



IRRIGATION MANAGEMENT FOR FORESTRY NURSERIES

SHAUN BIGGS



UNDERSTAND CROP SPECIFIC NEEDS

- **Species requirements**
- **Growth stage**
 - Evapotranspiration rates
 - Specific stage requirements
- **Root System**
 - Root mass & morphology
 - Root health





UNDERSTAND CROP SPECIFIC NEEDS

Environment

Plant Category	Daily Water Use (liters)
Palms	110 -200
Ornamental Trees	60-100
Afforestation Trees	35-50
Shrubs	20 to 50
Groundcover	12.5 to 25 liters/m ²
Lawn	17.5 to 25 liters/m ²

Source: KISR, 1996



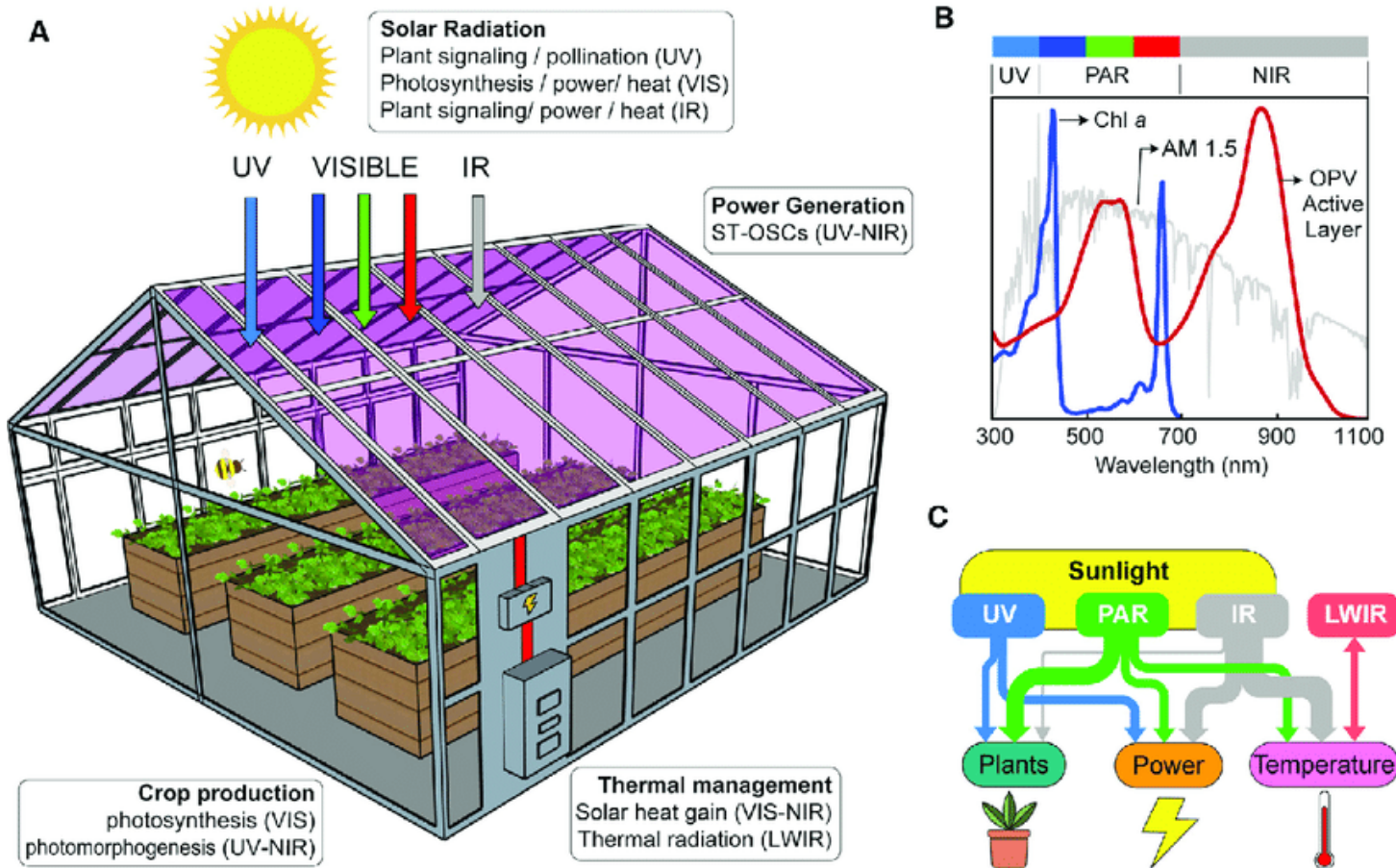
UNDERSTAND MOISTURE AVAILABILITY

- **Substrate physical properties**
 - AFP
 - WHC & Drainage
 - Volume retention
 - Cost & security
 - Sustainability
- **Dry down rates**





