

Meat Thy Maker

A study called "Healthy Planet Eating" hit the UK headlines recently with its finding that lowering meat consumption could significantly reduce deaths from heart disease, cancer and strokes, as well as help protect natural resources (Thomas et al. 2010). The state of the world's ecosystems was a recurring theme of many of the lectures of Module A1 (see for example Rhydwen 2010); it is clear that urgent action is needed in order to mitigate the effects of climate change. Could that also include wholesale changes to the food we eat and how it is produced?

This paper discusses the impact of industrialised livestock production, finding that it makes a significant contribution to global habitat degradation. It concludes that the livestock sector must be the focus of worldwide environmental legislation and that a price must be put on the ecological damage caused by large-scale industrial farming. This will increase the cost of meat produced by such methods, resulting in ecologically sound practices becoming more feasible for many farmers. There will be significant health benefits too because the price of meat will inevitably increase. It will then become something of a luxury item and where there is over consumption, less will be eaten. However, where industrial livestock systems are prevalent, government policies must not simply focus on market led solutions; they must also encourage thriving rural communities that promote biodiversity. Science has an important role to play too; not as a tool to increase profits, but rather to research productive farming practises that are of benefit to the natural world.

Livestock's Impact

In 2006, "Livestock's Long Shadow" looked at the ecological impact of an industry that produced 229 million tonnes of meat and 580 million tonnes of milk in 1999/01 (Steinfeld & Food and Agriculture Organization of the United Nations 2006):

- 20% of the world's animals are livestock.
- 70% of all agricultural land and 30% of the planet's land surface is given over to livestock production.
- 70% of previous forested land in the Amazon is occupied by pastures, and feed crops cover a large part of the remainder that has been lost.
- 30% of the land that livestock now inhabit was once habitat for wildlife. This is a factor in a loss of species estimated to be running 50 to 500 times higher than background rates found in the fossil records.
- The livestock sector is responsible for 18% of greenhouse gas emissions (measured in CO₂ equivalent). This is a higher share than transport.
- 37% of anthropogenic methane, 65% of nitrous oxide and 64% of ammonia emissions are produced by livestock. These are significant contributors to acid rain and the acidification of ecosystems.
- 8% of global human water use is used by the livestock sector, mostly for the irrigation of feed crops.
- In the US, with the world's fourth largest land area, livestock are responsible for an estimated 55% of erosion and sediment, 37% of pesticide use and 50% of antibiotic use.
- Livestock farming creates 33% of the nitrogen and phosphorus that seeps into

freshwater resources and ultimately ends up filtering into the oceans.

Those figures show that livestock production is a major contributor to our most pressing ecological problems: deforestation, acid rain, dead zones in the ocean, land degradation, water pollution, species extinction and global warming.

Fast Food

The latter half of the 20th Century saw the introduction of industrialised livestock production; large-scale farming systems that cut costs by feeding vast numbers of cattle in one location (Wikipedia 2010c). Michael Pollan describes one such system in a damning 2002 article for the New York Times. He concludes that beef production is culpable for many of the issues detailed in “Healthy Planet Eating” and “Livestock’s Long Shadow” (Pollan 2002).

Cattle are ruminants, highly specialized animals with multi-compartmented stomachs that allow them to thrive on a diet of high-fibre bulky grasses. Such an animal takes 5 years to reach the size suitable for slaughter, but large-scale industrialised farms have sped up the whole process through a combination of large quantities of grain, protein supplements and drugs (including growth hormones and antibiotics). The result is that a bullock now reaches the required size in just 14 months. Pollan describes this as “fast food indeed”; cattle have been translated into a high volume, low margin product requiring mass consumption:

“[a modern cattle ranch] is indeed a factory, transforming cheap raw materials into a less-cheap finished product, as fast as bovinely possible” (Pollan 2002)

