

Golden Grove

Smart Nursery

Partnership with Hort Innovation, Hitachi Digital Services,

Applied Horticulture Research and Garden Industry Australia

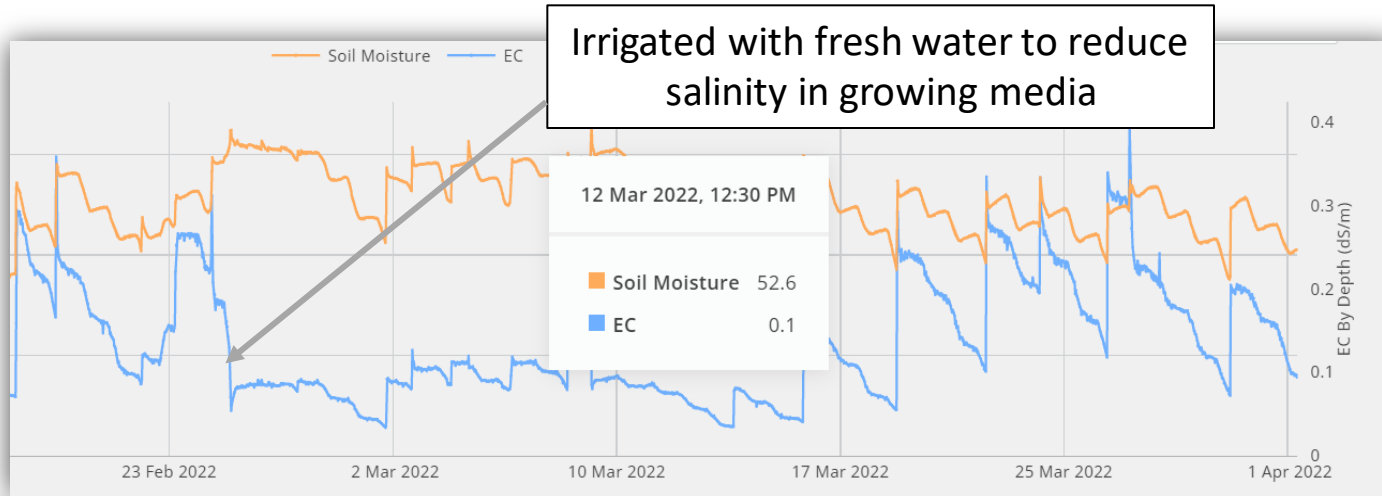


What we are Measuring?

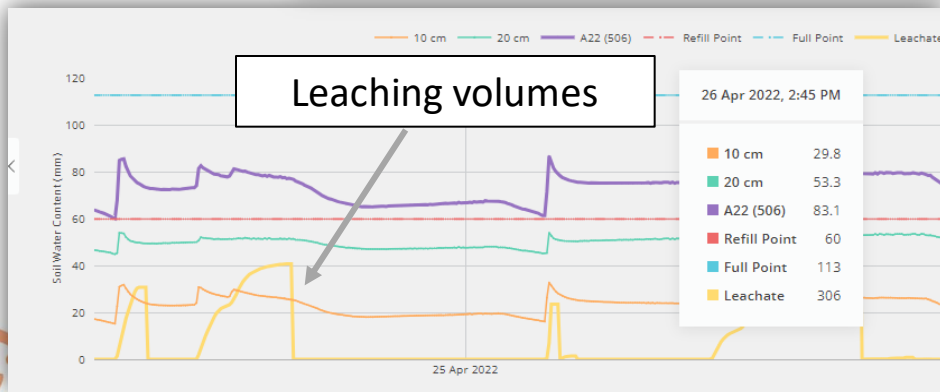
- Weather within the Shadehouse – Temperature, Humidity, Solar Radiation, Wind Speed and direction, Rainfall, and many more
- Source Water – pH, EC, Temperature, Redox
- Drainage/Recycled Water – pH, EC, Temperature, Redox
- Irrigation Water – pH, EC, Temperature, Redox, Block pressure
- Pot Leachate quantity and quality - pH, EC, leachate percentage
- Pest monitoring cameras - Early warning
- Residual Chlorine - irrigation water prior to use
- Photometer linked to the dashboard - Nitrate, Phosphate, Alkalinity, Sulphate, Iron and more via a desktop
- Pot media - Weight based & moisture sensor probes - weight, moisture, EC, Temperature
- irrigation controller -
- Fertigation controller equipment



