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MEAT & LIVESTOCK AUSTRALIA

Red meat in the Australian environment

Introduction

As a leading global supplier of red meat, the Australian red meat industry must consider the impact of climate change and respond with environmentally sustainable production practices that consider all aspects of natural resource management.

Australian red meat production systems have evolved in response to Australia's distinct landscape and climatic conditions. Since these are unique to the Australian context, several important aspects may differ significantly from red meat production systems used in other countries.

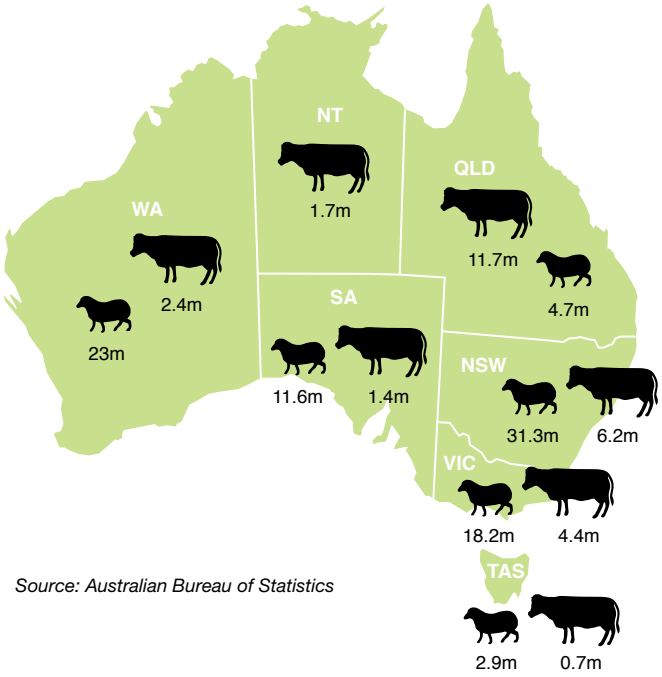
In considering the true effect of our red meat production on environmental sustainability, it is necessary to understand red meat production systems in Australia.

Australian red meat...

- goes to over 100 countries, contributing high quality protein to more than 4.7 billion meals
- is one of the safest, best quality red meat globally
- provides direct employment to 171,756 people, and jobs for many others, especially in rural regions
- contributes $15.9 billion to Australia's economy

Where is red meat produced in Australia?

The major cattle growing areas in Australia are in rangelands and semi-arid areas. This pastoral zone covers three quarters of Australia's land mass. Similarly, the major sheep producing areas are in rangelands and semi-arid areas located in the southern sub-tropical and temperate zones.



Source: Australian Bureau of Statistics

Because of geological, topographic and climatic factors, these regions are not suited for any high volume food production other than grazing. Less than 25% of Australia's land mass is suitable for intensive forms of agriculture such as cropping. These areas, closer to the coastal fringes, are also under pressure from urban, commercial and industrial land use demands.

In those areas suitable for ‘mixed farming’ (i.e. grazing and cropping), livestock and grain production are considered complementary. For example, after harvesting grains, livestock graze on crop stubble and legume-based pastures grown in rotation with grain crops to replenish soil nutrients. Integrating paddock use in this way maximises productivity and enhances soil health.

Australian broadacre zones

Source: Australian Natural Resources Atlas

Feed usage

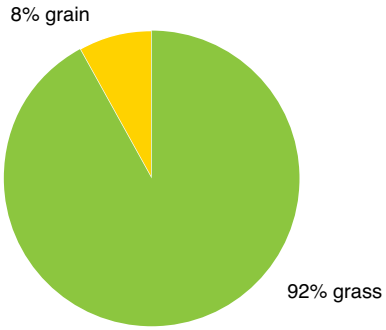
Most beef cattle in Australia are reared on pastures of native grasses or on improved pastures. Some cattle are fed grain, hay or silage, however this is generally for a short period of their life.

