

# Climate change implications of animal welfare and health

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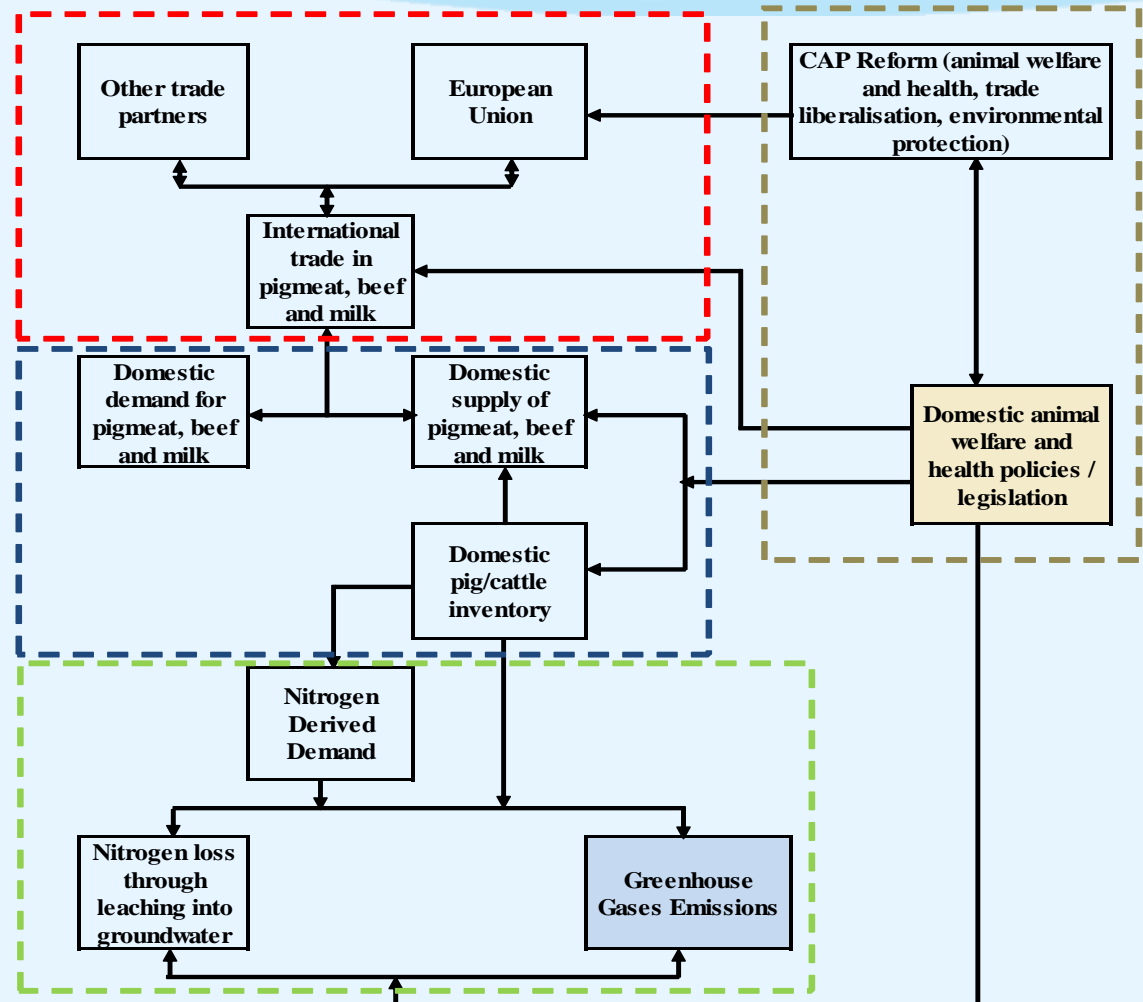
- CAP reform is increasing emphasis on promoting public goods (environment, animal welfare and health) in the EU.
- Interrelationship between animal welfare/health and climate change, as they both impact on each other
  - Increase in temperature and more extreme weather events will likely affect the welfare/health of animals
  - changes in animal welfare/health (e.g., diets, housing, disease eradication) will impact on emissions of greenhouse gases and energy consumption.
- Research purpose - analysis of animal welfare/health impact on climate change

