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The Animal Feed Industry's Impact on the Planet

Teaser: The diet of factory-farmed animals is linked to environmental destruction around the globe.

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[Article Body:]

In some parts of the continental United States, you might drive through a nearly unchanging landscape for hours. Stretching for miles and miles, vast swaths of soil are dedicated to growing crops—corn, grains, fruits, and vegetables that make up the foundation of our food system.

The process seems highly efficient, producing enormous quantities of food every year. But only a small percentage of these crops will go toward feeding humans. According to a 2013 [study](#) conducted by researchers at the Institute on the Environment at the University of Minnesota and published in the journal Environmental Research Letters, a mere 27 percent of crop calorie production in the United States actually feeds humans. So what

happens to the rest?

Some crops are [used](#) for the production of ethanol and other biofuels. But the vast majority—more than [67 percent](#) of crop calories grown in the U.S.—are used to feed animals raised for human consumption.

Rather than feeding people, these crops feed the billions of chickens, cows, pigs, and other animals who live and die on factory farms. And that’s a problem.

The issue is that feeding humans indirectly—essentially, making animals the caloric middlemen—is a highly inefficient use of food. “For every 100 calories of grain we feed animals, we get only about 40 new calories of milk, 22 calories of eggs, 12 of chicken, 10 of pork, or 3 of beef,” [writes](#) Jonathan Foley, PhD, executive director of the nonprofit [Project Drawdown](#), for National Geographic. “Finding more efficient ways to grow meat and shifting to less meat-intensive diets... could free up substantial amounts of food across the world.”

This shift in growing and consuming food more sustainably has become especially important, with up to 783 people [facing hunger](#) in 2022, according to the United Nations. Research indicates that if we grew crops [exclusively for humans](#) to consume directly we could feed an additional 4 billion people worldwide.

Farming has always loomed large in American politics, history, and identity. But the idyllic farming we may imagine—rich piles of compost, seedlings poking through the soil, and flourishing gardens of diverse fruits and vegetables—has transformed into [factory farming](#), a highly industrialized system far removed from earth and soil. Animal feed is essential for the sustenance of this industry—supplying the cattle feedlots, broiler chicken sheds, and egg factories that increasingly make up the foundation of our food system.

What Factory-Farmed Animals Eat

Take a moment to picture a farm animal enjoying dinner. Are you imagining a cow grazing on grass or perhaps a chicken pecking at the ground, foraging for seeds and insects? In today’s factory farming system, the “feed” these animals eat is far removed from their natural diets. Rather than munching on grass or insects, most animals on factory farms eat some type of animal feed—a cost-effective mixture of grains, proteins, and often the addition of antibiotics designed to make them [grow as quickly as possible](#).

The ingredients in animal feed don’t just matter to the animals’ health. They also impact human health—especially since the average American [consumes 25 land animals](#) yearly. Researchers have noted that animal feed ingredients are “[fundamentally important](#)” to human health impacts. As author and journalist Michael Pollan [puts it](#): “We are what we

eat, it is often said, but of course that's only part of the story. We are what what we eat eats too.”

So, what are the main ingredients used in animal feed today?

Corn and Other Grains

In 2019, farmers planted [91.7 million acres](#) of corn in the U.S. This equals 69 million football fields of corn. How can so much land be devoted to a single crop—especially something many people only eat on occasion?

The answer is that corn is [in almost everything](#) Americans [eat today](#). It's just there indirectly—in the form of animal feed, corn-based sweeteners, or starches. The U.S. is the world's [largest](#) producer, consumer, and exporter of corn. And a large percentage of all that corn is [used](#) for animal feed, supplying factory farms across the country.

While “cereal grains”—such as barley, sorghum, and oats—are also used for animal feed, corn is by far the [number one feed grain](#) used in the U.S., accounting for more than [96 percent](#) of total feed grain production. Corn supplies the carbohydrates in animal feed, offering a rich energy source to increase animals' growth.

