

**BRS SEMINAR SERIES PRESENTS:  
Friday 24 February  
MLA Spatial Toolsets: a new and intuitive web tool for managing  
climate risk for agricultural production**

**Greg Laughlin — BRS**

The Bureau of Rural Sciences was contracted by Meat and Livestock Australia to build a comprehensive toolset to help livestock producers better manage supply-side risk, predominantly climate. This seminar will describe the development of this real time system and the role producers played in designing its look and feel.

The seminar will show how long climate records are integrated to create simple graphics of seasonal patterns of rainfall, soil moisture and pasture growth potential, which are available for 3,300 sites across Australia. It will also show how these are realised in real time via weekly updates and projections 13 weeks into the future.

Now that the system is in production, with over 1,200 regular users, it is timely to speculate on other applications of this system in the context of the DAFF portfolio.



Australian Government  
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# The MLA Spatial Toolsets Project

Greg Laughlin

Senior Principal Scientist - BRS

Science for decision makers



DEPARTMENT OF AGRICULTURE, FISHERIES AND FORESTRY



Australian Government  
Bureau of Rural Sciences



## Official launch

The MLA toolset was Launched by the Hon. Peter McGauran, Minister for Agriculture, Fisheries and Forestry in Oct 2005.



"I believe it is one of the best applications of science I have seen ...it is an example of how great research and innovation can equip farmers to make the best decision about their future," he said.

Extract from The Canberra Times, p.5 11/10/2005



MLA toolset ranked 4<sup>th</sup> best new product in 2005 by BRW magazine



**CADBURY SCHWEPPE'S — BOOST**

**3** The fact that Cadbury Schweppes in Australia has not had a big new chocolate bar launch for 10 years says a lot about how overcrowded the segment in Australia is. Its new bar, Boost, is innovative in its blending of the ingredients of popular muesli-style bars — oats, bran, honey and fruit — with those of more conventional confectionery chocolate bars, such as caramel and rice crisps. Consumers have responded to the new product hungrily. Released in April, Boost had become the top-selling chocolate bar in Australia by October, according to AC Nielsen, with a 7.6% market share.

**MEAT & LIVESTOCK AUSTRALIA — ONLINE RAINFALL PREDICTION**

**4** Being able to forecast rainfall patterns and pasture growth accurately is an agricultural dream. In October, Meat & Livestock Australia (MLA) brought it a little closer with the release of the first online tool for livestock producers, which will enable them to assess rainfall patterns, climatic conditions and potential pasture growth for the coming season. MLA's manager of strategic science, Dr Hutton Oddy, says: "The tool collects rainfall information from over 3000 weather stations throughout southern Australia and combines this with weather forecasts up to 13 weeks in advance from the Bureau of Meteorology. This means that livestock producers can combine what has happened in the past with predictions of future rainfall to make

**The year's best new products**

**TOYOTA — YARIS**

**1** As if Australia's small-car segment was not already competitive enough, the dramatic rises in fuel prices in 2005 have intensified that rivalry. Into the fray in November came Toyota's Yaris, the replacement for its Echo model. The car is not just an exercise in rebadging: it has been extensively remodelled. Innovations include features such as side airbags, which Toyota has previously incorporated only in larger vehicles. It is also the first Toyota car to provide a driver's knee-bag.