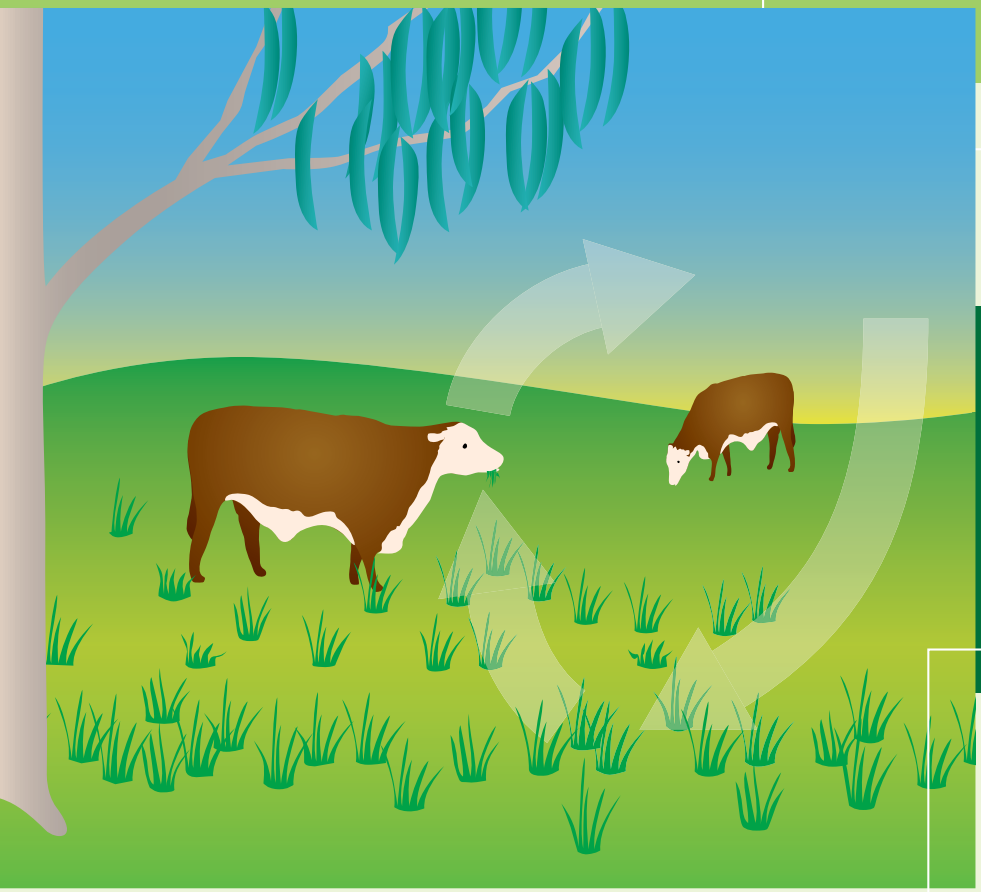
Grain feeding may be used to:

- supplement pastures during times of drought
- ‘finish’ cattle for short periods to achieve consistent quality standards
- produce highly marbled meat for high-end export customers

In Australia, 70% of our cattle are totally grass-fed. The remaining 30% which are classified as ‘grain-fed cattle’ are also typically raised on pastures for most of their lifetime (around 17 to 21 months) but are then grain-fed (or ‘finished’) for between 2 and 4 months. Combined, the total diet/feed of Australian cattle consists of around 92% grass and 8% grain.

Total cattle feed





International greenhouse gas accounting rules only reflect agriculture's emissions and do not account for the full carbon exchange in landscapes.

The Carbon Cycle

Greenhouse gases

Red meat production's contribution to greenhouse gas emissions is best understood within the context of the carbon cycle – it is not just about emissions, but also about transfers between carbon stores. The carbon stored in plants is consumed by livestock when they graze, some is then released into the atmosphere (as carbon dioxide as they breathe and methane as they digest their food). Carbon dioxide is then re-absorbed by plants as they grow and so the cycle continues.

