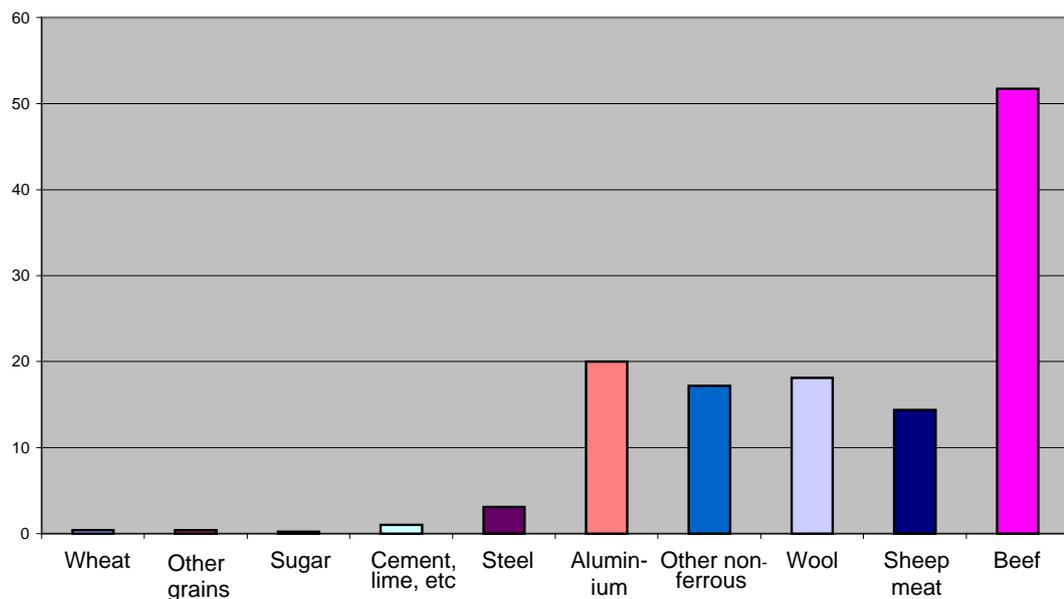


SOME KEY IMPACTS OF LIVESTOCK PRODUCTS ON THE ENVIRONMENT

“Livestock are one of the most significant contributors to today’s most serious environmental problems. Urgent action is required to remedy the situation.” Henning Steinfeld, United Nations Food & Agriculture Organization, 2006¹

Greenhouse Gas Emissions:

- Based on a 20-year GWP (i.e. global warming potential)ⁱ, livestock in Australia produce more CO₂-equivalent emissions than all our coal-fired power stations combined.²
- Even using a 100-year GWP (which can understate livestock’s impact):
 - The greenhouse gas (GHG) emissions intensityⁱⁱ of carcass beef in Australia is around 2.5 times that of our aluminium smelting.³ To put that into perspective:
 - aluminium smelting consumes around 16% of Australia’s electricity⁴;
 - the emissions intensity of aluminium smelting in Australia is around twice the global average due to the fact that around 90% of the electricity used is generated by coal-fired power stations^{5 & 6}; and
 - our annual tonnage of beef production is around 10% higher than that of aluminium.^{7 & 8}

