WHAT CAN FARMERS DO?

Lucinda Corrigan Founding Chair Farmers for Climate Action & Director Rennylea Pastoral Company
Beginnings
Our board has over 200 years of combined experience in agriculture. They are industry leaders from across the country.

Our advisors are Australia’s leading climate & agricultural researchers.

Our staff have expertise in politics, advocacy, regional development, research agriculture, media and marketing.

Our collaborators are some of the leading bodies in agriculture, conservation & rural Australia.
FCA has galvanised farmers and the Ag sector as a credible voice for climate action.
Industry Targets are moving quickly

The Headline is the National Farmers Target CN2050
Dairy – 30% reduction by 2030
Pork – CN2025 to be announced by end FY21
Grains – consulting on a 2030 target, support NFF CN2050
Wine Industry – committed to a CN2050 vision
Horticulture – finalizing Draft Sustainability Framework
Sheep Meat & Wool – Launching their Sustainability Framework 21.4.21
& more.......
The rainfall-temperature operating envelope

Pre-1950’s

Temperature (°C)

Rainfall (mm)

Hotter, drier

Colder, wetter

BoM data: southern Australia
A changed operating environment

- Hotter, drier
- 2001 onwards
- 1951-2000
- Pre-1950’s
- Colder, wetter

BoM data
Climate changes (post 2000) affecting farm profits from -37% (Vic.) to +8.7% (NT)

Hughes et al. 2020
Potential wheat production is down

- Potential yields have declined by 27% since 1990, from 4.4 tonnes per hectare to 3.2 tonnes per hectare.
- Rainfall declines accounted for 83% of the decline in yield potential
- Temperature increases are responsible for 17% of the decline.

Hochman et. al., 2017
Potential Wheat production is down

- Why then have actual yields remained steady when yield potential has declined by 27%?

**ADAPTATION**

- Wheat farmers are closing the yield gap. From harvesting 38% of potential yields in 1990 this increased to 55% by 2015.

- Averaged out over a number of seasons, Australia’s most productive farmers achieve about 80% of their yield potential.

- As climate change accelerates enhanced levels of adaptation will be required in order to increase the proportion of potential yield farmers can realise.
Greenhouse gas emissions from beef production expressed as kg of CO₂ equivalents per kilogram of protein

Source: Herrero et al., 2013 PNAS 110: 20888-20893
Growth by region in cattle numbers, 1961-2018
Figure 10. Relationship between the methane mitigation potential in individual animals and likely time to first implementation on farm after considering additional research needed for a range of methane mitigation practices. The size of the bubble-dot represents a relative estimate of the likely cost and risk of further research required.
Our Work At Rennylea
Genetics and Genomics – Accurate description

<table>
<thead>
<tr>
<th>Traits Observed: GL, BW, 200, DOG, Genomics</th>
</tr>
</thead>
</table>

NOTES: Highest IMF bull in the sale at 5.7. L467 out of a H708 female. You can’t access meat quality genetics like this anywhere else. Top 1% IMF, Angus Breeding, Heavy Grain Indices. Top 5% Heavy Grass Index. Top 10% Domestic Index.
Commercial British Heifer Target Growth Rate and End Weight

- Target Growth Rate
- Target End Weight

- Joining @ 345kgs
- Weaning @ 187 kgs
- BCS 3.5-4 @ 415 kgs
  Pregnancy test and sell empties or culled
- Calving @ 450 kgs
- No weight gain in last 6wks of pregnancy

Months:

Growth Rate:
- 1.40
- 1.20
- 1.00
- 0.80
- 0.60
- 0.40
- 0.20
- 0.00
- -0.20

End Weight (kgs):
- 600
- 500
- 400
- 300
- 200
- 100
- 0

Crawford Fund - For a Food Secure World
Dung Beetle Research Site
Solar Electricity to mitigate emissions
Rennylea Emissions profile

- CO2 - Energy: 80%
- CO2 - Transport: 2%
- CO2 - Lime: 1%
- CO2 - Urea: 0%
- CH4 - Energy: 0%
- Embedded emissions - urea: 0%
- Embedded emissions - purch. feed: 0%
- CH4 - Enteric: 0%
- CH4 - Manure Management: 0%
- CH4 - Savannah Burning: 0%
- CH4 - Transport: 0%
- N2O - Fertiliser: 0%
- N2O - Urine and Dung: 0%
- N2O - Atmospheric Deposition: 0%
- N2O - Leaching and Runoff: 0%
- N2O - Savannah Burning: 0%
<table>
<thead>
<tr>
<th><em>State/Region</em></th>
<th>Vic.</th>
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**Herd Information**

