

# In Defense of Animal Agriculture

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When I read online media stories that blame animal agriculture for being a large part of the environmental problems we have, it troubles me that people are so far removed from agriculture and food production that they don't realize how connected to nature farmers are. I'm thankful for animal agriculture, from the producers who raise the livestock, to the grain farmers who grow grains and other crops whose byproducts we feed to livestock and companion animals, to the companies who produce, and distribute byproducts, to the feed companies who formulate products so that animals receive the proper nutrition, to the companies and people involved in delivering high-quality animal-based products to consumers around the world. I have often considered speaking up in defense of animal agriculture, because globally protein-energy malnutrition is the largest cause of human deaths; and in 2020, the World Health Organization estimated that more than 149 million children under the age of five were too short for their age, and another 45 million were too thin for their height. In fact, 45% of deaths of children under five years of age are attributed to undernutrition.

The agricultural system in the United States is the most efficient, sustainable food production system in the world, and is looked up to by developing, and developed, countries around the globe. It wasn't, however, something that just happened! In 1862, Justin Smith Morrill's Land-Grant Act was passed to provide affordable, accessible higher education for the children of the working class. Then, in 1887, the Hatch Act was passed to provide public funding for science-based research directed to the needs of farmers in order to provide a plentiful food supply to the burgeoning urban population. This was followed in 1890 with the Second Land-Grant Act, whose purpose was to provide a means for providing affordable, accessible higher education for African-Americans in the then-segregated Southern states. The increase in knowledge gained from research required the dissemination of information, and this was assured in 1914 with the passage of the Smith-Lever Act, which established the Cooperative Extension Service to disseminate the information learned in agricultural research. In the last 108 years, the Cooperative Extension Service, a branch of Land Grant University colleges of Agriculture, which now includes Food and Environmental Sciences, has trained scientists and millions of farmers, young people involved in 4-H, nutritionists, and consumers in everything from vegetable and fruit production to animal production to poultry production, horticulture, plant pathology, crop and soil sciences, agricultural economics, consumer sciences, rural sociology, and agricultural education. In many states, there are county-level Extension agents in agriculture, youth development, and consumer sciences. This network of people providing training on things such as pesticide application, responsible herbicide use, animal welfare, animal production, natural resource management, and food safety is unparalleled in other parts of the world.



As companies are switching to more food items made without animal products, I can't help but think that with fewer Americans involved in food production at the farm level, we are increasing our social challenges in explaining how nature impacts our food supply and our global climate. I am not saying that there is anything wrong with being a vegetarian. In fact, of the 7.8 billion people on earth, approximately 22% are vegetarians; meaning we have approximately 1.7 billion vegetarians around the world. In countries like India, approximately 40% of the population are vegetarians. Unfortunately, many parts of the planet are too dry, rocky, or hilly, or the soil is too poor for crop production. Depending on the definition of "grasslands", approximately 20% to 40% of the earth's land is in grasslands, which when grazed by ruminant animals (cattle, sheep, or goats) they not only provide high-quality protein for human consumption, but also sequester carbon in the grass. In fact, carbon sequestered by grasses goes primarily into the soil, instead of going into the leaves or wood of trees, and is more stable when stored in the soil, as forest fires release the carbon stored in leaves and wood back into the atmosphere ([Link](#)). With a growing world population, providing high-quality animal-derived protein to prevent malnutrition, while simultaneously sequestering carbon, should be viewed as a positive, instead of a detriment to ensuring a sustainable human future.

In the United States, farming and ranching families are less than 2% of the population, and due to our practices which are based on science, each farmer feeds 166 people worldwide; more than any country ([Link](#)). In 2021, even with widespread inflation, U.S. consumers only spent 10.3% of their disposable personal income on food, with 5.2% being spent on food prepared away from home and 5.1% being prepared at home. In contrast, in 1960, 17% of Americans disposable income was spent on food. Increased food production efficiency accounts for this improvement. The low percent of disposable income in the U.S. stands in stark contrast with other countries, many of which spend more than 40% of their household income on food including: Nigeria (58.9%), Kenya (52.2%), Cameroon (45.5%), Kazakhstan (42.8%), Philippines (41.9%), and Pakistan (41.9%). As a result, Americans enjoy a higher standard of living, because we have money left for things other than food and housing. We have a lot to be thankful for, much of it due to these unsung benefits of our agricultural productivity.