UNDERSTAND MACRO CLIMATE





UNDERSTAND MACRO CLIMATE

- Greenhouse design
- Energy transmission & retention
- Climate control tools
 - Humidification
 - Screens
 - Venting (Forced & natural)
 - Heating
- What is the crop experiencing?
- VPD (Dynamic)

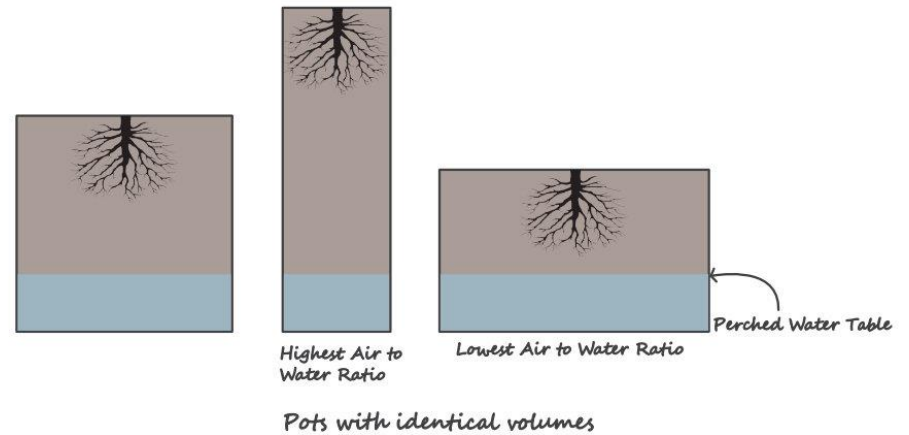




UNDERSTAND MICRO CLIMATE

- Ellepot dimensions
- Substrate physical properties

How Container Shape Affects Air to Water Ratio



- Ellepot paper



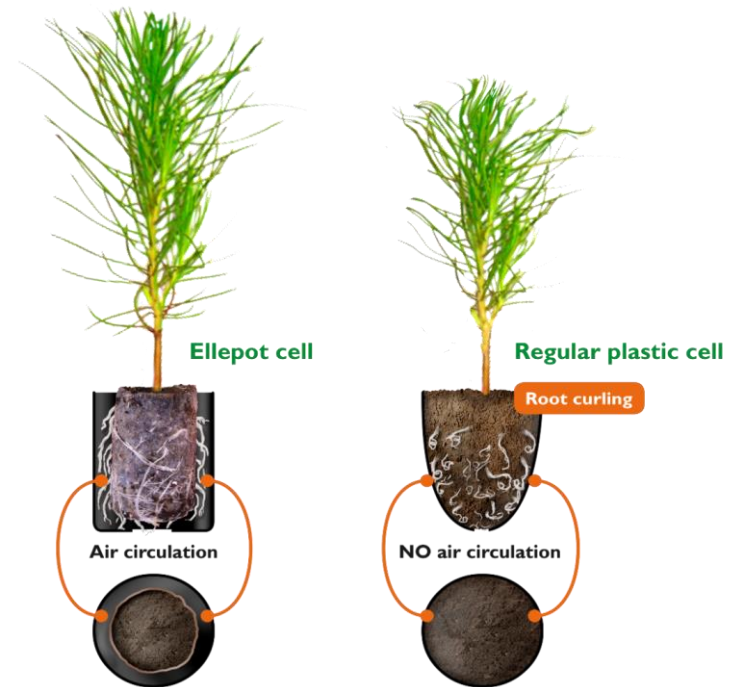
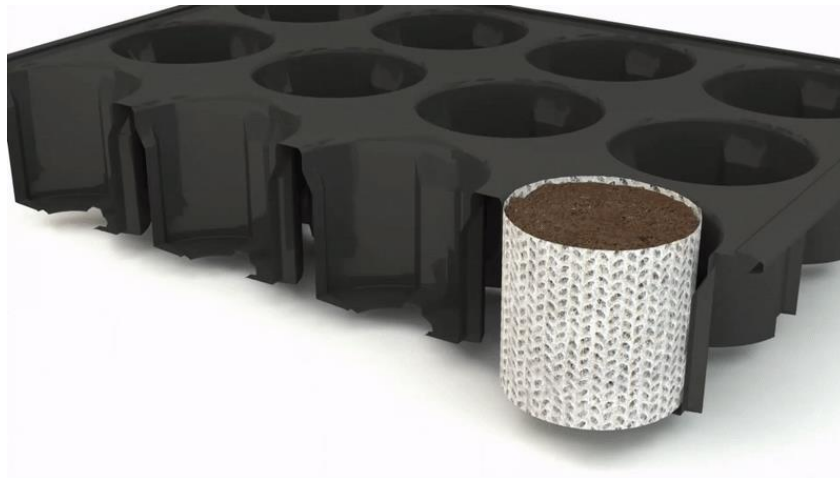
IRRIGATION MANAGEMENT



