



FUTURE FARMING Productive, Competitive and Sustainable

Land Use Change.....

.....isn't it essential?

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How else does food & fibre production respond to changing times?

Changing consumer demands, markets, labour, input costs, climate & water, pest/disease, genetics, production systems, land costs, effective scale, etc.....

Think 1900, 1940, 1960, 2000, 2010

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- Agriculture's mission - to double global food production whilst the world reduces emissions and adapts to a changing climate....
- A bright future, but not necessarily for all
- Big challenges ahead – it will be different!

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Key "impact themes" of climate change

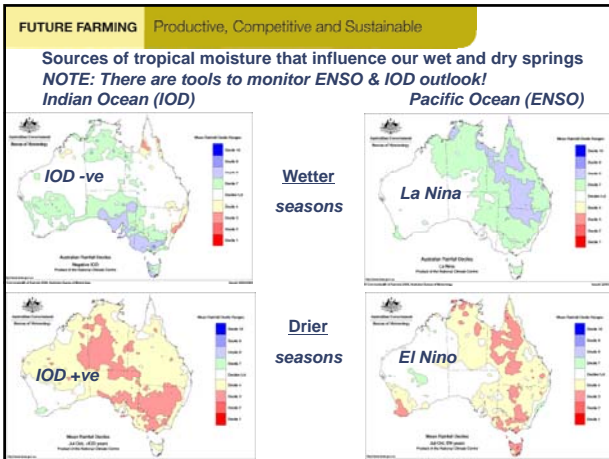
- **Direct Climate Impact**
 - Warmer, Drier, Wild weather
- **Policy responses**
 - Emissions Trading, Renewable Energy Targets, Energy costs, Exceptional Circumstances Review, Water Industry reform etc
- **Trade impacts/responses**
 - Carbon footprint, consumer/supply chain responses, trade, finance/insurance

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The 4 sheep dogs that round up our rainfall:

- ENSO – Pacific Ocean moisture source
- IOD – Indian Ocean moisture source
- SAM – the fronts....
- STR – the highs.....

Key drivers of our seasonal variability in Victoria – always have been and always will be!

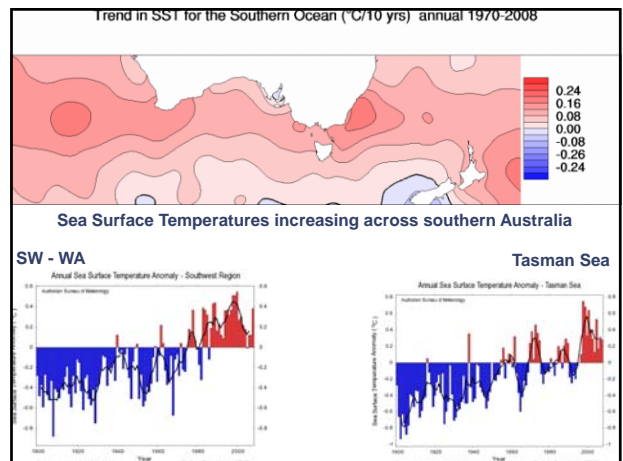
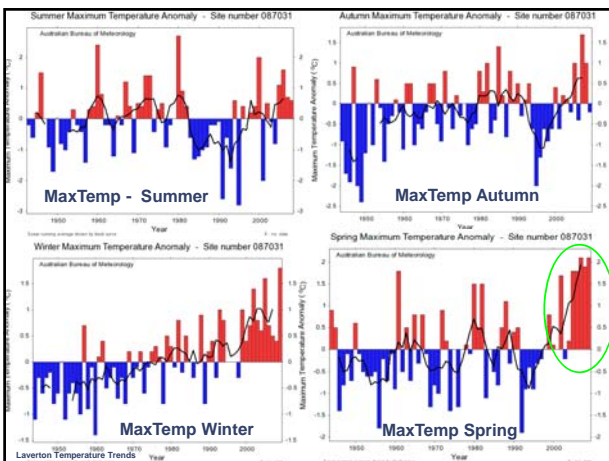
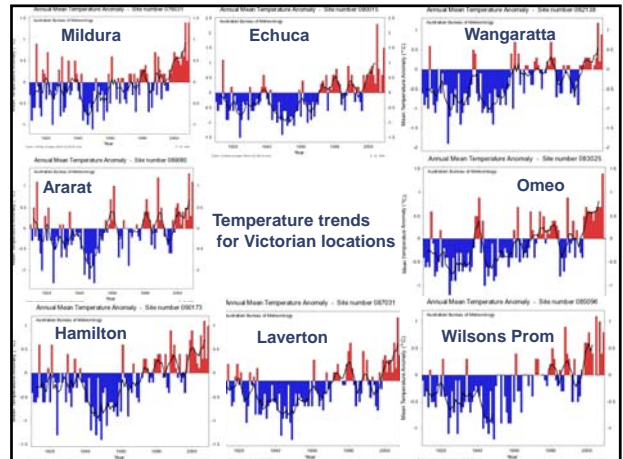
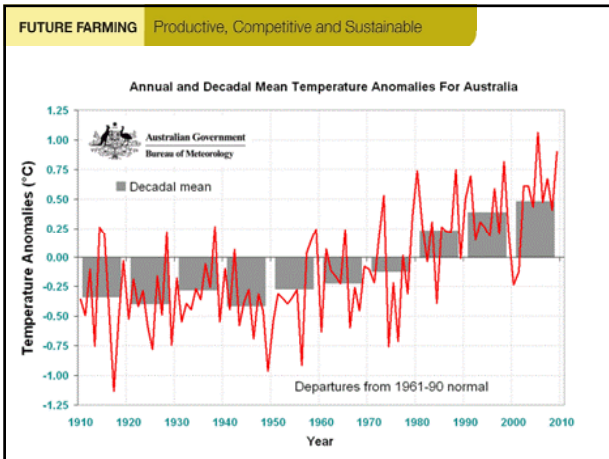


