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HSI Fact Sheet

The Impact of Animal Agriculture on the Environment and Climate Change in Brazil

The intensification of farm animal production in industrialized agricultural systems, or factory farms, compromises animal welfare¹ and degrades the environment.² Animal agriculture inefficiently consumes natural resources,³ contributes to deforestation,⁴ and produces immense quantities of animal waste, threatening water and air quality⁵ and contributing to climate change.⁶ The Food and Agriculture Organization (FAO) of the United Nations estimated in 2006 that animal agriculture was responsible for 18% of global, anthropogenic, or human-induced, greenhouse gas emissions⁷ and was “by far the single largest anthropogenic user of land.”⁸

Factory Farming in Brazil

Over 67 billion land animals were raised globally for human consumption in 2008,⁹ and global meat and milk production are projected to approximately double between 1999 and 2050.¹⁰ Brazil is the world’s largest meat exporter¹¹ and 2009 statistics show that its cattle herd is the largest in the world at over 200 million animals.¹² Per capita meat consumption nearly doubled in Brazil between 1980 and 2005,¹³ and Brazilian beef production and exports were expected to rise by 3% in 2010 compared to 2009.¹⁴

Farm animal operations are industrializing in developing nations,¹⁵ with rapidly increasing demand for meat and milk driving this industry transformation.¹⁶ Unlike pasture-based or mixed farming systems, today’s concentrated farm animal production facilities, or **factory farms**, often confine tens of thousands of animals in factory-like facilities.¹⁷ These operations are becoming more widespread throughout the world, and can bring along devastating environmental consequences.¹⁸ According to the FAO, industrial systems now produce approximately two-thirds of the world’s poultry meat and eggs, and more than half of all pork.¹⁹ In fact, “[i]n recent years industrial livestock production has grown at twice the rate of more traditional mixed farming systems and at more than six times the rate of production based on grazing.”²⁰

At the same time, there is increasing standardization and consolidation of production in developing countries through vertical integration, in which the retailer contracts with suppliers and/or processors, as well as full integration, in which all units in the food chain are owned by one company.²¹ This evolution includes the animal agriculture sector²² and is present in Latin America, where there is a trend towards vertical integration. For example, 40% of Brazil’s market for broiler chickens is supplied by just four integrators.²³ In Brazil’s dairy industry, the number of milk producers fell by approximately 23% between 2000 and 2002, while maintaining the same volume of milk production.²⁴ This consolidation may have deleterious effects on rural farmers, as it often “eliminates open market competition and drives down prices paid to growers.”²⁵ Small farmers that try to directly compete with large animal agribusiness are at risk of being pushed out of the market because they lack the political and economic power of the larger companies, or the ability to exploit economies of scale.²⁶

Not only is farm animal production becoming consolidated in developing countries, the facilities themselves are becoming more geographically clustered.²⁷ In Brazil, these high levels of geographical concentration can be seen in the pork and poultry industries. For example, in 1992, 78% of Brazil’s hen population resided in only 5% of the country’s area; in 2001, this number grew to 85%, while occupying the same total land area.²⁸ Over the same time period, Brazil’s pig population rose from 45% to 56% on only 5% of the country’s area.²⁹ This geographical concentration of farm animal production can cause significant air and water pollution.³⁰

The Environmental Threat of Animal Agriculture

In 2006, the FAO published “Livestock’s Long Shadow: Environmental Issues and Options,” its landmark report assessing the impacts of animal agriculture. The FAO concluded that “the livestock sector emerges as one of the top two or three most significant contributors to the most serious environmental problems, at every scale from local to global.”³¹ With global meat and milk production expected to approximately double within the next 50 years, the FAO cautions that the “environmental impact per unit of livestock production must be cut by half, just to avoid increasing the level of damage beyond its present level.”³²

Farm Animal Waste

Much of the environmental damage caused by factory farms, in which each farm may confine up to hundreds of thousands of animals,³³ is due to the volume and content of animal waste, and the consequent challenges of storage and disposal.³⁴ In fact, “[o]ne animal facility with a large population of animals can easily equal a small city in terms of waste production.”³⁵