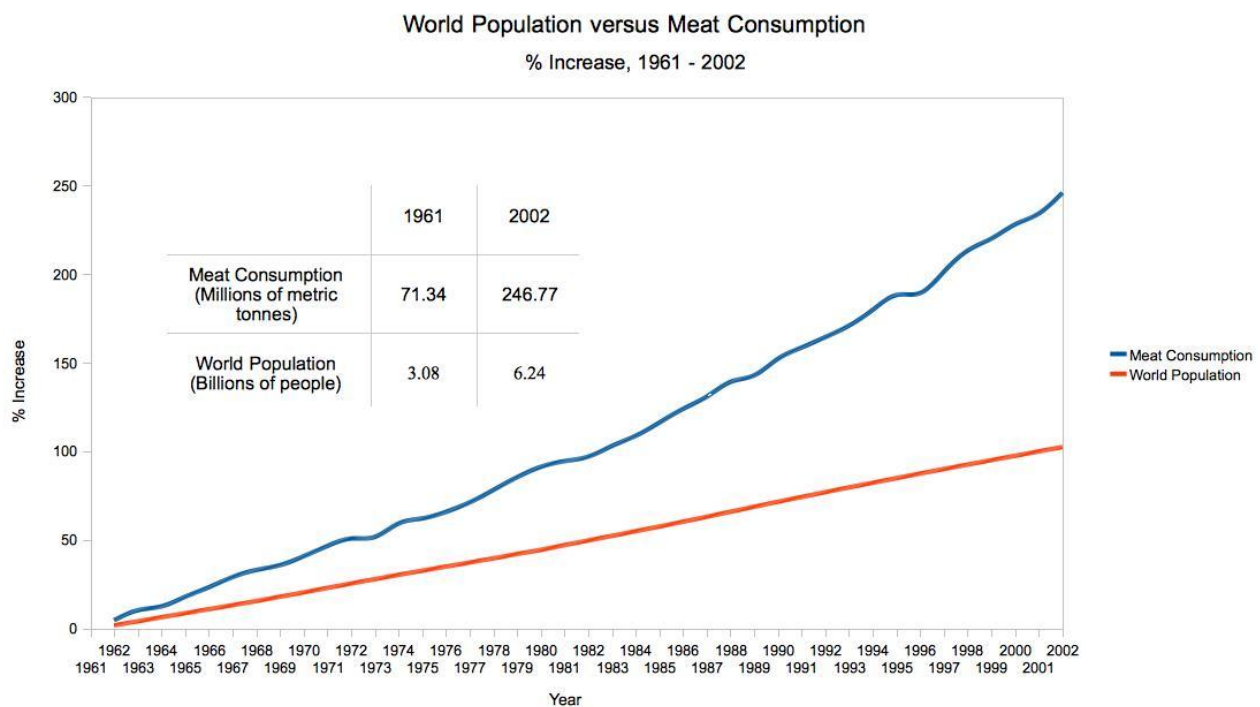


Figure 1: Source - FAO

Indeed, Figure 1 shows that the amount of meat consumed during the industrialisation of livestock production has risen nearly fourfold, whilst the global population has 'only' doubled.

Blake Hurst, an industrialised livestock farmer from Missouri, defends his methods by saying that "we can't change nature" and that the harsh reality of farming as nature intended is that it can result in natural disasters too. He cites an example of his neighbour losing 4000 turkeys to drowning and says that critics of the modern meat production system do not understand such realities. He suggests that only industrial farming can produce cheap food that satisfy the demands of an increasing population and that any changes to his current industrialised methods will be driven by the markets:

"Farmers can raise food in different ways if that is what the market wants" (Hurst 2009)

Tyler Cohen, an American economist, agrees that market forces must drive the requirements of industrialised livestock production and argues that critics often ignore the 'macro perspective' required to properly understand the global food markets:

"Society uses markets, prices, and formal accounting precisely because a narrative is as likely to mislead us about social costs as not. Markets may require tinkering, but to make that judgment, let us put down that hoe and pick up a price-theory textbook." (Cowen 2006).

The True Cost

However, in his 2004 book "So Shall We Reap", Colin Tudge writes that it is precisely this economic outlook that is responsible for all the health and ecological problems. Treating farms like any other business means that their principle aim becomes to supply wealth, rather than feeding the people. In so doing, science is kidnapped for commerce, not the common good and often at the expense of the environment (Tudge 2004). Pollan argues that the cheap food produced by farms such as Hurst's does not reflect the true cost of meat, laying much of the blame on the grain that's used as cattle feed. He believes there's a hidden public health expense due to issues such as food poisoning by new strains of E. coli, which is often found in the cattle's manure as a consequence of feeding them on foods they were not designed to eat. The authors of "Healthy Planet Eating" would agree and could cite the deaths caused by people eating too much of this 'cheap meat'.

