



# Smart Farms Updates – Current Installs & considerations

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It has been a busy few months across the SCF Smart Farms Initiative, as we approach the second year of the initiative. With a wide range of AgTech equipment now installed across our demonstration sites and initial teething issues resolved, we are starting to see some quality data come through in-line with the growing season.

*So what technology do we currently have on the smart farms?*

Across both demonstration sites, our soil moisture probes are settling down nicely to reflect the field conditions, while our remote rain-gauges are actively recording rainfall variation across the landscape. A range of tank-level monitoring solutions have also been installed on the livestock/cropping demonstration site, proactively alerting our smart-farm host to any issues with water-supply, while both sites now have improved Wi-Fi coverage with the recent installation of point to point equipment and meshing access points.



**Soil Moisture Probes**

**Satellite Monitoring and Dashboards**

**Farm Connectivity**

**Security**

**Water Level Sensing**

**Weather Stations**



## Current Equipment Installed WEATHER STATIONS

We are currently utilising DTN weather stations across both farms, which utilise sensors made by Davis. These lower-cost stations continuously record weather data and send the information (rainfall, temperature, humidity & wind speed/direction) to the cloud every 15 minutes. Alternative brands will also be tested during the 2020 growing season across a range of locations in our membership base.

*Tip: Consider the on-going costs & platform fees between lower-cost & higher-cost stations, as differences do apply with total costs of ownership. Sometimes the more expensive set-up can be cheaper in the long-term.*



## HYPER LOCAL FORECASTING PLATFORM

The two DTN weather stations are continuously feeding current weather conditions into the DTN cloud, creating 36-hour & 14-day forecasts for each location. The platform also utilises the established Bureau of Meteorology & DPIRD weather-station sites and allows pretty well any other internet-connected weather-station to be fed into the model, should users wish to upload their own data.

*Tip: There are platform options available for users to utilise hyper-local forecasting, even if you do not have an internet-connected Weatherstation on the farm.*

## SOIL MOISTURE PROBES & STATIONS

To gain a better understanding of soil conditions, SCF has installed soil moisture probes under the Smart Farms Initiative. Featuring our in-house designed solution and also AxisTech Soil Moisture stations, we are regularly receiving soil moisture & temperature conditions in 10cm increments across all sites. In combination with rainfall data, SCF now can measure infiltration rates and amounts for our soils, while grower members can utilise this data for nutrient management decisions throughout the growing season.

## TANK LEVEL MONITORS

SCF is currently trialling two tank-monitoring solutions provided by Ellenex & Farmbot systems. Both sensors measure the pressure above a pendant, calculating the water level above the sensor and providing the option to send alerts if water falls below a pre-set level.

While the Farmbot solution is more expensive than the Ellenex solution, it does provide additional options to connect sensors such as rain-gauges, safety check-in buttons, electric fence monitoring and much more. These Farmbot devices run off either the Telstra or satellite network, meaning that you can also install these devices in remote locations where LoRaWAN coverage may not exist.



## REMOTE RAIN GAUGES

Remote rain gauges are a cost-effective method to infill rainfall data between weather stations and help measure rainfall variation across the landscape. SCF is currently trialling Axistech Sigfox rain gauges, GoannaAg LoRaWAN & Satellite rainguages and is also collating data from our in-house developed soil moisture probe stations to gain a better understanding of rainfall distribution throughout the region.

*Tip: Some stations will allow users to purchase a basic rain-gauge first, then allow additional sensors such as temperature/humidity or wind sensors to be added at a later date, allowing farmers to start small and grow!*

## LORAWAN GATEWAYS

LoRaWAN gateways are the device that creates a radio-network for your LoRaWAN sensors to connect to, typically up to 15 kilometres in the ideal world. They require a modem or internet connectivity for the sensor-data to be displayed on dashboards. Pricing typically varies depending on the gateway used and its features, frequencies & channels available. Both smart-farm demonstration sites are utilising lower-cost solutions produced by Laird (Sentrius RG191-Au version) & MatchX, operating on the Au-915mhz frequency. This allows us to connect our tank level monitors and soil moisture probes to the internet.



## POINT TO POINT WIFI & BUILDING WIFI

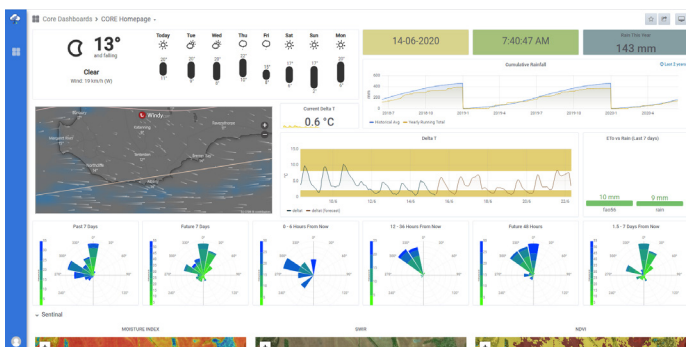
Instead of relying upon a multitude of modems to create network connectivity in multiple buildings, members can develop networks and share connectivity between devices through a combination of two types of Wi-Fi networking; Point to Point Wi-Fi solutions & Building Wi-Fi solutions.

As the name suggests, Point to Point connectivity shares data between two or more buildings only, while building Wi-Fi provides the network for mobile devices, tablets and computers to physically connect to. SCF have deployed these technologies across the farms to provide connectivity in buildings where phone coverage is not available, and to create the backbone for our sensor networks to connect to.



## DASHBOARD INTEGRATIONS – PAIRTREE INTELLIGENCE

As our smart farms get more complicated with different sensor types, vendors & platforms, it is essential that farmers can take advantage of aggregating their data into one single point, where they can easily make management decisions from. SCF is currently trialling the PairTree platform which combines the sensor data from our in-house built soil moisture probe/rain-gauge stations with Bureau of Meteorology 5km x 5km point forecasting & satellite imagery.



## NEED SOME SUPPORT OR GUIDANCE IN CHOOSING AGTECH?

Stirlings to Coast Farmers are here to help our members on their AgTech journey. Throughout this Smart Farms Initiative, we will be hosting & providing a range of workshops and publications materials to help identify how to choose your AgTech equipment and what features to look for. In addition to this, SCF can offer assistance in the acquisition and installation of your AgTech equipment. For more information regarding products available or to arrange a copy of our Smart Farms Workshop manual, please contact Philip on 0428 768 589.

## EARLY IMPLEMENTATION REWARDS - SMART FARM CALCULATOR

While some of the technologies implemented on the demonstration sites won't have easily calculable "returns on investment" within the first year such as soil moisture probes, other technologies such as remote rain-gauges and tank level monitoring can yield considerable savings in both labour and travel from the initial implementation. To help identify some of the potential cost-benefits that could be implemented, SCF has developed a basic calculator which helps determine potential savings over five years. To find out more, please visit <https://bit.ly/smartfarmcalculator>.

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