Reduce, Reuse, Go Vegan

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The environmental case for a plant-based diet
WRITTEN BY JULIANA SANDFORD
There exists a caricature of vegans:

The overly outspoken, dreadlocked, underweight hippie touting PETA slogans and carrying protest signs underarm. Society makes vegans out to be crazed individuals set on their lifestyle of fervent meat-eater hatred. But, vegans are onto something the rest of the world has yet to figure out: plant-based diets—beyond reducing animal cruelty, providing clean nutrition and being ethically sound—have the potential to reduce the anthropogenic burdens on the environment. Veganism can help save our planet.

It can be reasonably assumed that most people living in developed countries have at least a cursory understanding of climate change and its driving forces. Yet, based on the consistent increases in global meat consumption and the related growth of the livestock industry, it seems that people are generally unaware of the contribution the agriculture sector, especially livestock, makes to global warming—or perhaps those who are aware are not willing to cut meat from their diets. We can maintain our collective ignorance, or we can choose to acknowledge the facts: the meat industry is a significant contributor to climate change in many facets, from direct emissions to land use. Essentially, our appetite for meat is yet another driving factor of our planet’s decline.

We logically associate dirty industry and gasoline-guzzling vehicles with greenhouse gas (GHG) emissions. But the serene bucolic farmland we pass by while driving in those vehicles, though seemingly innocent in terms of environmental damage, produces GHG emissions as well—9.1% of the total 2014 emissions in the United States, or 625.2 million metric tons of CO2 equivalent, to be exact.\(^1\) For context, that figure is equivalent to the annual GHG emissions of 132 million passenger vehicles.\(^2\) In global terms, as published in the IPCC’s 2014 Synthesis Report, according to the U.S. Department of State, agriculture’s contribution is even more significant, with 24% of 2010 global GHG emissions produced by agriculture, forestry, and other land uses, most of which are noted as agriculture and deforestation.\(^3\) It is alarming, to say the least, that ostensibly natural land use contributes more to global GHG emissions than the clearly unnatural transportation sector—just 14% globally, as given by the same report for 2010.

Carbon dioxide is targeted in mainstream knowledge as the number one contributor to climate change via accumulation in the atmosphere coupled with the greenhouse effect, but it’s not the only one. While carbon dioxide accounts for 80.91% of greenhouse gas emissions in the United States, methane adds another 10.61% from natural gas and agricultural emissions.\(^4\) Globally, methane contributes 16%, largely from the agriculture sector.\(^5\) In addition, the comparatively low percentage is deceiving:

Greenhouse gas emissions by economic sectors.
IPCC, Climate Change 2014: Synthesis Report, 47.
methane is significantly more potent than carbon dioxide, with a global warming potential (GWP) of 86 over a twenty year time period relative to the standard carbon dioxide GWP of 1. In practice, this measure indicates that methane is capable of trapping 86 times more heat in the atmosphere than the same mass of carbon dioxide over the twenty year interval. That alone should be concerning enough to take action.

In a 2006 report entitled Livestock’s Long Shadow, the Food and Agriculture Organization (FAO) of the United Nations estimated that the livestock industry alone is responsible for 18% of global GHG emissions and, notably, 75% of agriculture sector emissions. However, a more recent report published in 2009 in World Watch Magazine contradicts both the earlier estimate and the 2014 EPA estimates mentioned above. In the report, World Bank environmental specialists Robert Goodland and Jeff Anhang analyzed “uncounted or misallocated” GHG emissions to correct the FAO estimate to a shocking 51% of global GHG emissions attributable to the livestock industry and its products. Moreover, Goodland and Anhang used a now outdated methane GWP of 72 on a twenty year scale, making their assessment conservative. With contradicting data available from different credible sources, it is hard to confidently rely on one estimate; regardless, methane emissions deserve attention.