Irrigation water quality and wastewater management

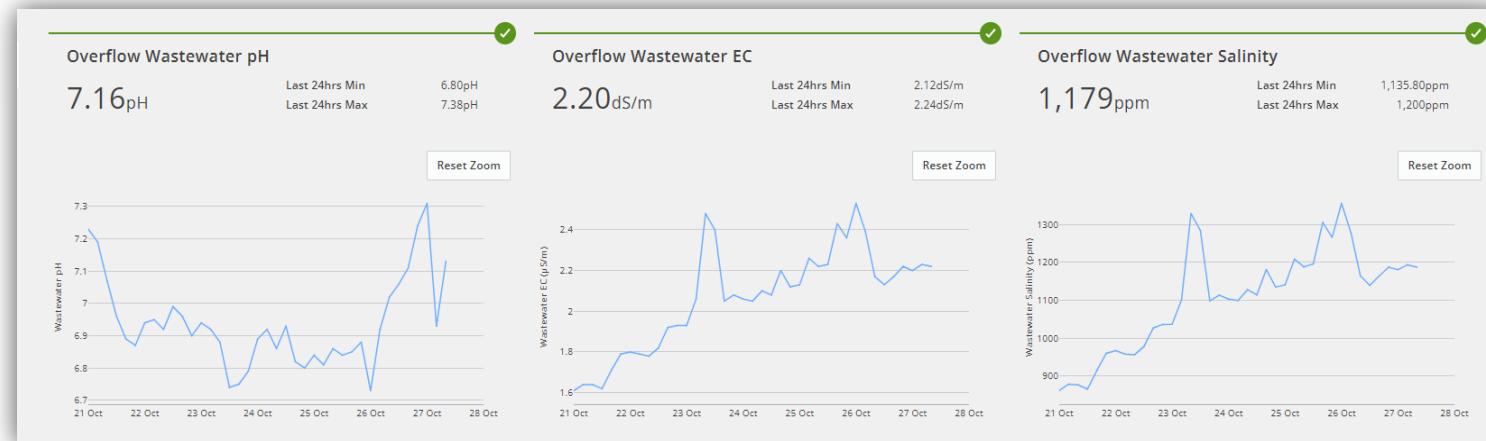


Assess changes in growing media **salinity after irrigation** and fertilizer applications



Realtime assessment of **leaching volumes** for managing salinity and soil quality around plant roots

Assess drainage and wastewater quality for managing drainage from production sites

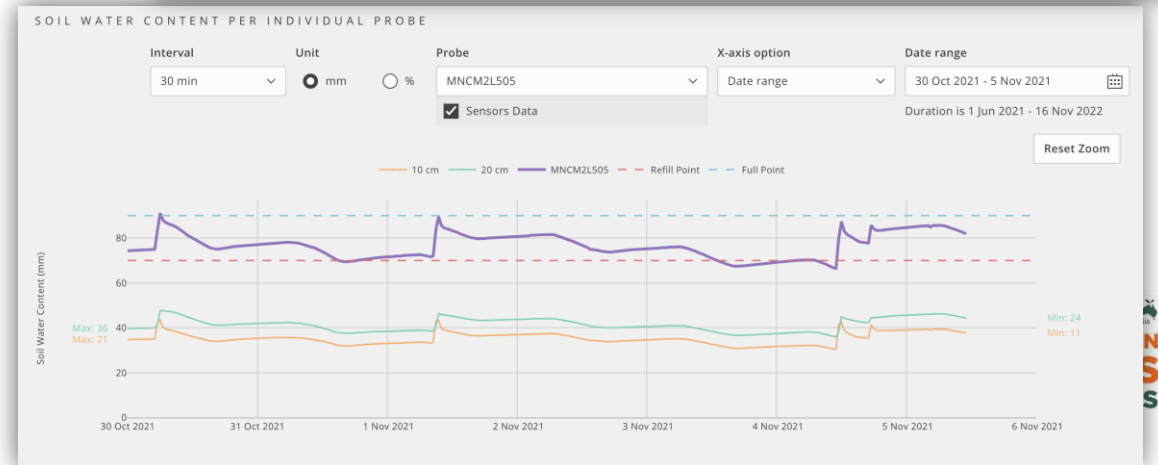
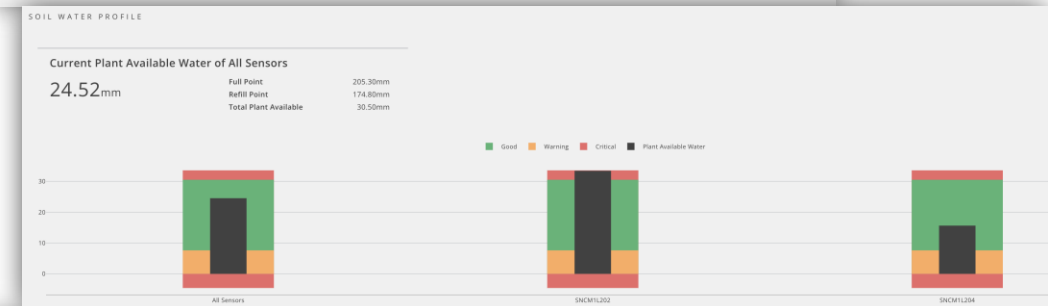


Irrigation management

Data Insights



- Soil moisture sensor and weight-based data allow easy interpretation of plant water status
- Can see changes in water use over time and how effective rainfall and irrigation has been in changing soil water.
- Can drill down to water use by depth to reduce excessive leaching from over watering

