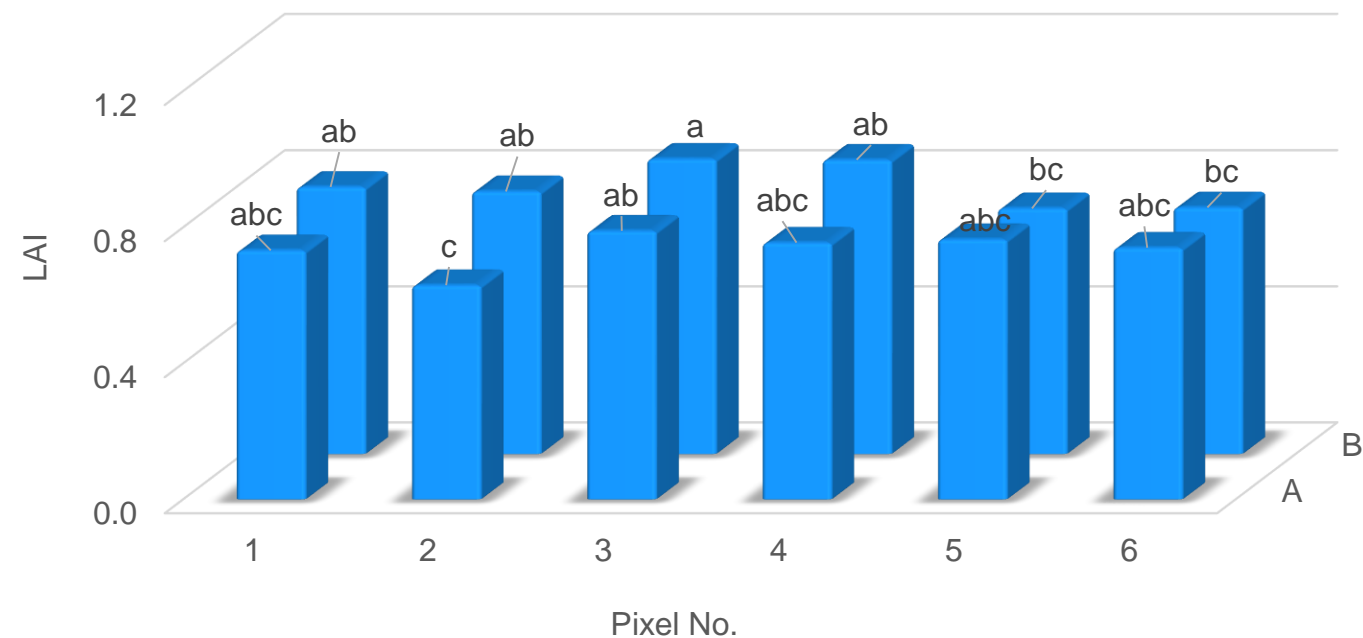


MODEL DESCRIPTION



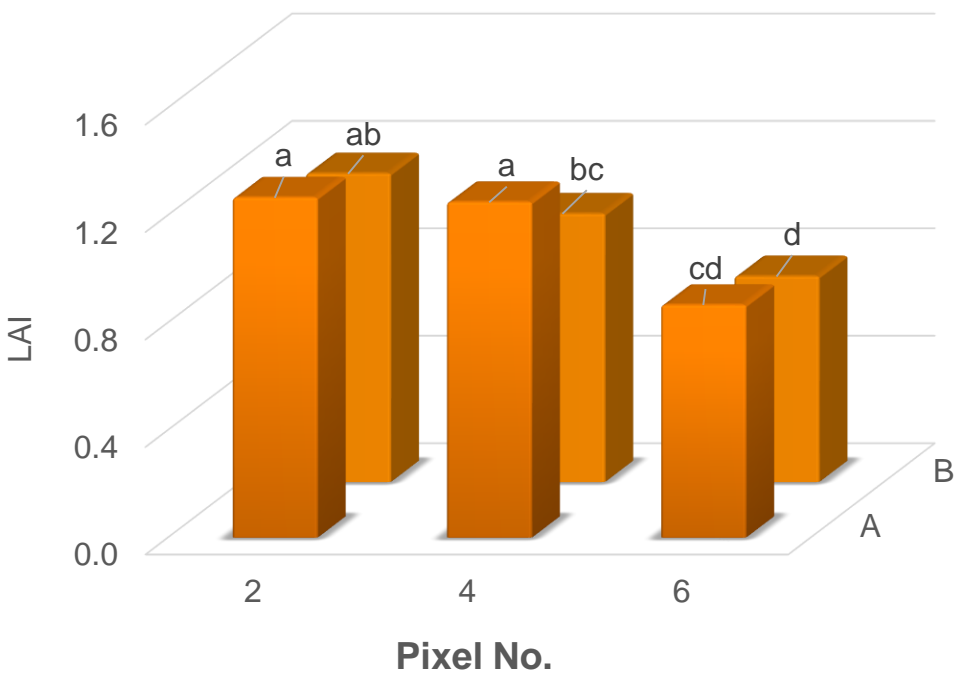
PHYSIOLOGICAL MEASUREMENTS- LAI

VRDI (2016)



South → North

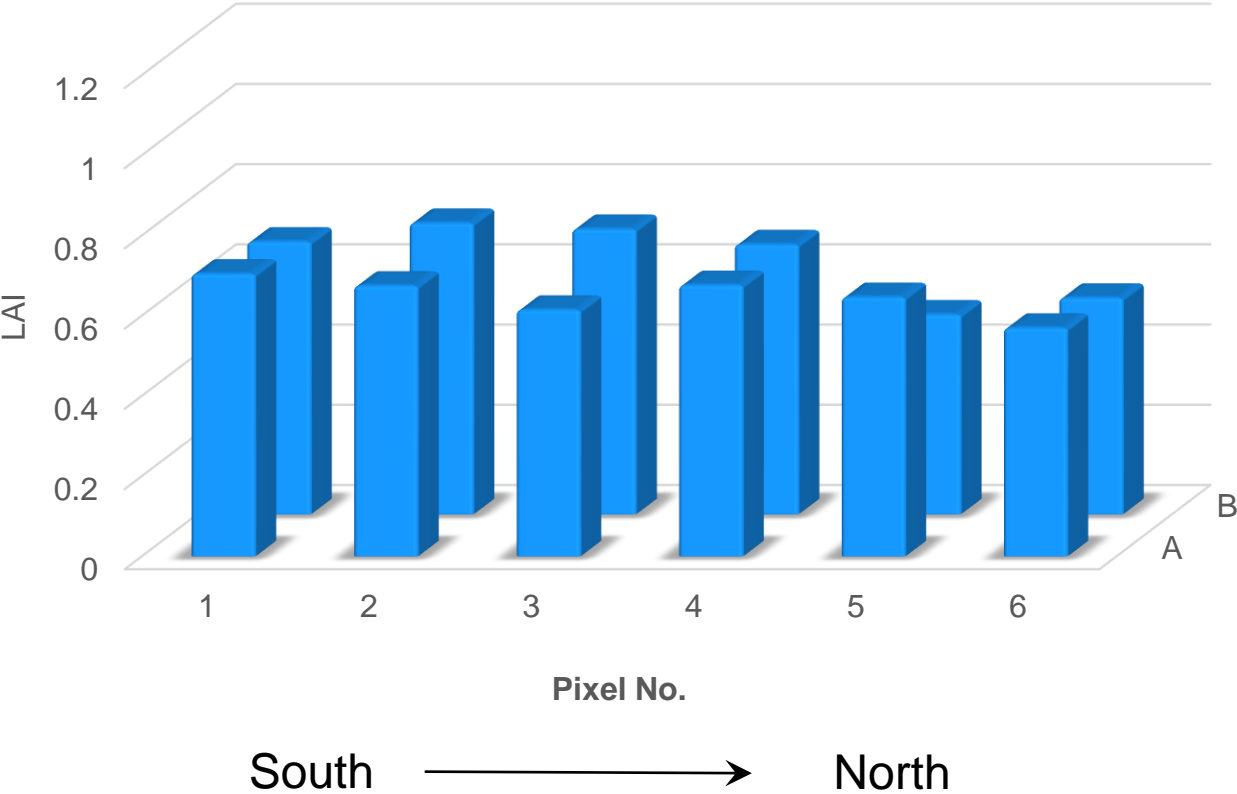
Uniform irrigation (2014)



