



# Smart Farm Cropping & Livestock Demonstration Site Case Study

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## Background

**NAME:** Andrew Slade – Glenridge Park  
**LOCATION:** Kendenup, Western Australia  
**PROPERTY SIZE:** 6000 hectares  
**FARMING TYPE:** 50% Cropping, 50% Livestock  
**FARM MANAGEMENT:** Family farming operation.

## Background

Currently, Glenridge Park utilises the Telstra mobile network as their primary internet source, while a recently installed Pivotal network is being finalised. The undulating terrain of the farm and limited nearby Telstra towers have resulted in quite variable mobile phone coverage across the property, with some areas receiving no signal at all. When the new network is operating, the majority of Andrew's farmland will have access to the Pivotal 4G LTE network for high-speed internet and voice communications, with the future capability for NB-IoT enabled devices to connect directly to the network at a low cost.

As Glenridge Park stretches approximately 20 kilometres in width over numerous properties, the importance of developing a strong communications and sensor network was paramount for Andrew to maximise the value of the data he was collecting. For Andrew, the lack of support, high-sensor pricing and reliability concerns were some of the issues that were slowing adoption.

SCF wanted to design a trial solution that helped the Slade family adopt ag technologies that would help mitigate risk on their farm through the integration of livestock and pasture management into their cropping enterprises. This would be achieved through a range of digital technologies including remote water level monitoring, remote rain gauges, weather predictions and soil moisture monitoring.

## Current Connectivity Types

**FARM INTERNET SERVICE –**  
Telstra Mobile Broadband  
**FARM INTERNET SPEEDS –**  
5Mbps down, 1.5Mbps up  
**FARM INTERNET ALLOWANCE –**  
60gb Mobile Broadband  
**SENSOR CONNECTIVITY TYPES UTILISED -**  
Cellular, SigFox & LoRaWAN

## Installation

A range of suppliers and technologies were utilised on the SCF Cropping & Pasture Demonstration Site. These included:

- Remote rain-gauges, soil moisture probe and Sigfox in a box from Axistech,
- Weather stations with hyper-local forecasting services by DTN,
- Tank level monitoring solution with remote Raingauge from Farmbot
- Tank level monitoring solutions from Ellenex
- Mesh WiFi system produced by Ubiquiti

The majority of the IoT devices were self-installed by SCF however, it is recommended to use a registered cabler for any network & cabling work.

Overall, the AgTech installations were virtually "Plug & Play", particularly for the Sigfox enabled systems, with little effort beyond powering the device on after install. As the Sigfox network is managed directly by Thinxtra in Australia, the data automatically streams into the dashboard when the sensors come in range.

Unfortunately, with one of the Sigfox based soil moisture probes and remote rain-gauges installed; we had difficulty in getting a stable connection to the Sigfox network, even after checking the network coverage map and placing it in an area where there didn't appear to be any issues. Our Sigfox partner, Axistech, organised a "Sigfox in a box" system, which works by creating a mini Sigfox network with



a 5-10km coverage range. This instantaneously provided the much-needed coverage that we needed to get these sensors to work and appearing on with readings on our dashboard.

It is crucial that time is taken to verify what coverage is available in the area prior to installing equipment, and if there isn't sufficient coverage available, create a plan to boost your chances of connection via external aerials and/or coverage boosting devices like "Sigfox in a Box".

## Operation & Decision Making

Overall, the different technologies assisted in farm management operations and could be easily applied to both grain-growers and mixed crop & livestock operations. The use of the DTN weather-station helped in some situations in providing advice to potential future harvest & spray conditions through hyper-local weather forecasting; however, it's accuracy & model improves over time and as the nearby station count increases. At this stage it is still too early to make management decisions based off soil moisture data generated as it can take a while for the soil moisture probes to settle. It is still perceived these soil moisture probes will help with operation decisions based on nutrient application improving yields and grain quality as well as modifying grazing habits through soil water conservation and predictive growth rates.

## The Calculable, Immediate Benefits

The most visible immediate savings on farm was the usage of water-monitoring technologies. One example of this was where SCF employed a single Farmbot Tank Monitoring solution on a recently purchased farm, located approximately 14 kilometres from the main homestead. This was based on an equipment purchase price of approximately \$1200 (ex GST) for the water level monitoring device and a \$342/year connectivity & dashboard fee. It was calculated that even if only there was one-trip taken per week to check the tank level; the system would have paid itself off within the first 8-months. Approximately \$900 savings in labour & travel would occur in year-one, with savings in excess of \$9,300 over an estimated 5-year period. [Based on assumptions of 28km round-trip at \$0.68/km, taking 1-hour of labour at \$28.00/hr]. It is also important to note that these savings are most likely

understated, as additional benefits & efficiencies could be gained through the effective re-allocation of work-tasks, in lieu of other production & economic benefits such as better water management in dry years, or early warning of water leaks/loss prior before affects operational tasks or animal product & welfare.

## Future Plans

Currently the Sigfox coverage over the Glenridge Park property is limited to particular sectors, as the signal is coming from Mount Barker. Unfortunately, in its current form, the fees to keep the additional Sigfox coverage operating can't be justified at a single farm level for very few sensors compared to the other connectivity sources available. Where there is no Sigfox coverage available, there has been the progression to add LoRaWAN sensors and LoRaWAN gateways into the Smart Farm Demonstration site.

Particular planned add-ons into the Smart Farm ecosystem include:

- Silo & Feed bin level monitoring,
- Waterflow sensors for tanks & inside the feedlot,
- Livestock GPS Trackers,
- Farm security cameras,
- Dashboard aggregation for all IoT & production data to be displayed in one place.

## Indicative Pricing for Equipment Installed

Item	Upfront	Ongoing Costs
DTN Weather Station & Hyper Local Weather Forecasting Package	\$2,200	POA
Automatic Tipping Rain Gauges	\$785*	\$60
600mm Aquacheck Soil Moisture Probe	\$1200*	\$60
FarmBot Water Level Monitor + Rain Gauge + LoRaWAN Station	\$1200	\$342
Ellenex Water Level Monitors	\$700*	\$60
Ubiquiti Mesh WiFi System	\$187 – 320	-
LoRaWAN Gateway + External Antenna + Cabling	\$850	-

Notes: Prices are subject to change and exclude GST. Please confirm pricing directly with manufacturer or reseller. \* Pricing includes first year of subscription



## Key Messages

The key message to smart farm implementation is Plan, Plan, Plan!

- Define what problems you are trying to solve first, and then identify the sensors that are needed to help achieve that:
  - Can the problem be measured or managed by practice change?
  - Will it boost on farm productivity or quality, and improve overall efficiency?
  - You will also need to consider how this all fits into your budget and where your limitations are.
- Identify what connectivity types are available in your region (Sigfox, LoRaWAN, Satellite or Cellular), and methods of creating a LoRaWAN network if required.
- Calculate the costs of implementation, and compare it against the savings you could potentially make in time, travel and efficiency gains. There is quite a few technologies available that can create significant savings.
- Start small, and work out what works in your situation and what doesn't. If you ever need help, there are resources and organisations to assist you.
- Consider your long-term goals, and how you would like to access your information when you're all setup. Would you like all your data in one place?

To calculate the potential savings you could make from implementing remote rain-gauges or water level monitoring, please visit <https://bit.ly/smartfarmcalculator>.



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Acknowledgements: The WA Internet of Things (IoT) DecisionAg Grant Program is funded by the Department of Primary Industries and Regional Development (DPIRD)



Department of  
**Primary Industries and  
Regional Development**