<table>
<thead>
<tr>
<th></th>
<th>Bulls &gt;1</th>
<th>Steers &lt;1</th>
<th>Steers &gt;2</th>
<th>Cows &lt;2</th>
<th>Heifers &gt;1</th>
<th>Heifers 1-2</th>
<th>Steer/heifer/cow</th>
<th>cow</th>
<th>heifer</th>
<th>steers</th>
<th>heifers</th>
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</thead>
<tbody>
<tr>
<td>Livestock Numbers</td>
<td>35</td>
<td>714</td>
<td>363</td>
<td>38</td>
<td>1160</td>
<td>628</td>
<td>486</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Liveweight</td>
<td>619</td>
<td>260</td>
<td>576</td>
<td>0</td>
<td>583</td>
<td>199</td>
<td>423</td>
<td>480</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Emission intensity - steer/sheep/cow</td>
<td>0.70</td>
<td>1.20</td>
<td>0.70</td>
<td>0.18</td>
<td>0.20</td>
<td>0.89</td>
<td>0.40</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Grade Protein</td>
<td>14.5</td>
<td>16.5</td>
<td>15.5</td>
<td>16.5</td>
<td>16.5</td>
<td>16.5</td>
<td>16.5</td>
<td>16.5</td>
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<tr>
<td>Feed quality digestibility</td>
<td>67.5</td>
<td>67.5</td>
<td>67.5</td>
<td>67.5</td>
<td>67.5</td>
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<td>67.5</td>
<td>67.5</td>
<td>67.5</td>
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<tr>
<td>Liveweight gain</td>
<td>0.70</td>
<td>1.20</td>
<td>0.70</td>
<td>0.18</td>
<td>0.20</td>
<td>0.89</td>
<td>0.40</td>
<td>0.00</td>
<td>0.00</td>
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<table>
<thead>
<tr>
<th></th>
<th>Dryland</th>
<th>Irrigated</th>
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<tbody>
<tr>
<td>Nitrogen Fertiliser Pasture</td>
<td>30.82</td>
<td>0</td>
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<tr>
<td>Nitrogen Fertiliser Crops</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Nitrogen Fertiliser (other)</td>
<td>7.6</td>
<td>0</td>
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<tr>
<td>Annual Diesel Consumption</td>
<td>50477</td>
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<tr>
<td>Annual Petrol Consumption</td>
<td>6000</td>
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<tr>
<td>Annual Electricity Use</td>
<td>900</td>
<td>kWh</td>
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<tr>
<td>Transport</td>
<td>25000</td>
<td>km</td>
</tr>
<tr>
<td>Area of Trees Planted after 1990</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Type of Trees planted</td>
<td>Hardwood</td>
<td></td>
</tr>
<tr>
<td>Rainfall</td>
<td>Med (500 - 700)</td>
<td></td>
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<tr>
<td>Power Source</td>
<td>State Grid</td>
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**Outputs**

<table>
<thead>
<tr>
<th></th>
<th>t CO2/t</th>
<th>t CH4/t</th>
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</thead>
<tbody>
<tr>
<td>CO2 - Energy</td>
<td>146.19</td>
<td></td>
</tr>
<tr>
<td>CO2 - Transport</td>
<td>93.76</td>
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<tr>
<td>CO2 - Lime</td>
<td>10.00</td>
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<tr>
<td>CO2 - Urea</td>
<td>49.13</td>
<td></td>
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<tr>
<td>CO2 - Energy embedded emissions</td>
<td>172</td>
<td></td>
</tr>
<tr>
<td>embedded emissions - lime</td>
<td>55.00</td>
<td></td>
</tr>
<tr>
<td>CO2 - Urea embedded emissions</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>CO2 - Energy embedded emissions - urea</td>
<td>55.00</td>
<td></td>
</tr>
<tr>
<td>CH4 - Enteric</td>
<td>5,506.03</td>
<td></td>
</tr>
<tr>
<td>CH4 - Manure Management</td>
<td>1.20</td>
<td></td>
</tr>
<tr>
<td>CH4 - Savannah Burning</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>CH4 - Transport</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>N2O - Fertiliser</td>
<td>35.98</td>
<td></td>
</tr>
<tr>
<td>N2O - Urine and Dung</td>
<td>489.33</td>
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<tr>
<td>N2O - Atmospheric Deposition</td>
<td>52.53</td>
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<tr>
<td>N2O - Leaching and Runoff</td>
<td>515.75</td>
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<tr>
<td>N2O - Energy</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>N2O - Savannah Burning</td>
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<tr>
<td>N2O - Transport</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>N2O - Other</td>
<td>-152.69</td>
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<tr>
<td>Net Farm Emissions</td>
<td>2,721.90</td>
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**Summary emissions**

<table>
<thead>
<tr>
<th></th>
<th>t CO2/t</th>
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<tr>
<td>Net Farm Emissions</td>
<td>2,721.90</td>
</tr>
</tbody>
</table>
What’s next?
The Resilient Cow in a Changing Climate

Digital and disruptive, eg.
Auctions Plus
Supply chain value creation
Genomics – new traits
Efficiency using sensors to gather
Pasture quantity & quality
Feed additives to mitigate CH4
New legumes
The Goal – A Sustainable Food System

THE GOAL - A SUSTAINABLE FOOD SYSTEM

CN 2030

- DEVELOP sustainable audits to meet consumers expectations
- Biodiversity
- Water
- Ireland’s “Origin Green”
- Sophisticated DATA driven farms through the food chain

Driver – Capital Markets
- Alternative & plant based Protein
  - Eg: Soy, potato defying the idea that true Protein comes from animals

DISRUPTION
- cell based meals
- Fermentation
- Dairy products
- Eg: “Perfect day” using genetically modified yeast

INVESTMENT/

Financial Incentives

Doubling down
- sustainable intensification with less resources

Business as usual
Thank you!