**SONY ERICSSON — WALKMAN MUSIC MOBILE PHONE**

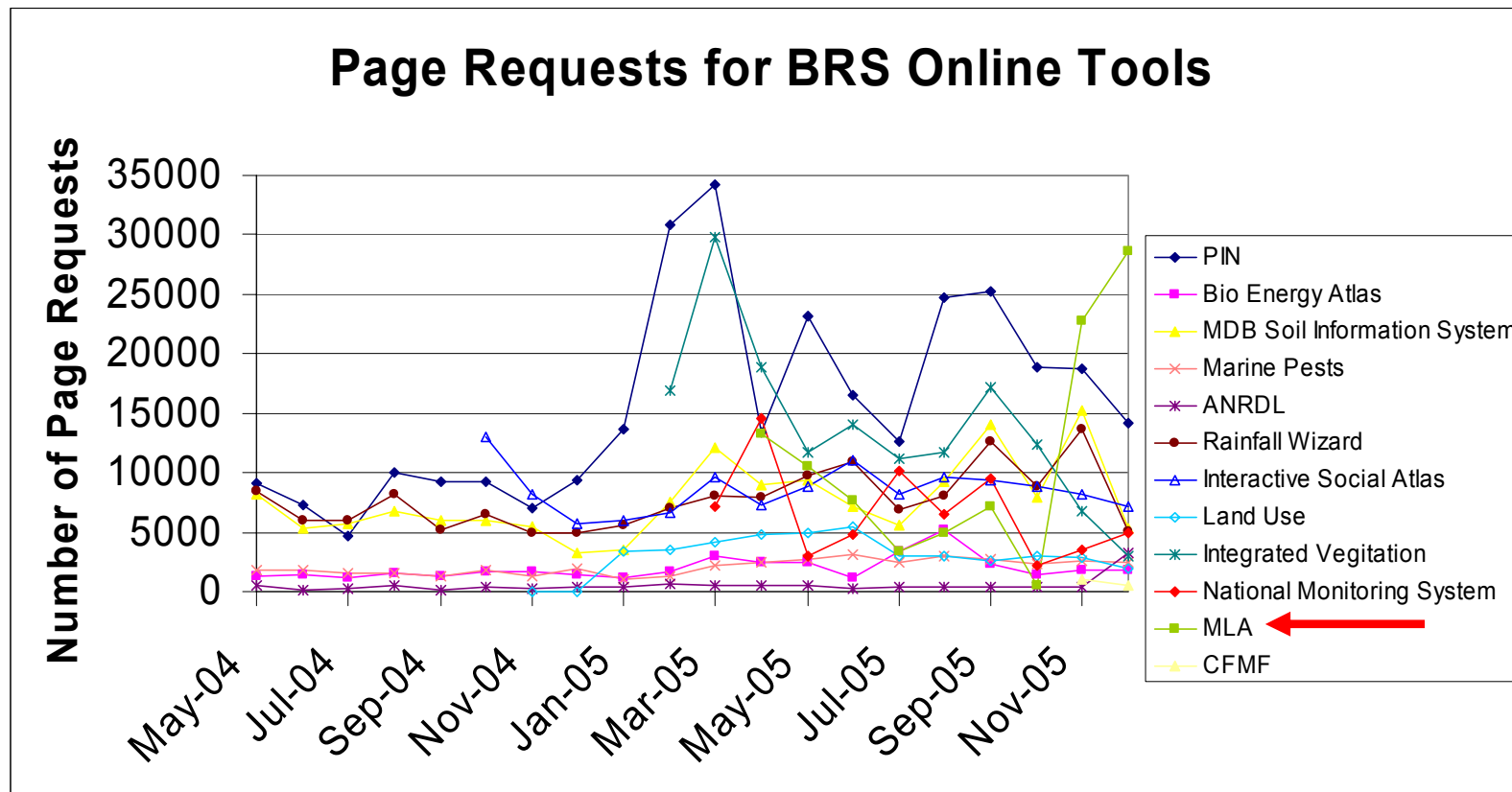
**2** When Sony tested the idea of a Walkman portable music player on consumers, it was a flop. But when Sony forged ahead and released the product anyway, it could never have envisaged that more than

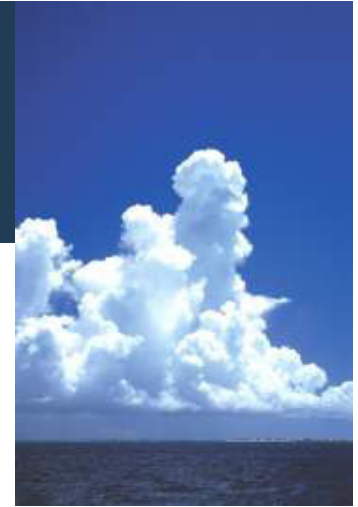


38 | November 24-30, 2005 | BRW.



## BRS web statistics summary





## Acknowledgements

- **Meat and Livestock Australia (SSP)**  
Hutton Oddy, Peter Speck, David Falepau, Dave Raynor
- **BRS**  
Simon Knapp, Michael O’Keeffe, Antti Roppola, Simon Barry, Kema Ranatunga, Robert Smart, Stuart Row, John Sims, Tim Brinkley, Colin Grant, Kylie Paulsen, Jim Walcott
- **BoM NCC**  
David Jones, Mike Coughlan
- **ANU (CRES, CMA)**  
Mike Hutchinson, Anthony Clark, Alan Welshe
- **The Reference Group**  
Barry White (MCVP), Ian Johnson, John Black, Peter Horwood, Terrey Johnson, Tom Ellis



## Overall mission

- Develop and deliver via the web, an integrated toolset for assessing current rainfall and pasture conditions as well as their near-future prospects
- Improve climate risk management in Australia's southern livestock industry
- Provide outputs that are 'farmer-friendly' and 'farmer relevant'
- To incorporate climate forecasts into the system **if** they add 'value' to decision making



## In the terms of the farmer reference group

Web deliver the following for 3,300 sites:

- **Long-term historical**
  - e.g. average growing season and its reliability, frosts, ...  
Based on 100+ years of record (summaries thereof)
- **Current season**
  - Rainfall, soil moisture, pasture
  - Compared to other years (historical context)
  - Up-to-date (<7 days)
- **Prospects** for the current season
  - Rainfall, soil moisture, pasture (13 weeks hence)

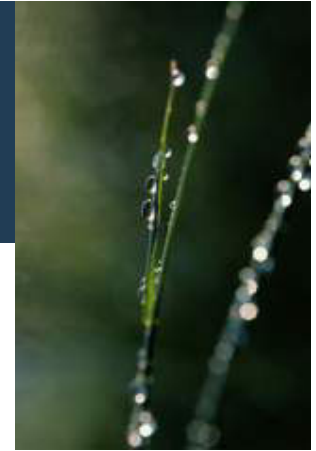


## A changing climate?

*For most Australian agricultural industries, within-season variability remains the most important feature of climate that affects profitability. The ways in which underlying, long-term trends in climate affect within-season variability is the most important feature of climate change for rural industries.*

Source: Farming Profitably in a Changing Climate: Workshop Summary 2004 (Will Steffen and John Sims)

Will return to this climate change at the end of the seminar



## Outline

- Examples of how **long term climate, the present season and its future prospects** are commonly presented
- How the MLA tools combines present season with future prospects in one graphic
- Structure of the MLA system
- Demonstration
- Comments on seasonal forecasting and the pasture growth model (initially controversial)
- Speculation on future developments and concluding remarks



## Long term climate

Climate averages by number - Microsoft Internet Explorer

Address: [http://www.bom.gov.au/climate/avsrages/tables/cw\\_018011.shtml](http://www.bom.gov.au/climate/avsrages/tables/cw_018011.shtml)

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### What is the weather usually like?