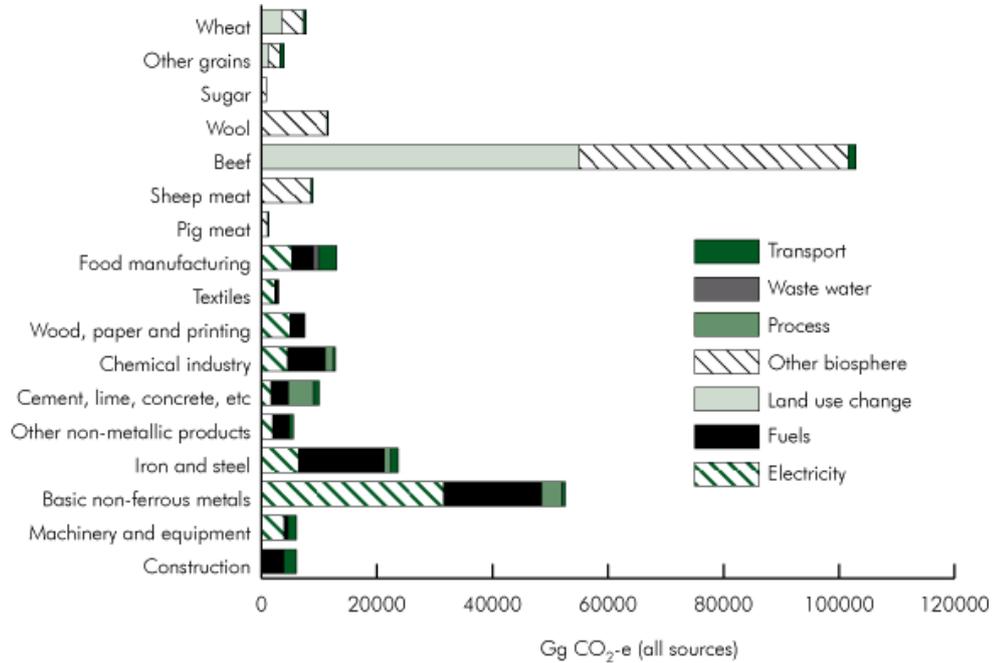


Greenhouse gas emissions intensity of various commodities in Australia

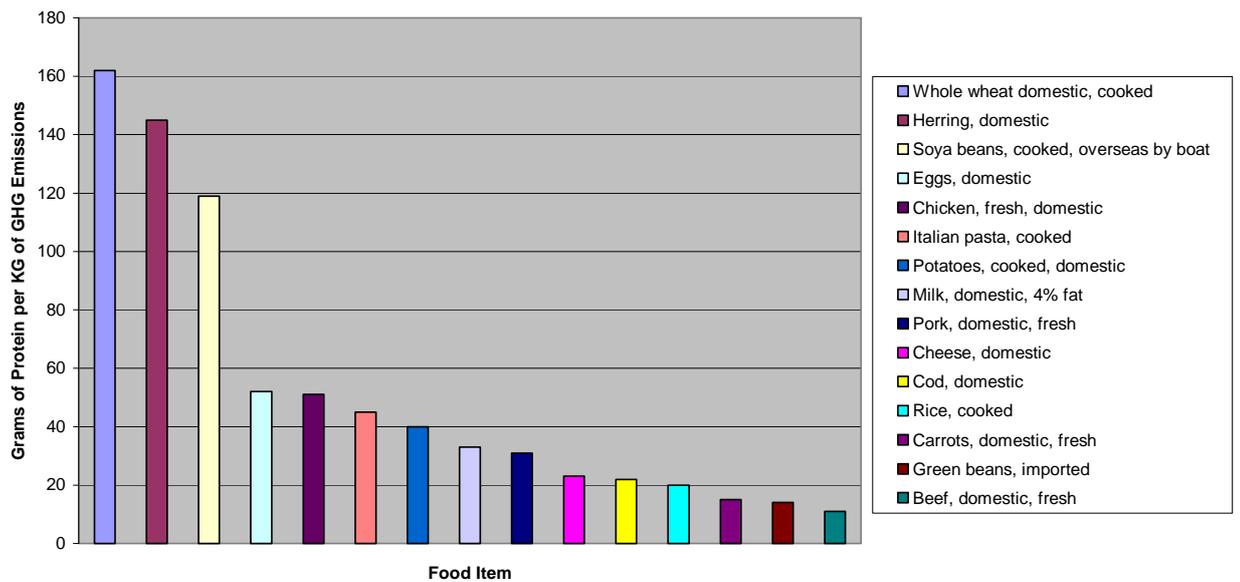
ⁱ The emissions of different gases can be aggregated by converting them to carbon dioxide equivalents (CO₂-e). They are converted by multiplying the mass of emissions by the appropriate global warming potentials (GWPs). GWPs represent the relative warming effect of a unit mass of the gas when compared with the same mass of CO₂ over a specific period. For methane, the GWPs used by the UN’s Intergovernmental Panel on Climate Change (IPCC) are 21 for 100 years and 72 for 20 years. The UN Food & Agriculture Organization used a GWP of 23 for the 100 year time horizon in its 2006 “*Livestock’s Long Shadow*” report.

ⁱⁱ Emissions intensity measures the tonnes of CO₂-equivalent greenhouse gases per tonne of commodity produced.

- In absolute terms, GHG emissions in Australia from beef alone are nearly double those of all non-ferrous metals (including aluminium), as depicted in the following chart.⁹

