

# Modelling climate change impacts and adaptation options in SW Victorian pasture systems

Brendan Cullen<sup>1</sup>, Richard Eckard<sup>1</sup> & Ian Johnson<sup>2</sup>

<sup>1</sup>University of Melbourne

<sup>2</sup>IMJ Consultants, Armidale, NSW

# *Dairy in SW Victoria*

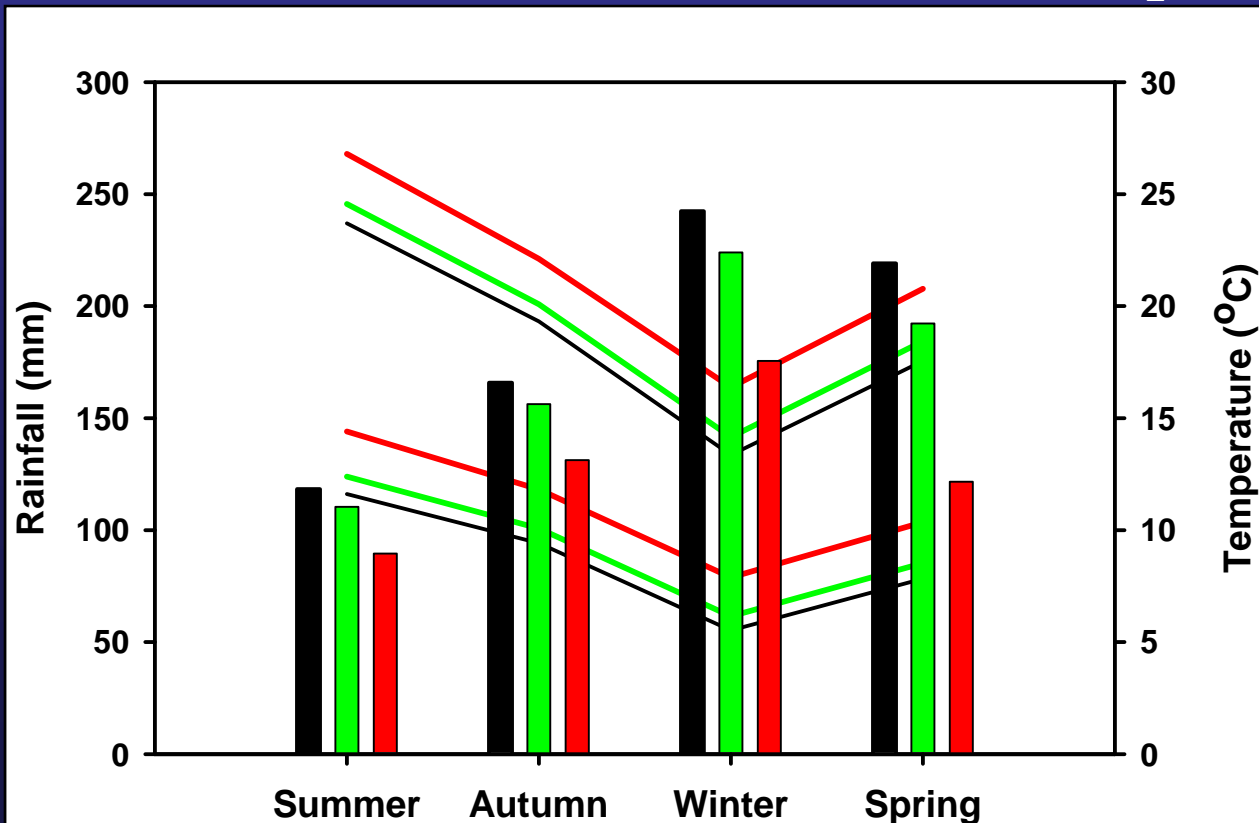


- Temperate climate
- Reliant on ‘home-grown’ pasture
  - largely perennial ryegrass/ white clover
- Modelling tool: DairyMod
- Impact on pasture supply
  - Including elevated CO<sub>2</sub>