Unfortunately, what this system offers in efficiency it lacks in resilience. Numerous researchers have expressed concern about the vulnerability of the food supply that is so reliant on a single crop. “Under these conditions, a single disaster, disease, pest, or economic downturn could [cause a major disturbance](#) in the corn system,” notes Jonathan Foley in another article for Scientific American. “The monolithic nature of corn production presents a systemic risk to America's agriculture.”

Soybeans

When you think about soybeans, you might imagine plant-based foods like tofu and tempeh. However, the vast majority of soybeans are used for animal feed. Animal agriculture uses [97 percent](#) of all soybean meal produced in the United States.

While corn is rich in carbohydrates, soybeans are the [world's largest source](#) of animal protein feed. Similar to corn, Americans might not eat a lot of soybeans in the form of tofu, tempeh, and soy milk—in fact, 77 percent of soy grown globally is used to feed livestock, and only 7 percent of it is [used directly](#) for human consumption, states a 2021 Our World in Data article—but they do consume soy indirectly through animal products like meat and dairy.

Soy production comes at a high cost to the environment. It is heavily linked to deforestation, [driving the destruction](#) of forests, savannahs, and grasslands—as these natural ecosystems are converted to unnatural farmland—and “putting traditional, local

livelihoods at risk.” Critical habitats, like the Cerrado savannah in Brazil, are being razed to clear space for soybean production to meet the global demand for animal feed. [More than half](#) of the Cerrado’s 100 million hectares of native landscape has already been lost, with livestock and soybean farming being major contributors to this destruction.

“Most soybean-driven land conversions in Brazil have happened in the Cerrado,” [said](#) Karla Canavan, vice president for commodity trade and finance at World Wildlife Fund, in 2022. “The corridor [Cerrado] is like an inverted forest that has enormous roots and is a very important carbon sink. ... Unfortunately, more than 50 percent of the Cerrado has been already converted into soybean farmlands.”

It’s a common misconception that plant-based soy products like tofu drive global deforestation. In reality, the vast majority of soy is [used](#) for animal feed. To fight this tragic habitat destruction, it’s far more effective to replace meat with soy-based alternatives.

Animal Protein and Waste

Editor’s note: The following section contains graphic descriptions that may disturb some readers.

It’s not just plants like corn and soybeans that go into animal feed. The factory farming industry has a long history of feeding animals waste and proteins from other animals. In 2014, outrage ensued when an investigation by the Humane Society of the United States [revealed that pig farmers](#) were feeding animals the intestines of their own piglets. At a huge factory farm in Kentucky, workers were filmed eviscerating dead piglets and turning their intestines into a puree that was being fed back to mother pigs.

This wasn’t even an isolated atrocity. The executive director of the [American Association of Swine Veterinarians](#) in 2014 commented that the practice was “[legal and safe](#)” and was meant to immunize the mother pigs against a virus called porcine epidemic diarrhea, according to the New York Times. Pigs aren’t the only animals who are effectively turned into cannibals by the factory farming industry.

Farmers were only prohibited from [feeding](#) cow meat to other cows following concerns about bovine spongiform encephalopathy (BSE), more commonly known as mad cow disease. The U.S. Department of Agriculture [notes on its website](#) that BSE may have been caused by feeding cattle protein from other cows. The practice was [banned in 1997](#)—but, notably, only because of the risks to human health and not out of concern for the cows.

Antibiotics

Another key ingredient in animal feed likely doesn’t come to mind when you think about

animal nutrition. This ingredient is antibiotics, [commonly used](#) in the food given to animals across the country.

On factory farms, animals are confined in extremely crowded, filthy facilities—the perfect conditions for spreading illness and disease. Not only do antibiotics allow animals to survive the conditions in these facilities but they also [encourage animals](#) to grow unnaturally large and fast. Drugs are administered through food and water, starting when the animals are just a few days old.

The meat industry’s excessive antibiotic use has directly been linked to [antimicrobial resistance](#) (AMR), a massive threat to human health. As bacteria are killed off, the surviving that remain gradually learn how to survive the attacks, becoming resistant to antibiotics over time.