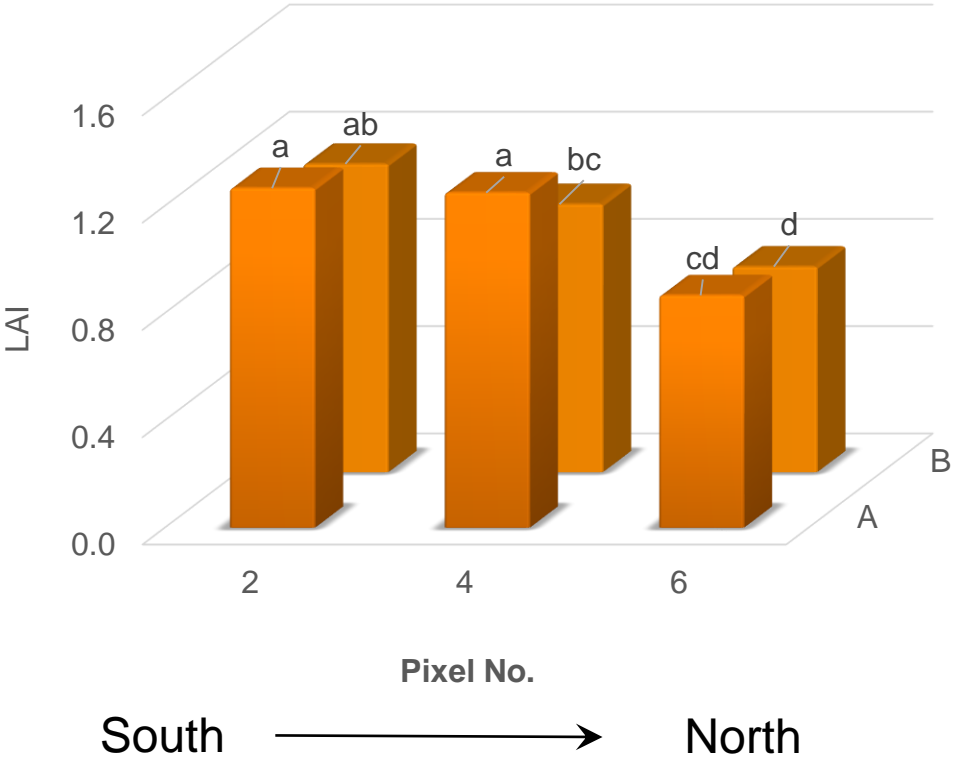
South → North

PHYSIOLOGICAL MEASUREMENTS- LAI

VRDI (2017)

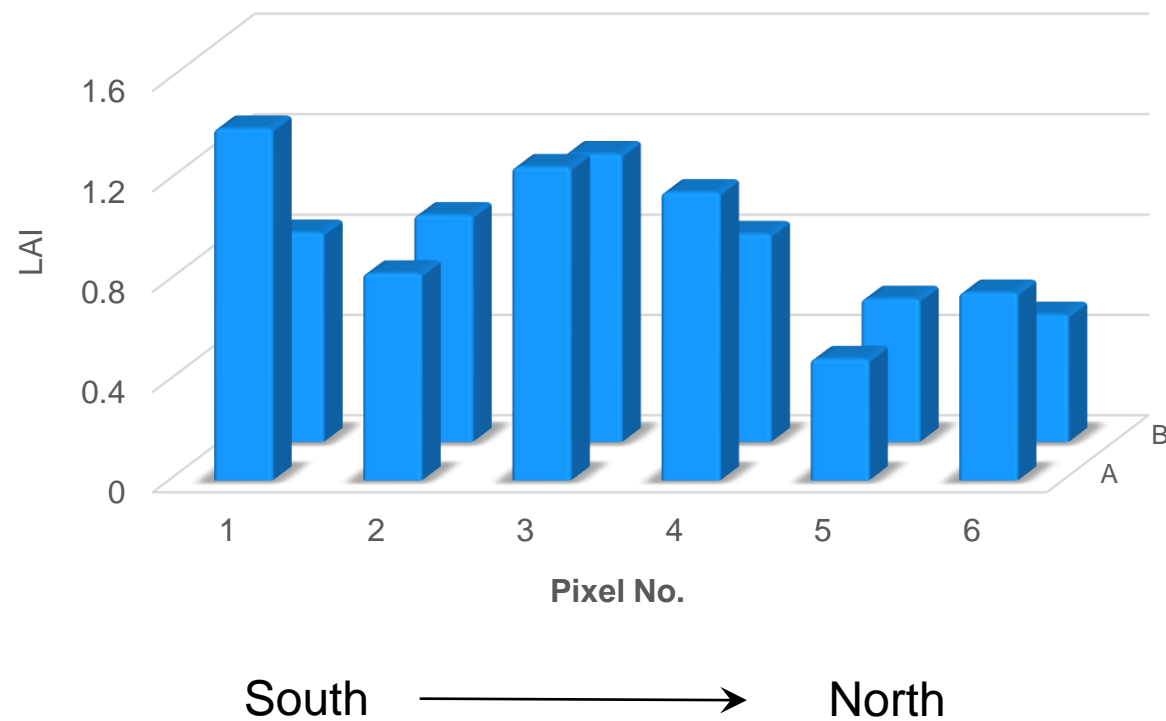


Uniform irrigation (2014)