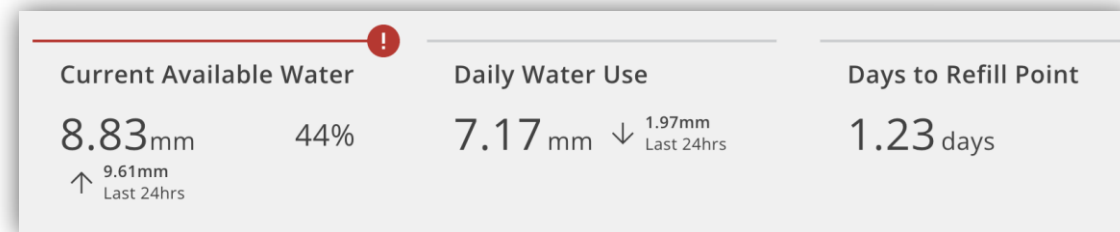
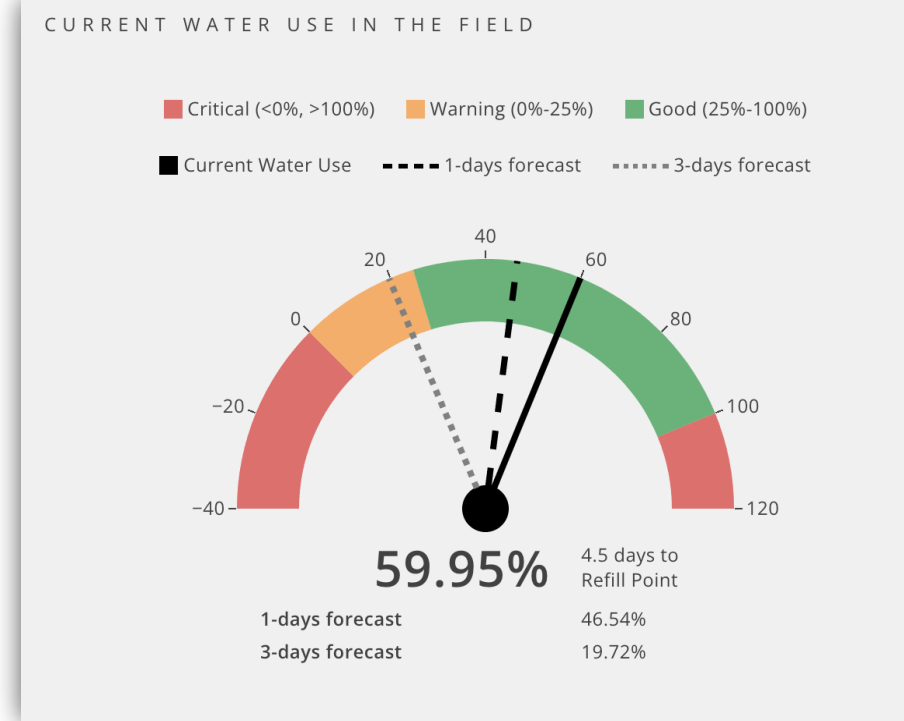


Advanced modeling of water use



Predictive and forecasting tools

- Utilize weather and crop models for predicting water use
- Forecast predictions on water use over 1, 3 or 10 days
- Predict when to irrigate
- Assess in real time rate of water use across different depths
- Map total water use against planned water budgets.
- Predict when water resources will be limited to allow improved water budgeting.

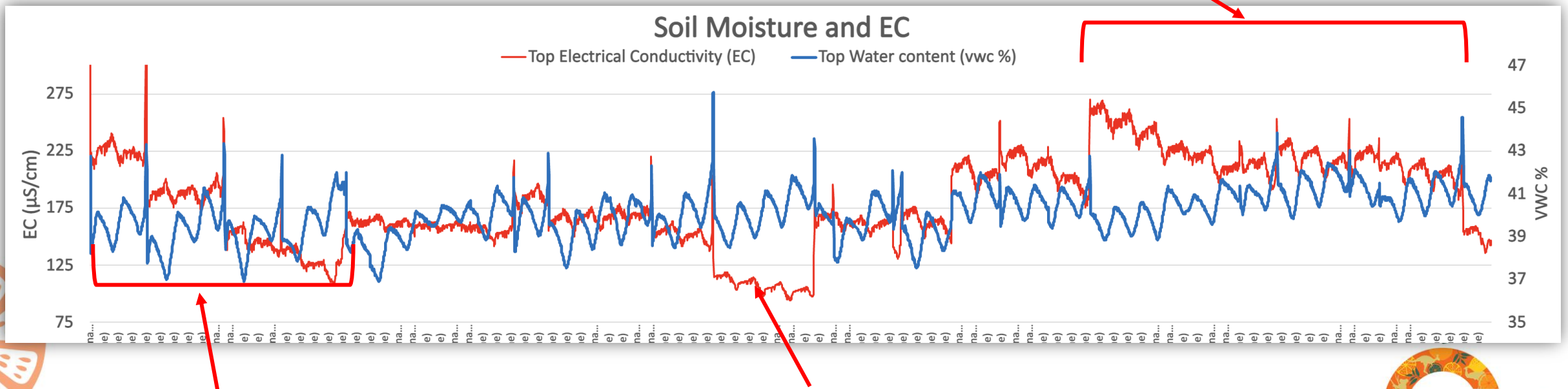


Managing fertigation

Insights into soil EC and salinity with growing soil

- Real time data on soil/growing media EC and salinity (dissolved salts/nutrients)
- Assess impact of irrigation and leaching on soil/growing media EC and salinity
- Assess impacts of fertigation and other soil additive in soil quality

