

Russell Pattinson, National Coordinator
**Climate Change Adaptation
in Southern Australian Livestock Industries
SLA 2030**



IT'S NOTHING, GUYS -
JUST A HOAX
PERPETRATED BY
PRANKSTER
CLIMATE SCIENTISTS
IN A VAST
WORLDWIDE
CONSPIRACY.

THE STRAINE BUREAU
caglecartools.com

09

GLOBAL WARMING

AWI Australian Wool Innovation Limited

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mia MEAT & LIVESTOCK AUSTRALIA

“Prepare don’t Predict” (Malcolm, 2009)

- **Trying to predict the future or convince others** that climate change is real? – No
- Saying climate change will have a big impact on farming – No
- **Helping farmers think about the future** - tools and people who can explore uncertainty - Yes.
- That adaptation is gradual and continuous and lots to learn from the last 10 years - Yes

Why might you be interested?

- Links to people, papers & future workshops
- Models for your clients



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Take a look into the future ... today!

What?

- Impacts of a changing climate on **sheep, beef** and dairy

How?

- Transfer modelling from Uni / CSIRO to extension partners
- Run models at local level – producers involved
- Workshops with producers

Why?

- Review current strategies
- Model potential impacts down the track
- Examine whether adaptations might help? Which ones?
- Will enterprise change help?



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Partners

- DAFF
- MLA
- Dairy Australia
- CSIRO
- University of Melbourne
- Tasmanian Institute of Agricultural Research
- State Departments – NSW, Vic, Tas, SA and WA



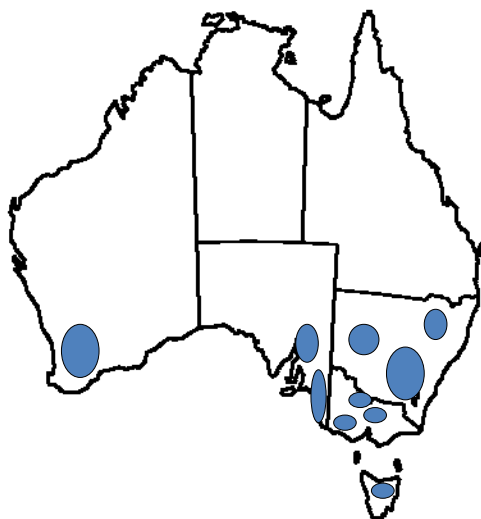
Australian Government
Department of Agriculture,
Fisheries and Forestry



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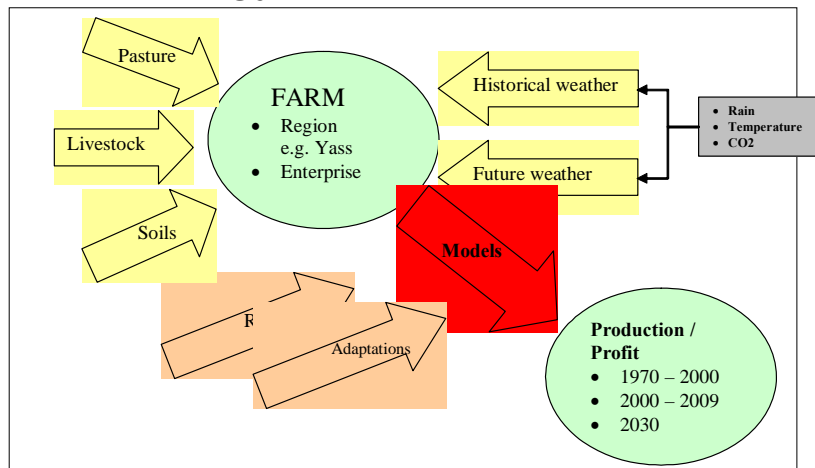
Where



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Methodology



What's the "weather" going to be?

- 1970 to 1999 – know that!
- 2002 – 2009 – know that too!
- Must look back before you look forward**
- 2030? – Global Circulation Models (GCM's)
- Which GCM's?



