

Trade-offs between production, efficiency, and environment in livestock farming systems (Poster presentation)

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Background: The Victorian livestock (sheep meat) industry faces major challenges due to diminishing terms of trade and increasing community expectations for environmental stewardship. The industry needs to both improve value chain efficiency and demonstrate its environmental credentials.

Water (quantity and quality) has arisen as a key resource use issue for Australia's primary industries, and Victoria's livestock industry is no exception. Furthermore, climate change predictions suggest that water will become an increasingly important issue in the future, with lower average rainfall, more frequent droughts, and a greater proportion of rain falling in summer.

In livestock production systems, the efficiency of water use is intimately linked to the efficiency of nutrient use and to the quality and availability of animal feed, which in turn largely controls productivity and profitability. Inefficiencies in water and nutrient use and poor soil and plant conditions greatly increase the risk of sediment and nutrient export from farmland to waterways, an increasing problem in agricultural catchments.

Objectives: The objectives of this project are to: (1) Benchmark the current efficiency and sustainability of sheep meat farming systems in terms of water and nutrients (nitrogen and phosphorus); (2) Identify and test ways to improve productivity, resource use efficiency and environmental performance relating to water and nutrients (nitrogen and phosphorus); and (3) Develop sheep meat production systems that enhance resource use efficiency simultaneously with productivity and environmental gains.

We aim to develop sheep meat production systems that demonstrate 20% greater productivity, 10-20% greater resource (nutrient and water) use efficiency, and 10-20% improvements in environmentally sustainability (runoff, nutrient loss). This will be achieved by reducing natural and other resource inputs per unit of output, increasing production, reducing wastage and reducing off-site impacts while improving the natural resource base.

Application of Bayesian networks: Bayesian Networks will be our main tool for investigating and quantifying the interactions among key factors influencing animal production, pasture production and water and nutrient utilisation. The networks will be populated using a combination of existing datasets and results of new experimental work. The networks are currently in the early (conceptual) stage of development.