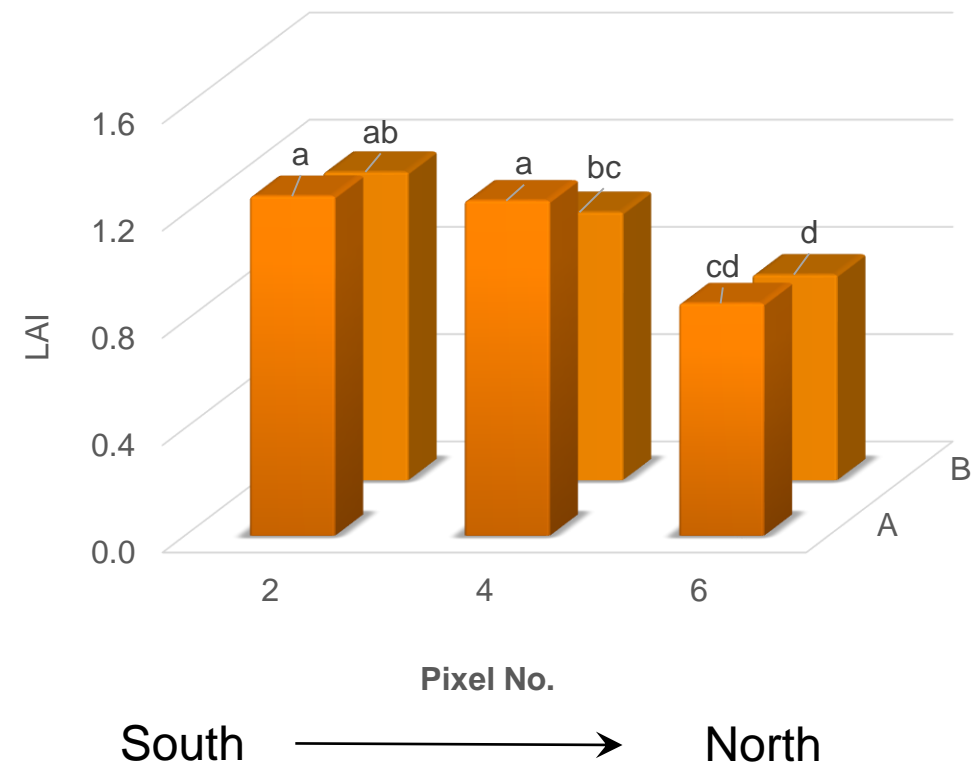


BACK TO DIFFERENT CANOPY SIZE

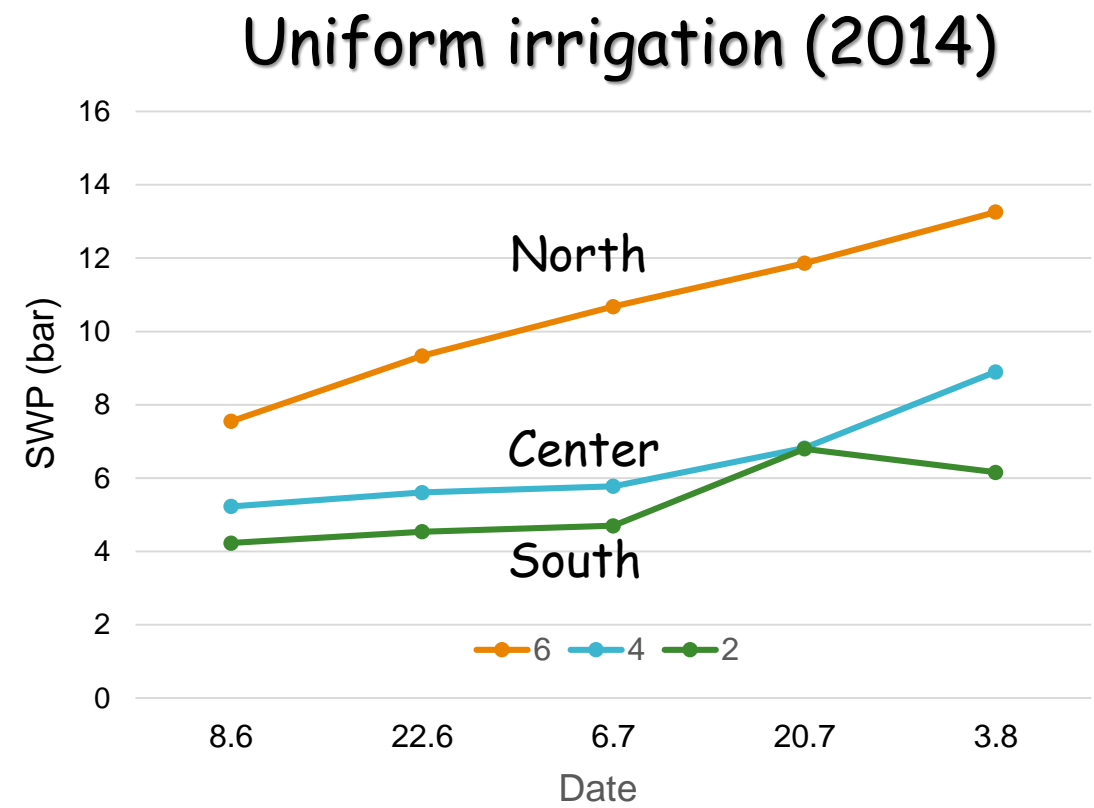
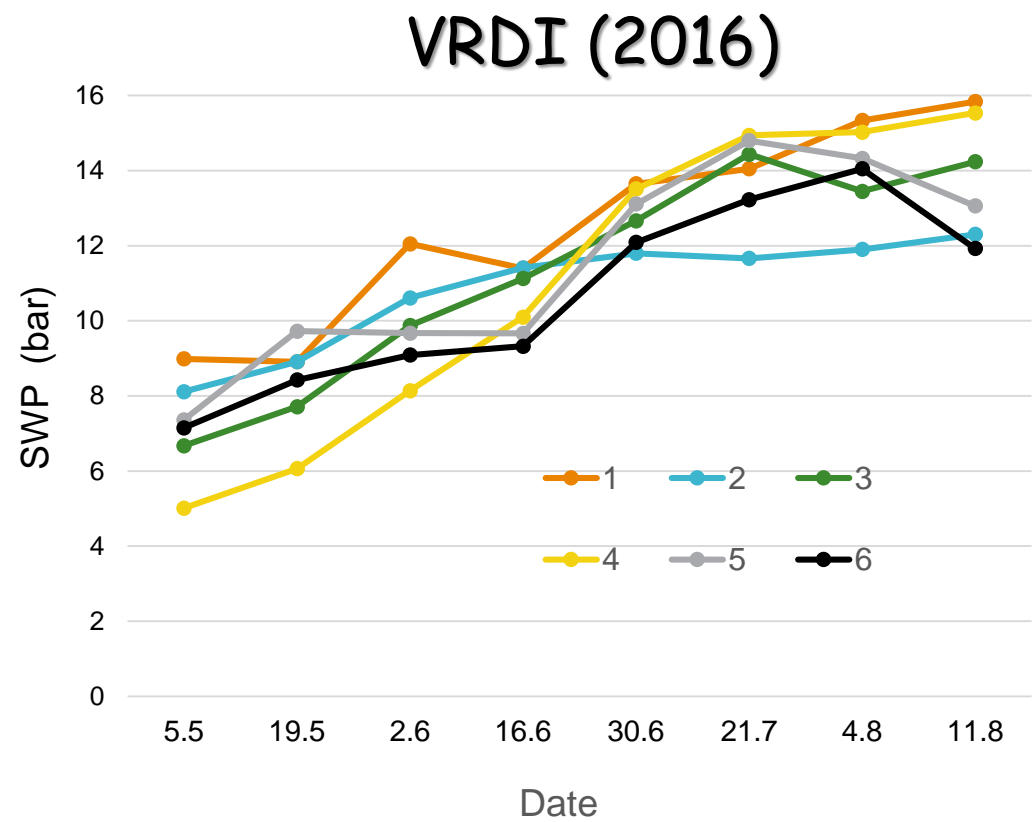
Uniform irrigation (2018)



Uniform irrigation (2014)

