

Animal Agriculture & Climate Change



THE HUMANE SOCIETY
OF THE UNITED STATES

According to a 2006 report by the Food and Agriculture Organization (FAO) of the United Nations, the livestock sector emits more greenhouse gases than cars and SUVs.

Greenhouse Gas Emissions. The animal agriculture sector is responsible for 18% of greenhouse gas emissions, measured in carbon dioxide (CO₂) equivalent, higher than the share contributed by cars, trucks, and sport utility vehicles. This figure accounts for the livestock sector's direct impacts as well as the impacts of feeding the world's approximately 56 billion farm animals.¹ Specifically, animal agriculture accounts for:

- 9% of annual human-induced CO₂ emissions,²
- 37% of methane (CH₄) emissions, which has more than 20 times the global warming potential of CO₂,³ and
- 65% of nitrous oxide (N₂O) emissions, which has almost 300 times CO₂'s global warming potential.⁴

Mapping has shown a strong relationship between excessive nitrogen in the atmosphere and the location of intensive farm animal production areas.⁵ In the U.S., the primary greenhouse gases emitted by agricultural activities are methane and nitrous oxide.⁶ Globally, the U.S. is responsible for the greatest emissions of methane from farm animal manure, nearly 1.9 million tons.⁷ The majority of these emissions emanate from pig and dairy cow manure, from which methane emissions increased by 37% and 50%, respectively, between 1990 and 2005. The EPA attributes this increase to the shift toward housing pigs and cows in larger facilities where liquid manure management systems are increasingly used.⁸ During the same 15-year period, nitrous oxide emissions rose by 10%, an increase attributed to the poultry industry's shift toward litter-based manure management systems, confinement in high-rise houses, and an overall increase in the U.S. poultry population.⁹

Farm Animal Waste. As animal agriculture intensified over the last 50 years, more animals have been intensively confined in fewer, but larger, operations. Today, 10 billion land animals are raised for meat, eggs, and milk annually in the U.S.,^{10,11} typically warehoused by the tens if not hundreds of thousands in industrialized production facilities known as factory farms.¹² The USDA estimates that confined farm animals generate approximately 500 million tons of manure annually, three times more raw waste than generated by Americans.¹³

Feed. The production of animal feed—mainly high protein and concentrated feeds made from corn and soybeans—requires large amounts of chemical fertilizer. Animal production accounts for a very significant portion of total fertilizer use—more than half of the global corn crop is used for animal feed.¹⁴ Corn uses more nitrogen fertilizer than any other crop, while other feed crops, including barley and sorghum, also use significant amounts. In total, experts estimate that fertilizer used in feed production contributes “an estimated annual emission of CO₂ of more than 40 million tonnes.”¹⁵

Energy Use Varies by Type of Production System. Massive, enclosed factory farms (also known as confined animal feeding operations, or CAFOs) use a great deal of energy for lighting, heating, cooling, automated machinery for feeding and watering, and ventilation. In addition, to produce feed for farm animals, the combined fossil fuel for machinery and energy use for seed and the production of herbicides and pesticides usually exceeds that of fertilizer production. On-farm fossil fuel use may emit as much as 90 million tonnes* of carbon dioxide per year alone.¹⁶ Production systems that rely on grasslands or crop residues for feed, on the other hand, usually have very low or even negligible fossil fuel use.

Deforestation. According to the FAO, deforestation for livestock production is responsible for 2.4 billion tonnes of CO₂ per year.¹⁷ A 2004 Center for International Forestry Research (CIFOR) report stated that the total area of forest lost increased from 41.5 million hectares in 1990 to 58.7 million hectares in 2000. In just ten years, an area twice the size of Portugal was lost, most of it to pasture for farm animal production.¹⁸ In June 2005, the FAO predicted that by 2010, more than 1.2 million hectares of forest in Central America and 18 million hectares in South America will disappear due, in large part, to clearing land for grazing cattle.¹⁹

* One tonne is one metric ton, or 1,000 kilograms.