- Climate Averages for Australian Sites -

#### Averages for CEDUNA POST OFFICE

Make sure you understand [what the Climate Averages are all about](#) before you make use of the following information. A comma separated text file of these averages is also available for [download](#) which can be graphed in software such as a spreadsheet

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN	No. Yrs comp
018011 CEDUNA POST OFFICE														
Latitude: -32.1267 S Longitude: 133.6725 E Elevation: 10.0 m State: SA														
Commenced: 1906 Last record: 1990														
Mean Daily Max Temp (deg C)	27.5	26.3	26.4	23.2	20.2	17.8	16.9	18.6	21.0	22.7	24.4	26.6	22.6	11.9 98
Mean no. Days, Max >= 40.0 deg C	3.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	1.7	8.3	11.1 91
Mean no. Days, Max >= 35.0 deg C	5.9	3.9	4.8	0.4	0.0	0.0	0.0	0.0	0.2	1.0	2.8	5.4	24.4	11.1 91
Mean no. Days, Max >= 30.0 deg C	9.3	7.1	8.6	3.2	0.6	0.0	0.0	0.2	1.6	5.6	7.3	8.5	51.9	11.1 91
Highest Max Temp (deg C)														

Takes experience to use these kinds of data in an agricultural context

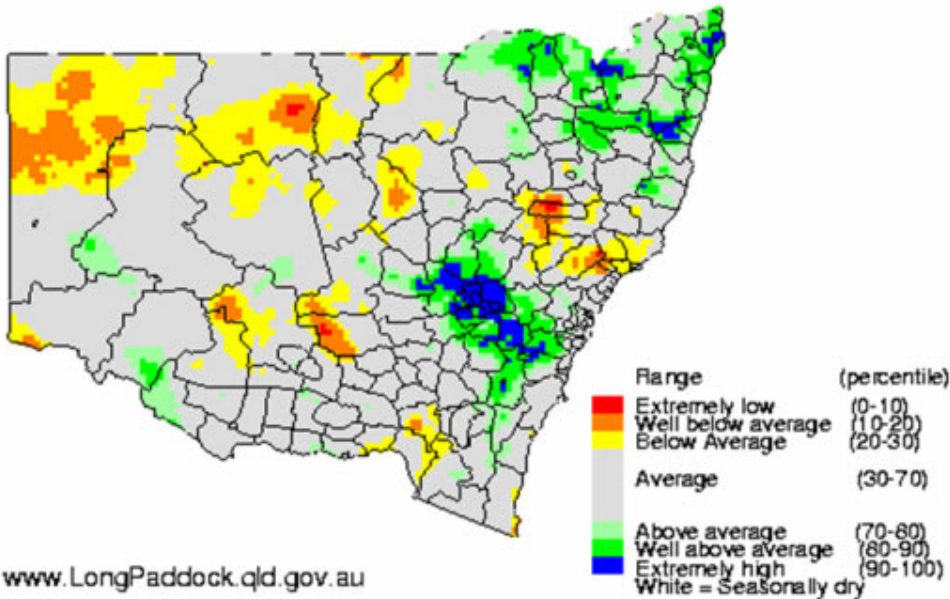


## Present season (rainfall)

[http://www.longpaddock.qld.gov.au/RainfallAndPastureGrowth/NSW/Rainfall\\_Relative3mt](http://www.longpaddock.qld.gov.au/RainfallAndPastureGrowth/NSW/Rainfall_Relative3mt)