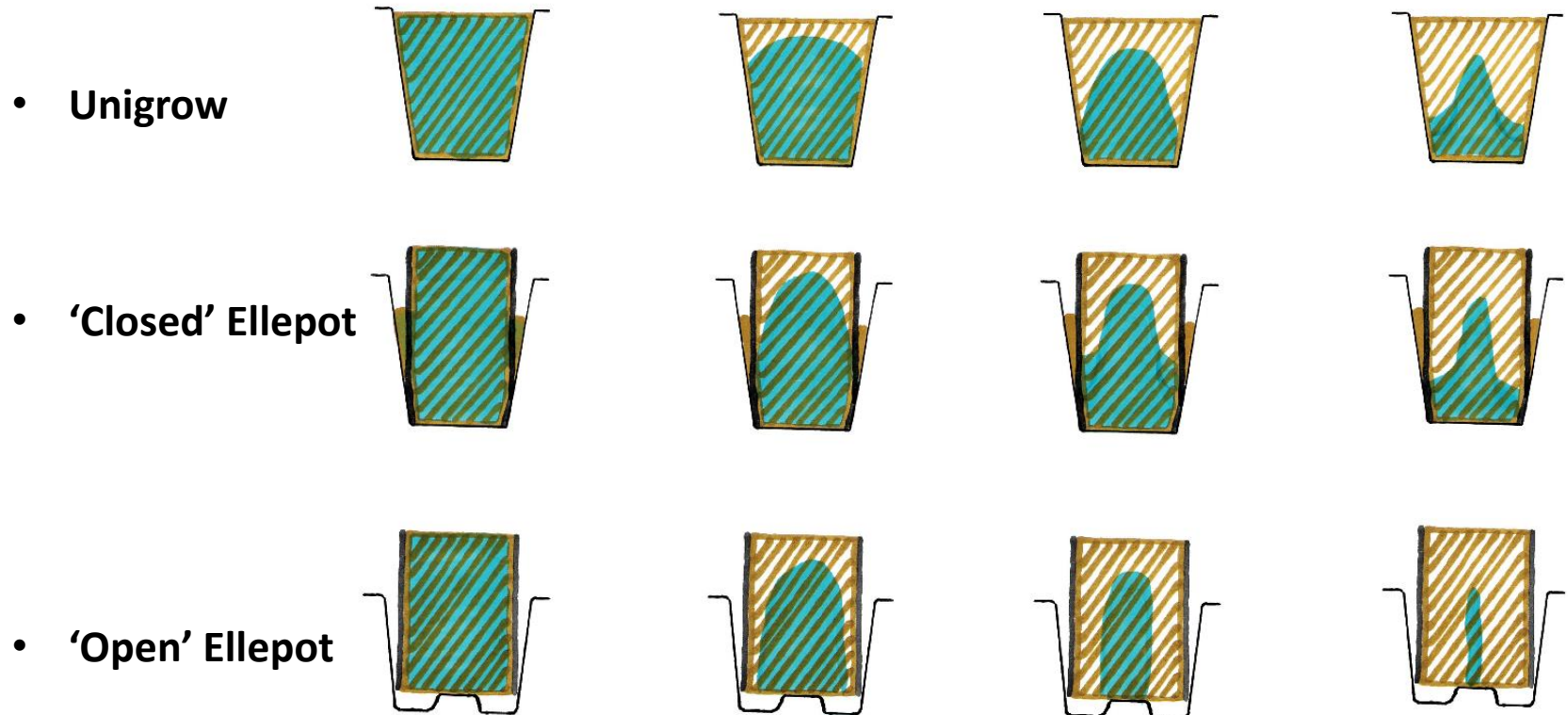
UNDERSTAND MICRO CLIMATE

- Cavity design

Crop → Substrate → Micro-climate → Irrigator



UNDERSTAND MICRO CLIMATE





UNDERSTAND MICRO CLIMATE