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What's going on with our weather patterns?

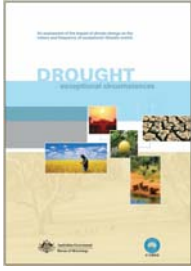
Is now anything different to what's happened before?

What might happen from here?



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The CSIRO & BoM Drought Report



“Over the period 2010-2040, years currently considered exceptionally hot are likely to occur every one to two years”

(above 95th percentile for 1900-2007 or a typical 1 in 20 year “exceptionally hot year”)

http://www.daff.gov.au/agriculture-food/drought/national_review_of_drought_policy
<http://www.bom.gov.au/climate/droughttec/>

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Getting warmer.....so what?

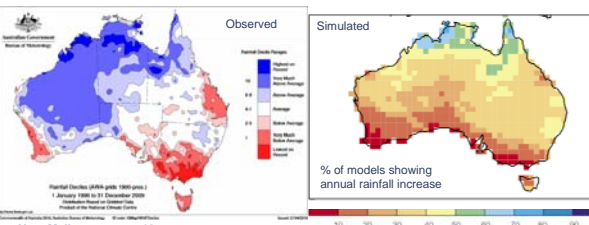
Implications for your farm?

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What about our rainfall in a warmer world?

Rainfall trends over the past 12 years in southern Australia versus the climate model projections – similar?

Observed (Oct 1996-2009) Model prediction per degree warmer



Near Melbourne, past 12 years are 20% below the average for 1961-90

Likely decrease Uncertain Likely increase

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What’s happening to the drivers of Victoria’s rainfall in a warmer world?

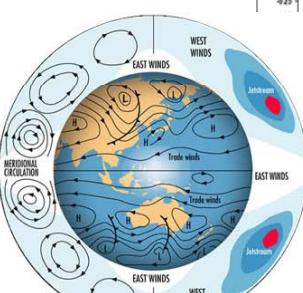
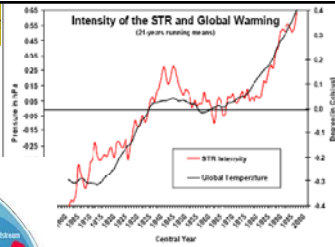
ENSO/SOI?
IOD?
SAM?
STR?

(ie the 4 sheep dogs!)