File Edit View Favorites Tools Help

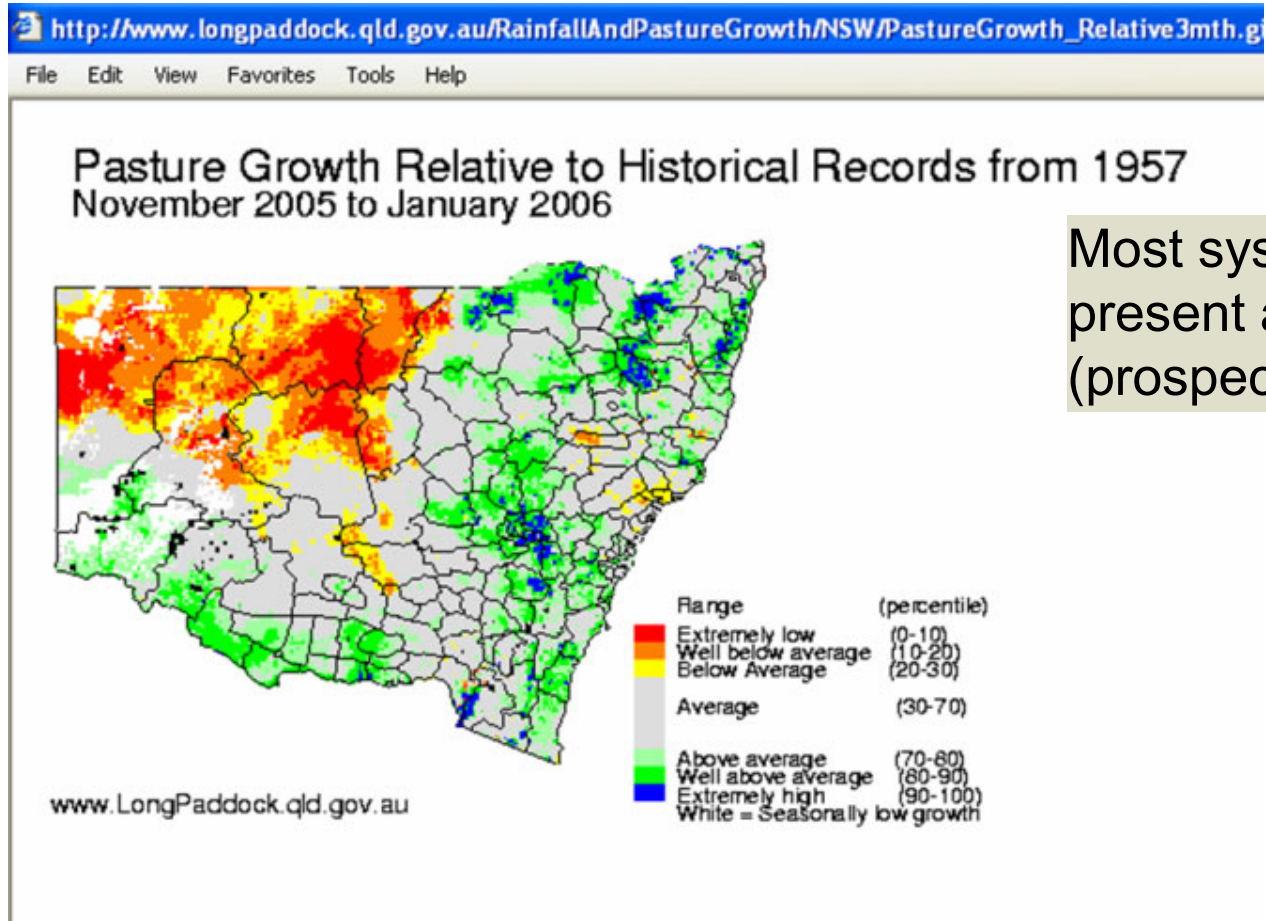
Rainfall Relative to Historical Records  
November 2005 to January 2006



Most systems show present and future (prospects) separately



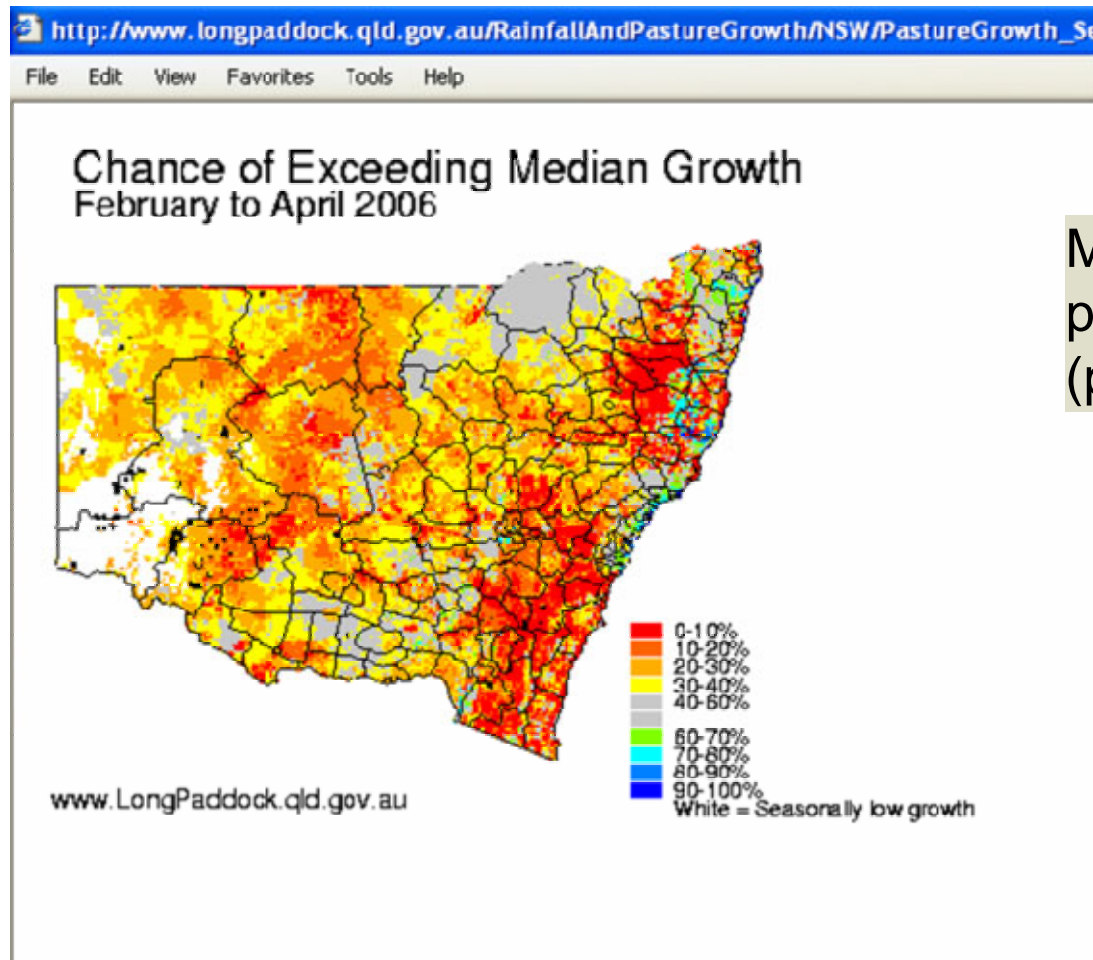
## Present season (pasture)