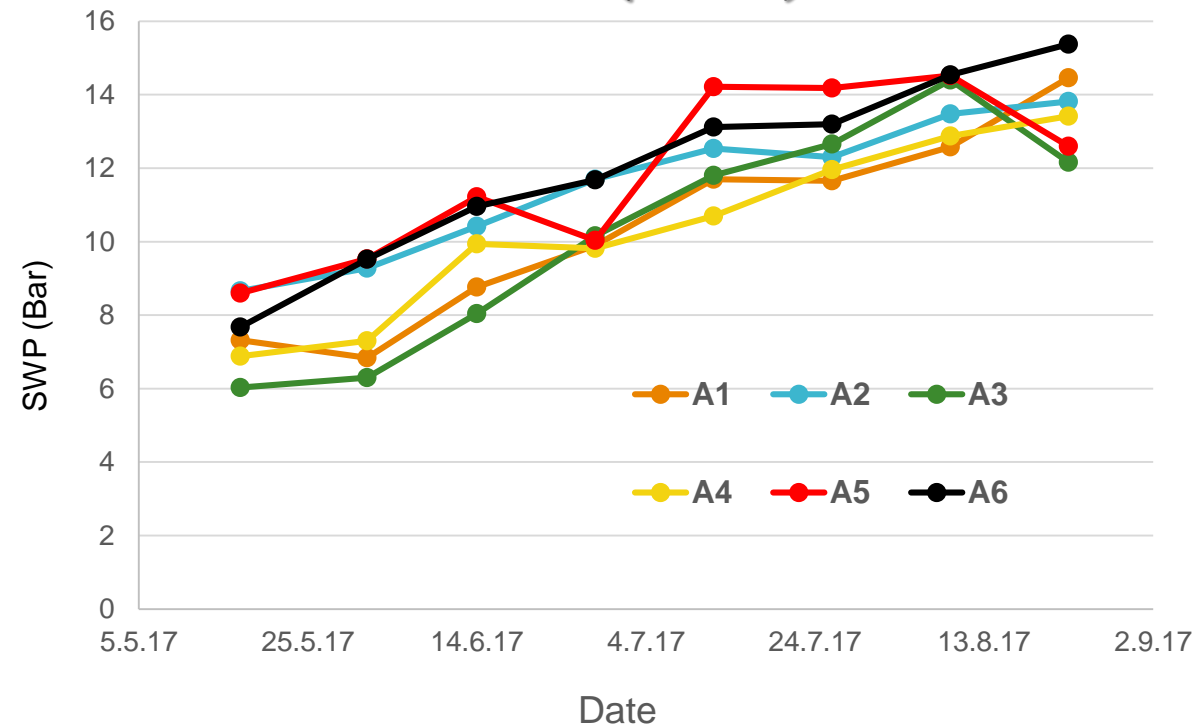


PHYSIOLOGICAL MEASUREMENTS- WATER POTENTIAL

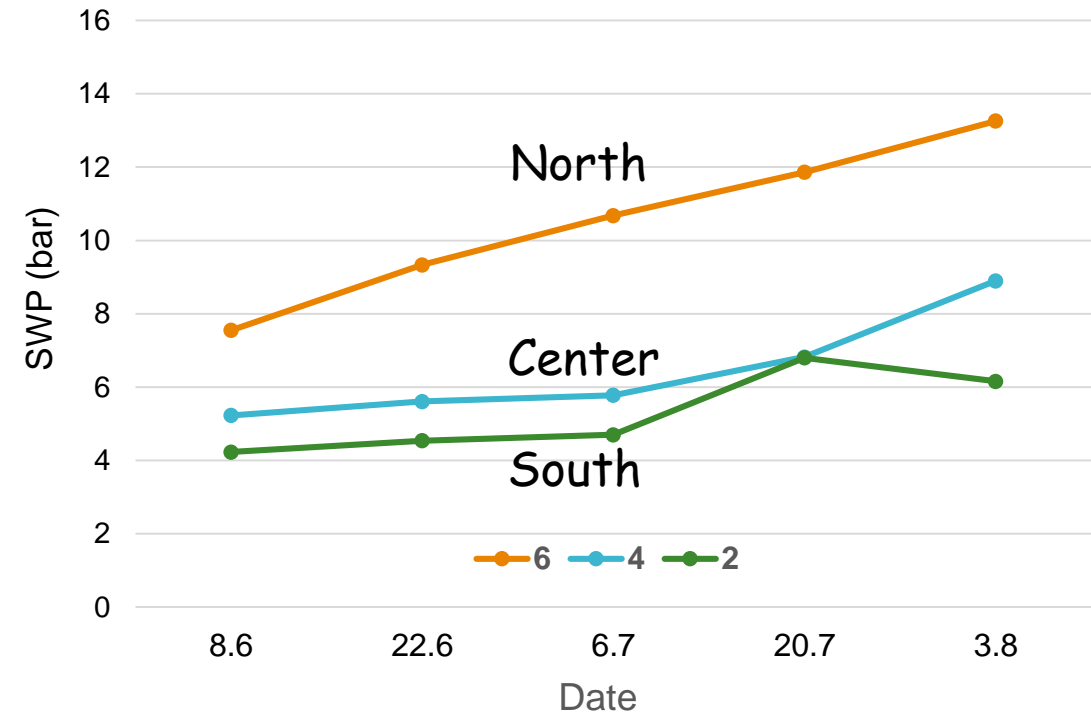


PHYSIOLOGICAL MEASUREMENTS- WATER POTENTIAL

VRDI (2017)

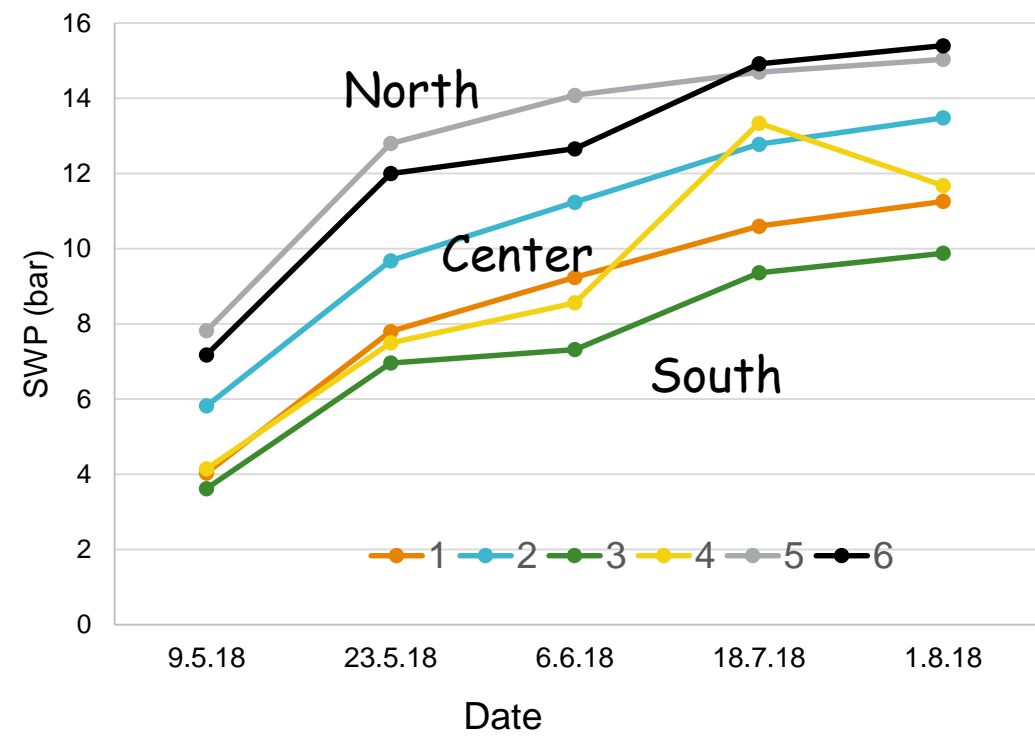


Uniform irrigation (2014)

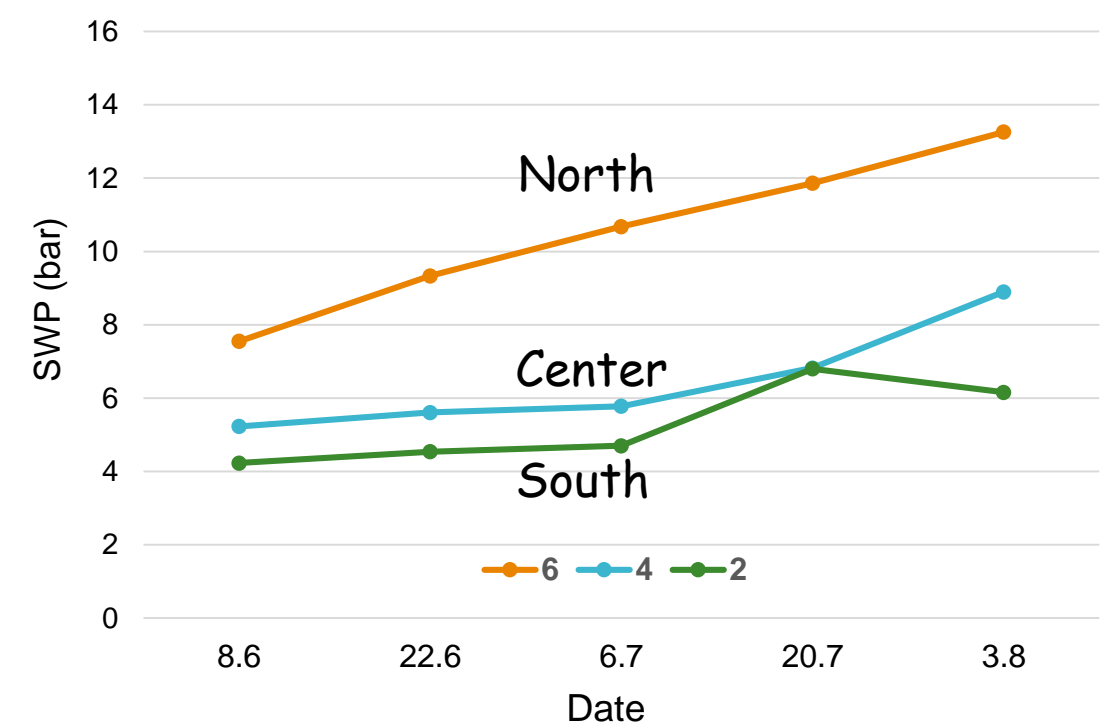


BACK TO VARIABLE SWP

Uniform irrigation (2018)