In spite of this natural cycle, there are still two key drivers for reducing emissions:

- Kyoto emission targets will require reductions to be achieved across a range of sectors including agriculture
- industry's search for productivity gains will continue to find ways to convert the energy lost through methane emissions into muscle development

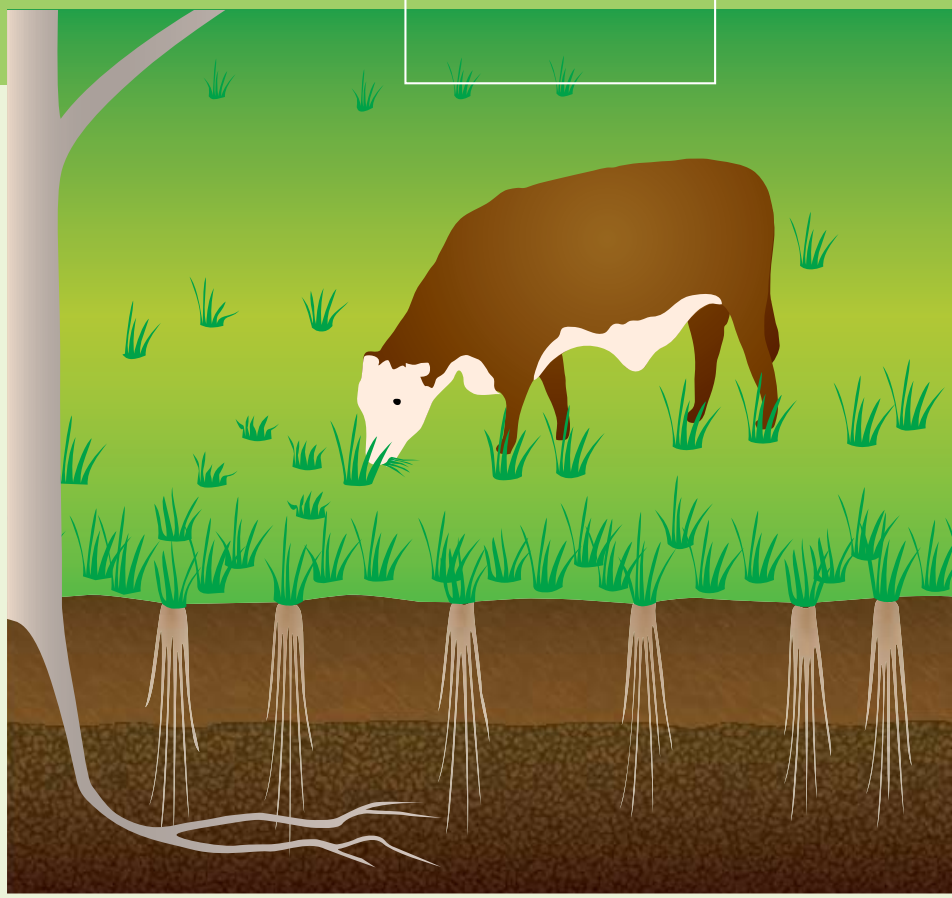
Ninety-seven percent of livestock's emissions arise from enteric fermentation, a fermentation process that takes place in the digestive system of ruminants, such as sheep and cattle. According to the Australian Greenhouse Office, livestock currently contribute 11% to total emissions on a CO_2 equivalent basis.

Most carbon released into the atmosphere is in the form of carbon dioxide (CO_2). Ruminants release carbon in the form of methane (CH_4). CH_4 has about 25 times the greenhouse impact of CO_2 and therefore is multiplied by 25 to achieve an equivalency to CO_2. In accounting, all greenhous gas is measured in terms of CO_2 equivalents or CO_2e.

Carbon sequestration

Carbon is absorbed from the atmosphere by plants as they grow. Some of this carbon is stored in the leaves, stems and roots of plants and some is stored in the soil, improving the soil's health. The process of absorbing carbon from the atmosphere and storing it in plants and soil is called 'sequestration'.

Deep-rooted perennial pastures and trees found in grazing systems in Australia are an important carbon sink.

