

VEGETABLE SMART FARM

AUSTCHILLI



WELCOME TO AUSTCHILLI'S SMART CHILLI FARM

There is a growing desire from farmers and consumers for their produce to be grown using more efficient and environmentally friendly on-farm practices. A key step in achieving this goal is to find new and innovative ways to deliver real-time field data into the hands of farmers, allowing them to make best decisions for their crop.

Bundaberg growers AustChilli have established a pilot smart farm to develop new technologies and tools that will help Australian horticultural businesses improve nutrient, water, and labour use efficiencies. AustChilli is the largest chilli grower in Australia with 160 ha is family owned and operated, and has vertically integrated on-site production, processing, and packing.

The new systems, developed by project partners Applied Horticultural Research and Hitachi Vantara, focus on real-time monitoring and data collection combined with a user friendly interface. This combination can help farmers maximise nutrient and water use efficiency and minimise inputs of inorganic nitrogen and phosphorus inputs, reducing potential run-off.

The establishment of the AustChilli pilot smart farm allows these technologies to be tested in a working farm environment.

AUSVEG and Freshcare are also supporting the project by exploring ways in which these new technologies can be used to automatically collect and provide evidence

for certification audits and BMP systems, including EnviroVeg and Freshcare ENV. This will significantly reduce barriers to Best Management Practice adoption for Australian farmers

The AustChilli smart farm is a part of the *Digital remote monitoring to improve horticulture's environmental performance* project funded by the National Landcare Program and Hort Innovation.

Applied Horticultural Research is developing water balance, nutrient load and growth models that will be updated by soil, plant, and weather sensors.

Hitachi Vantara is developing the Control Tower to holistically measure farm productivity and environmental stewardship by integrating sensor data, weather forecasts and biophysical models.

The project will automate much of the Freshcare Environmental audit reports and provide decision support tools for managing nutrient runoff and leaching.

PILOT SMART FARMS HAVE ALSO BEEN ESTABLISHED IN THE FOLLOWING INDUSTRIES:

- Bananas, Innisfail QLD
- Avocados, Bundaberg QLD
- Nursery, Torbanlea QLD

TECHNOLOGY

The following technology has been installed on the pilot smart farm:

TECHNOLOGY	PRODUCTIVITY	ENVIRONMENTAL	BMP REPORTING
Weather Station	On-site real time weather information, such as wind and rain	Overwatering can be minimised	Spray records are automatically populated
Smartphone and Tablet	Reduced time required for audit forms	Improved accuracy of audit forms	Freshcare environmental records are automated
Full Stop Wetting Front Detectors	Improved nitrogen management	Nitrate loss to environment can be minimised	Nitrate runoff and leaching load manually monitored
Soil Moisture to 80cm	Improved irrigation management	Overwatering can be minimised	Leaching events are detected
Rated Flumes	Improved irrigation and nitrogen management	Nutrient loss to environment can be minimised	Runoff loads can be calculated
Stem Dendrometer	Improved irrigation and tree stress management	Overwatering can be minimised	



Soil moisture sensors with communications node



Weather station

DECISION SUPPORT TOOLS

- Simple displays of soil moisture, evapotranspiration and plant stress data show if irrigation matches plant water use.
- 7-day forecasted nutrient runoff and leaching for better managing irrigation and fertiliser timing.
- Growing degree day forecasts, to predict a fruit maturity date using short-term and seasonal forecasts.
- Simple displays of current and predicted spray conditions with guidelines on when to avoid spraying.
- Interactive farm overlay of field conditions, plant health, sensors, assets.

CROP X SOIL MOISTURE PROBES (INNOVATIVE SENSOR)

Crop X soil moisture probes are being trialled at AustChilli. These sensors are preferable to regular soil moisture sensors in short-term crops such as chillies. The Crop X soil moisture probes are easily installed and removed, with minimal soil disturbance. The probe is shaped to behave like a screw, an advantage compared to the unwieldy cables of conventional sensors. This is especially important when monitoring chillies, due to the regular cultivation and rotation involved. The Crop X soil moisture probes will be compared to TDT sensors in this trial.

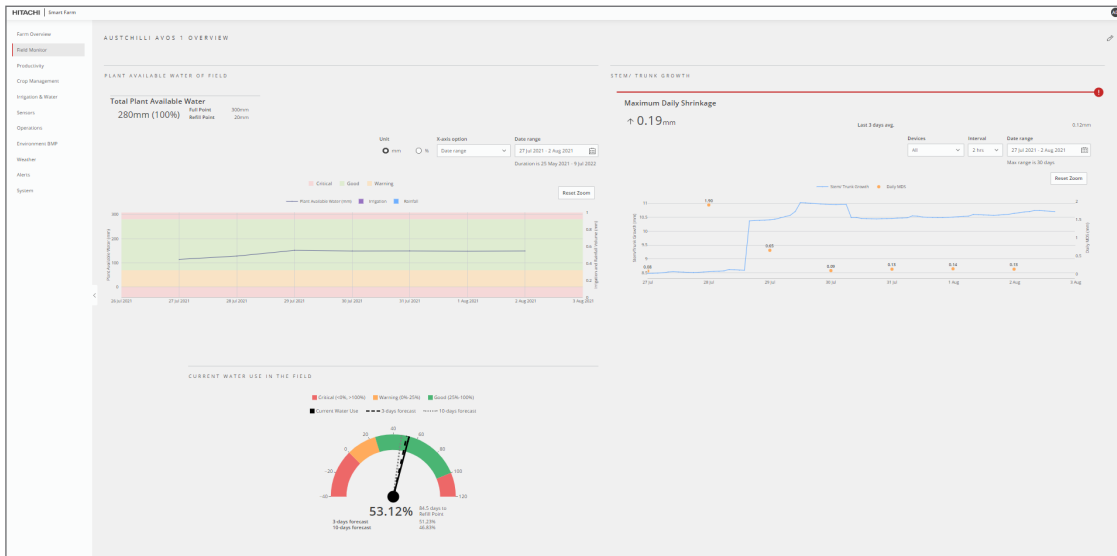


CropX soil moisture sensor



Environmental Block map

Whole farm map



Hitachi Control Tower



Full Stop leachate monitoring (left)

Runoff flume with flow rate monitoring (right)

UPCOMING ACTIVITIES AND EVENTS

- Continued data collection and site maintenance
- Additional installation of sensors
- Development of nutrient and growth models
- Development of Hitachi Control Tower
- Field days and webinars
- Factsheets and technology guides