- Use of partial equilibrium (PE) models to simulate trade and environmental impacts of changes in animal welfare and health in Scotland
- PE approach
  - useful for understanding a particular response to changing policy scenarios and can capture the impacts of small changes that do not (seriously) affect sectors other than agriculture
  - models a baseline scenario (equilibrium between demand and supply for a particular livestock product),
  - adds shocks (changes in animal welfare/health) and
  - simulates system's response (shifts in prices, quantities, trade and environment).

# Case studies

Case study A -  
changes in sow's diet  
before mating

Case study B -  
eradication of Johne's  
disease in beef and  
dairy cattle



Schematic representation of the linkages between animal welfare and health policies/legislation, production, trade and environment

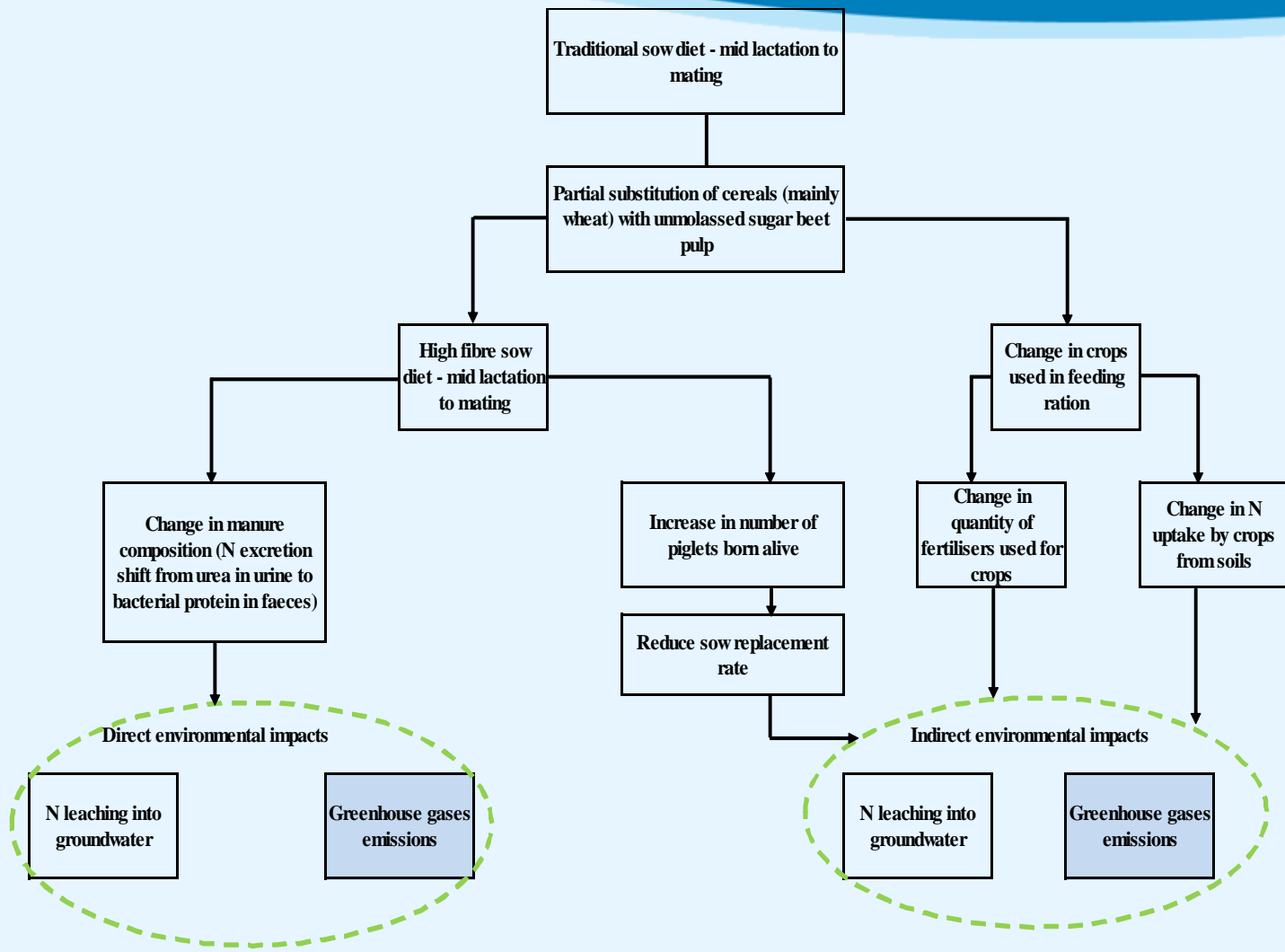
Source: Toma, Ashworth, Stott, 2008; Toma, Gunn, Stott, 2008