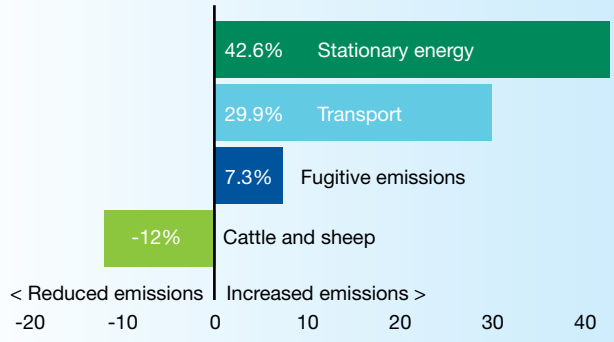


Efforts to reduce greenhouse gases

Methane emissions vary depending on the animal's diet and size. A key to reducing emissions is by maximizing the animal's growth rate and converting as much of this 'lost energy' into meat through more efficient feed conversion. This can be achieved through more selective breeding for this trait as well as improved feed management.

Improvements in management practices and production efficiencies and changes in livestock numbers have combined to reduce gross greenhouse gas emissions from sheep and cattle by 12% (from 58mt/pa in 1990 to 51mt/pa in 2005). Production efficiencies have delivered at least a 12% reduction in emissions per tonne of beef produced. Research to find further improvements is continuing.

Percentage change in emissions



The Australian Greenhouse Office reports that livestock industry changes combined with land use changes reduced Australia's net emissions by approximately 74mt CO_2 equivalents per annum from 1990 to 2005. This more than offsets the total gross emissions attributed to livestock production each year, and the vast majority of this reduction has occurred on grazing lands.

Biodiversity

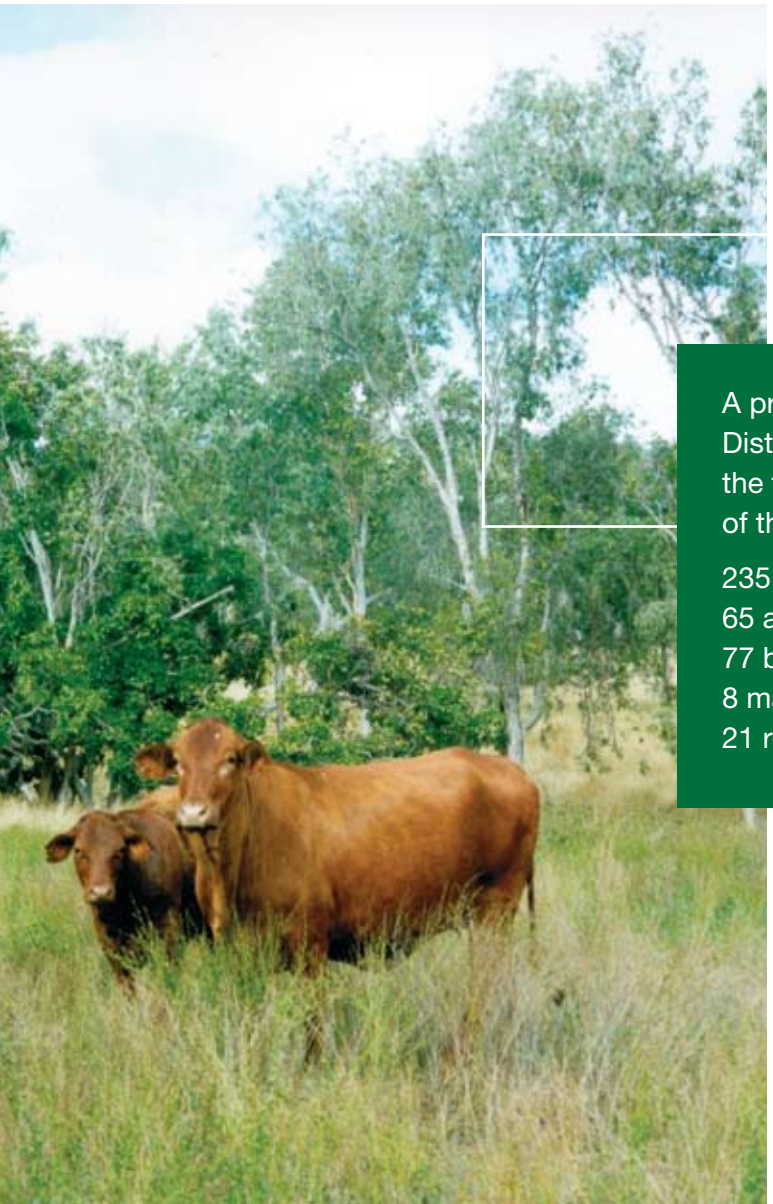
Diverse grassland and woodland systems with a healthy mixture of species are naturally resilient and more biologically stable than monocultures.