Activists often criticize animal production as competing directly with humans for food crops; however, most people do not realize that over 40% of the feeds we use for livestock production are byproducts of other industries. For instance, 45% of our U.S. corn crop now goes to ethanol production so that our vehicles can be driven with less nitrous oxide production. Ethanol production leaves 32 million (M) tons of dried distiller's grains as a waste product, but these are high in fiber and protein. The beef industry uses 13.9 M tons, while dairy production utilizes 7.9 M tons, broiler chickens use 2.8 M tons, egg laying hens consume 1.6 M tons, and pigs eat more than 4.5 M tons. Soy oil is also produced by soybean processing, which produces another byproduct high protein feed, soybean meal and soyhulls which are a great source of fiber (cellulose) which can only be digested by ruminant animals. Each year, beef and dairy cattle consume almost 3.8 M tons of soyhulls; and cattle eat more than 3.4 M tons of soybean meal, whereas chicken production consumes 20 M tons, and pigs use more than 7 M tons. Cotton production produces a byproduct (cottonseed) of which more than 3.2 M tons are fed to beef and dairy cattle. High-fructose corn syrup production leaves behind byproducts as corn gluten feed and corn gluten meal, which are both high protein and high fiber byproduct feeds of which more than 5 M tons are fed. Many other byproducts from many industries, such as potato peels, with the beef industry using more than 437,000 tons ([Link](#)). The impression that all feeds used in modern animal production practices are grown solely for animals, and takes food away from humans is simply incorrect. If vegetable crop production were more profitable and feasible from the standpoints of production requirements, climate and soil in a geographic area, herbicide and pesticide usage, equipment requirements, and labor availability, then farmers would switch their production to those crops. In fact, more than 900 feedstuffs are used in both food animal and companion animal (dog and cat) diets, many of which are byproducts of other industries, and the use of these feeds by animals makes our entire food and energy systems more efficient, reduces the waste stream reaching landfills, and improves sustainability. This should be seen as a positive impact on society.

The U.S. EPA estimates that 27% of greenhouse gases (GHG) come from transportation, 25% from electric power, 24% from industrial production, 13% from residential and commercial sources, and 11% from all of agriculture (including field crops, vegetable, and fruit production). However, beef and dairy cattle, and all other ruminants account for just 3.9% of all greenhouse gases produced in the United States, and Dr. Frank Mitloehner from U.C. Davis found that beef cattle accounted for just 2 percent of direct emissions. In 2020, the U.S. EPA reported that 7% of greenhouse gas production was nitrous oxide and methane was 11%. However, even though we don't hear this on the news, methane comes from sources other than agriculture including the production and transport of coal, natural gas, and oil, and by the decay of organic waste in municipal solid waste landfills ([Link](#)). Another underreported fact is that nitrous oxide is 265 times more potent than carbon dioxide, CO<sub>2</sub>, (the baseline value of one), whereas methane is only 28 times more potent than CO<sub>2</sub>. However, the really scary thing is that fluorinated gases, which are manufactured gases used in refrigerants and air conditioners, aerosols, such as hair care products, and some foam products account for 3% of greenhouse gases, but are 23,500 times more potent than CO<sub>2</sub> ([Link](#)).

Contributions of Major Greenhouse Gases on a Carbon Dioxide Equivalent Basis				
	CO <sub>2</sub> Equivalents	Percentage of All GHG	Multiples of CO <sub>2</sub>	Percent Contribution on a CO <sub>2</sub> Equivalent
Carbon Dioxide	1	79	1	0.001%
Methane	28	11	308	0.424%
Nitrous Oxide	265	7	1855	2.553%
Fluorinated Gases	23500	3	70500	97.022%
Total Multiples of CO <sub>2</sub>			72664	100.000%
Percentage of GHG from: <a href="https://www.c2es.org/content/u-s-emissions/">https://www.c2es.org/content/u-s-emissions/</a>				

It's an increasing human population, and the products we use daily along with the vehicles we drive that are causing global warming. The math is irrefutable, even though the 'news' only reports facts that don't make us uncomfortable about our personal role in climate change, so it is much easier to blame farmers for the food they produce for all of us. However, when put on a percentage basis of CO<sub>2</sub> considering potency, methane only accounts for a little over 0.4% of Green House Gas production. There are no easy answers as a rapidly increasing human population places more stress on the natural resources, including available land, for food production. However, all food production requires inputs that most people don't understand. Sufficient crop production to meet the demands of the growing world population takes nitrogen, phosphorus, and potassium fertilization, along with herbicides, and pesticides. The fact is that humans are responsible for greenhouse gas production, and blaming animal agriculture for methane and carbon dioxide production by ruminants pales in comparison to the nitrous oxide and fluorocarbons that arise from human populations in industrialized societies. Blaming cattle, and the use of feed byproducts from industries that produce energy, clothing, and human foods such as oils and sweeteners is not only incorrect, but dangerous, as it focuses unwarranted attention on efficient and sustainable agricultural and food systems that are making use of byproducts of other industries rather than dealing with societal problems that are, unfortunately, complex and for which we all bear responsibility.



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