

## Soil moisture data and 100% groundcover drives decision-making

LOCATION: Jamestown

ANNUAL RAINFALL: 400-475 mm

FARM SIZE: 1680 ha

ENTERPRISES: Cropping, wool, lamb

SOIL TYPE: Sodic red clay

Information from soil moisture probes located on **Luke Clark's** Jamestown property drives many of his key cropping decisions. The maintenance of groundcover both in Luke's cropping and sheep enterprises is also critical for his business.

Luke operates a 1680 ha property in partnership with his brother Scott and father Denis. The operation is cropping focused, with approximately 80% of the farm permanently cropped under a controlled traffic farming system. The remaining 20% is non-arable 'hills country'. This is largely vegetated with native pasture and is grazed by a flock of 500 self-replacing merinos.

The Clark's have three weather stations (comprising a rain gauge and sensors measuring temperature/relative humidity, wind speed and wind direction) and four soil moisture probes established in cropping paddocks across their property. The weather stations were first installed in 2013 with the others in 2015 and 2019.

### Crop decision-making

During the growing season, Luke checks his weather station and soil moisture probe data on a near daily basis. He especially relies on the probe data to take the guesswork out of key crop management decisions, including:

1. Paddock crop rotation – a four-year rotation of beans/canola/wheat/barley is generally followed. However, if there is little remaining sub-soil moisture after a bean crop, canola may be replaced with wheat given it uses less moisture throughout the growing season.
2. Nitrogen fertiliser application – in-crop fertiliser decisions are determined by the amount of moisture in the soil profile and the rate it's being used by the crop. For example, in August 2017 with a pending rainfall event other farmers in the district were applying urea to their crops; however as the Clark's soil probes showed the moisture profiles were depleting, they did not. Given the poor finish to the 2017 season this decision ensured their crops did not 'burn off' (due to excessive nitrogen) and they had significant cost and labour savings through not applying urea.



**Luke Clark at one of the three weather stations installed on his Jamestown property.**

3. **Frost management** – the Jamestown region is subject to frost and when frost events occur in spring, the Clark's check both air temperature and probe data to gauge frost severity. After a frost event in September 2018, the probes showed that some of their cereal crops had immediately stopped using moisture, which indicated they had been severely frosted (and given the timing of the frost, grain yield would be significantly reduced). Armed with this information they immediately started cutting the crops for hay, rather than waiting before the physical signs of frost were seen (which often takes a week). By cutting immediately, the nutritional quality of the hay was conserved as much as possible.

### **Groundcover is king for both cropping and sheep enterprises**

In the Clark's cropping operation, groundcover is maximised by using a stripper front at harvest and retaining all the stubble. In addition, sheep don't graze the stubble to ensure groundcover is never compromised. Through maintaining high stubble loads and full groundcover, evaporation and run-off are negligible. This gives the best chance for moisture to be stored in the soil profile and be available for crop growth.

The philosophy of 'groundcover is king' has flowed through to the Clark's grazing management of their native pastures. Between 2010-15 this section of the property was fenced into 11 x 20 ha smaller paddocks for rotational grazing. Through adopting rotational grazing, pasture production increased whilst ensuring even grazing and maintenance of groundcover. As the Clark's native pasture is located in their 'hills country', maintaining groundcover is particularly critical for erosion control and to minimise run-off.

As soon as paddock groundcover starts to be less than 100%, the sheep are removed and put into the Clark's containment lot. They generally remain in the containment lot for two to three months and are only released once there is sufficient native pasture production for grazing to sustainably commence.



**The Clark's merino ewes grazing native pasture.**

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For further information visit <http://biggroup.org.au/project/soil-moisture-monitoring/>*

## KEY DECISIONS

Flexibility to change crop rotation based on soil moisture levels prior to sowing

Having confidence to apply (or not apply) in-crop nitrogen fertiliser

Determining if crops are frosted through reduced soil moisture use

Groundcover dictates sheep grazing management