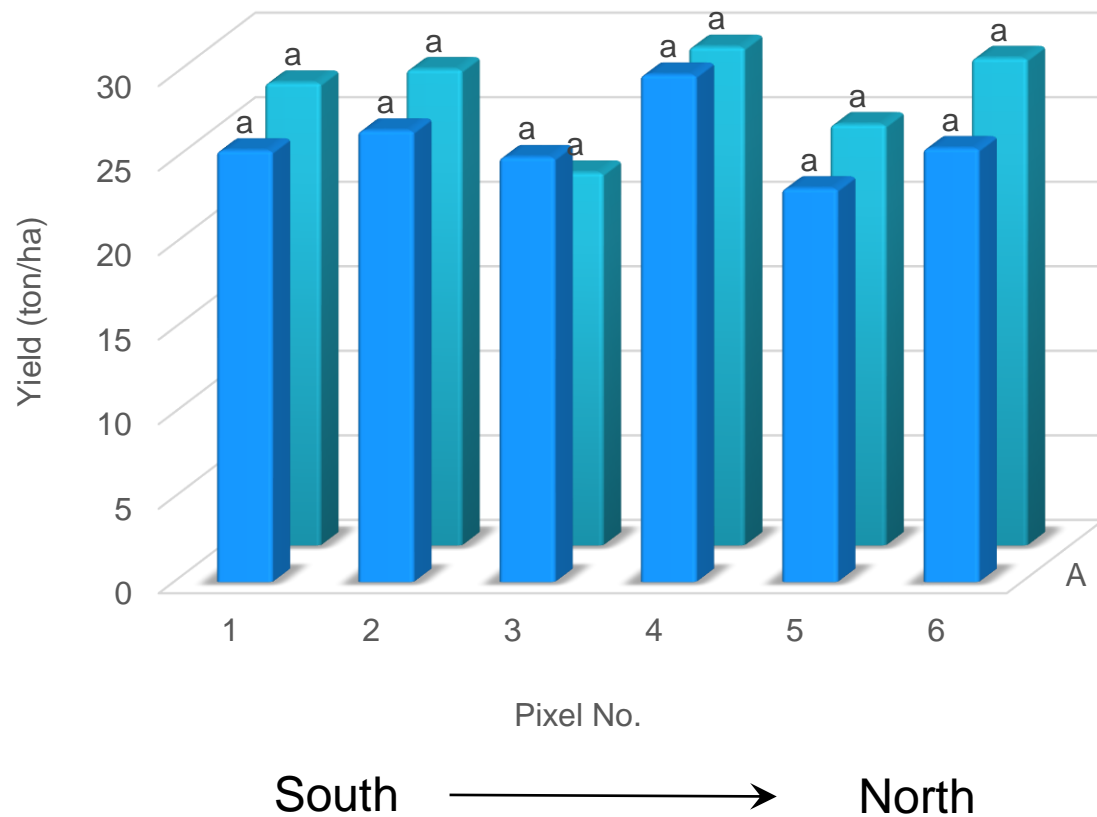


Uniform irrigation (2014)

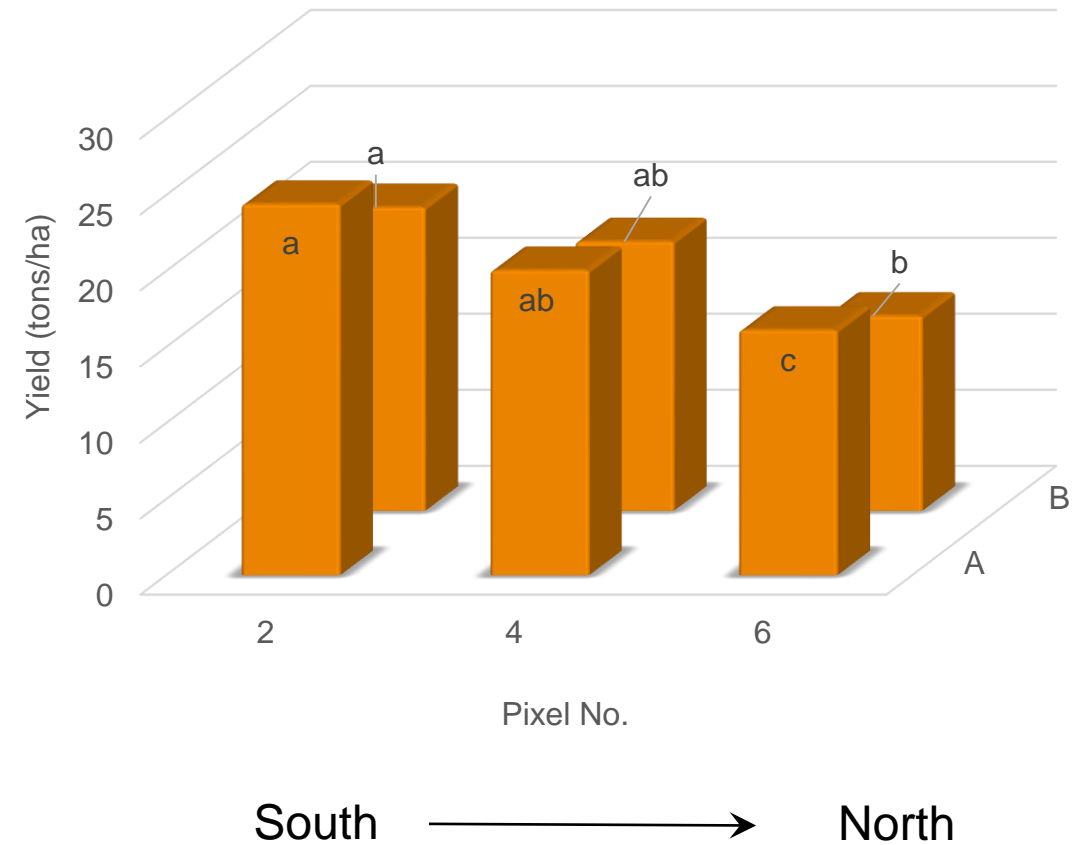


YIELD RESULTS

VRDI (2016)