EC and salinity increase with fertigation



EC and salinity increase again with fertigation

Rain event reduced EC and salinity

Managing Leachate

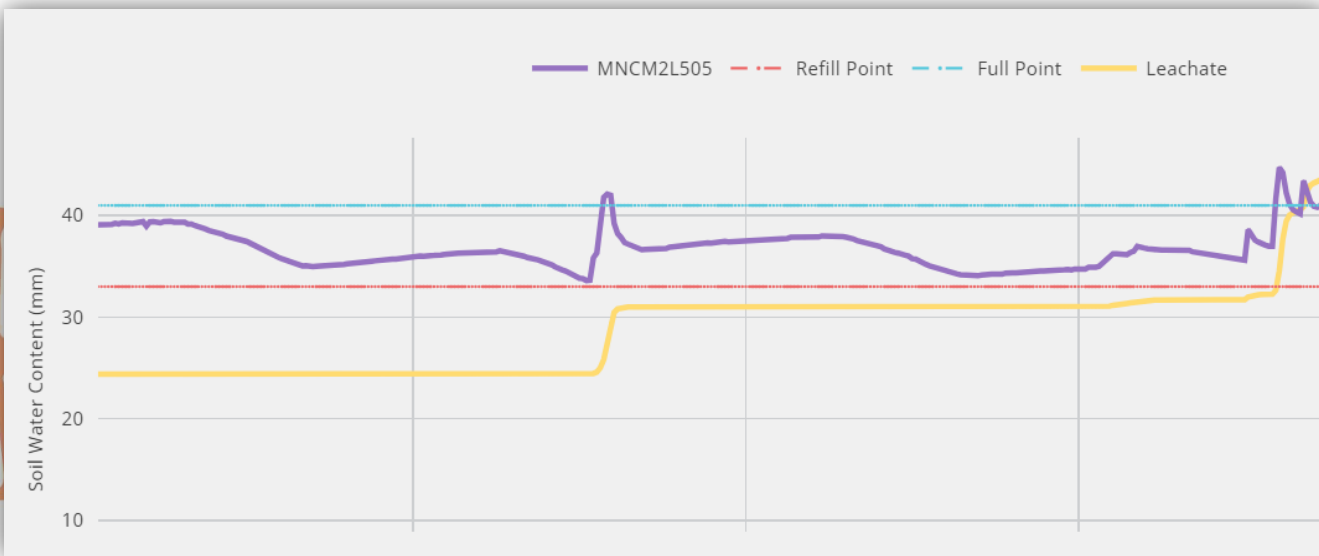
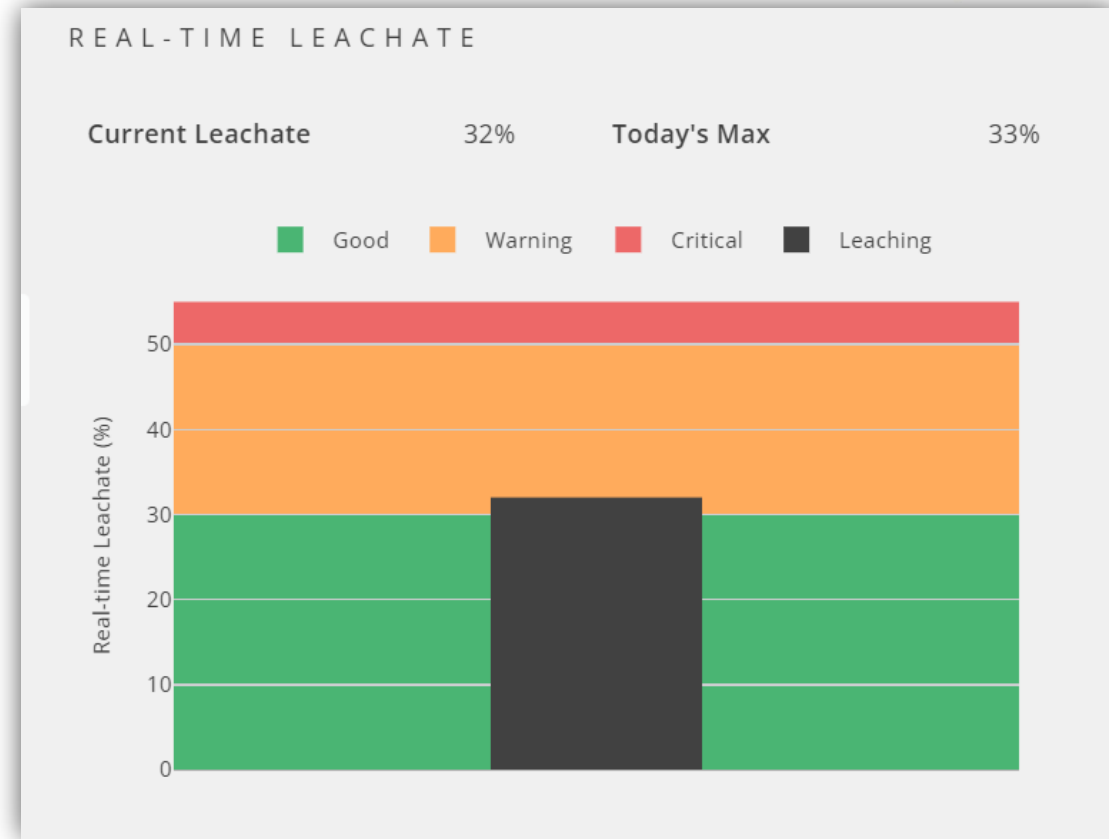
Real time leachate assessment