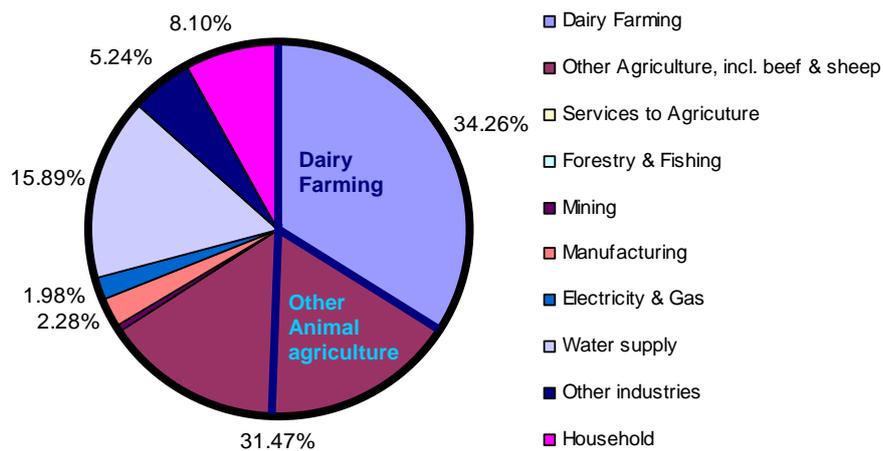


- Converting from a typical Western diet to a plant-based diet is 50% more effective in reducing GHG emissions than changing one's car from a conventional sedan to a hybrid.¹⁰
- The livestock sector produces around 40% more GHG emissions than the entire global transport system.¹¹
- Per kilogram of GHG emissions produced, carrots have more protein than beef. By the same measure, wheat has around thirteen times and soy beans around ten times more protein than beef, as demonstrated by the following chart:¹²



Water Consumption:

- The beef and dairy industries consume nearly three times more water than all Australia's towns and cities combined.
- According to the CSIRO, it takes as much water to produce the steaks for a family barbeque (5 people x 200g steak) as the water contained in a very large (50,000 litre) backyard swimming pool.¹³
- According to UNESCO, beef requires nearly five times more water to produce than rice.¹⁴ (This is a more conservative finding than the CSIRO's finding referred to in the previous point.)
- It takes 1,000 litres of water to produce one litre of cow's milk.¹⁴
- 90% of most people's water is consumed in the food they eat, with most of that being in animal-based products.¹⁵
- A person can save over 900,000 litres of water per annum on a plant-based diet (helping to save some of Australia's great rivers, their associated wetlands and the Murray-Darling "food bowl"), compared to 20,000 litres by taking 4 minute showers with a 3-star shower head.^{15 & 16}
- Direct household consumption accounts for only 8% of Victoria's water use, whilst dairy farming alone (largely through the flood irrigation of pasture for cattle) accounts for 34% and animal agriculture as a whole 51%.^{17 & 18}



Water Pollution:

- The UN's Food & Agriculture Organization has reported that livestock is probably the largest sectoral source of water pollution globally, contributing to eutrophication (*unwanted increase in plant density*), "dead zones" in coastal areas, degradation of coral reefs, human health problems, emergence of antibiotic resistance and many others.¹¹
- The grazing of around 4.5 million cattle in the Great Barrier Reef Catchment has caused widespread soil erosion, resulting in sediments, fertilizers and pesticides entering the Great Barrier Reef World Heritage Area.¹⁹
- The clearing of vegetation for livestock and other agricultural production is also a major contributor to the salinity problems in Australian land areas and waterways.
- As of 1997 in the United States, around 130 times more animal waste was being produced than human waste, roughly 5 tons for every U.S. citizen.^{iii&20}

ⁱⁱⁱ Animal waste generally refers to manure but also includes wastewater, urine, bedding, poultry litter, and animal carcasses.

- Whilst the much-publicized 1989 Exxon Valdez oil spill in Alaska dumped 12 million gallons of oil into Prince William Sound, the relatively unknown 1995 New River hog waste spill in North Carolina poured 25 million gallons of excrement and urine into the water.²¹

Deforestation and Land Degradation:

- For any given area of agricultural land: (a) wheat, corn and rice produce between 15 and 19 times the gross energy output (joules) of beef;²² and (b) soy beans provide 18 times the amount of high quality protein, containing all the essential amino acids.²³
- The grossly inefficient nature of livestock as a food source generates ever increasing pressure to destroy forests and utilise the land for grazing or feed crop production. For example, as of 2006, 70 percent of previously forested land in the Amazon was occupied by pastures, whilst feedcrops were covering a large part of the remainder.¹¹ The destruction is continuing.
- Consumption of cattle and sheep products contributes to critical land degradation. Cattle and sheep are introduced species that devastate our land, which has not evolved to cope with them, often creating desert and/or preventing reforestation.²⁴
- A warming climate and droughts reduce the moisture content of forests and greatly increase the likelihood and consequences of destructive forest fires.

“. . . compared to its economic performance, the environmental impacts of the livestock sector are not being adequately addressed, despite the fact that major reductions in impact could be achieved at reasonable cost.