# Case study A



- The animal welfare component of the model is based on the results of a commercial sow feeding trial described by Ferguson et al. (2004).
- The experiment analysed the effect the feeding of increased dietary fibre from mid lactation until mating has on the number of piglets born alive. The fibre source used was unmolassed sugar beet pulp which replaced cereals (mainly wheat) in the diet.

# Case study A (cont.)



Schematic representation of the environmental impacts of changes in sow's diet  
Source: Ashworth, Toma, Hunter, 2009

# Case study A (cont.)

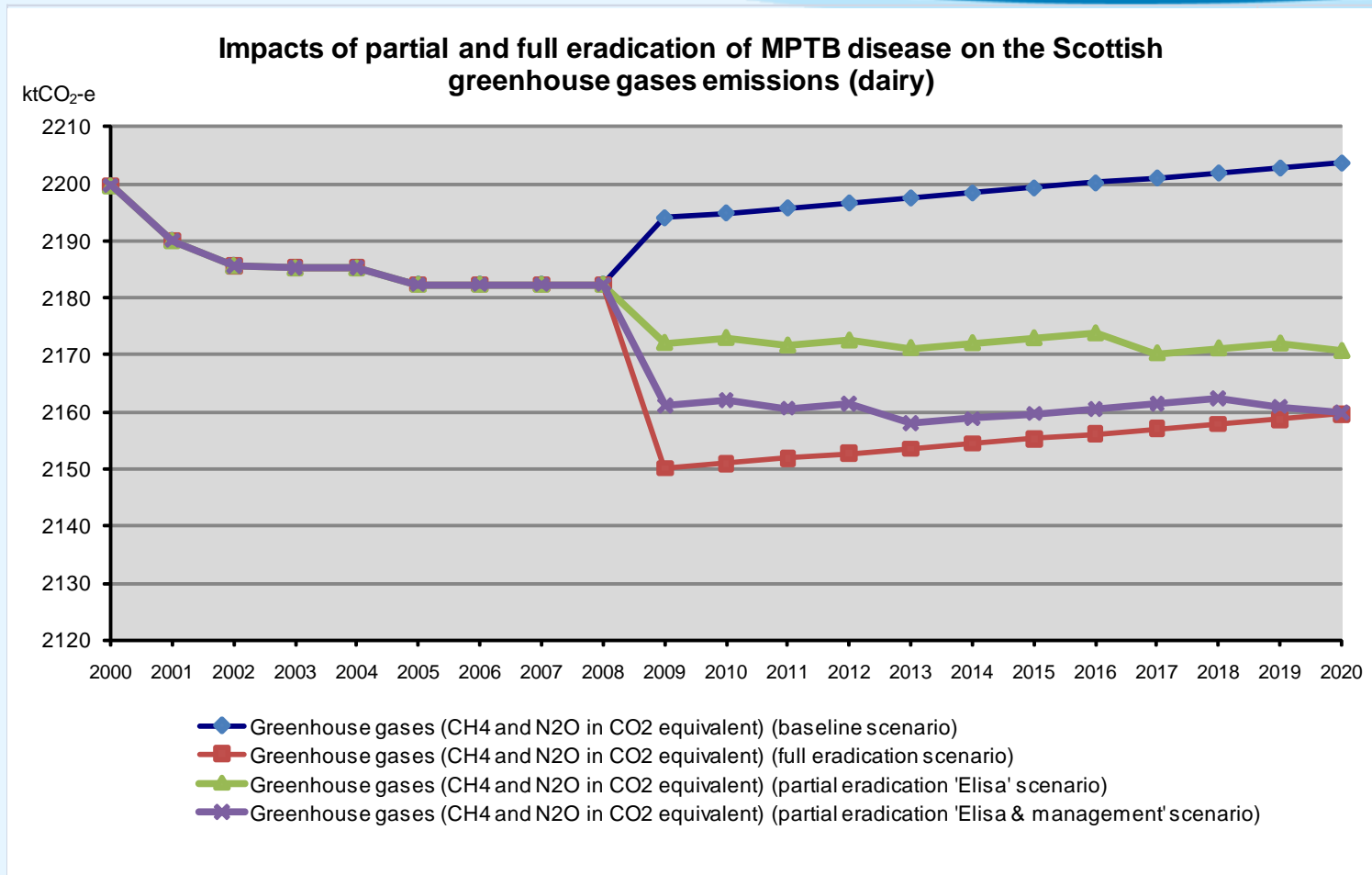


- Win-win-win situation with animal welfare, trade and environmental gains.
- In terms of climate change, the contribution to GHG emissions decreases by 6% at the end of the simulation horizon (2015) in the alternative scenario (improved sow diet) compared to baseline scenario (traditional sow diet).

- Economic & environmental impacts of paratuberculosis:
  - losses to Scottish dairy producers - decreasing milk yield, loss of body weight and premature replacements
  - losses to environment – e.g., increase in quantity of manure
- Scenarios
  - Baseline - case of the Mptb infected herd