Mixed farming systems connect the animal agriculture activity to the crops.³⁶ On these systems farmers balance the number of animals with the land’s ability to absorb the nutrients in their manure. Factory farms confine large numbers of animals on a disproportionately small land area, breaking this link between crop production and animal husbandry.^{37,38} In particularly high production areas, this has resulted in factory farms producing more manure than can be assimilated by available land,³⁹ causing environmental damage.⁴⁰

Factory farm animal waste, which is stored in lagoons or pits,⁴¹ contains chemical contaminants as well as numerous pathogens.⁴² Potentially contaminating water, soil, and air, factory farms typically spray minimally treated or untreated waste on fields.⁴³ Manure storage lagoons can also overflow.⁴⁴ Pathogens from the manure may end up in surface water, and nutrients such as nitrogen and phosphorous can leach into groundwater and run off of fields.⁴⁵ Waste storage and application also emit carbon dioxide, hydrogen sulfide, ammonia, methane, and particulates into the atmosphere.⁴⁶ Nitrogen can also volatilize into ammonia emissions⁴⁷ that are then redeposited into waterways.⁴⁸ In fact, according to the FAO, “[t]he livestock sector... is probably the largest sectoral source of water pollution, contributing to eutrophication, ‘dead’ zones in coastal areas, degradation of coral reefs, human health problems, emergence of antibiotic resistance and many others.”⁴⁹

In part to promote growth, farm animals are given large amounts of antibiotics and other drugs,⁵⁰ and consequently, produce manure that includes these drug residues.^{51,52} Because the animal’s digestion does not degrade all of the drugs, antibiotic and other drug residues are excreted into the environment and have been found to contaminate ground, surface, and tap water.⁵³ According to the World Health Organization, “[a] growing body of evidence establishes a link between the use of antimicrobials in food-producing animals and the emergence of resistance among common pathogens.”⁵⁴

In addition to antibiotics and other drugs, heavy metals are added to animal feed.⁵⁵ Animals are capable of absorbing only 5 to 15% of these toxic metals,⁵⁶ and increased feed conversion efficiency results in manure and slurry with an even higher concentration of metals than the enriched feed.⁵⁷ Applying factory farm manure degrades the environment because the metals can accumulate in the soil, and potentially poison plants and animals.⁵⁸

Deforestation

Nearly one-third (31%) of the earth’s land is covered by forests,⁵⁹ which act as net carbon sinks, releasing less carbon than they store.⁶⁰ In fact, the world’s forests retain about 289 billion tonnes of carbon.⁶¹ Deforestation causes approximately 17% of the world’s human-induced GHG emissions, by releasing stored carbon into the atmosphere.⁶²

Pasture expansion for livestock is a key driver of deforestation, especially in Latin America, and it is estimated that “some 70 percent of previously forested land in the Amazon is used as pasture, and feed crops cover a large part of the remainder.”⁶³ Since the 1970s, Brazil, in particular, has suffered extensive deforestation in its Amazon region for cattle ranching.⁶⁴ The FAO estimates that 16.9 million hectares of the Legal Amazon were deforested from 2000 through 2008.⁶⁵ Between 1990 and 2002, Brazil’s cattle population located in the Amazon expanded from approximately 18% to 31%, which represents 80% of Brazil’s total cattle herd growth during this period.⁶⁶ A World Bank paper found that in 2004 “[c]attle ranching enterprises...[occupied] nearly 75 percent of the deforested areas of Amazonia.”⁶⁷ With this in mind, it is no surprise that cattle ranching is the main contributor to deforestation in the Brazilian Amazon.⁶⁸

Soybean production for animal feed is another emerging cause of rainforest destruction.^{69,70} According to a 2006 FAO report, the cultivation of soybean and corn for animal feed contributes to the clearing of forests in Brazil and Latin America.⁷¹ Over 97% of global soymeal production is fed to animals used in agriculture, and during the last four decades of the 20th century, over 60% of the corn and barley crop were also fed to these animals.⁷² Globally, soybean production increased rapidly in recent decades, and expanding production is currently due to demand for animal feed.⁷³ A 2010 study of Amazonian deforestation during the years 2000–2006 concluded that “even if the proximate cause of deforestation was mainly ranching, it is likely that soy cultivation is a major underlying cause.”⁷⁴