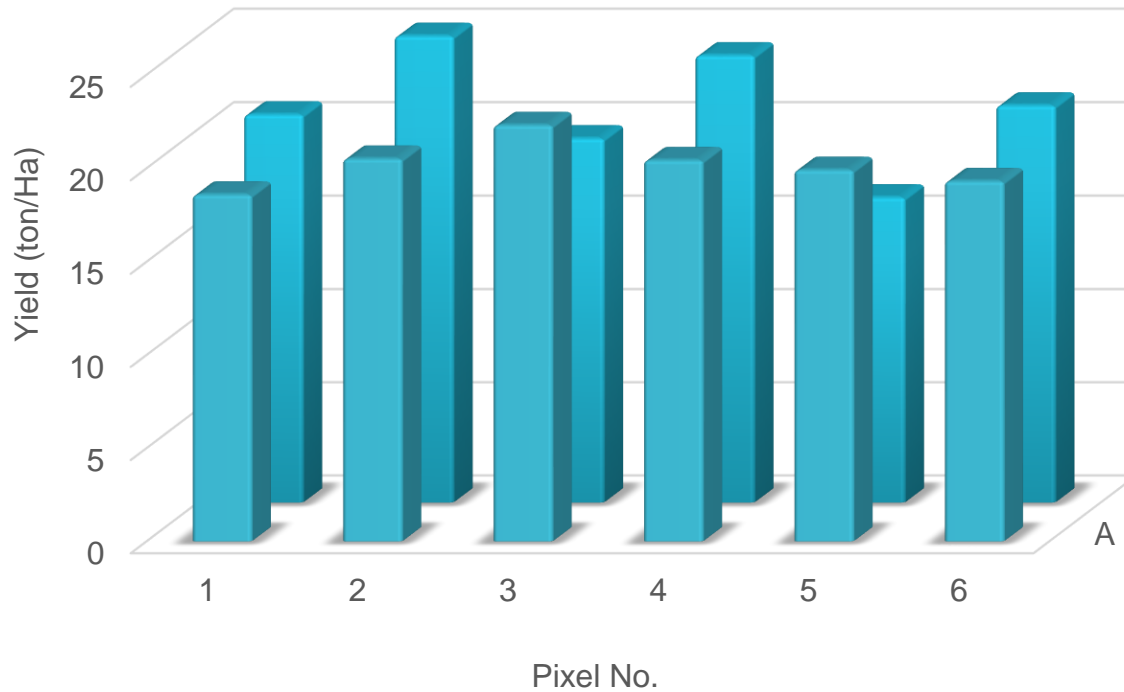


Uniform irrigation (2014)



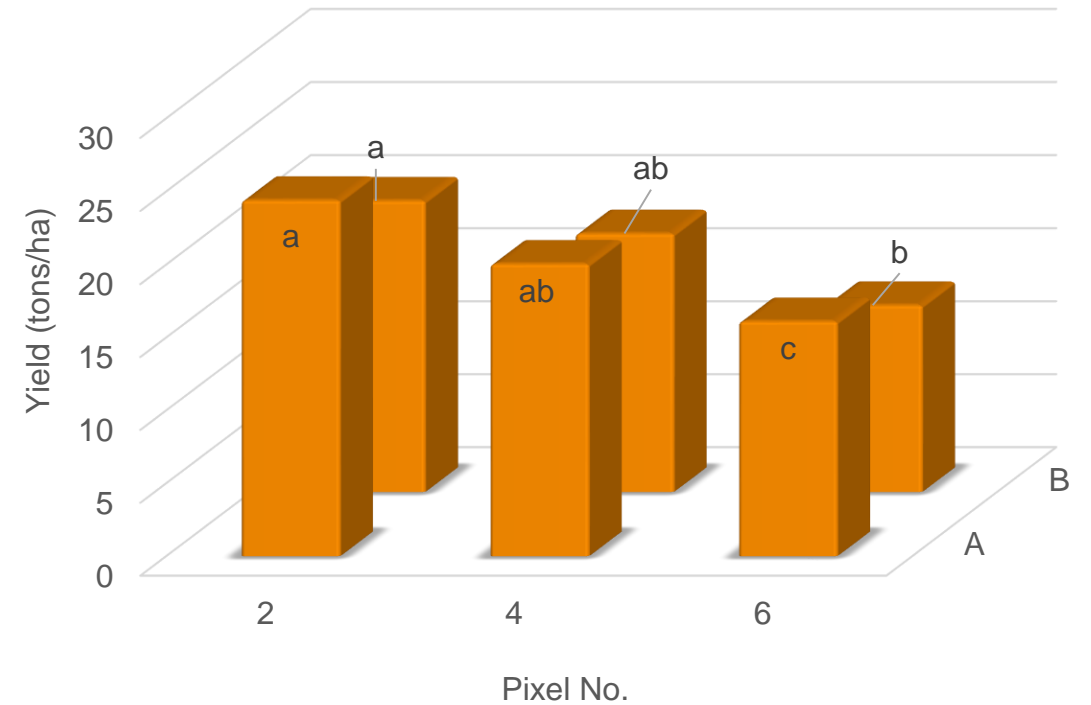
YIELD RESULTS

VRDI (2017)



South → North

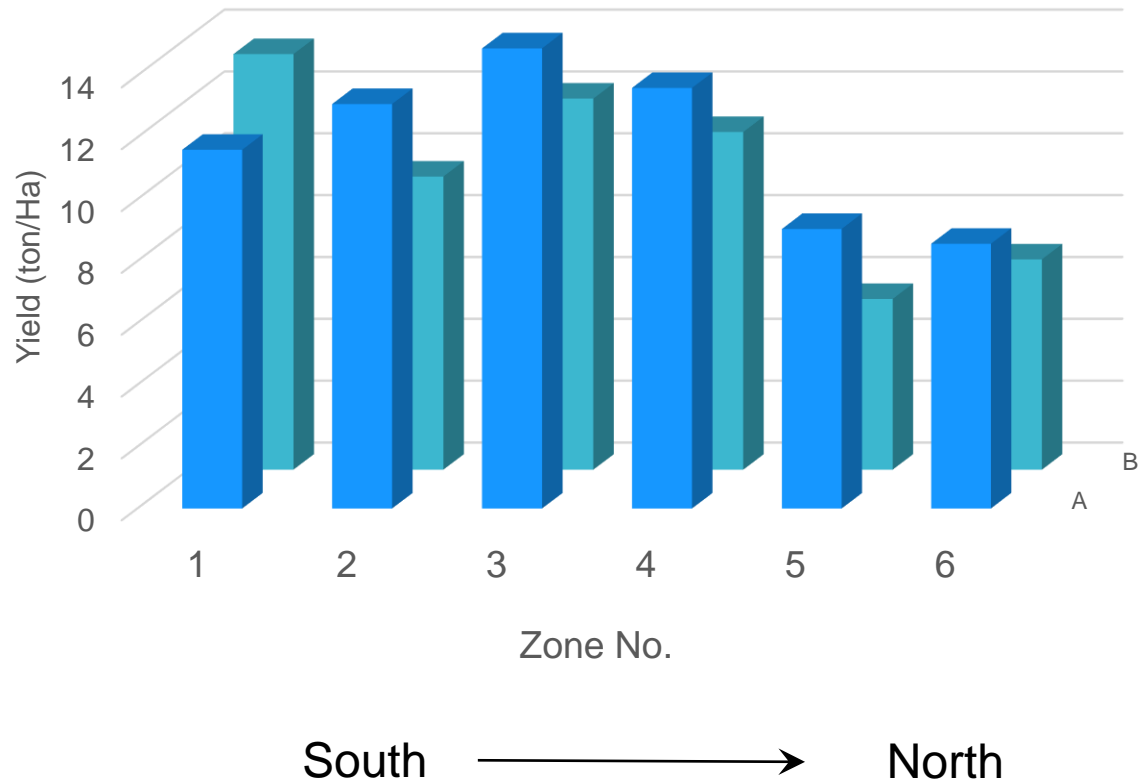
Uniform irrigation (2014)