- Measured as part of weight based and soil sensor system

OR

- Individual leachate unit

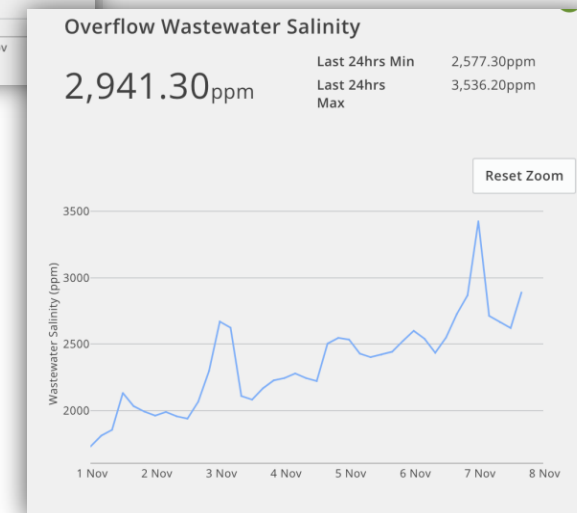
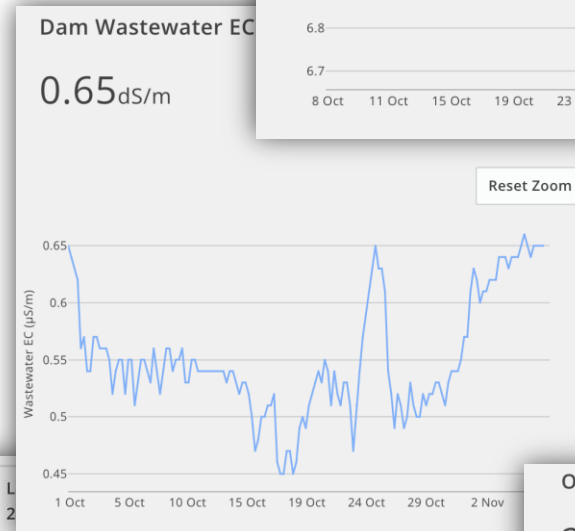
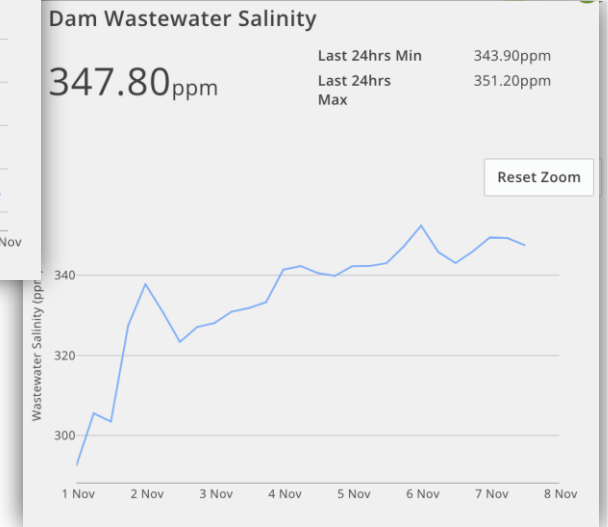
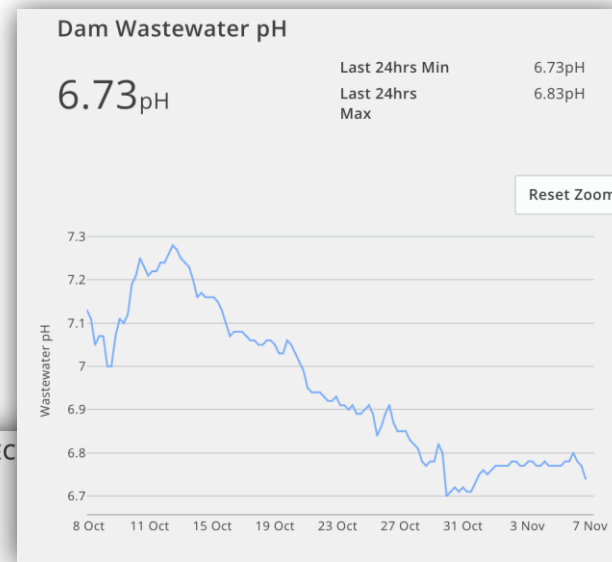