Then there's the ecological cost that "Livestock's Long Shadow" says is disregarded:

"Most frequently natural resources are free or underpriced, which leads to overexploitation and pollution. Often perverse subsidies directly encourage livestock producers to engage in environmentally damaging activities" (Steinfeld & Food and Agriculture Organization of the United Nations 2006)

Much of the environmental damage detailed in that report is caused by oil derived products like herbicides and fertilisers - more of these are used in the production of feed grains than any other crop. Pollan asked David Pimentel, a Cornell ecologist who specializes in agriculture and energy, to quantify the oils used in modern meat production; assuming an average bullock eats 25 pounds of grain a day and reaches a weight of 1,250 pounds, he

will have consumed roughly 284 gallons of oil in his lifetime. To put that in context, the SMART Fortwo Coupe is capable of doing 85.6 miles to the gallon (What Green Car 2010), so the fuel used to produce a carcass of industrialised beef is almost equivalent to driving that car around the equatorial circumference of the globe. Pollan laments that we have transformed a solar-powered ruminant into a fossil-fuel powered machine. That's not ideal in a world trying to avoid uncontrollable climate change due to the burning of such fuels.

Hurst argues that his use of herbicides has actually had an environmental benefit as it has removed the need for tillage (the agricultural preparation of the soil by ploughing, ripping, or turning) and that this 'no-till' policy has resulted in much less soil erosion. Yet the use of herbicides was rejected by Masanobu Fukuoka, a Japanese natural-philosopher-farmer who was one of the pioneers of no-till farming. Fukuoka found that the best forms of cultivation mirror nature's own laws (Fukuoka 2009). Over 30 years of practice he refined his so called 'do-nothing' method that did not rely on ploughing or tilling, chemical fertilisers, pesticides, weeding, pruning, machinery or compost. Yet the yields from his crops were equivalent to those produced either by traditional or chemical agriculture (Varughese 1997).

Putting a Price on Nature

Humankind flourished for thousands of years on traditional farming methods that did not rely on oil based chemicals. Indeed, farmers such as Fukuoka have demonstrated that there are approaches that can be productive, as well as ecologically sound. Yet the developed world (as defined by Wikipedia 2010b) relies upon industrialised livestock methods that are causing wide-scale environmental damage. This needs addressing with some urgency. "Livestock's Long Shadow" agrees, and concludes that the industry should be a primary driver of global environmental policy simply because it has considerable potential to provide significant solutions to our most pressing ecological problems:

"[the livestock industry] should be a major policy focus when dealing with problems of land degradation, climate change and air pollution, water shortage and water pollution and loss of biodiversity" (Steinfeld & Food and Agriculture Organization of the United Nations 2006)

Farming policy must ensure that natural resources are priced appropriately, since their cost is often ignored, leading to exploitation. As an example, at the time of writing a beef carcass is fetching £2.70 per Kg in the UK (Hunt 2010), which means that a 1,250 lbs (568 Kg) animal costs £1533.60. If it effectively takes 284 gallons to produce the feed for that carcass (as the Cornell ecologist suggests), then at the current pump price of £1.20 per litre (£5.46 per gallon), the fuel to produce that carcass costs £1550.64 alone. The discrepancy is partly due to the improper pricing of feed and therefore legislation should include reform of the government subsidies that are given to producers of livestock feed crops in many regions worldwide (Wikipedia 2010a). Once health and environmental costs are properly factored into the equation, Hurst and Cohen will get the market-based solution they suggest will drive change. That's because beef produced by industrial systems will simply become too costly, making planet-friendly methods much more attractive to farmers. In turn, meat will become more expensive, transforming it into something of a luxury item and people who consume too much, will eat less. That's just what "Healthy

Planet Eating” calls for in order to reduce deaths.

However, where industrial livestock systems are the norm, market led policies cannot be relied upon to drive change alone. After all, Tudge argues that it is the livestock industry's focus on commerce that has resulted in many of the problems in the first place. So policy must also put farming back on a sound biological footing, encouraging biodiversity. The UK's Royal Society for the Protection of Birds (RSPB) agree. They want legislation that drives sustainable farming practices that contribute to a thriving rural economy, helping to provide safe, healthy, affordable food that protects and enhances a rich ecology (The RSPB 2010). Similarly, the Friends of the Earth (FoE) want governments of the developed world to look at measures that reduce the impact of the livestock industry and promote the health and environmental benefits of a lower-meat diet. Where Tudge says science has been kidnapped in the name of commerce, FoE suggest it should be used in the name of more environmentally friendly farming practices:

“[the FoE] recommend to direct research and technical development towards agricultural practices that follow organic standards or are otherwise environmentally less destructive and are nevertheless able to achieve high yield levels” (Erb et al. 2009)

Limitations and Further Research

This paper has focused upon the problems of industrialised meat production and has not looked in-depth at the feasibility of alternatives. Are the proposals of The RSPB and methods of farmers such as Fukuoka scalable to the extent that they offer a sustainable solution to global food supply? That's an area of research worth pursuing, as are the practicalities of pricing environmental damage. How does one put a cost on water pollution and land degradation? Also beyond the scope of this paper are the reasons for government subsidies given to livestock producers. Why are feed crops subsidised in many regions around the world (Wikipedia 2010a)?