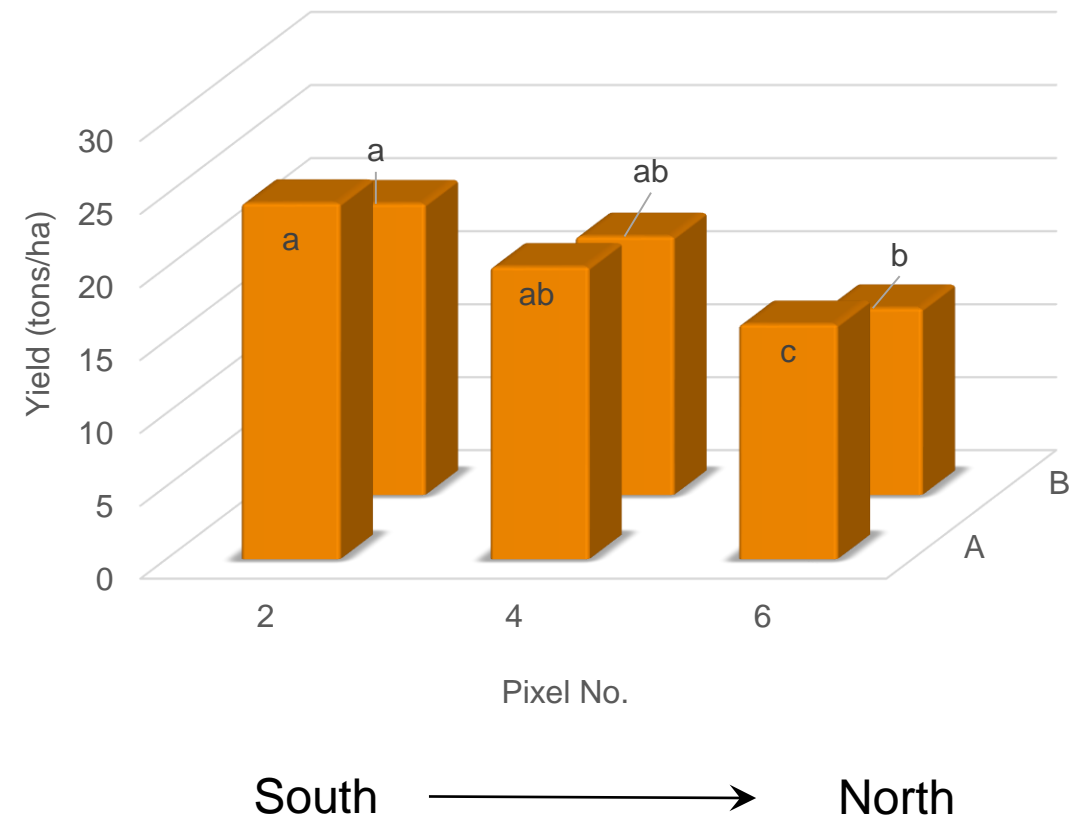
South → North

YIELD RESULTS

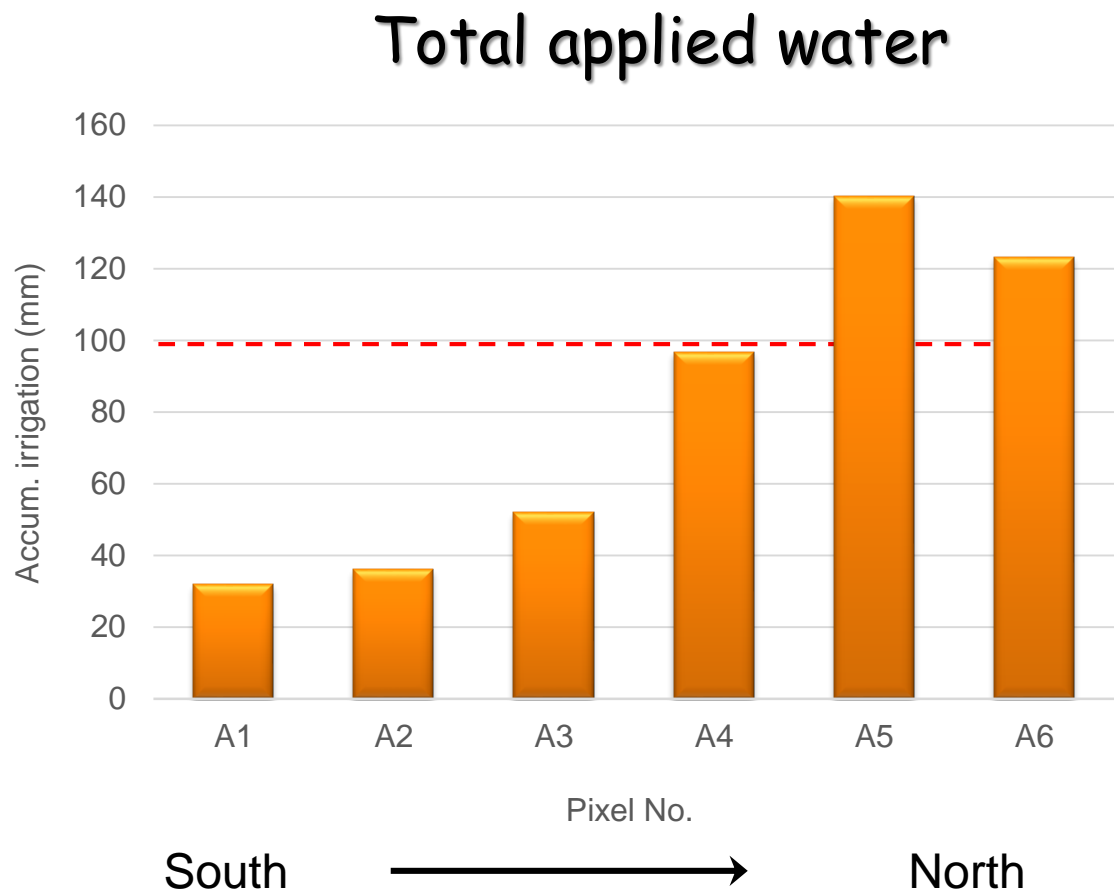
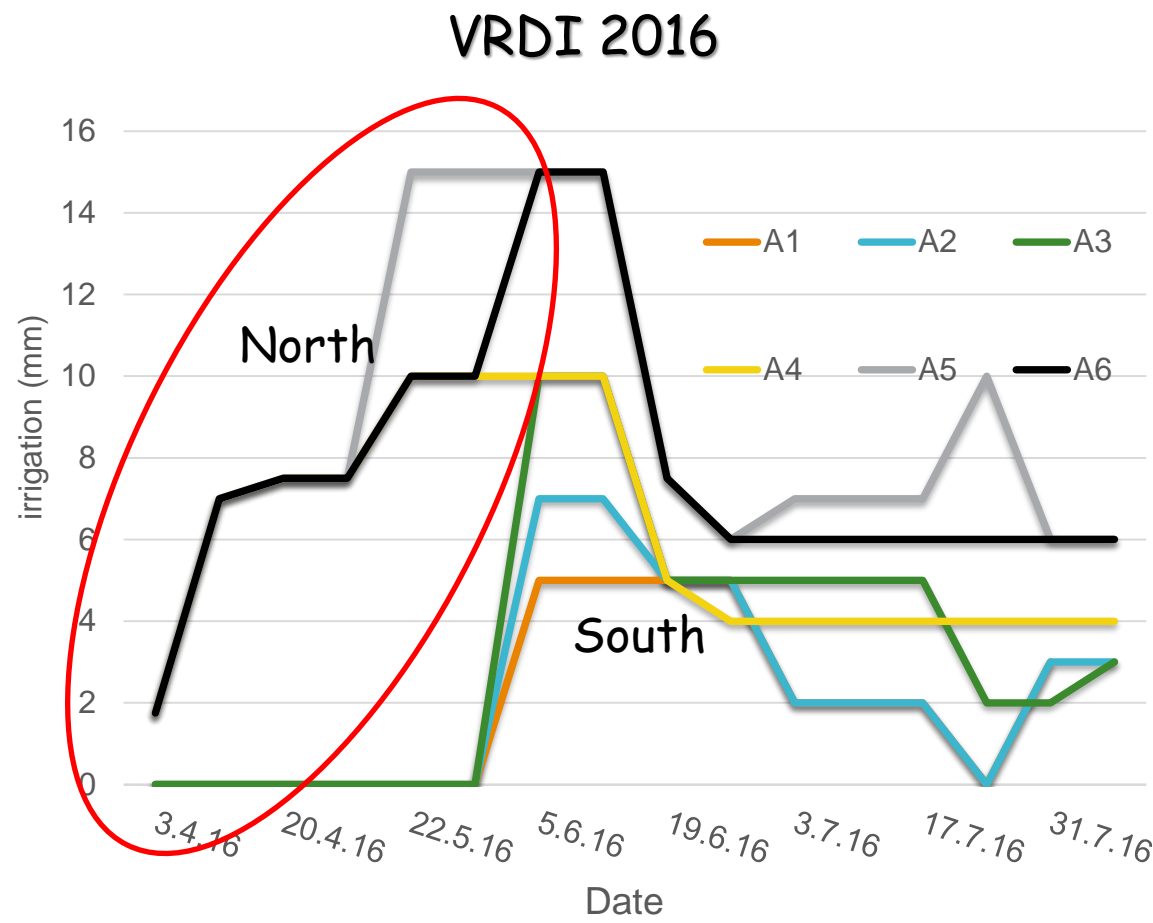
Uniform irrigation (2018)



