



Barossa Improved Grazing Group's (BIGG) Brett Nietschke and Graham Keynes at BIGG's demonstration weather station on Graham's Keyneton property

# Measuring soil moisture leads to better pasture

The Barossa Improved Grazing Group (BIGG) is connecting weather and subsoil moisture data with pasture growth forecasting to help livestock producers manage stocking rates.

In an increasingly variable climate, previous practices and 'rules of thumb' are no longer reliable for predicting pasture growth. The Barossa region is experiencing patterns of later autumn breaks, reduced spring rainfall and increased summer rainfall. These changes, which can be attributed to climate variability, make it difficult for local graziers to rely on historical data to predict pasture production, and therefore choose appropriate stocking rates.

Soil moisture and climate information can be used to assist producers in their decision making, such as stocking rates. An understanding of how much soil water is available, coupled with weather information, can enable modelling which helps to predict pasture growth. This can in turn be used to model the feed available to support livestock.

Information on available feed is especially critical during the onset of dry conditions as destocking can then be undertaken before pasture groundcover levels, and stock health, are compromised.

*The Barossa region is experiencing patterns of later autumn breaks, reduced spring rainfall and increased summer rainfall. These changes make it difficult for local graziers to predict pasture production and therefore choose appropriate stocking rates.*



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Participants at a 2017 pasture walk visiting BIGG’s soil moisture monitoring station at Flaxman Valley

The approach

BIGG has taken an innovative approach to data collection and analysis to help develop improved decision-making tools for livestock producers. The project has combined local soil moisture, weather information and pasture monitoring data to model pasture growth rate and provide recommendations on stocking rate.

In 2013, BIGG established three weather and soil moisture stations in the Barossa region, at Koonunga, Flaxman Valley and Keyneton. While soil moisture probes are widely used in the cropping industry, this was the first time a farming systems group in Australia had utilised soil moisture monitoring in pastures.

Each weather station collects data on: soil moisture and soil temperature (from a sub-surface capacitance probe), rainfall, air temperature, relative humidity,

- wind speed, and solar radiation. This near real-time data (updated every 15 mins) is publicly available on the BIGG website and has been converted into user-friendly interpretative graphs, including:
- plant available water – an estimate of the total amount of water that can be accessed by the pasture (between 15-85 cm depth)
  - Delta T – a measure of evaporative potential to determine if weather conditions are safe for spraying pesticides
  - weather conditions for high mortality risk of sheep – an estimate calculating a Sheep Chill Index
  - fire danger risk – used at crop harvest to determine if weather conditions are safe for harvesting
  - Sheep Blowfly Index – a measure to indicate the risk of sheep flystrike.



Learning how the soil moisture monitoring stations operate during a pasture walk



## Location

The project has three weather station sites: Koonunga, Flaxman Valley and Keyneton. The first two sites are within the Adelaide and Mount Lofty Ranges (AMLR) natural resources management region, with the third located on its border with the SA Murray Darling Basin region.

## The pasture modelling tool

In 2016, three years after the stations were installed, BIGG commenced a project to use the raw data recorded from these sites to model local pasture growth and production. A decision making tool has been developed by Peter Toome from TOIP for use by producers to better manage their stocking rates.

Field testing of the tool is in progress, with focus groups providing feedback before the tool is launched on the BIGG website. In future, BIGG plans to incorporate Bureau of Meteorology forecasting data into the model to predict future pasture production.

## The outcomes

Producers will be able to access the tool from [www.bigggroup.org.au](http://www.bigggroup.org.au) from late 2018. By inputting key pasture and livestock information, it will assist producers to sustainably manage their stocking rates throughout the season.

This information is especially critical in dry springs, as it gives producers a 'heads up' when pasture production will slow, enabling stocking rates to be appropriately adjusted.

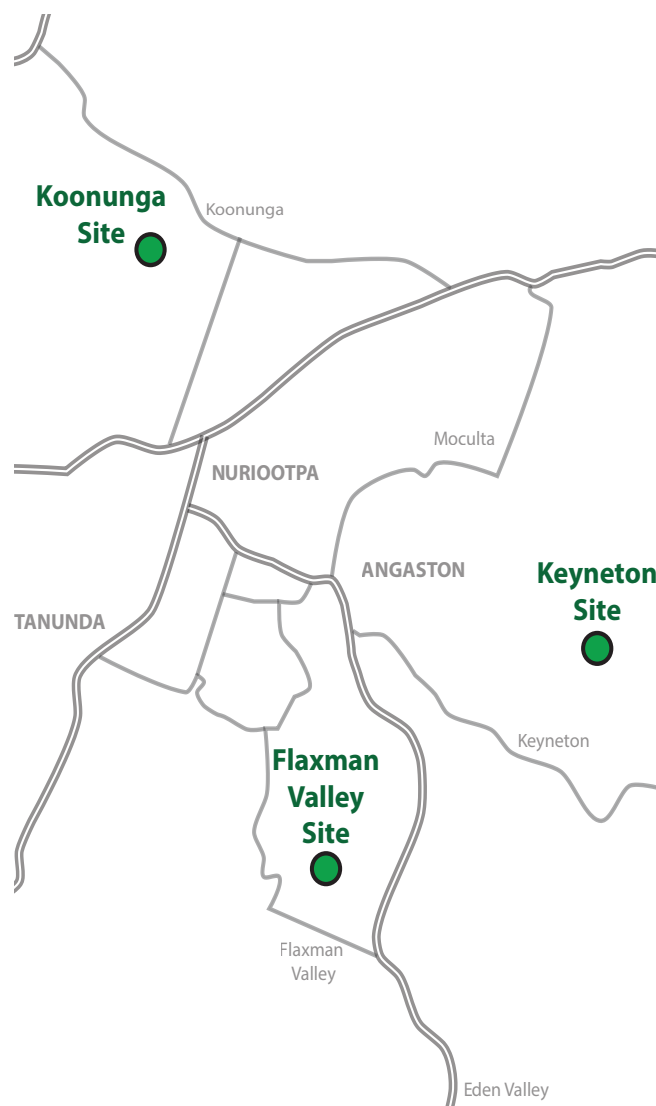
Not only will this save the landholder money through better decision-making, it also provides environmental benefits by encouraging destocking before groundcover levels are compromised. Maintaining groundcover improves soil health and reduces the potential for soil erosion and invasion of broadleaf weeds.

## Sustainable industry support

This project was supported by the AMLR NRM Board's Sustainable Agriculture Industry Support scheme through funding from the NRM levy.

Healthy natural ecosystems and sustainable primary production systems are fundamental to social, environmental and economic well-being.

With more than 50 per cent of the Adelaide and Mount Lofty Ranges region used for primary production, the board will continue to partner with industry to increase sustainability in production systems.



Map of the Barossa showing the Koonunga, Keyneton and Flaxman soil moisture and weather stations

## Project linkages

*Following BIGG's example, Fleurieu Farming Systems installed soil moisture probes at various local trial sites in 2016 through funding from the AMLR NRM Board. To read more about Fleurieu Farming Systems read the case study **Healthy farming for the Fleurieu**.*





For more information

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All photos thanks to BIGG



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