Most systems show present and future (prospects) separately



## Seasonal prospects (pasture)



Most systems show present and future (prospects) separately

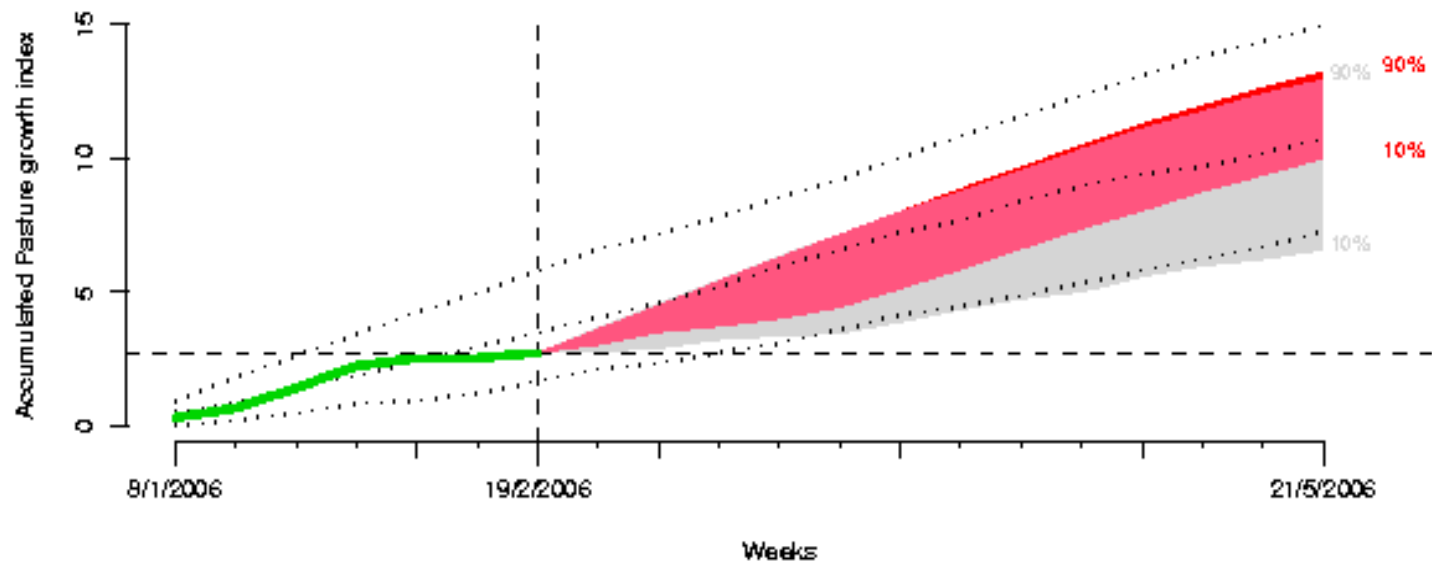


## Key points

- Tabular (long term) summaries not framed for agriculture
- Present season and its future prospects are usually separate products
- And you really need to see both at the same time to make sense (the future needs to be 'added' to the present)
- Difficult to locate a point (site) on small scale maps
- Before looking at the structure of the MLA tool, let's have a look at how it addresses the last 3 points