Managing water quality



Insights into water quality

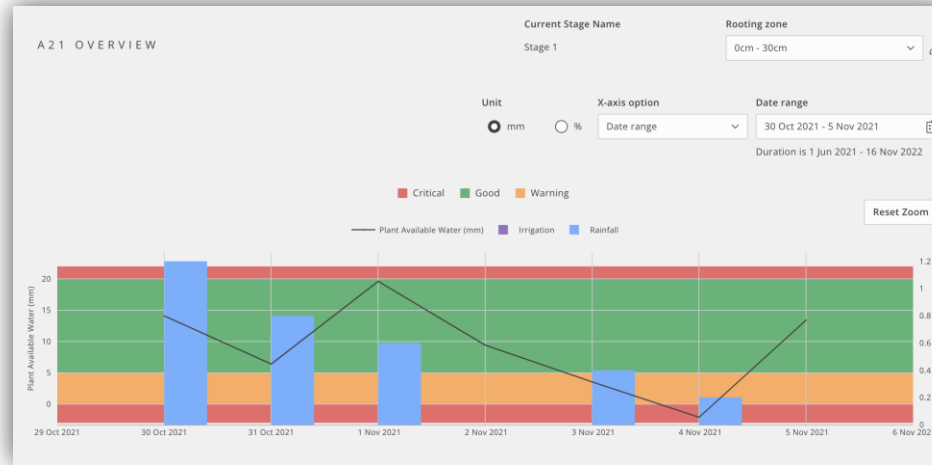
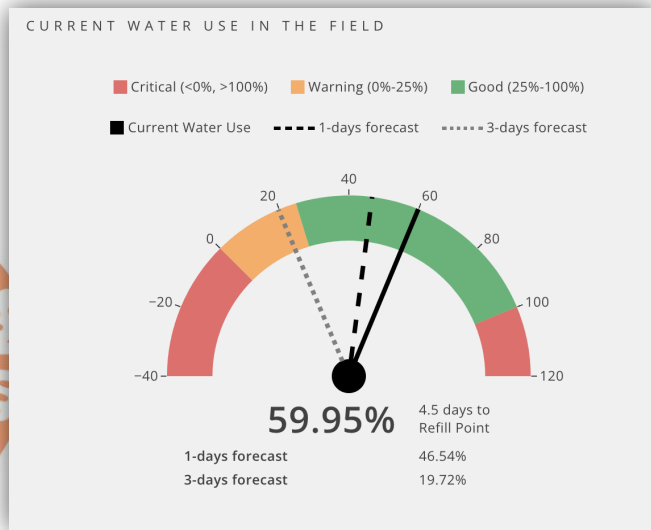
- Real time data on water quality from water sources
- Assess changes in water quality
 - Temperature
 - EC
 - Salinity
 - Ph
 - Radox



Threshold and Alert management

Alerts

- Customized system settings
- Can set alerts for each field, crop, rooting zone and depth of soil moisture
- Send alerts via SMS to irrigation manager



Growth Stage

Variety: Bartle Bananas Growth Stage Order*: 5 Growth Stage Name*: Stage 1-5

Stage Start Date - Stage End Date*: 14 Jul 2021 - 8 Jul 2022 Period (days): 360

Attribute	Value	Use Previous Stage Setting
<input type="checkbox"/> Sap Flow Limit	Enter value L/h	<input type="checkbox"/>
<input type="checkbox"/> Growth Stage Limit	Enter value mm	<input type="checkbox"/>

Root Zones + Add Root Zone

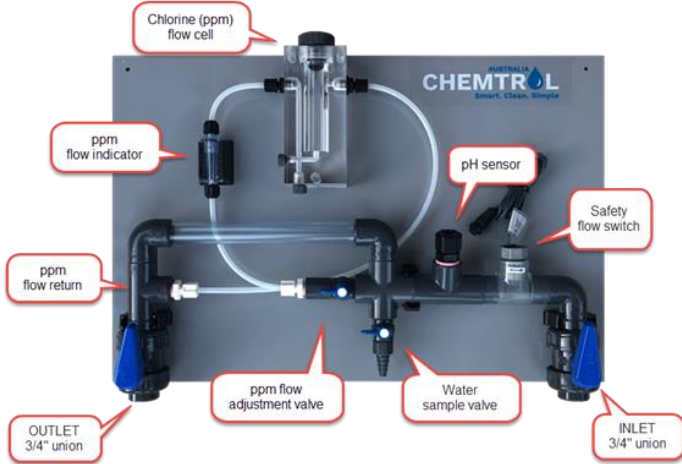
- Root Zone: 0cm - 15cm Select Root Zone Delete Apply Alert
- Root Zone: 0cm - 30cm Select Root Zone Delete Apply Alert

Attribute	Value
<input checked="" type="checkbox"/> Rooting Deep Start	0 cm
<input checked="" type="checkbox"/> Rooting Deep End	30 cm
<input checked="" type="checkbox"/> Full Point mm	55 mm
<input checked="" type="checkbox"/> Refill Point mm	40 mm
<input type="checkbox"/> Full Point %	165 %
<input type="checkbox"/> Refill Point %	120 %



Other Technology

Residual chlorine sensor



Heritage of Innovation

- 70,000 global patents
- 9,000 environmental patents
- \$2.9B annual R&D
- \$927M 3-year IoT R&D
- \$15B revenue from IT sector
- 15,000+ global customers
- 14,000 global partners