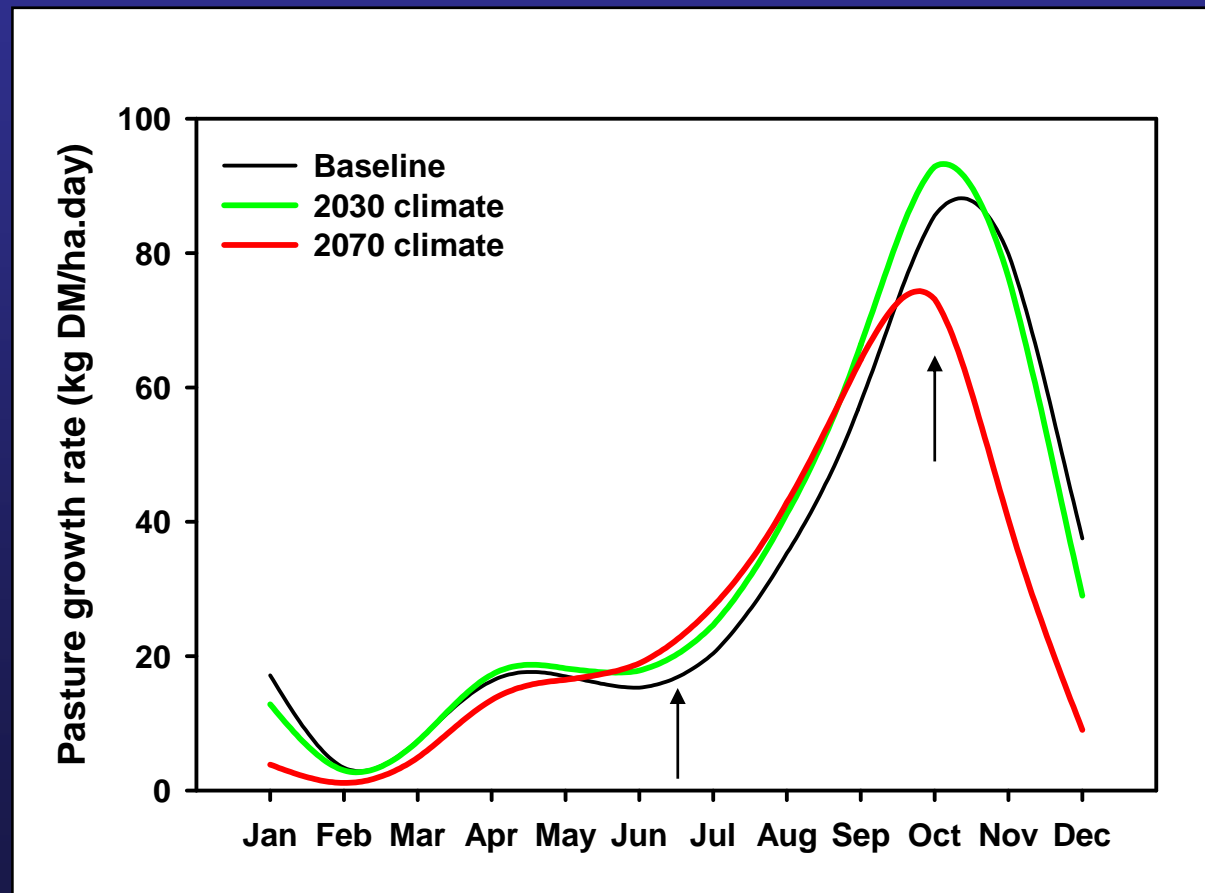
# Climate scenarios

- Baseline climate is 1971 to 2000.
- Future scenarios use A1FI projections from CSIRO Mk3:
  - 2030: +0.8°C, -8% annual rainfall, 450 ppm CO<sub>2</sub>.
  - 2070: +2.8°C, -29% annual rainfall, 700 ppm CO<sub>2</sub>.



# *Seasonal pattern of pasture growth*

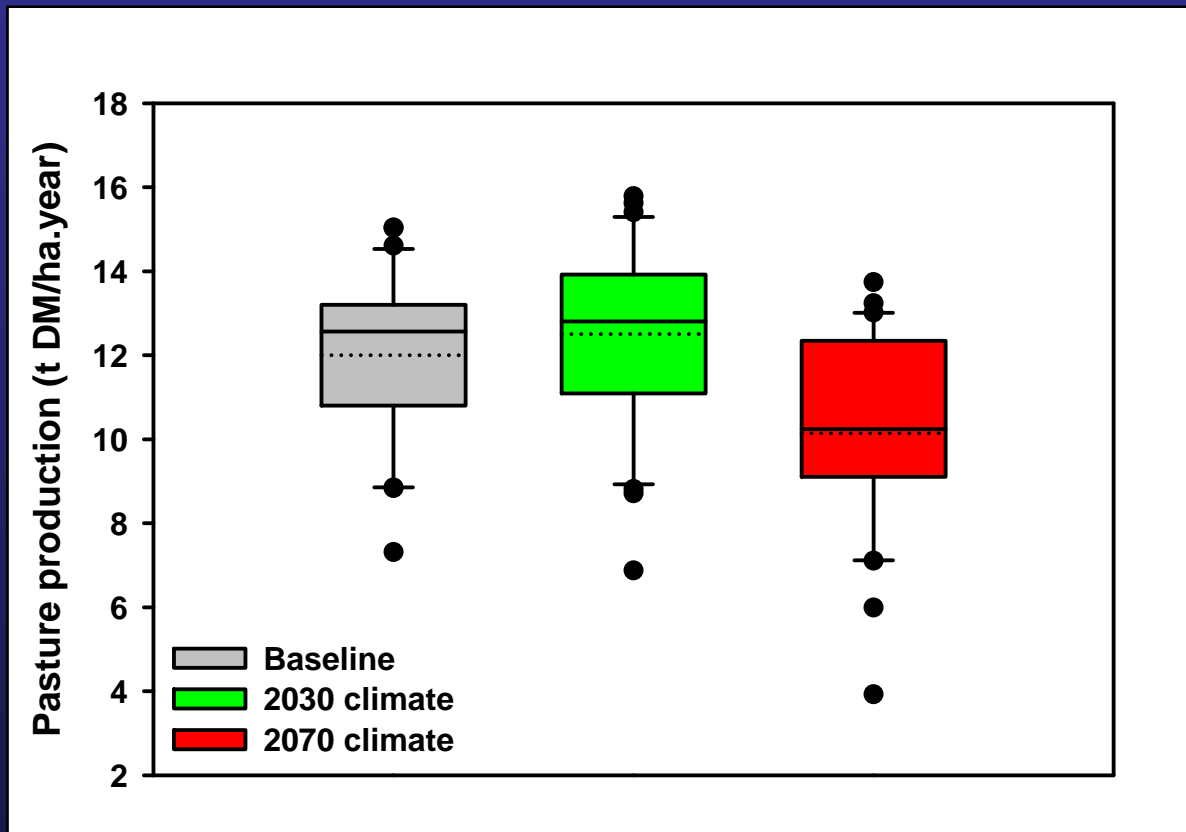
Higher winter production, but shorter Spring



# *Annual pasture production*

2030: 4% increase

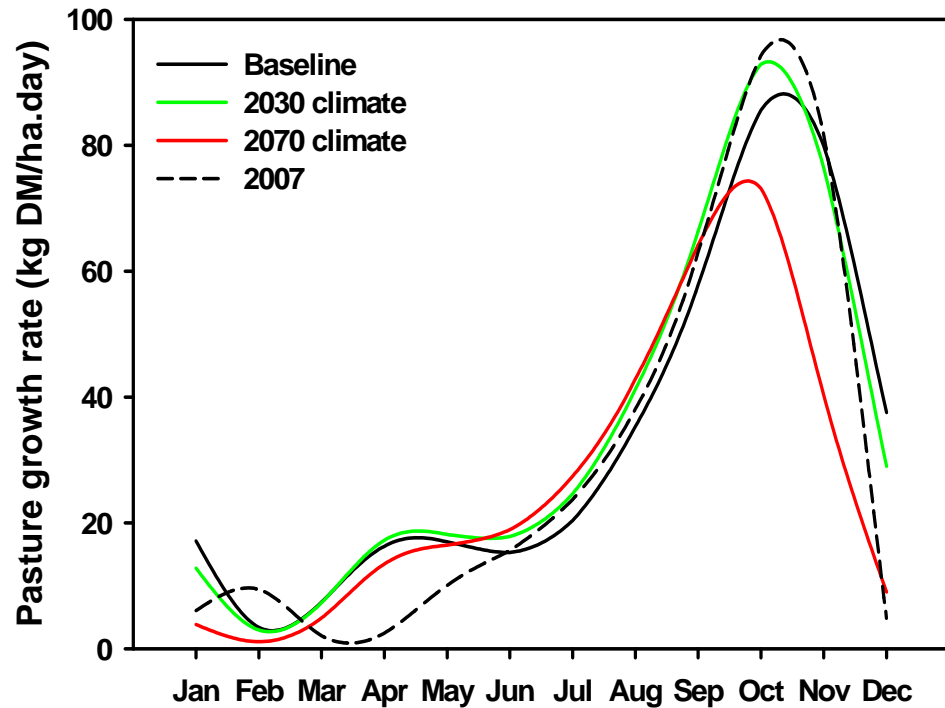
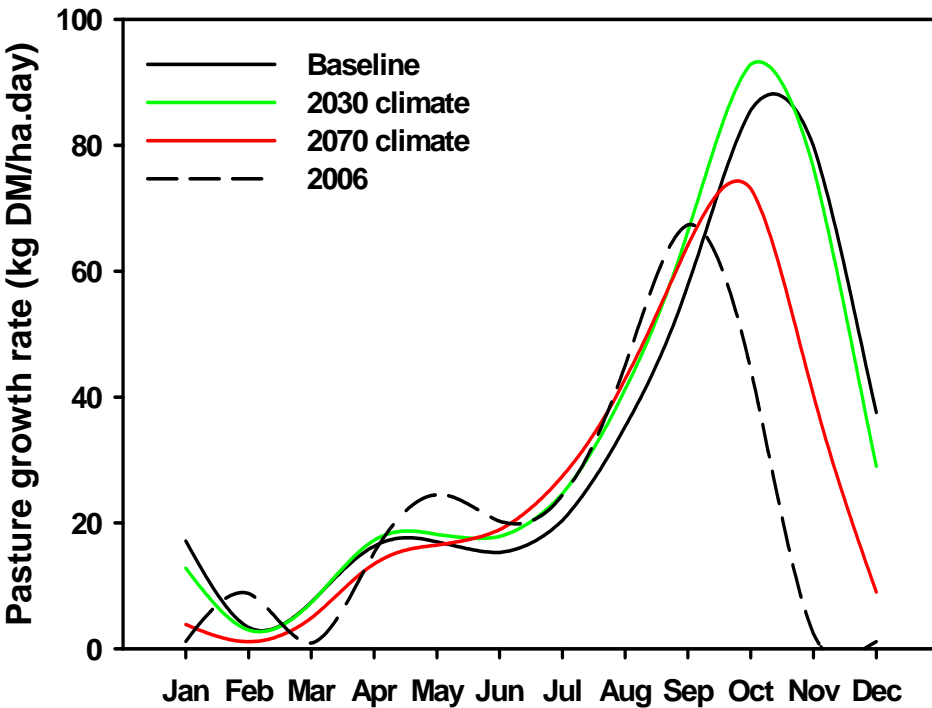
2070: 20% decrease



# What have recent years been like?

2006

2007



# *Modelling adaptation strategies*

Can deeper-rooted pasture plants help?



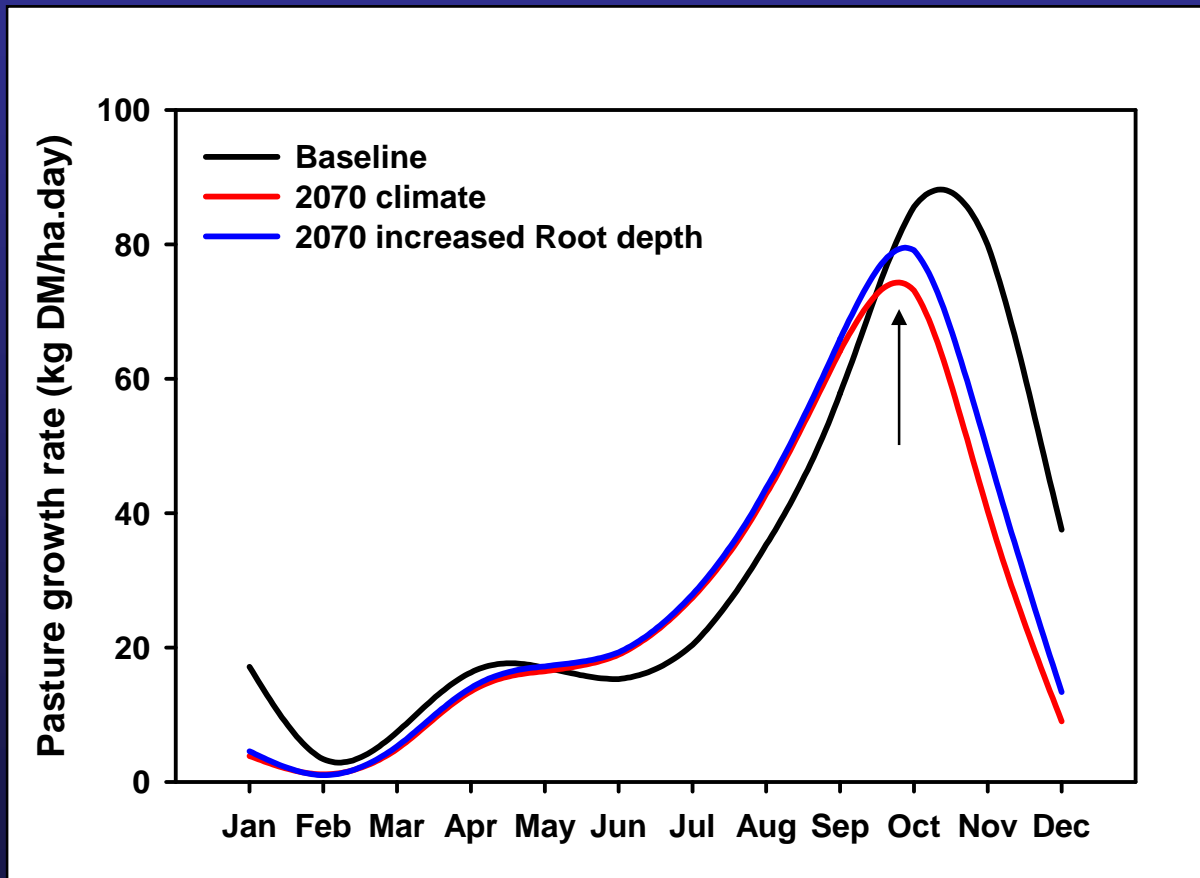
40 cm



60 cm

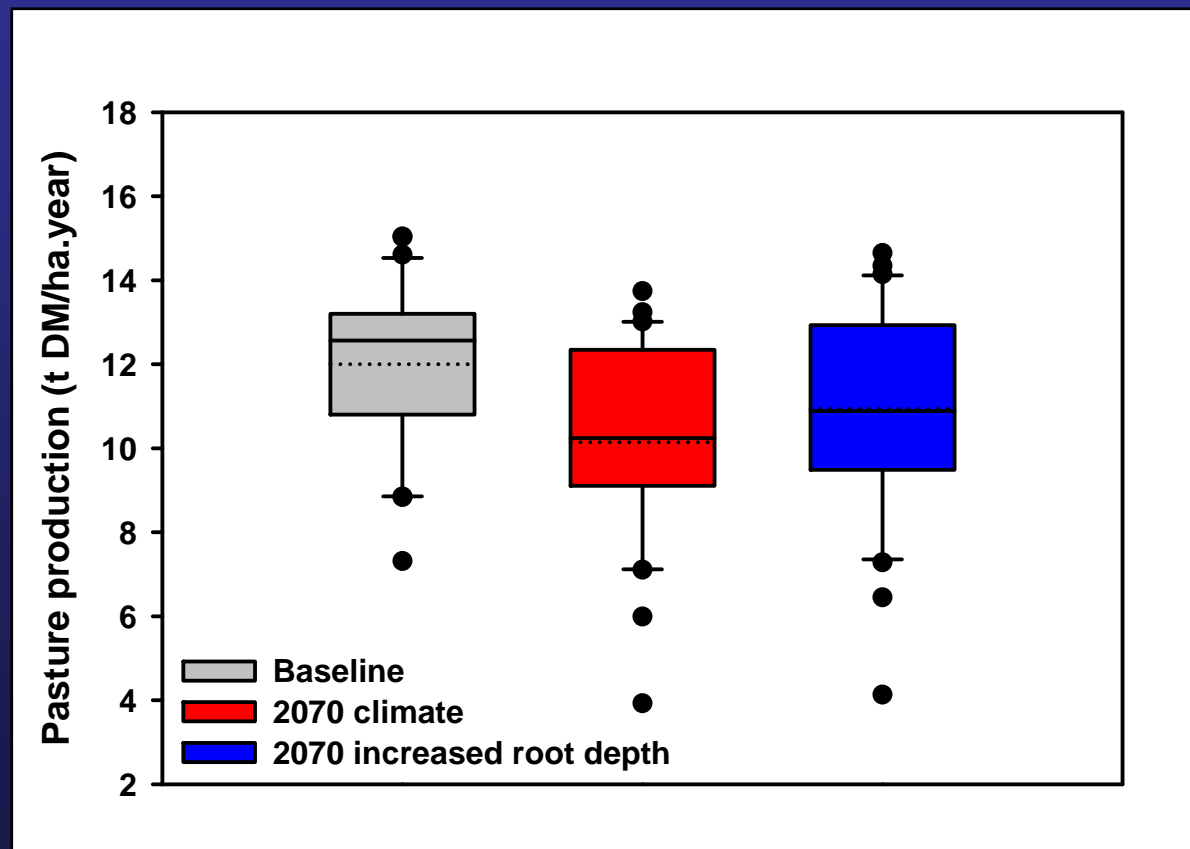
# *Impact of adaptation on pasture*

Deeper root systems increase Spring growth



# *Impact of adaptation on pasture*

Production increased 8% with deeper roots.



# *Conclusions*

- Current systems are resilient to 1°C warming and 10% rainfall decline.
- But, production declines are expected with higher climate change impact.
- However, changes to the frequency of extreme events not considered here.
- Deeper root systems aid adaptation.
  - Other plant adaptation options need to be investigated, e.g. heat tolerance, C<sub>4</sub> species.