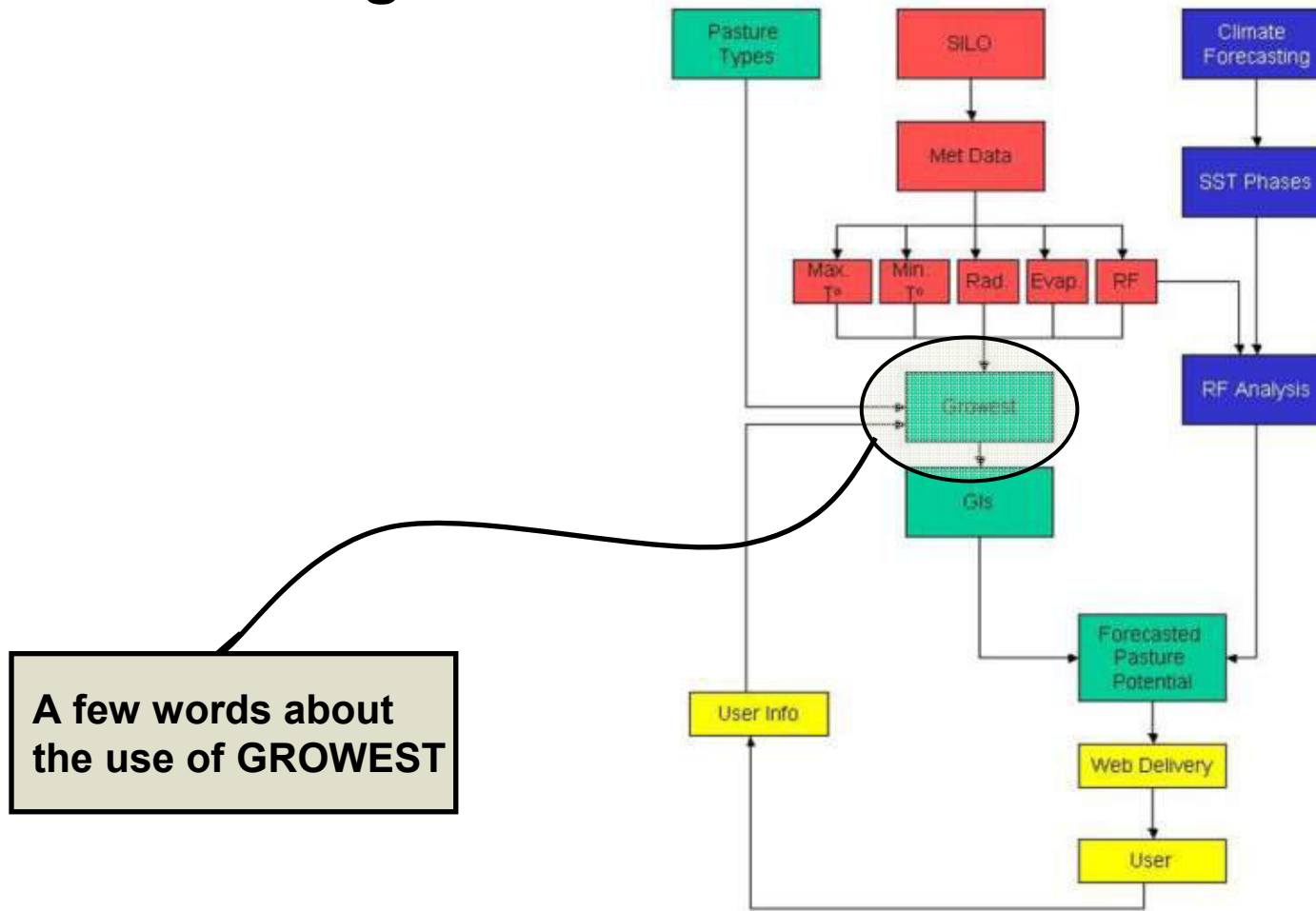


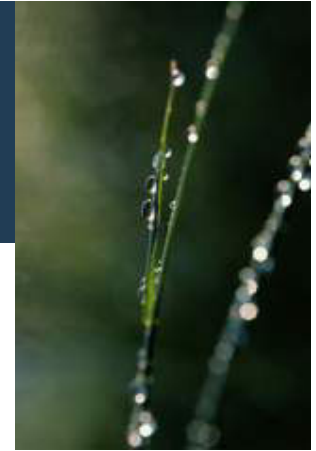
Output is delivered for specific sites, time is explicit and present and future in single figure





## MLA flow diagram





## GROWEST

- Simple model requiring only rainfall, maximum and minimum temperature, evaporation, and solar radiation
- Fixed soil and 'management'
- Set for temperate legumes and grasses (C3s)
- Assumes a perennial plant, ready to grow when conditions are right
- 0-1 index which elegantly summarises how suitable the weather has been for growth, hence *growth potential*
- **Farmers use this index easily and intuitively it seems, even down the scale of different paddocks**

Demo



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## Comments on the pasture growth model and seasonal forecasting



GROWEST

M.F. Hutchinson, H.A. Nix and C. McTaggart  
Centre for Resource and Environmental Studies  
The Australian National University, Canberra

