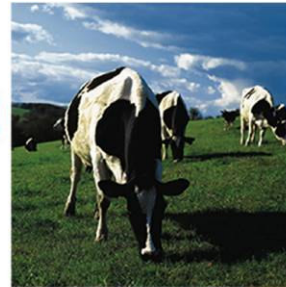


Greenhouse accounting for ruminant emissions and including animal genetic improvement in national accounts



UNFCCC & Kyoto Protocol

- All signatories to UNFCCC obliged to account for emissions of an agreed basket of greenhouse gases. Frequency varies depending upon stage of economic development.
- Kyoto Protocol an agreement to reduce GHG emissions in the industrialised nations by 5.2% relative to 1990
- Annexe 1 countries have their own target and must take responsibility for emissions above the target in the first commitment period (2008-2012)
- Developing countries have no targets
- Method of accounting follow guidelines published by IPCC & are subject to regular international scrutiny



Why accounting for emissions is important

- National accounts are the basis of allocation of 'assigned' amount i.e. 1990 baseline emissions
- National accounts used to decide liabilities under Kyoto protocol
- If a mitigation is not incorporated into national accounts it does not receive international recognition & credit



Methods of accounting

- Tier 1

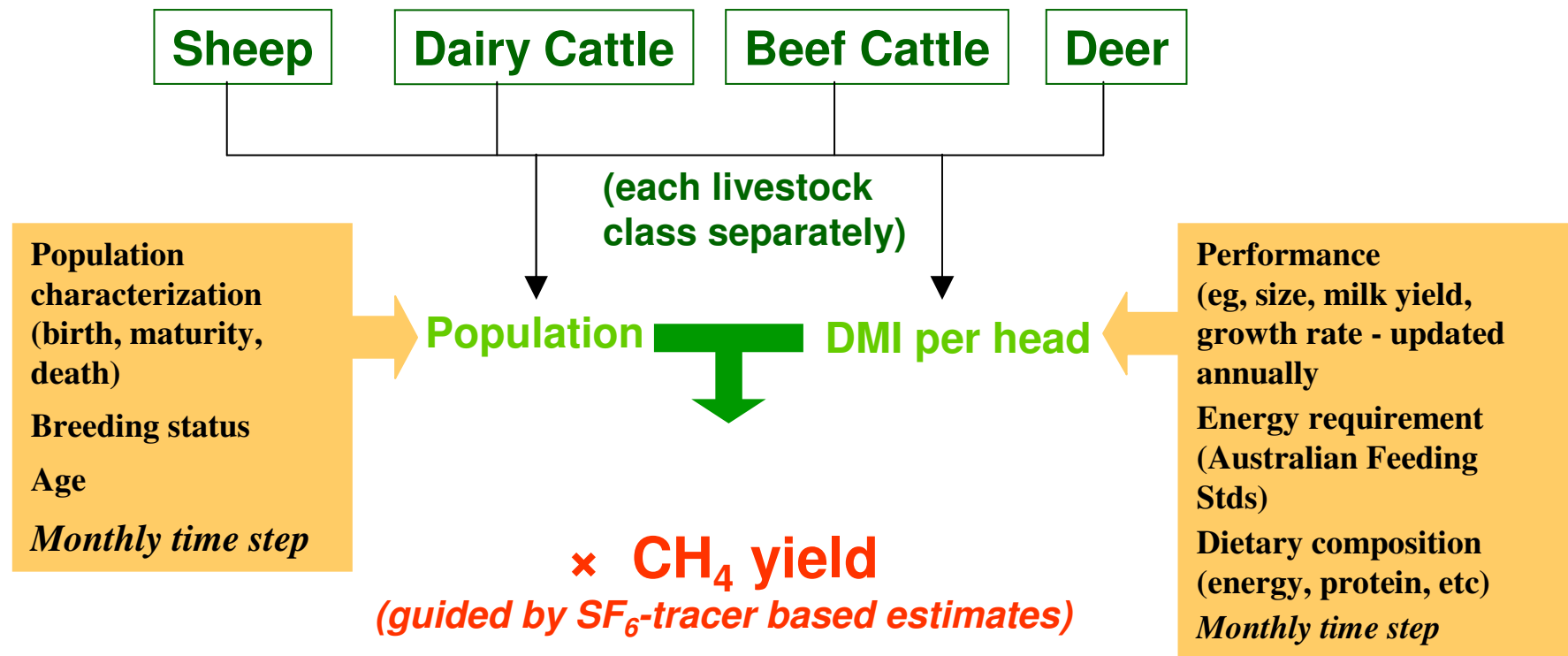
Simple methodologies using fixed emission factors (eg fixed quantity of CH₄/head/year). Appropriate for developing countries & gases making a small contribution to national emissions profile.

- Tier 2

More complex methodologies which apply to developed countries and those gases making a larger contribution to national emissions. Methods used try to capture unique national circumstances (eg levels of productivity, feeding regimes etc).



NZ 'Tier 2' enteric methane model



Generic components of a Tier 2 inventory



Examples of animal genetic improvements influencing CH₄ emissions

1. Productivity – milk yield, liveweight gain, reproductive performance, prolificacy
2. Lower CH₄ emissions per unit of feed consumed ‘low emitter’
3. Reduced feed intake for same level of performance
4. A combination of 2 & 3



Possible impact of animal genetic improvement on New Zealand Tier 2 inventory

	Intake per animal	Methane Yield ¹	Population ²	Total CH ₄ emissions
Productivity	Increases	No change	Decrease	No change
Low emitter	No change	Decreases	No change	Decreases
Lower intake	Decreases	No change	Increases	No change
Lower intake + low emitter	Decreases	Decreases	Increases	Decreases

¹methane yield a constant

²assuming no change in feed supply



Can animal genetic improvement be easily incorporated into the New Zealand Tier 2 inventory?

	Intake per animal	Methane Yield	Population
Productivity	Yes	New algorithm	Yes
Low emitter	Yes	New algorithm	New characterisation
Lower intake	New algorithm	Yes	New characterisation
Lower intake + low emitter	New algorithm	New algorithm	New characterisation



Conclusions

- Animal genetic improvement can increase or decrease emissions per animal.
- Changes in animal populations have a major influence on impact on emissions at the national scale.
- Inventory methodologies will need to be modified to fully capture impact of animal genetic improvement.
- Population characterisation needs to become far more sophisticated to fully capture impact of animal genetic improvement.
- Do not underestimate 'evidence' needed for the mitigation potential to be realised in the national accounts.