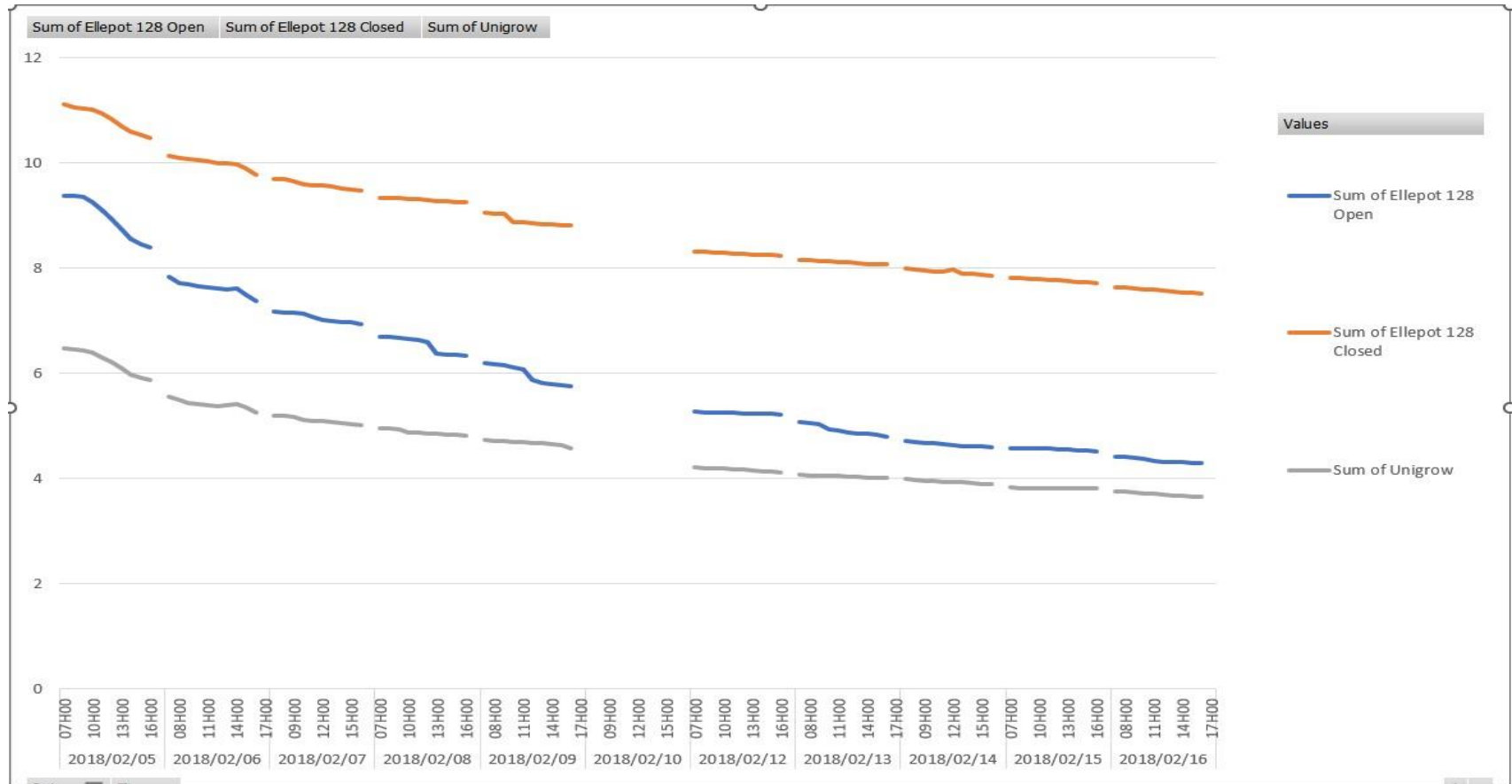
- Cavity Design



IRRIGATION MANAGEMENT



UNDERSTAND MICRO CLIMATE

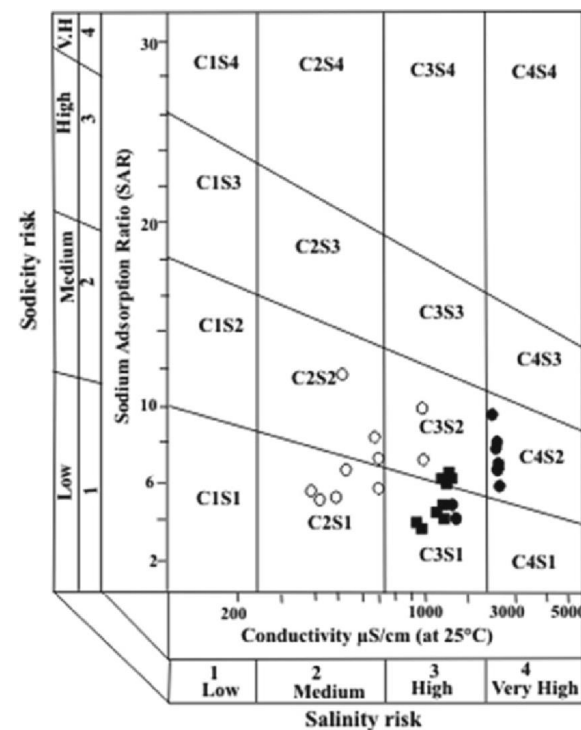
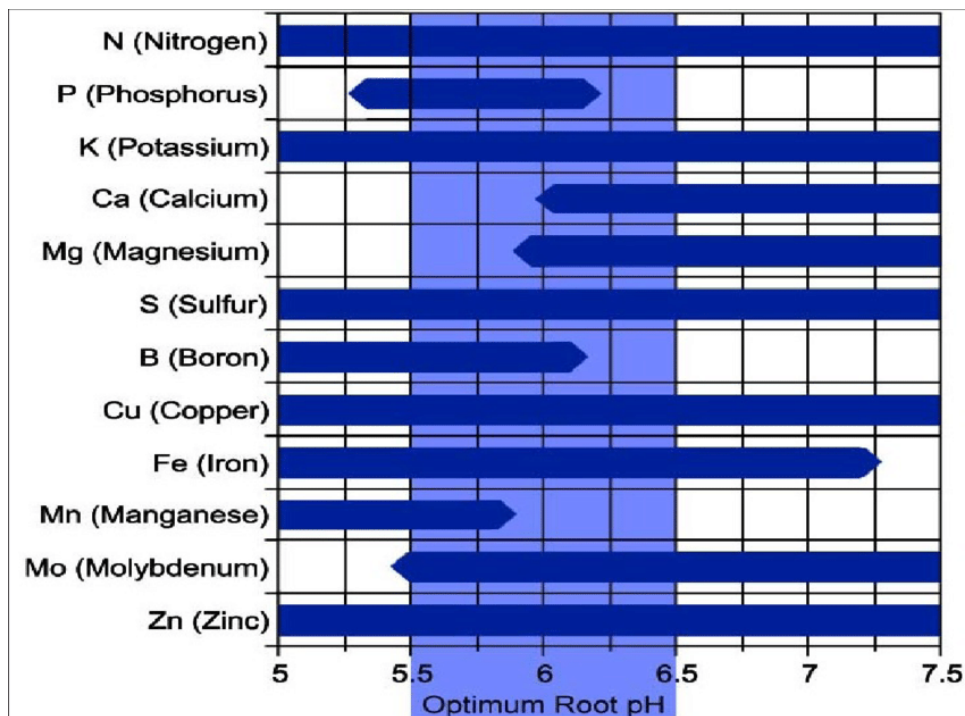