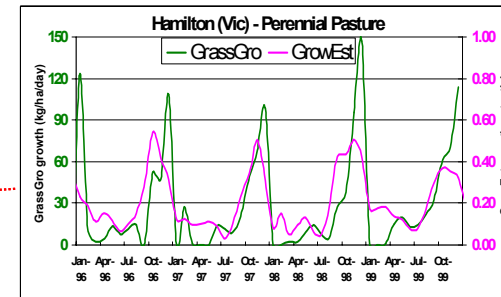
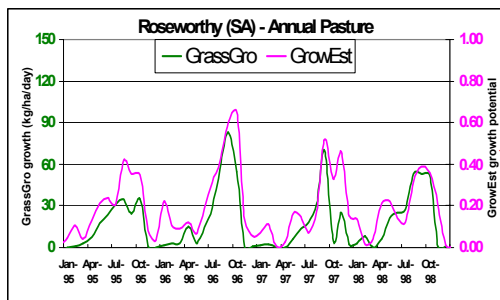
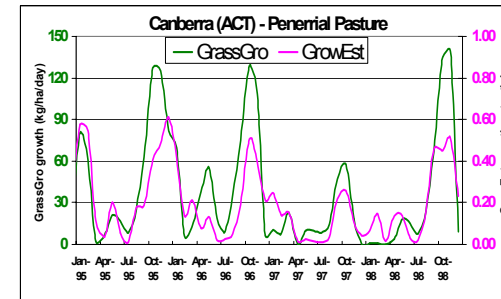
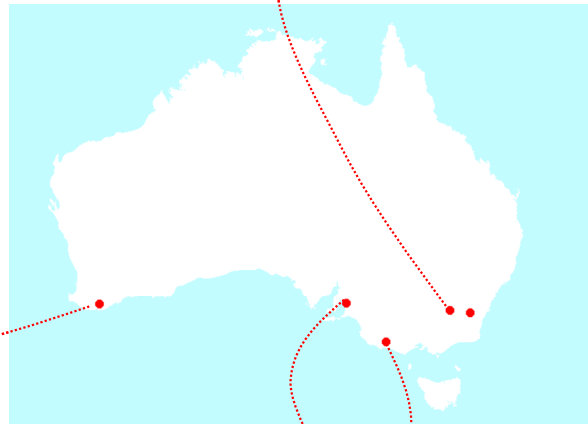
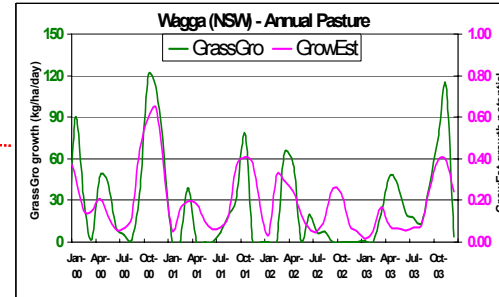
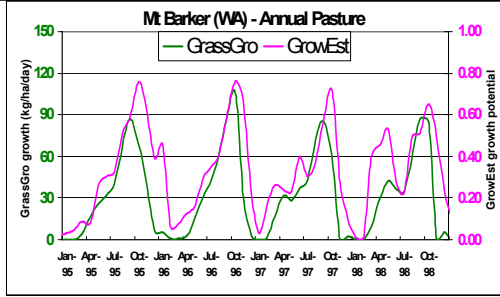


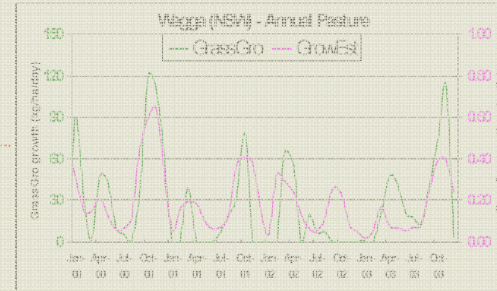
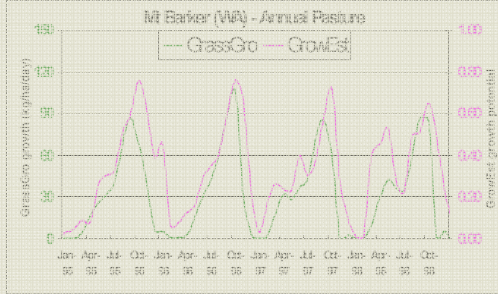
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GROWEST PLUS – A tool for rapid assessment of seasonal growth for environmental planning and assessment  
Greg Laughlin, Kemachandra Ranatunga  
Timothy Brinkley Michael Hutchinson and Ian Johnson

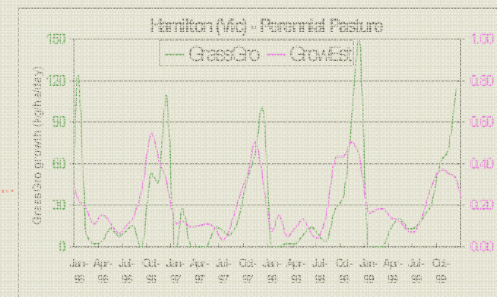
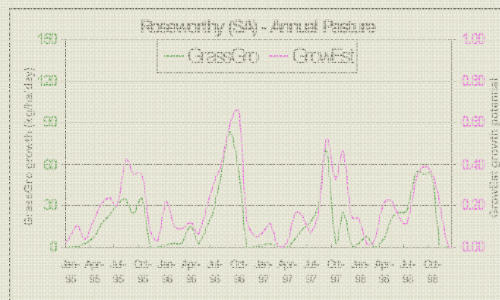
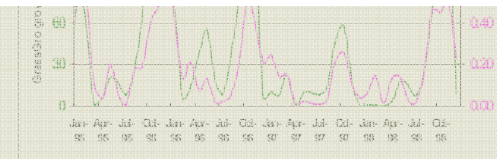


