Future pathways for Australian dairy farms

Introduction
This Dairy Australia led project is exploring possible futures for dairy farms as they may operate in a 2040 climate.

The project is examining:
- Trade-offs between profitability, risk, social impacts, and greenhouse gas (GHG) emissions associated with realistic farm development options.
- Potential impacts of climate variability and climate extremes on economic, biophysical and social aspects of farm development.
- Skills and industry support required to build capacity to respond to the changing climate.

Methods
Across three dairying regions in southern Australia, a case study farm has acted as a ‘baseline’ for modelling future climates, extreme climatic events, GHG emissions profiles and possible development options for that business in 2040.

Economic and biophysical aspects of the farm development options and climate extremes have been modelled in detail.

Social drivers influencing decision making have been explored. All development options have been profiled for their GHG footprint.

Results
The more intensive farm system options, which generally have lower GHG emissions intensity (kg CO₂e/kg milk) as seen for Gippsland in Fig 1, show high returns in favourable seasonal conditions, but high variability, and increased risk of low (or negative) returns in unfavourable conditions (Fig 2 & 3).

Conversely, the less intensive farm systems, which generally have higher GHG emissions intensity (kg CO₂e/kg milk), rely less on purchased supplementary feed inputs, offer more consistent returns over time whilst missing opportunities for higher returns in favourable years.

This suggests that there will be trade-offs between profitability, resilience and GHG emissions.

Conclusion
The project offers insights into the synergies and conflicts of adaptation versus emissions profile through the exploration of trade-offs as farm managers pursue different systems in response to a changing climate.

Farm managers will continue to make their own choices about development pathways based on their unique goals and resources. Hence, the current diversity in farm systems is likely to remain.

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