	1970 - 2000	2002 - 2009	GCM1	GCM2	GCM3	GCM4
Rainfall mm	1028	804 - 22%	1028 same	847 - 18%	911 -11%	989 - 4%
Max temp	19.5	20.2 + 0.7	20.7 + 1.2	20.9 + 1.4	20.9 + 1.4	20.5 + 1.0
Min temp	5.8	5.9	6.9	6.8	7.0	6.9

Tumbarumba

A snapshot of some results

- Δ Climate scenarios
- Δ Locations
- Δ Enterprises
- Δ Adaptations
- Wet or dry years
- Plant resilience



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Yass – different climate scenarios (NSWI&I)

Point 1: 2000 – 2009 – a shocker

	1970–2000	2000–2009	2030 GCM1	2030 GCM2	2030 GCM3	2030 GCM4
Rainfall (mm/yr)	687	613	607	578	685	683
Temperature (°C ave)	13.8	14.3	15.1	15.2	15.1	14.7
Pasture (kg DM/Ha/yr)	9059	7584	8121	7280	8891	9634
Stock Rate (DSE/Ha)	6.8	5.2	4.8	3.6	5.2	5.8
Profit (\$/ Ha)	206	129	133	63	191	240
Profit Δ 1970 - 1999		- 37%	- 35%	- 69%	- 7%	+ 16%
Profit Δ 2000 - 09			+ 3%	- 51%	+ 48%	+ 86%



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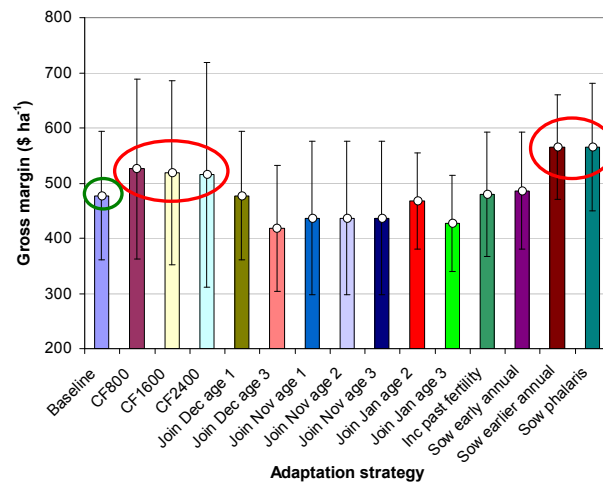
Yass – different climate scenarios

Point 2: Future scenarios vary
Some better than past

	1970–2000	2000-2009	2030 GCM1	2030 GCM2	2030 GCM3	2030 GCM4
Rainfall (mm/pa)	687	613	607	578	685	683
Temperature (°C ave)	13.8	14.3	15.1	15.2	15.1	14.7
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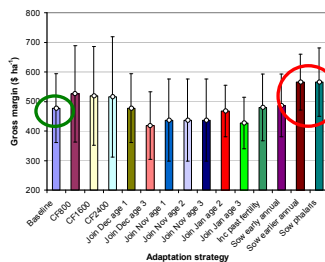
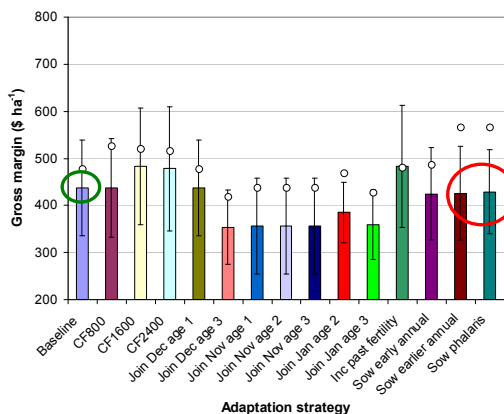
Hamilton: 1970 - 1999

Some adaptations
work now!
...Harrison, 2010



But in 2003?

Now



2030

- Reduced GM
- \$500 to \$400
- Adaptations change



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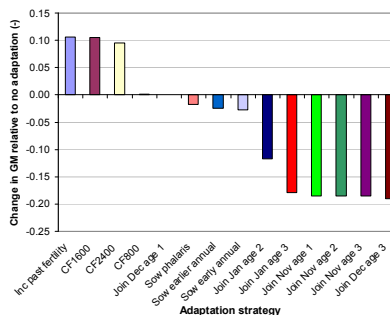
Hamilton

1970-1999

- Sow earlier annuals ✓
- Sow phalaris ✓
- Confinement feeding ✓
- Joining time little effect x

2030

- Increase pasture fertility ✓
- Confinement feeding ✓
- Joining time little effect x



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Adaptations: Yass Sheep – worst scenario

(NSW I&I)

Some things help!