Food for Thought. An article published in *The Lancet* in 2007 advocates a reduction in meat consumption to 90 grams per person per day in order to stabilize greenhouse gas emissions from this sector.²⁰ (A single beef hamburger patty is 80 to 100 grams.²¹) “For the world’s higher-income populations,” the authors write, “greenhouse-gas emissions from meat-eating warrant the same scrutiny as do those from driving and flying.” Yet, while consumers are willing to pay extra for cars that run on ethanol, biodiesel, or electricity to combat global warming, there has been less awareness of animal agriculture’s impacts on climate change. The FAO calls for action on many fronts, “recommend[ing] a range of measures to mitigate” the environmental assault by animal agriculture, including:²²

- **Land degradation:** Restore damaged land through soil conservation, better management of grazing systems, and protection of sensitive areas.
- **Greenhouse gas emissions:** Improved animal nutrition and manure management to cut methane and nitrogen emissions.
- **Water pollution:** Better management of animal waste in industrial production units, better diets to improve nutrient absorption, improved manure management and better use of processed manure on croplands.
- **Biodiversity loss:** As well as implementing the measures above, improve protection of wild areas, maintain connectivity among protected areas, and integrate livestock production and producers into landscape management.

The Humane Society of the United States, the nation’s largest animal advocacy organization representing 1 in 30 Americans, calls for an additional, critical action each one of us can and must take:

- **Reduce:** Every hour in the U.S., one million land animals are killed for human consumption. If each one of us cuts back on our animal consumption by only 10%, approximately one billion animals would be spared a lifetime of suffering each year and the impacts of industrialized animal agriculture would be diminished.
- **Refine:** Not all foods are equal when it comes to animal welfare or their environmental footprint. Each industry has its own abusive practices, and some are much crueler than others. For example, the chicken, egg, and pork industries tend to be far more abusive to animals than the beef industry, and extensive systems, such as free-range, are typically much more environmentally friendly than industrialized factory farms that confine tens if not hundreds of thousands of animals at a single facility. Refining your diet by avoiding conventional factory-farm products helps diminish animal suffering and protect the environment.
- **Replace:** The consequences of choosing vegetarian options are enormous—not only for farm animals, but for public health and environmental integrity.

¹ Food and Agriculture Organization of the United Nations. FAOSTAT Statistical Database. faostat.fao.org. Accessed August 27, 2007.

² Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M, and De Haan C. 2006. *Livestock’s long shadow: environmental issues and options* (Rome: Food and Agriculture Organization of the United Nations, p. xxi). virtualcentre.org/en/library/key_pub/longshad/A0701E00.pdf.

³ Ibid.

⁴ Ibid.

⁵ Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M, and De Haan C, op. cit., p. 114.

⁶ U.S. EPA. 2007. *Inventory of U.S. greenhouse gas emissions and sinks: 1990-2005*, p. 6-1. www.epa.gov/climatechange/emissions/downloads07/07CR.pdf.

⁷ Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M, and De Haan C, op. cit., pp. 97-8.

⁸ U.S. EPA, *Inventory of U.S. greenhouse gas emissions and sinks: 1990-2005*, p. 6-7.

⁹ Ibid.

¹⁰ USDA NASS. 2007. *Poultry slaughter: 2006 annual summary*. usda.mannlib.cornell.edu/usda/current/PoulSlauSu/PoulSlauSu-02-28-2007.pdf.

¹¹ USDA NASS. 2007. *Livestock slaughter: 2006 annual summary*. usda.mannlib.cornell.edu/usda/current/LiveSlauSu/LiveSlauSu-03-02-2007.pdf.

¹² U.S. EPA Emission Standards Division. 2001. *Emissions from animal feeding operations*, draft, p. xi. August 15.

www.epa.gov/ttn/chief/ap42/ch09/draft/draftanimalfeed.pdf.

¹³ U.S. EPA. *National pollutant discharge elimination system permit regulation and effluent limitation guidelines and standards for concentrated animal feeding operations (CAFOs)*; Final Rule, 68 Fed. Reg. 7176, 7180 (Feb. 12, 2003).

¹⁴ Ibid., p. 87.

¹⁵ Ibid., p. 88.

¹⁶ Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M, and De Haan C, op. cit., pp. 88-9.

¹⁷ Ibid., p. 90.

¹⁸ Kaimowitz D, Mertens B, Wunder V, and Pachebo P. 2004. *Hamburger connection fuels Amazon destruction: cattle ranching and deforestation in Brazil’s Amazon*. (Bogor, Indonesia: Center for International Forestry Research).

¹⁹ Food and Agriculture Organization of the United Nations. 2005. *Cattle ranching is encroaching on forests in Latin America*. Press release issued June 8.

²⁰ McMichael AJ, Powles JW, Butler CD, and Uauy R. 2007. *Food, livestock production, energy, climate change, and health*. *Lancet* 370:1253-63.

²¹ Ibid.

²² Food and Agriculture Organization of the United Nations, Agriculture and Consumer Protection Department. 2006. *Spotlight: livestock impacts on the environment*. *Agriculture* 21, November. www.fao.org/ag/magazine/0612sp1.htm.