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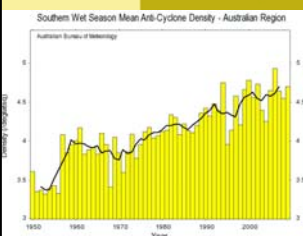
STR – Sub-Tropical Ridge & Blocking Highs

Trend for stronger “Highs” as global temperatures have increased

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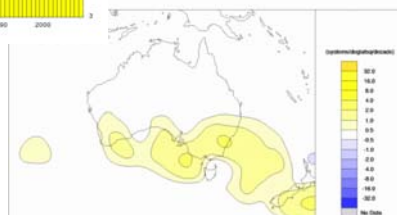
Southern Wet Season Mean Anti-Cyclone Density - Australian Region



Trend for stronger “Highs” as global temperatures have increased

Sub-Tropical Ridge & blocking high pressures

Trends since 1950 for anti-cyclone density



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We are not experiencing more natural variability.....

Our weather pattern is now:


- Consistently warmer than the past
- Pressure pattern consistently stronger, with storm tracks/fronts tracking southwards more often
- Seasons shifting – milder winters, longer summer extending into autumn & spring
- Still strongly influenced by ENSO & IOD - spring rainfall
- Increasing observation of wild weather
- Changes to rainfall intensity and frequency
- Changing nature of frost risk (clear night skies.....)

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Farmers Taking Action

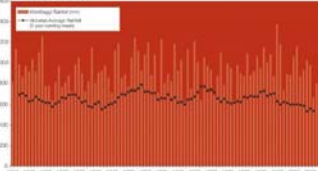
Simon Park
Dairy Farmer – Wonthaggi

140 Ha property | 600 head | 330 milkers | Declining average rainfall



Key Points

- The climate is very variable
- There are many ways to be proactive in reducing the climate risk for your farm.
- You don't have to be a climate change 'believer' to manage the risk of climate variability.




Simon was not waiting for another wet season before acting. He is currently improving his system to manage water supply in a variable climate.

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Period	Average Wonthaggi Rainfall
Long term (all historic data)	935 mm
1996 - 2008	922 mm
2006 - 2008	761 mm

- Simon has vastly improved the reliability of his stock water supply by improving the capture of water into an on-farm storage facility.
- Consultation with water and catchment authorities ensured modifications met permits and licences without disruption of natural waterways




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System changes

- Modifying a storage system to capture more run off
- Investigating irrigation with reclaimed water
- Feedpad allows feeding flexibility
- Flood wash system uses recycled water from effluent pond
- Hay and grain storage capacity increased

Know your farm's position

1. Is the water situation on your farm vulnerable?
2. What will your water requirements be in the future?



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Farmers Taking Action

Climate Decisions Support Tools
Victorian Potato Industry - Ballarat

Crop Logic Potato Calculator | McCain Foods (Aust) trial



Key Points

- Optimising water inputs is a key challenge for farmers
- Climate tools can support business decision making
- Tools can help forecast the implications of changed farm management



"Climate change is creating more competition for water, so using what we have more effectively is the key" Rod Lay (McCain)

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Potato Calculator

- Provides in season projections of required water and nitrogen
- Uses local weather station data to estimate yields under different management strategies
- Predicts potential production capacity under forecasted fertiliser and irrigation regimes

Climate decision support tools

- Access accurate and timely information about crops and soils
- Increase returns on inputs
- Supports decisions whilst trying to farm in a sustainable, productive and environmentally sensitive manner



"Optimising water inputs and getting the biggest bang for the dollar is a key challenge for the industry"
Norm Suckling (Grower)

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Farmers Taking Action

Mark McKew
 Sheep and Beef Farmer – Mount Cole Creek (Western Victoria)
 654 Ha property | 2000+ Sheep | 40+ Cattle | 24 Ha Lucerne



Key Points

- Stay informed about emissions and carbon issues
- Understanding the emissions balance of your farm is a good place to start
- Farmers are innovative and are good at finding solutions that save them money

“Don’t be afraid to measure and find out where you are at. I don’t envisage making money out of carbon, but if you can avoid extra costs, its best to do so”



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How will emissions reductions be achieved?

- Planting trees in the right place = “low hanging fruit”
- Breeding for improved feed efficiency
- Diets to reduce methane production
- Improve record keeping
- Wind Energy - revenue

Revegetation was a “perceived threat to rural communities, but every farm can have more shelter belts without affecting production; in fact it would probably help their production”



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Farmers Taking Action

Russel and Linda White
 Dairy Farmers – Warrnambool



130 Ha property | 200 head | Solar installed in 2005

Key Points

- A solar hot water system can reduce your dairy power costs!
- Find the solar hot water system that best suits your needs.
- Government renewable energy certificates can reduce the payback period.