AMR means that conditions that should be easy and affordable to treat—like ear infections—can become life-threatening. It’s “one of today’s biggest threats to global health, food security, and development,” according to the World Health Organization, [states](#) a News-Medical article, and it’s [projected](#) to kill four times as many people per year as COVID-19 did in 2020, according to the British Society for Antimicrobial Chemotherapy.

Additives and Preservatives

Along with the mixture of corn, soybeans, and a cocktail of antibiotics, animal feed may also contain a plethora of additives and preservatives. The Code of Federal Regulations provides a [long list](#) of additives legally permitted in animals’ food and drinking water. These include “condensed animal protein hydrolysate” (produced from meat byproducts of cattle slaughtered for human consumption), formaldehyde, and petrolatum—to name a few.

Unfortunately, many of these additives and preservatives have been linked to adverse human health impacts. For example, formaldehyde, which is classified as a [known human carcinogen](#) by the National Toxicology Program, is commonly used in animal feed to reduce salmonella contamination. In 2017, following concerns about farmworkers being exposed to the harmful substance, the European Commission [voted to ban feed producers from using formaldehyde](#) as an additive in animal feed.

Animal Feeding Operations

To understand the true impact of animal feed, we must look at animal feeding operations. Of all the animals in our food system today, [99 percent](#) live on factory farms—enormous, vertically integrated operations designed to make as much profit as possible (at the

expense of animals, people, and the environment). The transition to using animal feed has been closely intertwined with the transition to this type of large-scale factory farming.

The official term for a factory farm is [concentrated animal feeding operation](#) or CAFO. As the name implies, these operations are laser-focused on feeding large numbers of animals until they reach “slaughter weight,” after which they are killed and turned into products.

The faster an animal reaches slaughter weight, the more quickly the industry profits. So factory farms have dialed in on the most efficient way to feed animals in the shortest amount of time. Rather than grazing on pasture, animals are confined in stationary cages or crowded sheds and given feed that will increase their growth rates—even while it hurts their health.

Take cows, for example. Along with sheep and other grazing animals, they are known as “ruminants”—because they have a rumen, an organ perfectly designed to transform grass into protein. But the industry feeds cows corn instead of grass because it brings them to “slaughter weight” much faster than grazing. Sadly, this high-starch diet can [disturb](#) a cow’s rumen, causing pain with severe bloat, acidosis (or heartburn), and other types of stomach upset.

When it comes to feeding animals on factory farms these are some key industry terms to know:

- **Growth rates:** This is the rate at which an animal grows or how quickly the animal reaches “slaughter weight.” Sadly, most factory farm animals are bred to grow so quickly that their health suffers. Chickens raised for meat frequently develop bone deformities, muscle diseases like [white striping](#), and heart problems. Many chickens have difficulty walking, or even just standing due to painful lameness as a consequence of their fast growth rate.
- **Feed conversion ratio:** This is the ratio between the amount of feed an animal eats and the amount of body weight that an animal gains. In other words, a feed conversion ratio is the industry’s effort to feed animals as little as possible to make them grow as quickly as possible.
- **Selective breeding:** This is the practice of breeding two animals to produce offspring with a desired trait. For example, the poultry industry breeds birds who quickly develop outsized breast muscles. In the meat industry, selective breeding is generally used to optimize both feed conversion ratio and growth rates.

Animal Feed Industry Impacts

Overall, factory farming is incredibly resource-intensive and [harmful to the environment](#). From agricultural runoff to water waste and pollution, CAFOs are [responsible](#) for some of humanity's worst climate impacts.

“Livestock farms generate about 70 percent of the nation's [United States] ammonia emissions, plus gases that cause global warming, particularly methane,” [according](#) to the Public Broadcasting Service. The practice of growing crops for animal feed is one of the worst drivers of environmental [destruction](#)—leaving biodiversity loss, deforestation, and greenhouse gas emissions in its wake.