The problem therefore lies mainly with institutional and political obstacles, and the lack of mechanisms to provide environmental feedback, ensure that externalities are accounted for and embed the stewardship of common property resources into the sector.

Why is this so? First, civil society seems to have an inadequate understanding of the scope of the problem. Perhaps even among the majority of environmentalists and environmental policy makers, the truly enormous impact of the livestock sector on climate, biodiversity and water is not fully appreciated.”

“Livestock’s Long Shadow”, United Nations Food & Agriculture Organization, November 2006

What you can do:

- Consume fewer livestock products, particularly beef, lamb, dairy and wool.
- Inform others.

What Governments can do:

- In regard to those factors within their control, ensure that all relevant costs (including environmental costs) are incorporated in the price of water and agricultural products.
- Inform the community, so that consumers can make informed decisions.

The above measures by government would assist markets to operate efficiently, which should surely be the aim of all governments.

Paul Mahony
Black Rock, Victoria, Australia
July, 2010

References

- ¹ “Livestock a major threat to environment”, FAO Newsroom , 29 November, 2006, <http://www.fao.org/newsroom/en/news/2006/1000448/index.html> (accessed 25 July, 2010)
- ² Brook, Prof. Barry and Russell, Geoff, “Meat’s Carbon Hoofprint”, Australasian Science, Nov/Dec 2007, pp. 37-39, <http://www.control.com.au/bi2007/2810Brook.pdf> (accessed 27 June, 2010)
- ³ George Wilkenfeld & Associates Pty Ltd and Energy Strategies, National Greenhouse Gas Inventory 1990, 1995, 1999, End Use Allocation of Emissions Report to the Australian Greenhouse Office, 2003, Volume 1, Table S5, p. vii, <http://www.energyrating.gov.au/library/pubs/2003-endusereport-volume1.pdf> (accessed 27 June, 2010)
- ⁴ Hamilton, C, “Scorcher: The Dirty Politics of Climate Change”, (2007) Black Inc Agenda, p. 40
- ⁵ Turton, H. “The Aluminium Smelting Industry Structure, market power, subsidies and greenhouse gas emissions”, The Australia Institute, Discussion Paper Number 44, January 2002, ISSN 1322-5421, p. ix, https://www.tai.org.au/documents/dp_fulltext/DP44.pdf (accessed 16 July 2010)
- ⁶ Turton, H. “Greenhouse gas emissions in industrialised countries Where does Australia stand?”, The Australia Institute, Discussion Paper Number 66, June 2004, ISSN 1322-5421, p. viii, https://www.tai.org.au/documents/dp_fulltext/DP66.pdf (accessed 16 July 2010)
- ⁷ Knapp, Ron, Australian Aluminium Council, Letter 10 April 2008 to Prof Ross Garnaut, Garnaut Climate Change Review (Table 3), [http://www.garnautreview.org.au/CA25734E0016A131/WebObj/D0846236ETSSubmission-AustralianAluminiumCouncil/\\$File/D08%2046236%20ETS%20Submission%20-%20Australian%20Aluminium%20Council.pdf](http://www.garnautreview.org.au/CA25734E0016A131/WebObj/D0846236ETSSubmission-AustralianAluminiumCouncil/$File/D08%2046236%20ETS%20Submission%20-%20Australian%20Aluminium%20Council.pdf) (accessed 27 June, 2010)
- ⁸ Australian Bureau of Statistics, “Report 7215.0 – Livestock Products Australia”, Dec 2006, p. 10 [http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/AA5A6237A0AFC944CA257281001AD8F0/\\$File/72150_de c%202006.pdf](http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/AA5A6237A0AFC944CA257281001AD8F0/$File/72150_de c%202006.pdf) (accessed 27 June, 2010) and Australian Bureau of Statistics, “Report 7215.0 – Livestock Products Australia”, Dec 2010, p. 9 [http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/EF041893F402DA3ACA2577220016701B/\\$File/72150_mar ch%202010.pdf](http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/EF041893F402DA3ACA2577220016701B/$File/72150_mar ch%202010.pdf) (accessed 27 June, 2010)
- ⁹ George Wilkenfeld & Associates Pty Ltd and Energy Strategies, National Greenhouse Gas Inventory 1990, 1995, 1999, End Use Allocation of Emissions Report to the Australian Greenhouse Office, 2003 (Figure S2, p. vi and Figure 7.7, p. 111), <http://www.energyrating.gov.au/library/pubs/2003-endusereport-volume1.pdf> (accessed 27 June, 2010)
- ¹⁰ Eshel, Asst Prof Gidon and Martin, Asst Prof Pamela, University of Chicago, cited in “It’s better to green your diet than your car”, New Scientist, 17 Dec 2005, Issue 2530, p. 19
- ¹¹ Food and Agriculture Organization of the United Nations, 2006 “Livestock’s Long Shadow – Environmental Issues and Concerns”, Rome, <http://www.fao.org/docrep/010/a0701e/a0701e00.HTM> (accessed 4 July, 2010)
- ¹² Carlsson-Kanyama, A. & Gonzalez, A.D. “Potential Contributions of Food Consumption Patterns to Climate Change”, The American Journal of Clinical Nutrition, Vol. 89, No. 5, pp. 1704S-1709S, May 2009, <http://www.ajcn.org/cgi/content/abstract/89/5/1704S>
- ¹³ Derived from CSIRO Media Release 97/259 23 December 1997, “Eat The Right Food - And Help Save Australia's Water”, <http://www.csiro.au/communication/mediarel/mr1997/mr97259.htm> (accessed 4 July, 2010) and Mayer, Wayne S., “Water for food – the continuing debate”, undated, http://www.clw.csiro.au/publications/water_for_food.pdf
- ¹⁴ UNESCO, <http://www.waterfootprint.org/> (accessed 4 July, 2010)
- ¹⁵ Ian Rutherford, School of Social and Environmental Enquiry, University of Melbourne, Amelia Tsang and Siao Khee Tan, Department of Civil and Environmental Engineering, University of Melbourne (2007) “City people eat rivers: estimating the virtual water consumed by people in a large Australian city” http://www.csu.edu.au/research/ilws/news/events/5asm/docs/proceedings/Rutherford_Ian_348.pdf (accessed 4 July, 2010)
- ¹⁶ City West Water, “Making Waves”, Edition 32, April-June 2007
- ¹⁷ Australian Bureau of Statistics, Water Account, Australia, 2004-05, 4610.0, Media Release 112/2006, November 28, 2006, <http://www.abs.gov.au/ausstats/abs@.nsf/mediareleasesbyTopic/CF764A3639384FDCCA257233007975B7?OpenDocument#> (accessed 4 July, 2010) and [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/DE8E081CDE6116D6CA25727900069279/\\$File/46100_2004-05_pt2.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/DE8E081CDE6116D6CA25727900069279/$File/46100_2004-05_pt2.pdf) (accessed 4 July, 2010)
- ¹⁸ Australian Bureau of Statistics, Water Use on Australian Farms, 2004-05, 4618.0 [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/22F0E63FEA4A8B63CA2571B500752B52/\\$File/46180_2004-05.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/22F0E63FEA4A8B63CA2571B500752B52/$File/46180_2004-05.pdf) (accessed 4 July, 2010)
- ¹⁹ Australian Government Great Barrier Reef Marine Park Authority, http://www.gbrmpa.gov.au/corp_site/key_issues/water_quality/agriculture (accessed 3 July 2008)