Motivation:
 To reduce cost of electricity bill and to reduce environmental impact




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DemoDAIRY
 Dairy Research and Demonstration Farm – Warrnambool

YEAR	Cow numbers	Average Peak Usage (Kw/hour/day)	Average Off-Peak Usage (Kw/hour/day)
2006	250	120	160
2007 (Solar installed November)	250	100	142.50
2008	370	75	115

- Water used in dairy cleaning major use of energy.
- Introduction of solar has reduced costs
- System set up cost \$5140
- Need to think about payback periods
- Focus on what is within your control



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Farmers Taking Action

Allan and Andrea Hart
 Viticulturalists – Crowlands (Pyrenees)



58 Ha property | 6.5 Ha Vines | 5000+ trees | Wind & Solar used

Key Points

- Thinking about how your climate is changing can help plan for the future
- Climate change responses can be part of many business decisions – big or small
- Innovative water and energy solutions are possible

“We need to look at what the vines are doing. They respond to the immediate environment around them. We need to adapt.”



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DogRock Winery

- Successful growth of the Tempranillo and Grenache varieties – not popular in the region
- Whole farm planning course suggests more trees could be planted
- A ‘Big Roof’ acts like a roaded catchment to capture extra rainfall
- Wines cooled naturally underground
- Solar and wind power used
- Recycled packaging – aiming for 100%

“Harvest is getting earlier and climate change is becoming a part of our lives”



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Farmers Taking Action

Anne & Bob Davie
Beef Farmers – Phillip Island
144 Ha property | 226 head cattle



Key Points

- Good collaboration significantly supports climate change response adaptation
- Scientific research indicates several areas where positive action can be taken
- Farmers can reduce greenhouse emissions and increase productivity



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Anne & Bob's Action Plan

- Breeding for feed conversion efficiency
- Improved forage quality to reduce methane emissions
- Increasing dietary oils and tannins through feed additives.
- A pasture mix which reduces need for cultivation
- Grazing periods low, rotations kept high
- Growing pastures out to 15 cm will test soil carbon sequestration
- A silicone based product on dams to reduce evaporative loss
- Water is siphoned, rather than pumped, around the farm




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Farm change pathways (in increasing order of difficulty)

- **The first decisions** - change sowing times, crop/plant selection and rotations, water use efficiency, adjusting inputs/cost, modify existing equipment & infrastructure
- **Bigger decisions** - Expand farm in existing region, change business/financial structures, adjust enterprise mix, new feedstock/grazing/water systems, changing equipment or farm infrastructure
- **Tougher decisions** – Expand farm in new climate region, change enterprise or start new enterprise, new equipment or infrastructure, lease or exit farming

Aren't these the same change pathways that have always been available to us in agriculture?

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Example – options that grain farmers are considering?

- Choice of variety, long season or short season?, Sowing dates? Risks being planned for (rain, frost, yield, markets etc)
- Rotations – managing risk, ie canola okay if moist soil profile, if drier then cereals. Late break then barley. Disease/weed considerations.
- Agronomy – precision farming, moisture retention, controlled traffic, no-til, press-wheels, stubble retention, soil health, raised beds, deep drilling, fallow options
- Enterprise – spread of cropping versus grazing, grain vs graze vs hay, markets/futures, on farm storage, specialist feed/seed suppliers
- Business Structure – business mgmt, lease or buy, ptrnshp, family trust, company? Best use of skills/strengths (eg sub-contract transport or spray business), succession plan to grow or terminate?
- Capital base - buy more land locally, spread risk across climate zones, buy or lease land to farm, lease to others, exit & stay or retire

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Some ingredients for success:

- Good support & advice networks (business, agronomic, strategic, technology, industry, social)
- Active benchmarking systems (independent 3rd party eyes) that enable regular review and response
- Good people to implement on ground
- Strategies to spread risk & enable resilience to shocks & volatility (not just climate!)
- Seize opportunities (good rain, good prices)
- Can't rely on personal experience alone (profitable agriculture undertaken in a wide range of climates)
- Understanding your options/pathways and act!

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Contact DPI for a local climate session for your district

Also, see some of the new climate products, case studies of farmers taking action, FARMVIEW videos of Victorian farmers at:

www.dpi.vic.gov.au/climaterisk

THANKYOU

graeme.anderson@dpi.vic.gov.au

