Optimised Pasture Management
Tools & technologies to help maximise groundcover and sustainably improve total farm productivity.

Hosts: Walker Family (Green Range) and Pyle Family (Palmdale).

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KEY MESSAGES:

- Current ground cover measurement methodologies are based on assessing pasture availability irregularly & generally undertaken in selected locations in a paddock that may not be representative of a paddock's production potential.

- The adoption of digital technologies provides landholders with the ability to monitor a more significant proportion of their land more effectively, allowing the opportunity to monitor changes and trends over time through spatial analysis.

Project aim:

To increase the skills & knowledge of landholders, researchers & local NRM officers in the use of effective and practical digital tools that can help monitor and improve our land resources through active management of groundcover.

Project background:

Climate change presents a real threat to farming operations, particularly as seasonal conditions continue to change year on year. Rainfall variability, frosts & changes in temperature all play a significant part in the development and maintenance of groundcover. Effective ground cover management protects our soils against erosion, rain impact, and compaction and is an essential contributor to soil biology and soil chemistry, herbicide effectiveness, and overall soil condition.

With a varying climate, landholders need help to adapt their livestock and cropping management to limit their effect on the land whilst trying to optimise their production systems to remain sustainable into the future. Successful adaptation to climate change will need strategic preparation and tactical responses from landholders to ensure that farming remains sustainable and pasture production remains synergistic with animal production.

Current ground cover measurements assess pasture availability by eye based on the farmer's experience. Many landholders find it difficult to accurately determine feed availability and extrapolate measurements to define a whole paddock's livestock carrying capacity. The adoption of digital technologies will provide landholders with the ability to monitor their land more effectively and the opportunity to monitor changes and trends over time through spatial analysis. Low-cost technologies are easily adaptable to farming enterprises where landholders can utilise monitoring, analysis & learning within their decision-making process to understand the impacts on groundcover production better.

A better understanding of ground cover variation across paddocks means that landholders can implement better animal grazing to ensure that biodiversity continues to thrive. Better ground cover management will improve the sustainably of animal production both on & off-farm.

Tools & Technologies Available

There is a wide range of tools and technologies available to help increase farmers' awareness of pasture levels across a paddock, across a wide range of measurement methods. The methods analysed include:

- Ground based sensor measurements – which take measurements via direct contact (such as pasture

measurement discs),

- Remotely sensed measurements – measure pasture density, quality and/or health from a distance (non-contact), such as vehicle-based sensor, drone, plane or satellite. These can come in either an:

    - active-sensed form (utilise their own light source to provide a reference point, day or night), or,

    - passive-sensed form (utilise existing light sources such as sun to measure, however, lose accuracy in some conditions, such as cloud cover)

- Simulation-based measurements – these utilise algorithms and calculations to predict and simulate a result based on a range of user-inputted information (including soil type, rainfall, and climate information)

The Optimised Pasture project demonstrates a range of the following tools across 3 selected locations throughout the SCF membership zone:

- *Pastures from Space*
  Pastures from Space allows farmers to track Pasture Growth Rates (PGR) and Food On Offer (FOO) weekly over their property using satellite technology. Users can see FOOD & PGR rates in 6.25ha pixels, whilst the graph component allows farmers to turn on/off individual years, to get a better understanding of seasonal changes.
  https://pasturesfromspace.dpird.wa.gov.au/

- *Australian Feedbase Monitor (in conjunction with CiboLabs)*
  The Australian Feedbase Monitor tool is a relatively new grazing management tool that gives farmers insights into their feed capabilities. It uses higher-resolution satellite imagery and calibrated measurement points to generate percentage groundcover and total standing dry matter. This platform is free of charge for MLA members.
  https://www.cibolabs.com.au/

- *GreenSeeker NDVI*
  Either hand-held or vehicle mounted, GreenSeeker systems measure plant NDVI levels to indicate overall plant health. Being an active sensor, these systems

can be utilised day or night, but require complex calculations & measurement to return a food-on-offer value. This data can be mapped and modified, to be utilised in Variable Rate nitrogen applications to increase feed production prior to grazing.https://ww2.agriculture.trimble.com/product/greenseeker-handheld-crop-sensor/

- *Drone Imagery*
  Either through RGB and/or NDVI based imagery collected via drone and simple software such as Drone Deploy, Pix4D or Metashape, farmers have the ability to directly map and monitor their individual paddocks and measure plant health across the landscape. These systems typically allow timebased comparisons (comparing two different timeframes) to enable identification of areas impacted or of substantial growth.

- *FarmingForecaster – GrazPlan*
  Utilising a web-based (Farming Forecaster) or computer software-based version (GrazPlan) users can simulate & predict future pasture growth rates based off historic rainfall information, enterprise types and soil information, stocking rates and effects of supplementary feeding systems.
  https://grazplan.csiro.au/

Discussion & Conclusion

Ultimately, there are three ways to optimise the production of pasture on farming land, and these are typically confined to:

- Soil fertility and plant nutrition – managing your soils through ameliorants and fertiliser to increase biomass production,

- Improving farm grazing management – managing the effective stocking rates and duration to ensure pasture composition is managed, minimising the risk of overgrazing, and working to increase rooting depth of pasture to create environmental resilience to seasonal conditions, and,

- Selecting the right species – selecting the right species of pasture which maximises the production, quality and value of your pasture.

The use of technology such as those demonstrated through this project will help enable the ability for landholders to better manage and understand their pasture production at a much greater resolution than current practices. By improving their pasture production and management, farmers are more likely to benefit from increased pasture production, but also improved animal welfare, improved ground cover, reduction in weeds, increase in biodiversity and reduced erosion potential/land degradation potential.

Resources Available:

For more information regarding the tools and technologies available, please visit the Stirlings to Coast Farmers projects webpage via www.scfarmers.org.au/pasture-optimization

Project Acknowledgements: