THE ECONOMIC IMPACTS OF CLIMATE CHANGE ON CANTERBURY DAIRY FARMS

Anna Concepción Oñate Narciso
Dr Nazmun Ratna
Prof Geoffrey Kerr

Lincoln University

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INTRODUCTION
∙ How does farm production react to climate change and variability?
QUESTIONS

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- How would these changes affect farm profits?
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DAIRYING IN CANTERBURY

2004 – 2005

Representation of farms and herd size (Burns, 2013)
DAIRYING IN CANTERBURY

2012 – 2013

Representation of farms and herd size (Burns, 2013)
<table>
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<tr>
<th>Year</th>
<th>Dairy (1'000 000 000$)</th>
<th>Meat (1'000 000 000$)</th>
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**Source:** Statistics New Zealand (2013)
METHOD
METHOD: SIMULATION

**DairyMod**

- Developed by Johnson, et al.
**METHOD: SIMULATION**

*DairyMod*

- Developed by Johnson, et al.
- Multi-paddock, biophysical simulation model for dairy systems
**DAIRYMOD**

- Developed by Johnson, et al.
- Multi-paddock, biophysical simulation model for dairy systems
- Used in previous studies in New Zealand and Australia
Farm data (Canterbury region)
  · DAIRYNZ

Climate data (projections for climate scenarios)
  · NIWA
CLIMATE SCENARIOS

Adapted from the IPCC 5th Assessment Report

- **RCP 2.6 (E1):** aggressive mitigation scenario
- **RCP 4.5 (B1):** eco-friendly/globalised world
- **RCP 6.0 (B2/A1B):** high-tech/regionally sustainable
- **RCP 8.5 (A2/A1FI):** divided world/high population growth/poorly-developed institutions and governance
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PRELIMINARY RESULTS
Applied DairyNZ and NIWA data to DairyMod model to analyse climate change effects in:

- Lactation (milk production)
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- Lactation (milk production)
- GHG emissions
EMISSIONS

- Increase in $CO_2e$ from $N_2O$ (but very small)
- Increase in $CO_2e$ from $N_2O$ (but very small)
- No change in $CO_2e$ from $CH_4$
· Increase in $CO_2e$ from $N_2O$ (but very small)
· No change in $CO_2e$ from $CH_4$
· Irrespective of the increase in stocking rate
CO2e FROM CH4

Base 2.6 4.5 6.0 8.5
NET CO2E EMISSION
Decrease in lactation across climate scenarios
Decrease in lactation across climate scenarios

- Expected decrease in profits
Decrease in lactation across climate scenarios

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- The next stage of the research will be to see whether management would have a mitigating effect on lactation decrease
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LACTATION
LACTATION RESULTS

· As the stock density changes, the intake balance changes
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· Paddocks are being over-grazed
LACTATION RESULTS

- As the stock density changes, the intake balance changes
- Paddocks are being over-grazed
- No radical environmental impact in terms of GHG emissions
END
Thank you!!!
And any question/s?
😊 😊