Deforestation

Growing crops necessary to feed huge numbers of animals to support human meat consumption requires vast amounts of land, which results in [massive deforestation](#). Forests worldwide are systematically being cleared and replanted with monocrops (such as the corn and soybeans mentioned earlier) to meet the demand for animal products—and therefore, animal feed.

Brazil, for example, is the world's [biggest](#) beef exporter. In the Amazon rainforest—nearly [two-thirds](#) of which is part of Brazil—crops for animal feed are one of the [primary drivers of deforestation](#), damaging an essential habitat for countless species. Deforestation rates have [averaged nearly 2 million hectares](#) yearly since 1995 in the Amazon, or about seven football fields every minute.

Meanwhile, farmland expansion accounts for 90 percent of deforestation worldwide, “including crops grown for both human and animal consumption, as well as the clearing of forests for animal grazing,” according to a July 2022 [article](#) in Sentient Media.

Deforestation eliminates one of our best defenses against climate change as healthy, intact forests provide a crucial ecosystem service: carbon sequestration. Forests safely store more carbon than they emit, making them powerful “[carbon sinks](#)” critical to maintaining a stable climate. When we destroy forests for farmland and other uses, we remove that carbon sink and release all the carbon into the atmosphere that had been stored there.

Biodiversity Loss and Extinction Threat

Naturally, deforestation goes hand in hand with biodiversity loss—of which animal agriculture is also a key driver. A 2021 study found that land use conversions to support the “global food system” are a primary driver of biodiversity loss. Tragically, researchers project that more than 1,000 species will lose at least a quarter of their habitats by 2050 if meat consumption continues at the same rate.

At the [UN Biodiversity Conference \(COP15\)](#) in Montreal in December 2022, delegates

warned that if our land-intensive eating habits don't change, more and more critical species will go extinct. As author and journalist Michael Grunwald [points out](#) in the New York Times: “[W]hen we eat cows, chickens, and other livestock, we might as well be eating macaws, jaguars, and other endangered species.”

Water Use

Along with vast amounts of land, growing crops for animal feed requires [enormous quantities of water](#). In the U.S. alone, more than [60 percent of freshwater](#) was used to grow crops in 2012, and around 2.5 trillion gallons per year of water was used for animal feed in the same year. Corn, soybeans, and the other grains used in animal feed require [about 43 times](#) more water than grass or roughage, which animals could access if they were allowed to graze.

Soil Degradation

The intensive farming practices required to grow vast amounts of crops—like corn and soybeans—even take a toll on the soil.

Healthy soil contains millions of living organisms, which naturally replenish and recycle organic material and nutrients. Soil filters water, stores carbon, and allows for carbon, nitrogen, and phosphorus cycles that are critical for life on Earth.

But intensive farming practices, like growing “monocultures” (huge amounts of one crop like corn or soybeans), can [degrade soil](#) and deplete critical nutrients. Not only do these farming practices prevent soil's natural processes but they can also reduce the amount of carbon stored in soil—a [huge problem in the face of climate change](#). Intensive agriculture, closely intertwined with factory farming, damages the soil beyond repair.

Change Is Possible

The impacts of our animal-based food production system are far-reaching and complex. The intensive farming practices that supply animal feed for factory farms are destroying our water, air, and soil—and harming countless animals raised in food supply chains. But there is hope. It's not too late to build a better food system from the ground up.

The movement to build a healthier food system is growing every day. Around the world, people are advocating for systemic change—from plant-based food options to better treatment of farmed animals. In fact, according to a March 2022 [article](#) in Phys.org, “switching to a plant-based diet in high-income nations would save an area the size of the EU worldwide.” Moreover, if just one person follows a vegan diet, an average of [95 animals](#) will be spared each year, according to the book, *Ninety-Five: Meeting America's Farmed Animals in Stories and Photographs*.

Concerned citizens and consumers can also hold corporations accountable for animal abuse and environmental degradation—by pressuring companies to adopt more sustainable practices. Already, several large meat producers and fast food and supermarket chains have stopped keeping pigs in gestation crates after people expressed “disgust” at the practice. According to [the New York Times](#), “[T]he tide is turning because consumers are making their preferences known.”