IRRIGATION MANAGEMENT



Know your water quality

pH & EC





Know your water quality

EC nutrient solution

Tomato

- 2.3
- 2.3
- 2.3
- 2.3

EC irrigation water

- 1.5
- 1
- 0.5
- 0

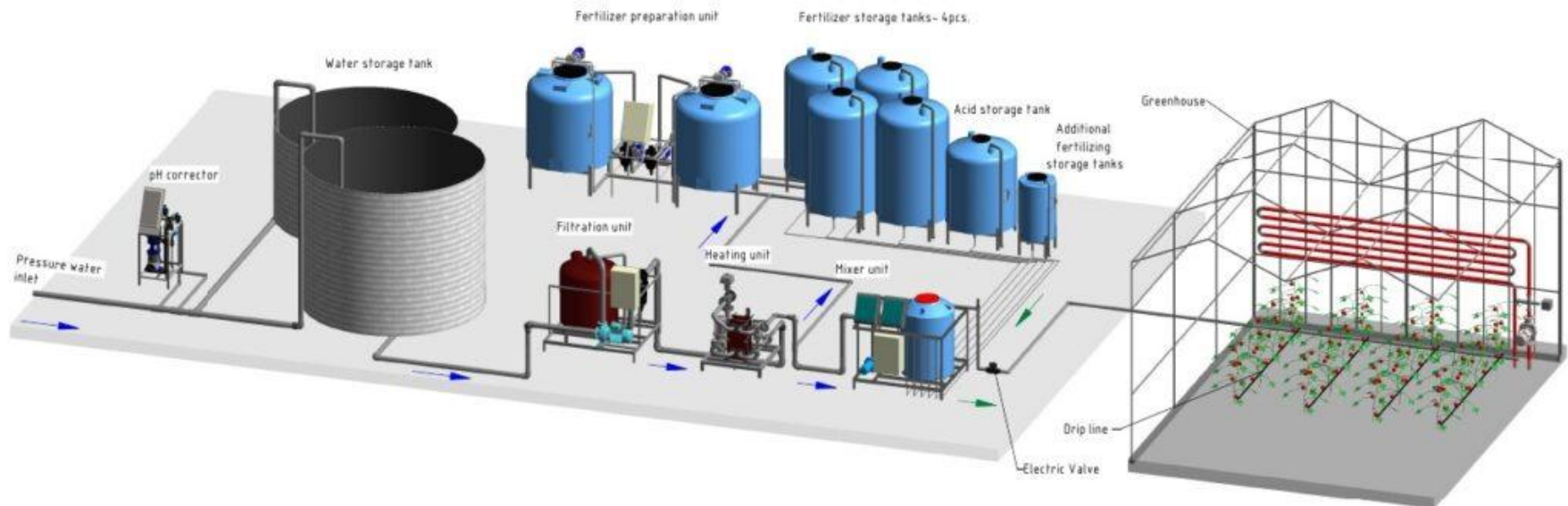
EC fertilizer

- 0.8
- 1.3
- 1.8
- 2.3

IRRIGATION MANAGEMENT



Irrigation System Design





Irrigation System Design

SPINNET™ SD SR 120070

Distance between heads (m) [UPDATE](#)

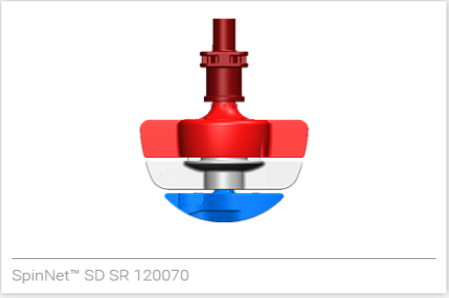
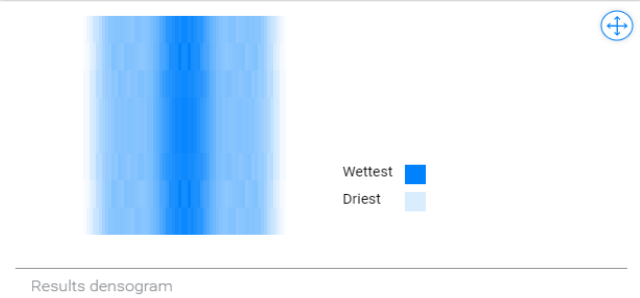