The native grasses, shrubs and trees typically found in the extensive cattle production systems in Australia are not only well-suited to grazing, but provide habitats for a diverse range of native animal, insect, bird and plant life. With proper grazing management, habitat, feed and water availability can all be maintained in a healthy state year round, supporting a vast range of life forms through all but the most extreme seasonal conditions.

For pastoralists, the natural diversity of plants and land systems provides a buffer against the long dry periods and unreliable wet periods which characterise rangeland seasons. Abundant native birds, animals and insects in the pastoral zone assist with pest and weed control.

Strategies employed by pastoralists to encourage biodiversity in grazing lands are based around:

- retaining, restoring and revegetating diverse plant species
- creating corridors for native flora and fauna
- nutrient cycling and ground cover for healthy soils
- controlling pests and diseases
- managing pastures with a variety of grass types based on perennials, rotational grazing and pasture spelling



A project on Pigeon Hole station in the Victoria River District (a district thought not to be biodiverse) found the following number of species at a sample section of the grazing property:

235 plants
65 ants
77 birds
8 mammals
21 reptiles

Another 12 bird, 2 reptile and 6 frog species were noted within the paddocks

Water usage

There are different ways of calculating water usage depending on the purpose of the calculation and the type of production systems. Different methods may return very different results, each valid in its own context. For example:

- CSIRO's The Balancing Act report provides a measure of the effectiveness of Australia's industries in using available water resources to produce goods for human use.

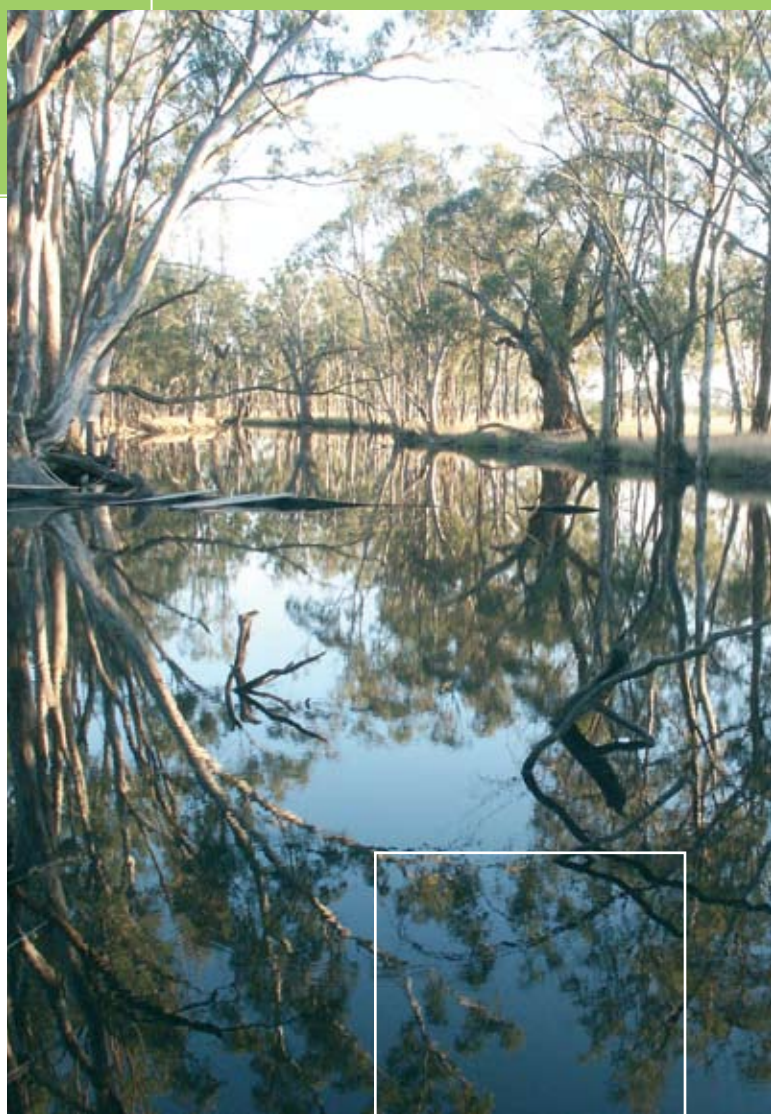
  For the cattle industry, this approach calculates the rainfall falling on a grazing paddock and divides this by the quantity of beef produced from that paddock. For example, 500mm of rain per hectare provides 5 million litres of water to support the ecosystem on that hectare, plus a surplus that runs off to other areas. If 100kg of beef is the only agricultural product from this hectare, this calculation assigns 50,000 litres to each kg of beef, ignoring run-off in streams, infiltration, tree and plant growth, etc.