FORTUNE[®]
500

Top 10 global tech
company by revenue

150+
factories

Top 100

Thomson Reuters
Global Innovators

83+

countries of operation

350,000
employees

\$78.6B
consolidated revenue

Winning Grower Solutions



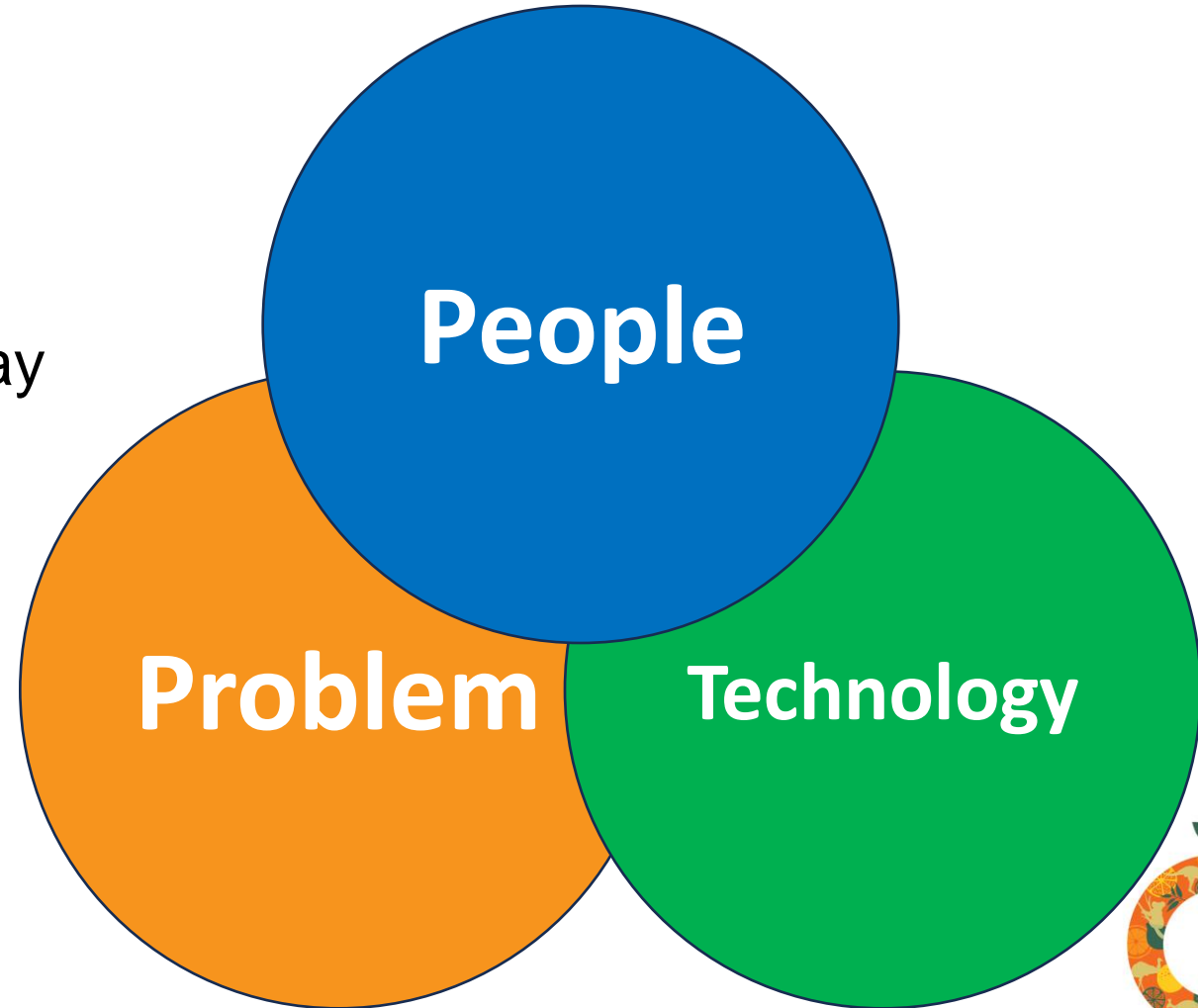
Runner Up
Bartle Frere Bananas Best Agriculture IT
Project in Australia 2022
(KPMG-ITNews)

Winner
Golden Grove
Nursery Best
Sustainability IT
Project in
Australia 2023
(KPMG-ITNews)



So much technology where do you start?

- You understand the Problem:
 - Irrigation management
 - Fertigation management
 - Insecticide / pesticide spray management
 - Operations management
 - Environmental reporting
 - ??????