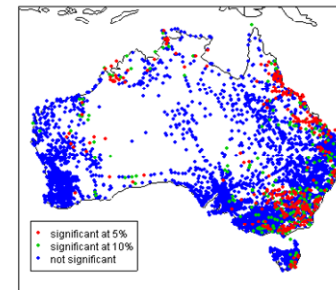
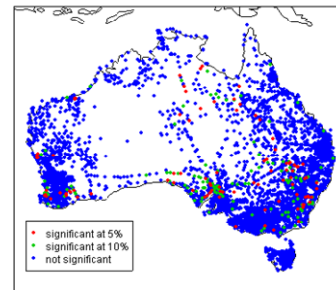
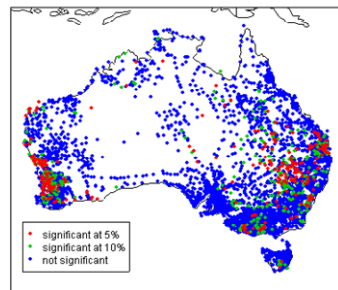
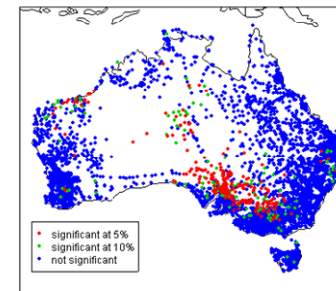
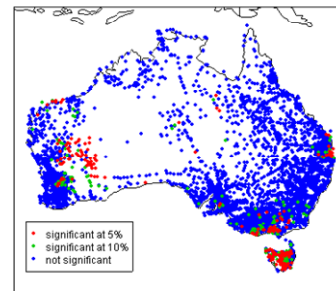
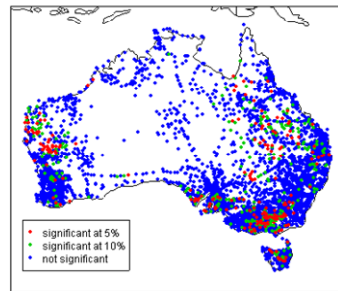
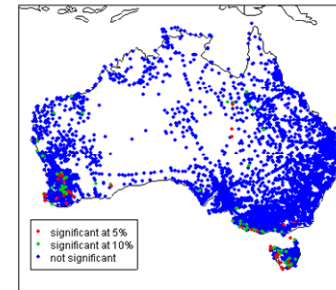
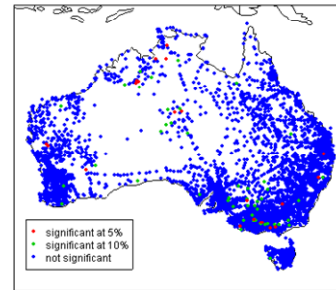
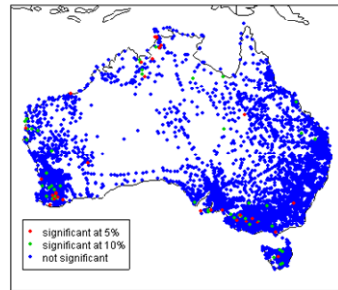
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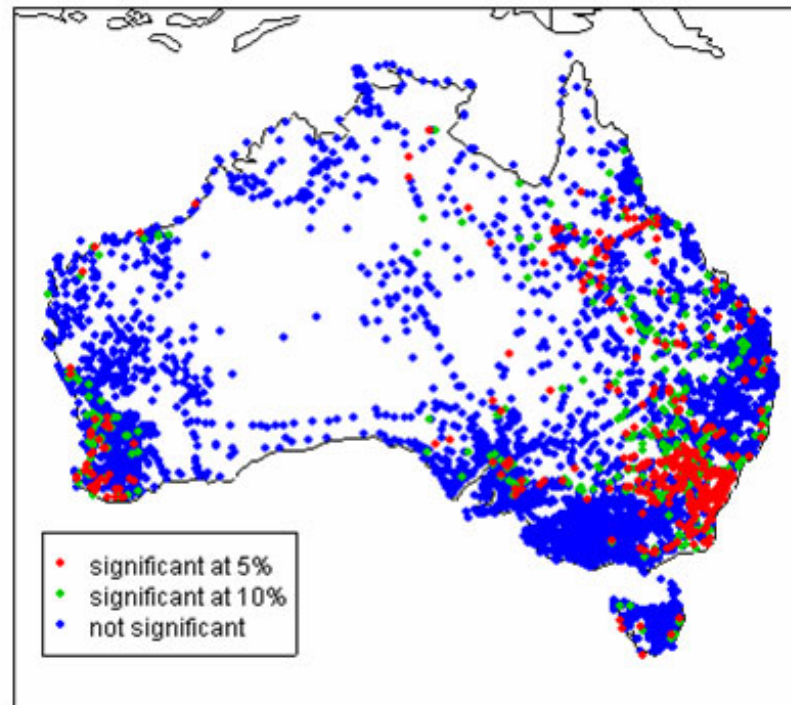




Analysis to be backed up by reference to a deterministic pasture model, Ian Johnson's SGS model

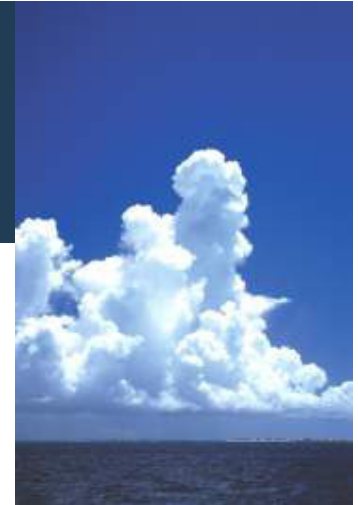






Same test, randomised phase table, 200 re-samples

BoM provide with results and are looking at options to improve “skill” significantly



## Where to from here?

- Continue to emphasise the importance of seasonal forecasting to agriculture and the need to improve its skill
- Explore opportunities to link this system to other key Portfolio interests, like water and crops
- Bushfire prediction (curing)
- Migrate key features to emerging products like the National Agricultural Monitoring System, Water 2010, salinity and groundwater programs



## Where to from here?

- BRS, CRES and BoM have commenced a proof-of-concept *second generation* approach to assessing the impacts of a changing climate on agriculture.
- Outputs in farmer-relevant terms
- Reflected in tools like the MLA?
- Variability, reliability and change in a single package