Installed Smart Farm Technologies

Metos 3.3 (Top) & DTN (Bottom) Automatic Weather Stations

Utilising a mobile phone connection, these weather stations measure a full suite of weather information, including rainfall, temperature & humidity, wind speed & direction, solar radiation and leaf-wetness, reporting every 15-minutes to the cloud.

All of this data can be fed into weather prediction services or disease modelling software, to help farmers plan fertiliser/chemical applications.

The main differences between the two stations is that the Metos station utilises a high-accuracy ultrasonic wind sensor, which reads low-wind speeds more accurately, than the Davis station below, with it's mechanical, spinning wind-sensors.

www.metos.at
www.davisinstruments.com

Stirlings to Coast Farmers LoRaWAN Rain Gauges & Soil Moisture Stations

Custom built in-house by SCF, these stations measure and report rainfall events and also soil moisture content levels via an EnviroPro 80cm Soil Moisture Probe.

These devices utilise a free LoRaWAN connection, with data being reported in the PairTree dashboard. Over multiple seasons, farmers will be able to make in-season management decisions (fertiliser) based on known soil moisture levels.

Goanna Ag – Satellite Rain Gauges

These rain-gauges record rainfall events throughout the day, then send rainfall data to the cloud when the satellite passes over the station. Currently, there's 4 readings per day, however, as more satellites are launched in the sky, they will be recording approximately every hour. The main benefit of these sensors is that they work everywhere, even where mobile phone coverage does not exist.
https://www.goannaag.com.au/

Installed Smart Farm Technologies

Ellenex Tank Level Monitor (Top) & Farmbot Tank Level Monitor + Rain Gauge (Bottom)

These low-cost units report water tank levels to a mobile app where a farmer can monitor how full his/her tank is, and measure how much water is used.

The metallic pendent is dropped into the tank on both models, and it effectively measures the pressure levels above it, to determine how full or empty a tank is. The more pressure exerted on the sensor, the higher the tank level.

The Farmbot system allows users to add additional sensors to the stations, such as rainfall in our case. Both systems have a web-based dashboard to check tank levels anywhere, with the Ellenex system also having a mobile app too. Additional alerts are available to advise if there is a sudden, dramatic loss of water volume.

The Farmbot system can utilise either the Telstra network or a satellite network, whereas Ellenex has models that connect to Telstra, LoRaWAN and Sigfox networks.

www.ellenex.com.au
www.farmbot.net.au

AxisTech SigFox Rain Gauge (Top) & AxisTech SigFox Soil Moisture Probe (Bottom)

Utilising the Sigfox network available in Mount Barker, these rain gauges record rainfall events, recording rainfall in 0.2mm increments. Soil moisture measurements are also transported via the Sigfox network and recording soil moisture content across 80cm.

www.axistech.co

Smart Farm Networks

LoRaWAN (Blue) & Sigfox (White) Gateways

These gateways create a radio network which allows farmers and researchers to connect their sensors to, and stream data to web and mobile phone applications.

LoRaWAN stations can be easily bought from electronic stores and have no-ongoing costs for the gateway or sensors connected to it, whereas the Sigfox gateways are leased from a company that manages the network for you, and have a low-cost yearly fee for the devices. Sigfox networks are available in most cities, and also currently in Mount Barker.

Some of the many sensors you can connect to these networks include tank-level monitoring, soil moisture probes, weather-stations, Vehicle GPS tracking, Animal GPS tracking, electric fence monitoring sensors, smoke alarms, water-meters and much, much more.

Ubiquiti Mesh Wi-Fi (Right)

These panels allow Wi-Fi devices (iPhone, iPad, computers, security cameras, printers) to connect to our smart-farm networks. Being a meshed based system, each addition to the network extends the coverage by up-to 180 metres.

Ubiquiti Point to Point Wi-Fi (Left)

Utilised where you need to share internet connectivity between buildings. These dishes can send a Wi-Fi signal to another dish up to 50kms away depending on models used.

On both Smart Farms, SCF is utilizing these dishes to share an internet connection where there currently is no mobile phone coverage allowing farmers to view smart-farm data.

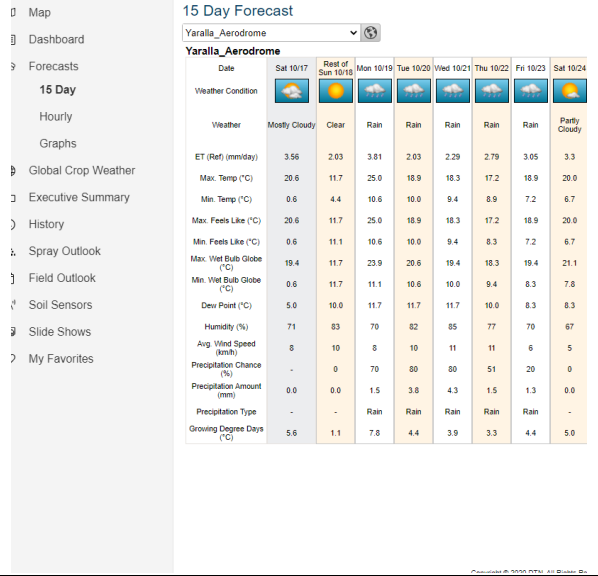
Smart Farm Tools

PairTree Dashboards

With data coming from multiple sources (weatherstations, soil moisture probes, rain-gauges etc.) and across multiple network connectivity types (LoRaWAN, Sigfox, satellite and Cellular), it is hard for our farmer members to keep track of multiple phone apps, password and logins.

Pairtree allows farmers to ingest data from multiple data sources, and display it all on one page. On top of this, the PairTree system allows SCF to view our soil moisture/rain station data without having to build a separate mobile application.

https://www.pairtree.co



DTN Hyperlocal Weather Forecasting

By feeding our weather-station data into modelling software, we can improve our weather forecasts for the next 36-hours and 14 days.

Each location a weatherstation of ours is installed, will create a forecast point. Utilising an adaptive-learning process, the system will predict future weather conditions, then check & compare it for accuracy, and then tweak its next estimation. Over time, these stations will become more accurate, producing better planning outcomes.

The forecast platform also advises farmers when it is safe to spray, taking into consideration any predicted rainfall, unfavourable DeltaT or wind-speed conditions.

https://www.dtn.com/agriculture/producer/dtn-ag-weather-station/