  - Scenario1 - full eradication at the beginning of the simulation horizon
  - Scenario2 - case of partial eradication using ‘Elisa testing’ over the simulation horizon (assumes decrease in farm level prevalence from 21% to 11%)
  - Scenario3 - case of partial eradication using ‘Elisa testing & infection management’ over the simulation horizon (assumes decrease in farm level prevalence from 21% to 1%)



# Case study B (cont.)



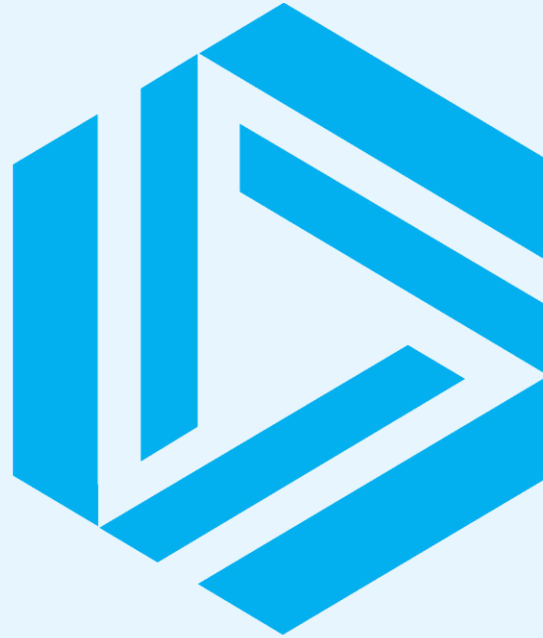
Contribution to GHG emissions decreases by up to 2% at the end of the simulation horizon (2020) in the alternative scenarios compared to baseline

- Current research - use of socio-economic approaches to assess the **relative contribution of animal welfare/health to agricultural sustainability** at different levels
  - producers (behaviour),
  - farm (production),
  - national and international (trade)
- Relevance to sustainable agriculture and rural policies

# Acknowledgements



- Scientific data (case study B) provided by Dr Ross Davidson and Dr Michael Hutchings (SAC), Dr Søren Saxmose Nielsen (University of Copenhagen).
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# SAC

**S**✓**ccess** through **Knowledge**