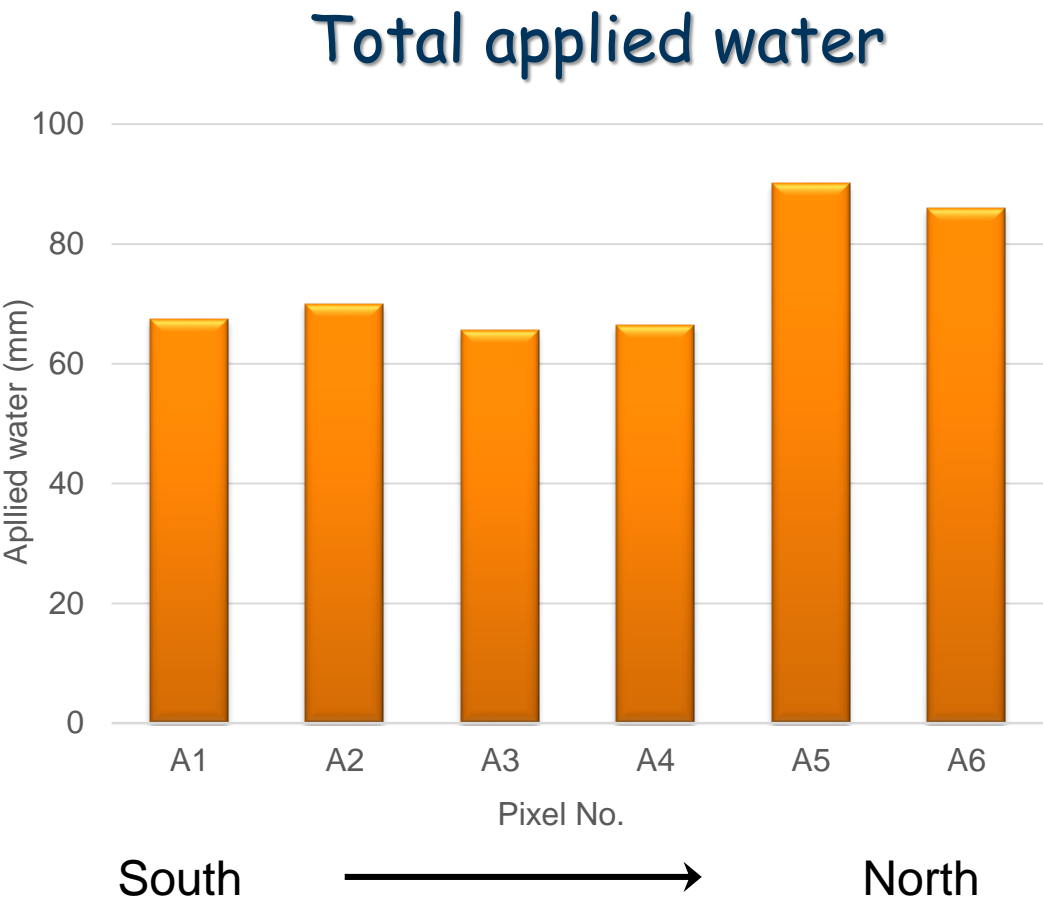
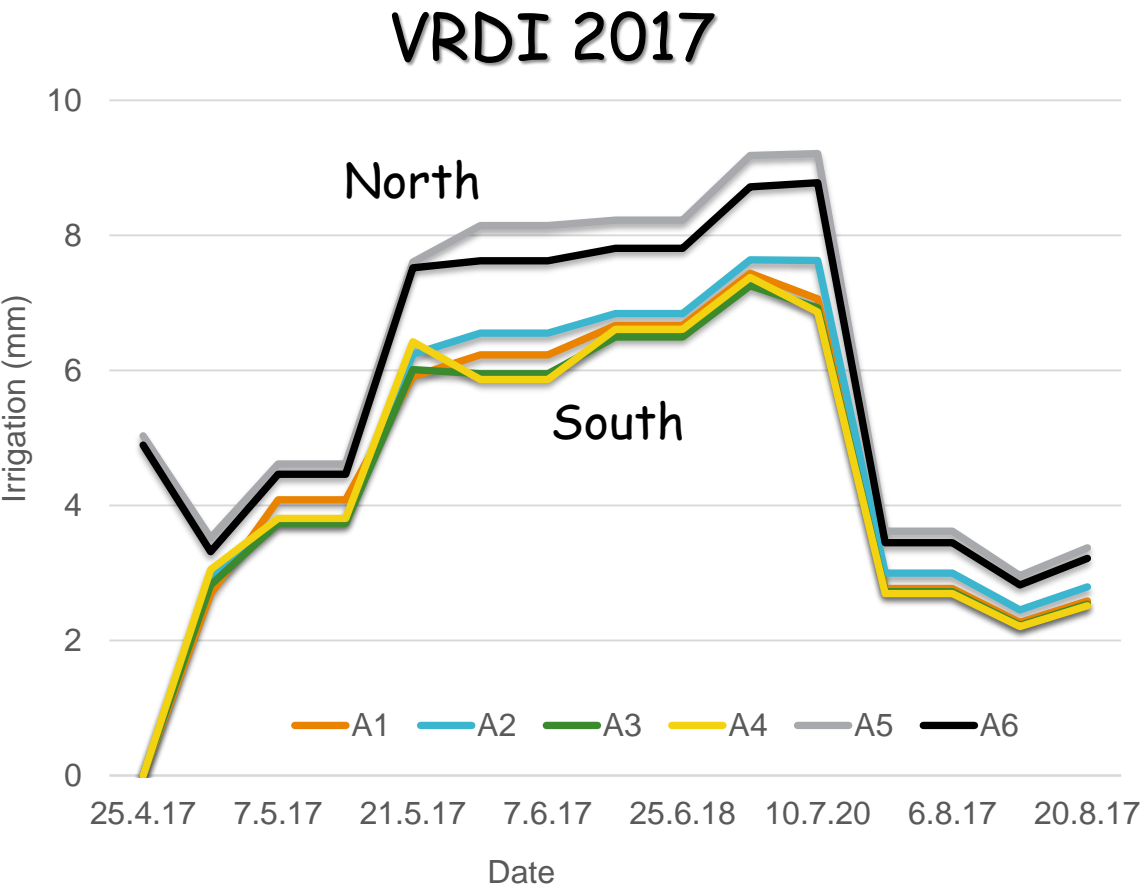
Uniform irrigation (2014)



IRRIGATION SCHEDULING



IRRIGATION SCHEDULING



CONCLUSIONS

- VRDI system has increased the total yield in the vineyard per year
- VRDI system has saved water by in comparison to the grower
- VRDI system has reduced variability in yield
- When not using the VRDI system the variability appears back
- Use the VRDI for variable rate fertigation (VRF)

Thank you!

Itamar.Nadav@Netafim.com