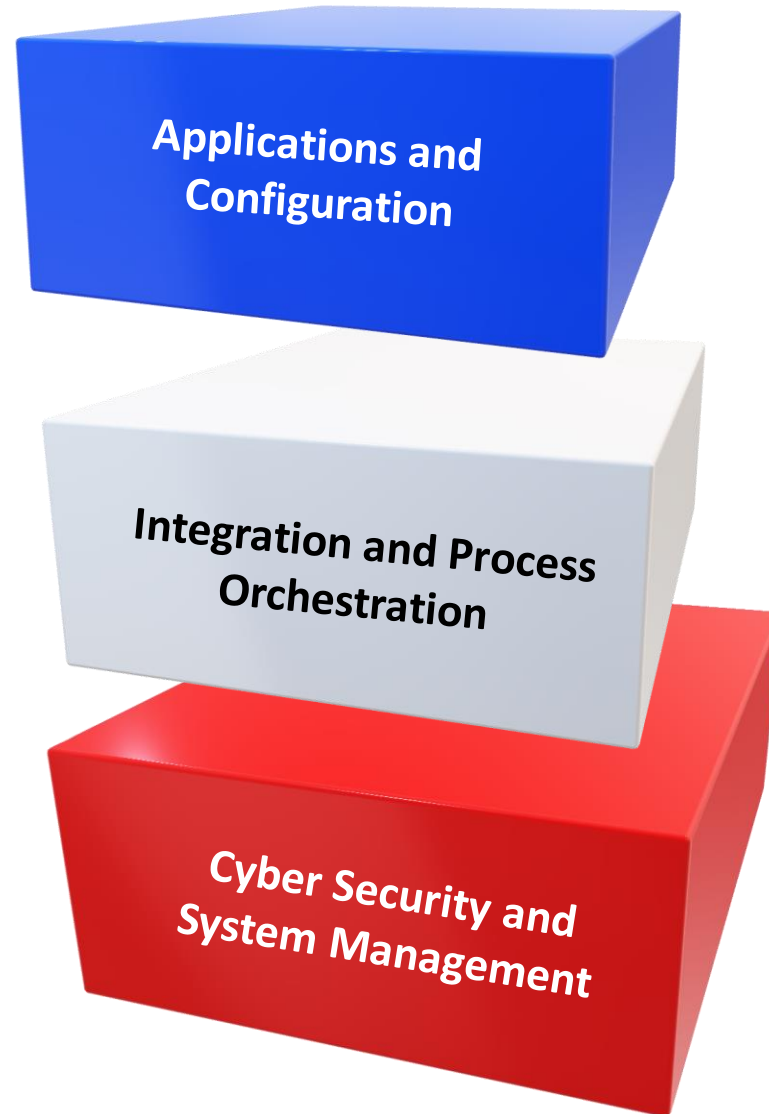
Actionable Insights

- Dashboards are dead – nobody has time to watch them
- Mobile Apps are great- if you don't have open 20 to get insights
- Actionable Insights
 - Trusted information
 - Information to act upon
 - Descriptive
 - Predictive
 - Prescriptive
 - Accessible



Use a Platform that can:

- Integrate your data from various sources and sensors
- N.B. Use sensors you trust and are locally supported
- Configure the platform to meet your needs
- Make sure the platform is effectively managed
- Ensure the platform can expand and grow with you



With the right Platform you can digitize:



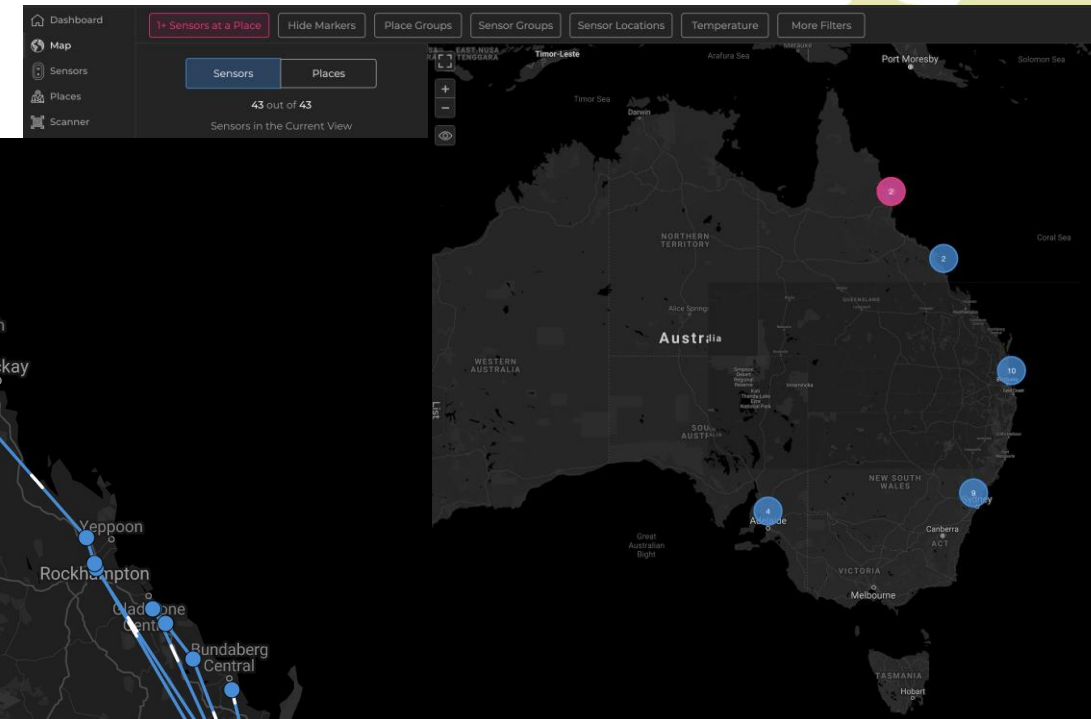
Track and Trace: Operations

- Know where machinery is operating
- Where activities are occurring in real time
- Manage sustainability
- Automate regulatory reporting



Track and Trace: Supply Chain

- Track produce by pallet
- Monitor delivery in real time
- Determine Scope 3 GHG emissions



Hitachi Digital Services

Contact

Dr Owen Keates
Associate Vice President
Hitachi Digital Services
m: +61 407 986645
e: owen.keates@hitachids.com