There are numerous other interesting research topics in this area. For example, the health concerns regarding our current levels of meat consumption and education initiatives to lower it, the impact of a growing population on farming practises, the moralities of large-scale industrialised livestock production and the regional disparities regarding the amount of meat eaten throughout the world (figure 2).

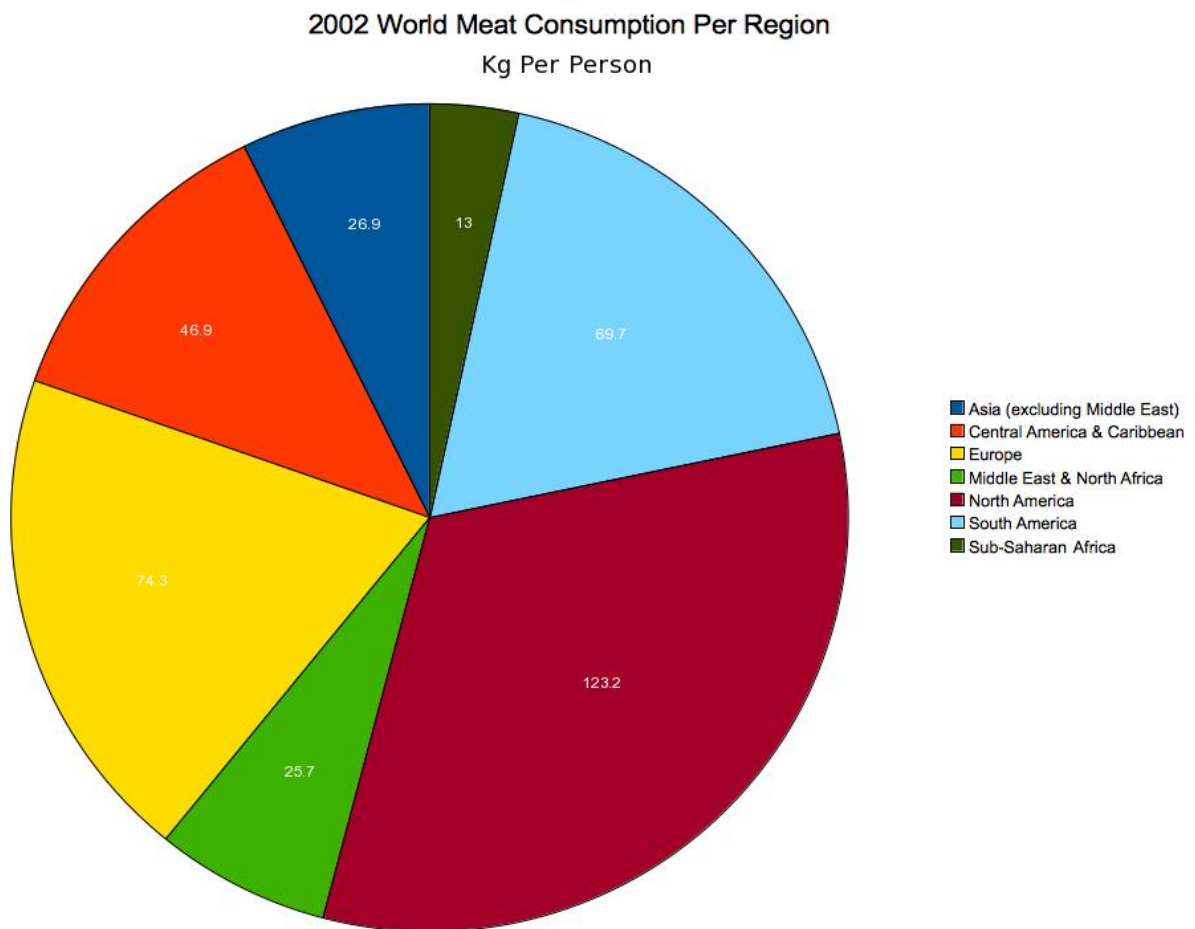


Figure 2: Source - FAO

Age-old Wisdom

In the preface to a 1911 book that has influenced Permaculture (a movement that uses natural patterns to integrate raising crops and animals with careful water management (Wikipedia 2010d)), Dr. L. H. Bailey warned that farming must learn to conserve natural resources (King 2004). A Chinese book of wisdom that is thousands of years old, the Tao Te Ching (Wikipedia 2010e), predicts the consequences of doing otherwise:

