

THE TRUE IMPACT OF ANIMAL AGRICULTURE ON THE ENVIRONMENT

BY: JUDE L. CAPPER, PH.D., 2014

A famous proverb states “we do not inherit the earth from our ancestors, we borrow it from our children.” The global population currently comprises over seven billion people and is predicted to rise to over nine billion by the year 2050 (U.S. Census Bureau, 2000). We will not have any extra land, water or fossil fuels in the future, indeed, we will have fewer resources for food production as the population increases, due to competition for housing and urban development. The question therefore arises as to how we should ensure that our children and grandchildren have the same access to food that we currently enjoy?

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Many activist groups opposed to animal agriculture contend that we should adopt a vegetarian or vegan diet in order to “save the planet”, however, these claims are often based on inaccurate calculations. In 2006, the Food and Agriculture Organization of the United Nations produced the report “Livestock’s Long Shadow”, which stated that livestock contribute 18% of global greenhouse gas (GHG) emissions (FAO, 2006). Although this statistic seemed to support the suggestion that we should eliminate meat from our diets, the report was soundly debunked by Pitesky et al. (2009), and the FAO authors subsequently admitted that the 18% figure was an overestimate (Black, 2010).

In the USA, we consume an average of 1,221 lb of animal-source foods (including milk, meat, fish and eggs) per year (FAO, 2013), yet claims for a significant reduction in GHG emissions through reduced meat consumption appear to be over-exaggerated. The US Environmental Protection Agency (EPA) reports that meat production contributes 2.1% of annual GHG emissions (US EPA, 2012). If all of the USA’s 314 million inhabitants removed meat from their diet for one day per week, the annual reduction in national GHG emissions would be equal to 0.30% (Capper, 2013b). Population-wide reductions in meat consumption would also require additional sources for the many by-products from animal agriculture, including leather, fertilizer, fats, fibers and pharmaceuticals.

Activist groups use consumer-friendly metrics to imply that consumption of meat and dairy products is environmentally unsustainable. A series of demonstrations across the world by People for the Ethical Treatment of Animals (PETA) exhibited two naked women in a bath, emblazoned with the slogan “50 baths = 1 steak. Clean your conscience: go vegan”. However, such water use claims are often exaggerated, with flawed assumptions behind the models involved. For example, an article in National Geographic magazine (2010) indicated that beef had a water use of 1,857 gal/lb, far higher than pork (152 gal/lb), chicken (34 gal/lb) or apples (2.6 gal/lb). The methodology behind the calculations was comprehensive, yet the assumptions relating to beef production were representative of an extensive, low-productivity system (with animals taking three years to grow to a finishing weight of 948 lb) rather than the highly-efficient U.S. system, in which an average animal is raised to a finishing weight of 1,338 lb in 15 months (Croney et al., 2012). Less efficient systems obviously confer greater resource use and GHG emissions (Capper, 2012), therefore given these flawed assumptions, it is not surprising that the 1,857 gallons of water statistic is considerably higher than the 441 gallons per lb of U.S. beef reported by Beckett and Oltjen (1993) in a peer-reviewed, scientific paper.

Continuous improvements in efficiency have allowed U.S. farmers and ranchers to considerably reduce resource use and GHG emissions over the past century. Compared to 1944, U.S. dairy producers use 77% less feed, 90% less land, 65% less water and have achieved a 63% reduction in the carbon footprint per gallon of milk (Capper et al., 2009). Similarly, the modern U.S.

beef industry uses 19% less feed, 12% less water, 33% less land and has a 16% lower carbon footprint than production systems characteristic of the 1970's (Capper, 2011a). Pork producers in the U.S. use 67% less feed than they did in 1959, with concurrent reductions in water use (41%), land use (22%) and carbon footprint (35%) (Cady et al., 2013); and the resources used to produce one dozen eggs have been cut considerably (74% less feed, 68% less water and 69% less energy) since 1960 (Xin et al., 2013).

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Globally, U.S. livestock production is among the most efficient in the world, and this efficiency reduces environmental impact compared to other regions. For example, dairy production accounts for approximately 2.7% of the global carbon footprint, with average GHG emissions of 2.4 lb CO₂-eq/lb milk (FAO, 2010), yet significant regional variation exists with emissions ranging from 1.3 lb CO₂-eq/lb milk in North America (average milk yield per cow of 19,621 lb/y) to 7.5 lb CO₂-eq/lb milk in sub-Saharan Africa (average milk yield per cow of 661 lb/y).

A popular argument for converting to a vegetarian or vegan diet is that human food requirements could be met simply shifting the grains currently fed to livestock to human food (Pimentel and Pimentel, 2003). Such theories are accompanied by claims that it takes 20 or even 30 lb of grain to produce a lb of beef (Palmquist, 2011). Biologically, such feed conversion efficiencies are implausible – the average feedyard-finished beef steer has a feed conversion ratio of approximately 7.8 (Arthur et al., 2001) and corn only accounts for 7% of the total feed used to produce a unit of U.S. beef (Capper, 2011a).

Globally, over 7 billion acres of pastureland are used to raise livestock, yet only a small proportion of grazed pasturelands are suitable for food crop production due to terrain, water or nutrient restrictions. Pasturelands also maintain habitats for many bird, animal and insect species that would be lost if converted to cropland. By-products from the food and fiber industries (including fruit, vegetables, oilseeds, protein meals, bakery products and candy) also play significant roles in feeding livestock. Gill (1999) estimated that 37 lb of by-product feeds for livestock are produced from every 100 lb of plants grown for human food – what would be the environmental consequences of diverting these human-inedible by-products to landfill if they weren't eaten by livestock? Furthermore, as 30% of all food purchased in the USA is discarded by the consumer, making a concerted effort to reduce food waste could significantly reduce environmental impacts.

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A perception exists that “natural” ruminants (e.g. free-roaming bison, elk or deer) have a neutral or positive effect on the environment, compared to farmed livestock. However, annually, each free-roaming bison is estimated to emit GHG equivalent to driving 4,777 miles in an average sedan car (Capper, 2013a). It is also worth noting that the 60 million bison that formerly roamed the Northern Great Plains had an annual carbon footprint approximately double that of the 2007 U.S. dairy industry (Capper, 2011b).

All foods have an environmental impact - it is disingenuous to single out animal agriculture as being solely responsible. Without livestock operations, many by-products from food and fiber production would be wasted; and fragile ecosystems within pastureland would be destroyed in order to grow foods on land that's currently unsuitable for crop production. To maintain food and resource availability for future generations, it is essential to continue the tradition of continuous improvement within animal agriculture that has reduced environmental impact over time, and to consider the additional areas where considerable reductions can be made.



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