GCM2 scenario	Stocking Rate /ha	Profit/ha (\$)
No change	3.6	63
Summer Feedlot	4.8	66
Rotation	3.6	62
Sell wether weaners	4.6	50
1% inc in fleece wt	3.6	106

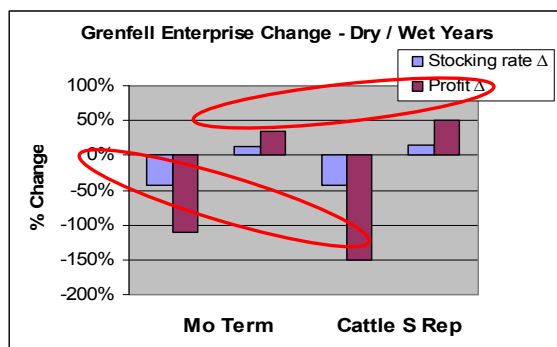


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Comparing enterprises: Dry and wet years - 2030

- Big differences between wet & dry years
- Sheep more resilient in dry years while cattle perform well in wet years



NSW I&I



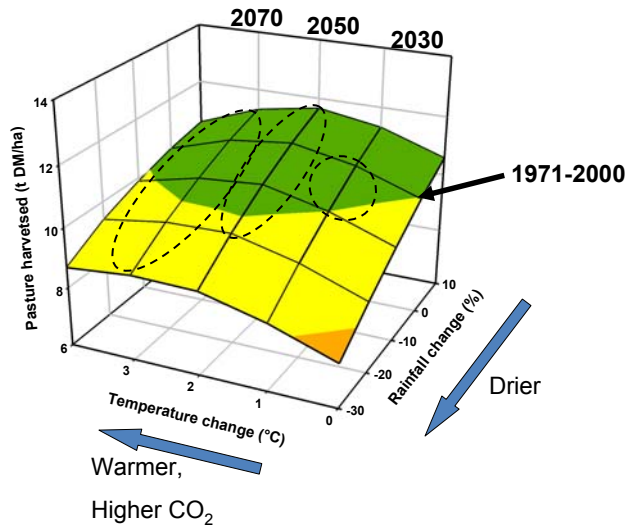
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Surface charts:

Another way of looking at it (Cullen et al 2010)

Hamilton - perennial ryegrass, subclover

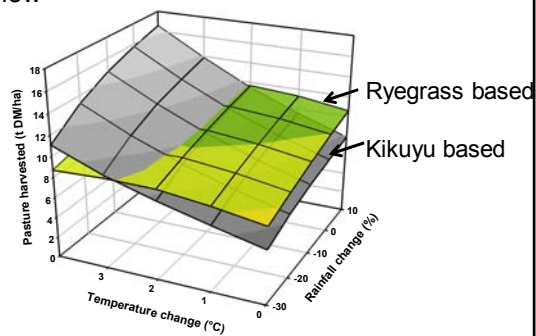


Surface charts – resilience of pastures

Hamilton

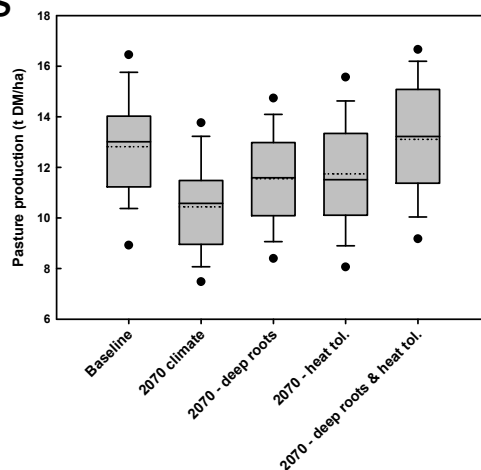
- ryegrass and clover better now
- kikuyu better when +2C (but digestibility etc?)

Hamilton - pasture type comparison



Use of deep rooted and / or heat tolerant pastures


Cullen et al:
Example from Ellinbank
(West Gippsland, Victoria)



Some initial findings

- No one future
- 2030 modelling – generally shorter growing seasons / reduced stocking rates and reduced farm Gross Margins
- Relatively small temperature and rainfall changes can have big impacts on profit
- Modelling of the period 2000-2009 not dissimilar to 2030
- Climate change impacts vary across southern Australia
- Value of adaptations varies between regions
- Stocking rate will need to be reduced so as to maintain natural resources (e.g. ground cover)

Some initial findings

- Climate change scenarios negatively impact most enterprises (changing livestock species no real benefit)
- Increasing livestock trading does not remove the threat in most areas
- Meat production does well in good years but falls in poor years (wool provides a shock absorber in poor seasons)
- Better animals (genetic improvement) will lessen the impacts
- Pasture species - deeper rooted and more heat tolerant in warmer and drier future climate scenarios.
- Reduced GM's  increase scale?



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So what?

- Helping farmers think about the future - tools & people
- Lots to learn from the last 10 years
- Absolute values are less important than trends
- No silver bullets but adaptations available, can help, and more to explore
- Can it help your clients?
- Are these models useful?
- Want more information or to get involved
- Future workshops, seminars, papers, contacts



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