Precision pasture management

Background

Pastures from Space (PfS) provides estimates of pasture production during the growing season by means of remote sensing.

Satellite data is used to estimate pasture biomass combining climate data to produce pasture growth rate estimates. District estimates are directly available from www.pasturesfromspace.csiro.au whilst individual farm data is available by subscribing to a paid service.

Pastures from Space was launched commercially in 2004 (Mata et al 2004) with 80 commercial subscribers in 2007 declining to many less in 2015. Feedback from producers indicates that there is a general lack of understanding on how the available data can be used and the perceived benefits.

This project worked with a group of producers, introducing them to PfS, and using the data to benchmark their farm's historical pasture performance across seasons.

This project also sought to improve the skills, knowledge and understanding of producers in pasture productivity, risk management strategies and grazing management and to increase their confidence to improve pasture utilisation and deal with seasonal variability.

The method

Interested cereal/ sheep producers were identified from across the region. They attended an initial workshop to understand more about the project and the processes involved.

Five collaborating farmers subscribed to PfS (beta version). Total dry matter (TDM) production data was taken from PfS for 5 paddocks across each property. A simple spreadsheet was developed to assist in using the data to benchmark each property. The key data included the week of break, growing season rainfall (GSR), TDM, water use efficiency (i.e. kg DM/mm GSR), potential stocking rate, potential total dry matter, unrealised TDM, and potential TDM/dry sheep equivalent (DSE).

Potential stocking rate (S/R) was calculated from TDM minus residue required at end of the season divided by 550 (the assumed kilograms DM consumed by a sheep) (Grimm 1998). Potential TDM was calculated from GSR multiplied by 30 (the target kg DM/mm GSR) (Bolger &Turner 1999). Ian McFarland, from PIRSA Rural Solutions SA, undertook the analysis of the data, across 4 farms.

The results

A case study was produced highlighting the ways Pastures from Space can be utilised on-farm. Current food on offer and pasture growth was measured for each paddock using both current and historical data. The Total Dry Matter produced per hectare (kg DM/ha) was also measured.

Figure 1 shows the paddocks for the case study farm Nevaome, entered into PfS. Food on offer and pasture growth rate data was provided for each paddock (to the left of the screen) for the designated report period. Historical and current information was available using this screen.

The total kgDM/ha is one of the most important measurements as it represents the total amount of feed available for livestock and governs the total number of livestock that can be carried. Total dry matter produced for the growing season for the property ranged from 1316 kg (in 2006) to 5,236 kg DM/ha in 2010. Average TDM (across all years) was 2,843 kg DM/ha.

Figure 2 shows an analysis of data collected from one of the farms. It shows the property's actual stocking rate (S/R) expressed as DSE/WGHa and the S/R that the TDM produced would support.

When the actual S/R exceeds the potential from TDM, the deficit is filled with supplementary feed. Overstocking reduces the leaf area and hence the capacity of the pasture to grow. There has to be a balance between growing pasture and utilization and the best compromise is when actual stocking rate is slightly less than potential stocking rate. It shows the importance of being flexible with stocking rate to adapt to seasonal variability..

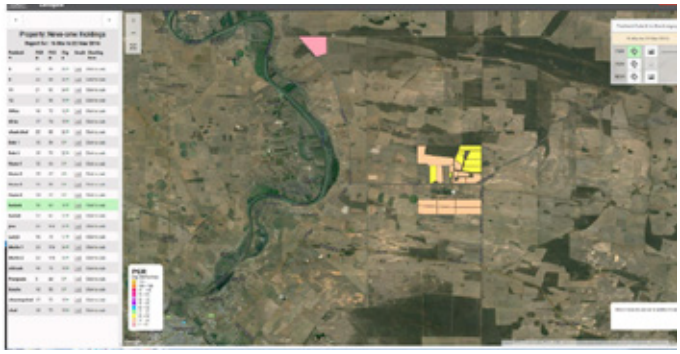

Figure 1. Pastures from space screenshot of case study farm (Nevaome)

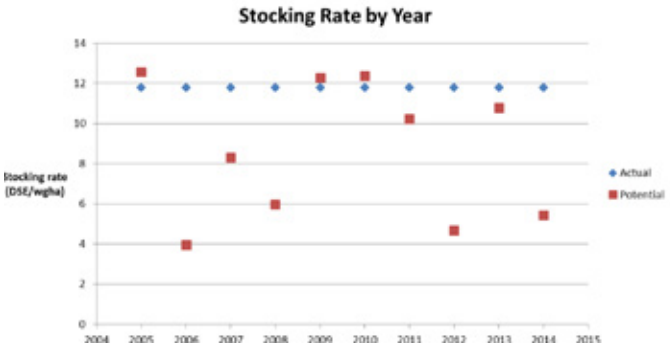

Figure 2. Potential versus Actual Stocking rate

Recommendations

Pastures from Space provides an indication of pasture production, however it has not been ground truthed for different pastures in the SA Murray Darling Basin region. The calibration of native pastures and lucerne in the future will be important to this technology being validated properly across the region.

To fully utilise the Pastures from Space programme, producers will need ongoing support or access to simple tools (beyond PfS) to assist them with the interpretation of the information. Further adoption of this technology will depend on this support; the program currently provides data and graphical displays, however it provides no interpretation or assistance with data interpretation.

Conclusion

A relatively simple exercise with a group of producers has demonstrated the value of the information that can be extracted from Pastures from Space, assisting producers to benchmark their pasture productivity and quantify the impacts of seasonal variation.

By analysing the bigger picture farm system results using PFS data, the impact of the management on the productivity of the pasture system and its capacity to cope with seasonal variability and the effectiveness of strategies adopted over the past 10 years can be analysed with little additional data collection on the part of the producer.

Acknowledgements

This project was supported by the Monarto Agricultural Bureau through funding from the Australian Government's National Landcare Programme and the South Australian Murray-Darling Basin Natural Resources Management Board and SheepConnect SA (Australian Wool Innovation Ltd).

For further information contact

Tony Randall
Land and Water Management Team Coordinator

P: 08 8532 9100
E: tony.randall2@sa.gov.au

www.naturalresources.sa.gov.au/samurraydarlingbasin

Australian Government | National Landcare Programme

Agricultural Bureau of South Australia Inc. PATHWAY TO IMPROVEMENT

FIS 94399

Natural Resources SA Murray-Darling Basin

Government of South Australia