Spacing patterns: Double line

Height above surface (m):

Emitter position: Upside-Down

Case 2:

Double Line, when distance between lines: 2.52 meter, with SpinNet SR SD 120/070, 0.9 meter between emitters on the line and 0.9 meter height

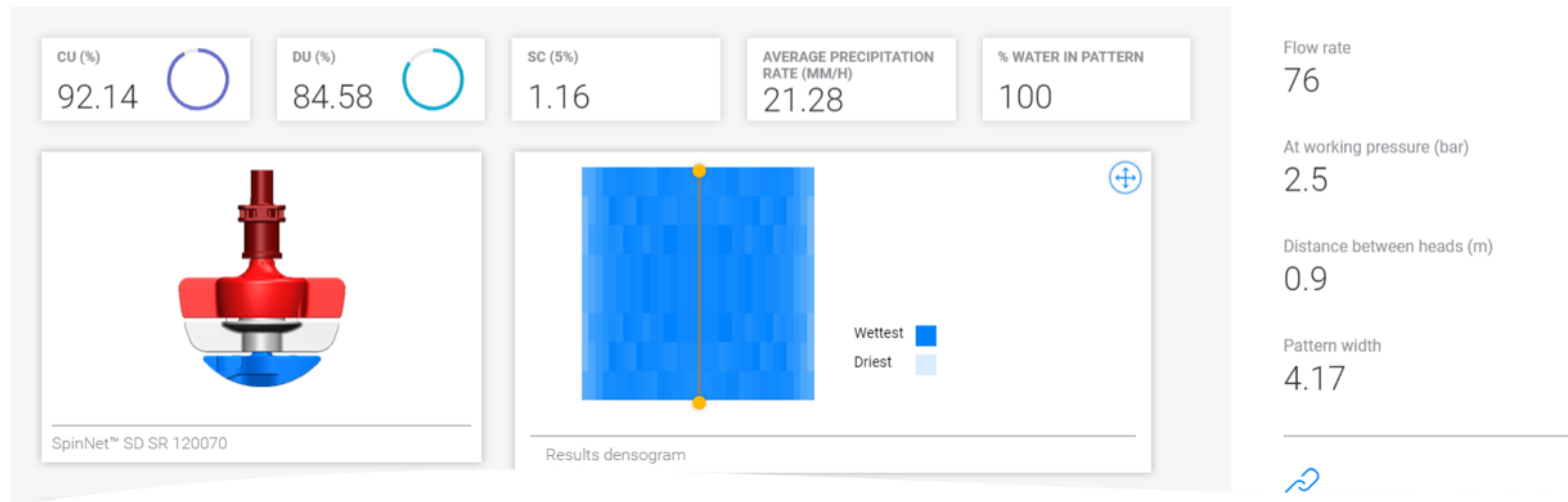
CU (%) 49.98	DU (%) 10.66	SC (5%) 5.77	AVERAGE PRECIPITATION RATE (MM/H) 20.92	% WATER IN PATTERN 100	Flow rate 76
					At working pressure (bar) 2.5
					Distance between heads (m) 0.9
					Pattern width 9.21

[Link icon](#)



Irrigation System Design

Christiansen coefficient





Irrigation System Design

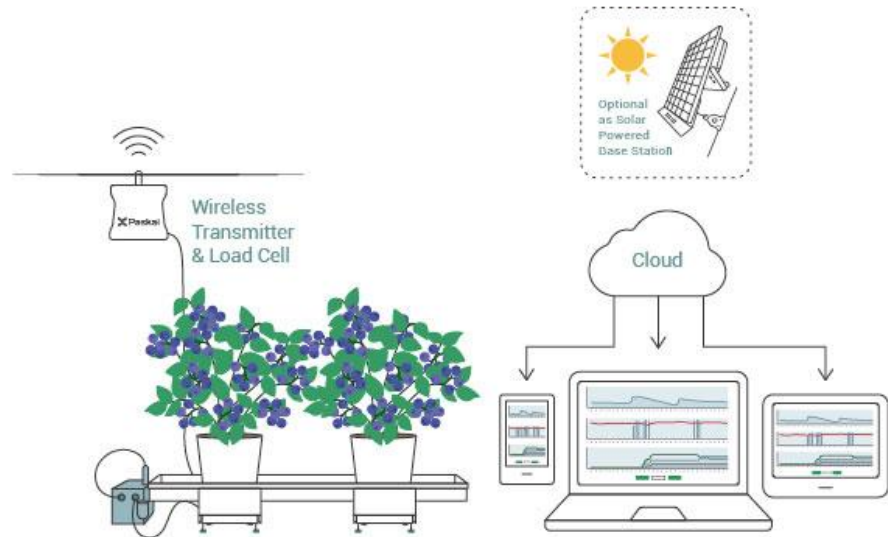
- Design (Fit for purpose)
- Operating pressures
- Fertigation
- Maintenance