*“In harmony [with the Tao],
the sky is clear and spacious,
the earth is solid and full,
all creature flourish together,
content with the way they are,
endlessly repeating themselves,
endlessly renewed.*

*When man interferes [with the Tao],
the sky becomes filthy,
the earth becomes depleted,*

*the equilibrium crumbles,
creatures become extinct.”*
(Laozi & Mitchell 2009)

“Livestock's Long Shadow” shows us that modern livestock production ignores such age-old wisdom. Indeed, it is one of the chief causes of the sky becoming filthy, the earth becoming depleted, the equilibrium crumbling, and creatures becoming extinct. The message is clear - we need to quickly implement worldwide policy agreements that promote productive farming practices, recognising the importance of a thriving rural community to the natural world. Furthermore, science should be used to research high-yield livestock production methods that do not trash the environment. At stake is not just the health of the world's population, but the ecological systems upon which everything on our planet depends.

References

Cowen, T., 2006. Can You Really Save The Planet at the Dinner Table? An economist's critique of The Omnivore's Dilemma. *Slate Magazine*. Available at: <http://www.slate.com/id/2152675> [Accessed October 30, 2010].

Erb, K. et al., 2009. Eating the Planet: Feeding and fuelling the world sustainably, fairly and humanely – a scoping study.

Fukuoka, M., 2009. *The one-straw revolution : an introduction to natural farming*, New York: New York Review Books.

Hunt, J., 2010. Beef farmers need to know what the market wants. *Farmers Weekly Interactive*. Available at: <http://www.fwi.co.uk/Articles/2010/03/15/120336/Beef-farmers-need-to-know-what-the-market-wants.htm> [Accessed November 1, 2010].

Hurst, B., 2009. The Omnivore's Delusion: Against the Agri-intellectuals. *The American, A Magazine of Ideas*. Available at: <http://www.american.com/archive/2009/july/the-omnivore2019s-delusion-against-the-agri-intellectuals> [Accessed October 30, 2010].

King, F., 2004. *Farmers of forty centuries : organic farming in China, Korea, and Japan* Dover ed., Mineola N.Y.: Dover Publications.

Laozi & Mitchell, S., 2009. *Tao te ching*, London: Frances Lincoln Limited.

Pollan, M., 2002. Power Steer. *The New York Times Magazine*. Available at: <http://michaelpollan.com/articles-archive/power-steer/> [Accessed October 30, 2010].

Rhydwen, R., 2010. Climate Change.

Steinfeld, H. & Food and Agriculture Organization of the United Nations, 2006. *Livestock's long shadow : environmental issues and options*, Rome: Food and Agriculture Organization of the United Nations.

The RSPB, 2010. The RSPB: Agricultural Policy. *The RSPB: Farming*. Available at: <http://www.rspb.org.uk/ourwork/farming/policy/index.aspx> [Accessed November 5, 2010].

Thomas, P. et al., 2010. Healthy Planet Eating. How lower meat diets can save lives and the planet.

Tudge, C., 2004. *So shall we reap : what's gone wrong with the world's food - and how to fix it*, London: Penguin.

Varughese, S., 1997. An article on the pioneer of organic farming, Masanobu Fukuoka. *Life Positive*. Available at: <http://www.lifepositive.com/body/nature/fukuoka-organicfarming.asp> [Accessed October 30, 2010].

What Green Car, 2010. SMART fortwo coupe Manual Transmission Auto 5-speed fortwo coupe cdi Softip 15in rear wheels [2011]. *What Green Car*. Available at: http://www.whatgreencar.com/view-car/27851/SMART-fortwo_coupe [Accessed October 30, 2010].

Wikipedia, 2010a. Agricultural subsidy. *Wikipedia, the free encyclopedia*. Available at: http://en.wikipedia.org/wiki/Agricultural_subsidy [Accessed November 1, 2010].

Wikipedia, 2010b. Developed country. *Wikipedia, the free encyclopedia*. Available at: http://en.wikipedia.org/wiki/Developed_country [Accessed November 8, 2010].

Wikipedia, 2010c. Feedlot. *Wikipedia, the free encyclopedia*. Available at: <http://en.wikipedia.org/wiki/Feedlot> [Accessed October 30, 2010].

Wikipedia, 2010d. Permaculture. *Wikipedia, the free encyclopedia*. Available at: <http://en.wikipedia.org/wiki/Permaculture> [Accessed October 30, 2010].

Wikipedia, 2010e. Tao Te Ching. *Wikipedia, the free encyclopedia*. Available at: http://en.wikipedia.org/wiki/Tao_Te_Ching [Accessed October 31, 2010].