-
- ²⁰ Senate Committee on Agriculture, Nutrition and Forestry Minority Staff: “*Animal Waste Pollution in America: An Emerging National Problem*”, Dec.1997, cited in United States General Accounting Office Report to Hon. Tom Harkin, Ranking Minority Member, Committee on Agriculture, Nutrition & Forestry, US Senate, “Animal Agriculture Waste Management Practices”, July, 1999, <http://www.gao.gov/archive/1999/rc99205.pdf>, (accessed 2 July, 2008)
- ²¹ Motavelli, J.,“The Case Against Meat”, E Magazine, 3 January 2002, <http://www.emagazine.com/view/?142&src=&src=>, (accessed 4 July, 2010)
- ²² Spedding CRW 1990 in Lewis b, Assmann G (eds) Social & Economic contexts of coronary prevention, London: Current Medical Literature, cited in http://www.eatwelltas.org.au/PDFs/sustainability_and_diet.pps#334,69,the balanced diet (accessed 4 July, 2010)
- ²³ U.S. Department of Agriculture and Protein Advisory Group of the UN FAO, World Health Organization and UNICEF, cited in Compassion in World Farming Trust, “*The Global Benefits of Eating Less Meat*” (2004), p. 23 http://www.ciwf.org.uk/includes/documents/cm_docs/2008/g/global_benefits_of_eating_less_meat.pdf (accessed 19 September, 2009) and USDA Nutrient Data Laboratory, http://www.ars.usda.gov/main/site_main.htm?modecode=12-35-45-00 and via Nutrition Data at <http://www.nutritiondata.com> (accessed 19 September, 2009)
- ²⁴ Singer, P & Mason, J, “*The Ethics of What We Eat*” (2006), Text Publishing Company, pp. 215 & 216