IRRIGATION MANAGEMENT



Monitor Moisture Levels





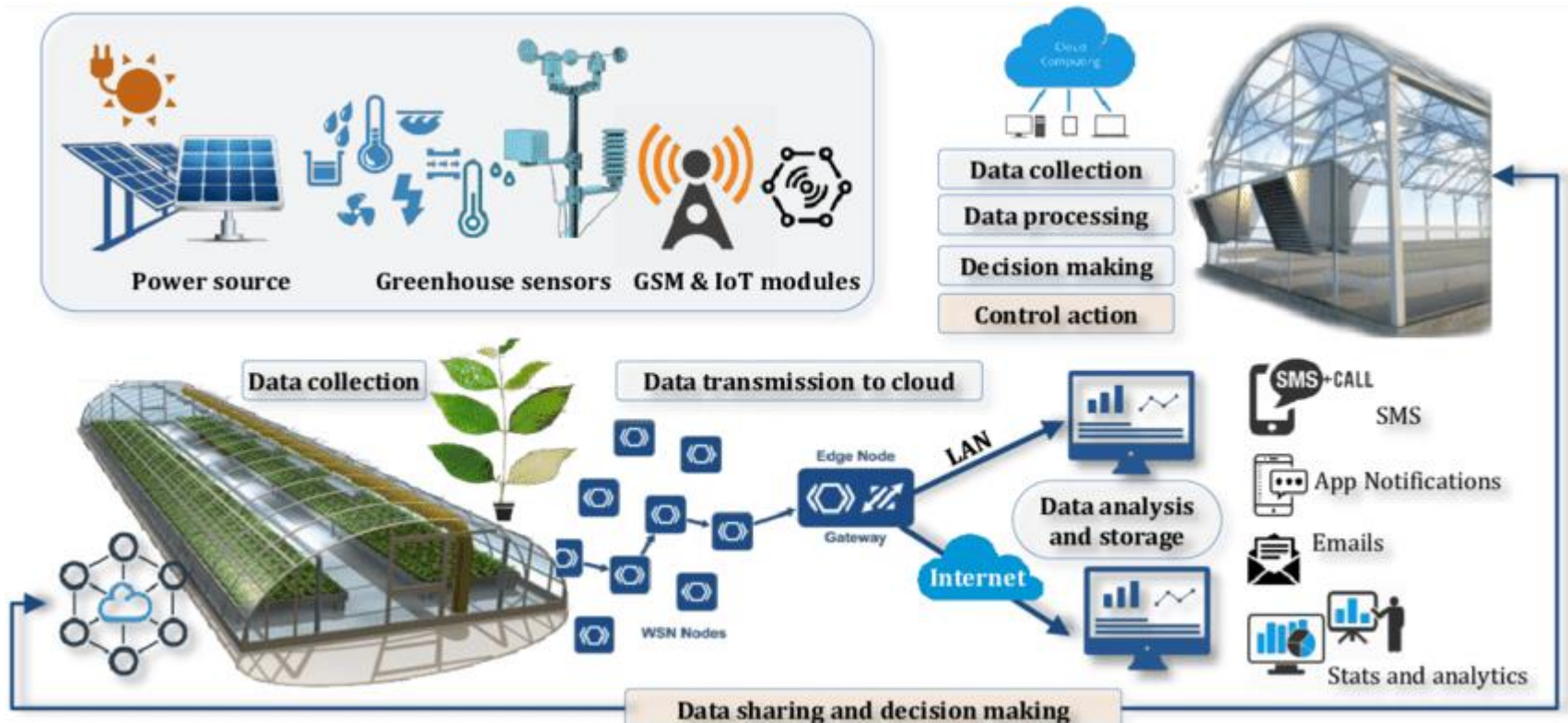
Monitor Moisture Levels



IRRIGATION MANAGEMENT



Monitor Moisture Levels



IRRIGATION MANAGEMENT



Monitor Moisture Levels

Considerations

- Accuracy
- Cost (representation)
- Management (AI)





Ellepot moisture management

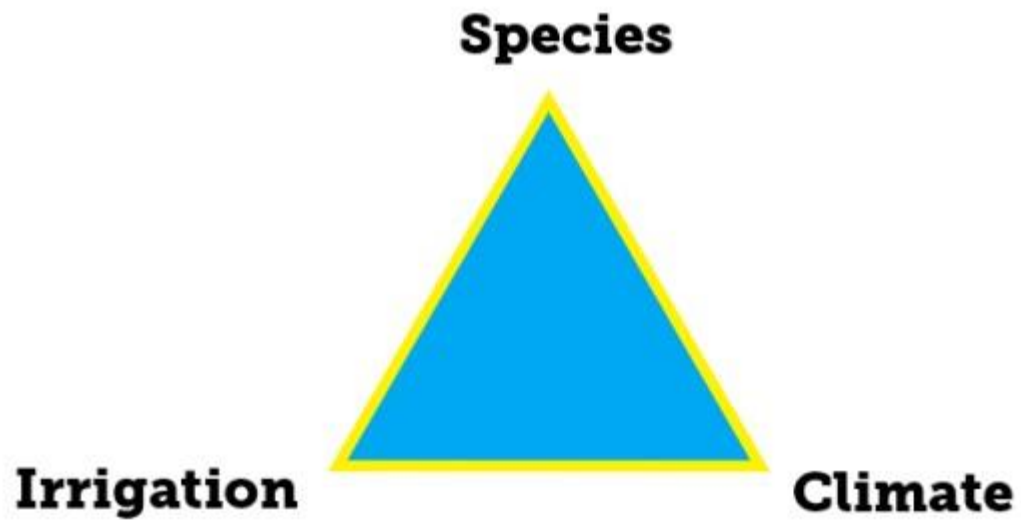
- Increased wet/dry cycles = increased root development
- Plant stress
- Air/Water Ratio

Plug Moisture Scale – Level 1- Level 5



Source: Paul Fisher – Plug Moisture Scale

IRRIGATION MANAGEMENT



IRRIGATION MANAGEMENT



'Let the roots do the talking!'



IRRIGATION MANAGEMENT



'Let the roots do the talking!'



IRRIGATION MANAGEMENT



'Let the roots do the talking!'



IRRIGATION MANAGEMENT



'Let the roots do the talking!'



IRRIGATION MANAGEMENT



'Let the roots do the talking!'





 **ELLEPOT**[®]
GROW SMARTER

THANK YOU!