Deforestation contributes to environmental degradation, including loss of biodiversity, soil degradation, and water pollution.⁷⁵ In Brazil, Amazon deforestation emits more CO₂ than any other source.⁷⁶

Greenhouse Gas Emissions (GHGs) and Climate Change

The FAO estimated in 2006 that animal agriculture is responsible for 18% of global, anthropogenic GHGs.⁷⁷ The animal agriculture sector is one of the most important sectors for policies aimed at immediate and swift reductions in humans’ climate impacts.⁷⁸

Essentially every part of the animal production chain pollutes the air or contributes to climate change.⁷⁹ The sector emits significant amounts of three of the most important GHGs: carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).⁸⁰ In fact, globally the farm animal sector accounts for:

- 9% of human-induced CO₂ emissions⁸¹
- 35–40% of human-induced CH₄ emissions,⁸² which has 25 times the global warming potential (GWP), or power, of CO₂ over 100 years,⁸³ and
- 65% of human-induced N₂O emissions,⁸⁴ which has about 300 times the GWP of CO₂.⁸⁵

CO₂: Carbon dioxide emissions from this sector are produced through nitrogen fertilizer production for feed, on-farm fossil fuel use, deforestation to make way for grazing and animal feed production (~2.4 billion tonnes), and pasture desertification,⁸⁶ which can result from overgrazing by farm animals.⁸⁷ An estimated 41 million tonnes of CO₂ are emitted from fertilizer production for feed crops each year.⁸⁸ Brazil, alone, emits 1.69 million tonnes of CO₂ per year from fossil fuel use in the production of nitrogen fertilizer for feed.⁸⁹

CH₄: Enteric fermentation and manure management are the key causes of animal agriculture’s methane emissions.⁹⁰ Enteric fermentation, which is microbial fermentation that takes place in the digestive systems of ruminant animals, such as cattle, sheep, and buffalo,⁹¹ accounted for 63.2% of Brazil’s methane emissions in 2005.⁹² Globally, this process accounts for 25% of animal agriculture’s total GHG emissions.⁹³ Manure is responsible for the remaining portion of methane emissions from farm animals⁹⁴ and accounts for approximately 5% of animal agriculture’s GHG emissions.⁹⁵

N₂O: The farm animal sector also is responsible for the majority of the world’s human-induced nitrous oxide emissions.⁹⁶ Nitrous oxide emissions from animal agriculture originate primarily from manure and fertilizer for feed crops,⁹⁷ and contribute approximately 31% of animal agriculture’s GHG emissions.⁹⁸

Conclusion

Mitigating the animal agriculture sector's significant yet underappreciated role in climate change and environmental problems is vital for the health and sustainability of the planet, and its human and nonhuman inhabitants. As “the single largest anthropogenic user of land”⁹⁹ and responsible for an estimated 18% of human-induced GHG emissions,¹⁰⁰ the farm animal production sector must be held accountable for its many deleterious impacts, and changes in animal agricultural practices must be achieved. Individually, incorporating environmentally sound and animal welfare-friendly practices into daily life, including a reduction in meat, milk, and egg consumption, can reduce our environmental impact.

Humane Society International (HSI) calls for critical actions each of us can and should take:

Reduce: A shift towards plant-based foods can achieve GHG reductions. By making flexitarian, vegetarian, and vegan lifestyle choices, each of us can reduce our environmental impact.^{101,102}

Refine: Refining the diet by switching to higher-welfare animal products helps diminish animal suffering and protect the environment.

Replace: The consequences of replacing animal products with healthy vegetarian options are enormous—not only for farm animals, but for public health and environmental integrity as well.

Humane Society International (HSI) and its partner organizations together constitute one of the world's largest animal protection organizations — backed by 11 million people. For nearly 20 years, HSI has been fighting for the protection of all animals through advocacy, education, and hands-on programs. Celebrating animals and confronting cruelty worldwide — On the web at hsi.org.

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