  Because the cattle use only a small proportion of this water, the calculation does not reflect actual water use for beef. This is highlighted by the fact that if stock numbers per hectare were reduced, water use per kg of beef would increase.

- The 'Diverted Water' approach uses the Australian Bureau of Statistics' definition of total water use which refers to water extracted from storages, rivers and the environment for use. Rain falling on the area of production is not included unless it is stored and/or diverted before use.

  Estimates of water use using the ABS approach vary by supply chains and range from 60 litres to 320 litres per kg of beef.

- Higher reported estimates of water use from the USA include 50,000 litres per kg beef (Meyer 1998) and 100,000 litres per kg beef (Pimentel 2003). These include the total volume of water (rainfall and irrigation) attributed to lands used for the production of grain or hay for feed (similar to the CSIROs' The Balancing Act report). As explained above, such estimates are of actual water use and are not applicable in Australia where the vast majority of beef production is in extensive rangelands and feed for feedlots is frequently not irrigated.



According to the ABS definition of water use, it takes between 60 litres to 320 litres of water to produce a kg of beef.

- The 'Closed System' approach assumes that all water used in beef production (as water and feed) either passes through the animal (as waste or transpiration) or is retained in the animal as it grows. As waste and transpiration is then recycled as a natural process, the only water that leaves the system is that which is in the animal.

  This approach suggests water usage in beef production is one to two litres per kg of beef.

Alternative energy

A project is underway to develop a fully integrated system that collects methane and solid waste and converts it to energy. It is hoped the systems will efficiently generate its own renewable energy and reduce demand for fossil fuels.

In feedlots and processing plants, opportunities are being developed to harness the energy from solid waste and methane and use it to supplement energy needs on site. Pilot projects are showing promising progress in this area.

Energy use

In meat processing plants, benchmarks and best practice models for achieving target energy reductions have been established. A number of projects and pilots are underway to find alternative energy sources and new ways to reduce energy consumption.

Waste management

Waste from red meat production is generally in the form of solid waste (excrement) and waste water. On-farm, all waste is naturally recycled into the soils. In feedlots and processing plants, the industry is minimising and re-using waste.

Research is under way to explore further alternatives for waste water and develop solutions that exploit the synergies between waste management and energy generation.

Using waste water for aquaculture

A project underway is investigating using abattoir waste water in aquaculture. An integrated biosystem treats abattoir effluent through a series of stages:

- nutrient is removed form the liquid by growing algae
- the algae becomes feed for zooplankton
- the zooplankton becomes feed for fish fingerlings that are the basis for sustainable aquaculture.

The system has potential for fishmeal and ornamental fish supplies and, when health and perception issues are satisfied, for edible fish supply.

Continuous improvement

A life cycle analysis project is currently underway that will provide whole of chain data. This research is evaluating impacts of conventional indicators including:

- Water use
- Energy use
- Greenhouse gas emissions
- Waste

The results will provide science-based evidence of the industry's position in an Australian context, will provide a benchmark for continuous improvement, and will inform future work. Results from the research will be published when they become available in late 2008 or early 2009.

Summary

The challenge of climate change affects us all. So too does the world's growing need for high quality protein.

As custodians of a very large proportion of our land mass, Australia's pastoralists have particular responsibilities as well as a major opportunities. On behalf of all Australians, they must manage their environment in responsible and sustainable ways while producing high quality protein efficiently and effectively. By understanding the unique Australian context and supporting their efforts, we can all help make a difference.

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