In the agriculture industry, methane is produced through enteric fermentation, which is a process of livestock digestion, and manure management. Yet the related environmental damage stretches far beyond direct emissions. In fact, the effects of the livestock industry are readily apparent in practically every form of environmental destruction: climate change, loss of biodiversity, deforestation, erosion, spread of disease, air pollution and water pollution. The use of hormones, antibiotics, chemicals and pesticides in agriculture and husbandry also contribute to environmental degradation. Of all sectors, the most land use is dedicated to animal agriculture, including the cropland required to grow animal feed, a staggering 60% of corn and barley fields and 97% of soymeal fields. Additionally, a study published in AMBIO shows the incredibly inefficient conversions of animal feed to meat produced: 4.2 kilograms of feed are required to produce one kilogram of chicken, 10.7 kilograms to produce one kilogram of pork, and 31.7 kilograms to produce one kilogram of beef. As a result, 56 million acres of U.S. land are used to produce hay for feed while only 4 million produce vegetables.

An innocuous shift in diet, the doubling of per-capita meat consumption, combined with a continually increasing population has resulted in a global demand for meat five times greater than the demand fifty years prior. The planet is simply not capable of responding to that demand. Enter a plant-based diet.

A study done at the University of Oxford and published in the PNAS Journal in March 2016 concluded that “transitioning toward more plant-based diets that are in line with standard dietary guidelines could reduce global mortality by 6–10% and food-related greenhouse gas emissions by 29–70% compared with a reference scenario in 2050.” The researchers examined four global diet trends extended to 2050: (1) a “normal” meat-based diet, (2) a healthy diet based on significant fruit and vegetable portions and decreased meat portions, (3) a vegetarian diet, including egg and dairy consumption, and (4) a completely plant-based diet. GHG emissions under the meat-based reference scenario were predicted
to increase by 51%, from 2005/2007 to 2050. Of the latter three trends, food-related GHG emissions were predicted to be, respectively, 7% greater, 45% less and 55% less than 2005/2007 baseline emissions and 29%, 63% and 70% less, respectively than 2050 reference scenario emissions. Other research predicts that food-related emissions, if diets do not change, will increase from 7.6 billion tons of carbon dioxide equivalent as of 2005 to 11.4 billion tons by 2050. The conclusions of the scientific community make the causal relationship between a global meat-based diet and increased GHG emissions—and therefore increased global warming—indisputable.

Further research substantiates the superiority of a plant-based diet over a meat-based one, at least in terms of environmental effects. According to David Pimentel, a researcher at Cornell University, 28 calories of fossil fuel energy are required to produce one calorie of meat protein but only 3.3 calories of fossil fuel energy are needed to produce one calorie of grain protein. A study by Swedish researchers examined twenty-two foods, their energy and their GHG emissions, ultimately finding higher protein content in plant-based foods to correlate with lower GHG emissions and higher energy efficiency and the converse to hold for animal foods. Another study published in Nature Climate Change found that global cattle and sheep production generates between 19 and 48 times more GHG emissions than does global protein-rich plant food production. That difference extends to water consumption as well; the production of a standard American diet requires 4,200 gallons of water per day while a vegan diet requires just a fraction of that amount, totaling 300 gallons per day. Veganism, or at least vegetarianism, should be an easy lifestyle change by logic alone.

For many, such a diet change is completely inconceivable. For others, a diet technically compliant with veganism may even be detrimental to personal health if not nutritionally balanced. Fortunately, diets need not necessarily be an “all-or-nothing” decision, and shifts along the continuum of meat and dairy consumption can bring...
about significant environmental benefits. For example, replacing red meat and dairy sources with other protein sources or vegetables as little as once a week can reduce emissions as much as always buying locally, as found by a Carnegie Mellon University study. A full shift from red meat and dairy to chicken, fish and eggs reduces GHG emissions more than five times as much as complete (and unrealistic) localization, while a full shift to a vegetarian diet reduces emissions approximately eight times as much as localization. To reiterate the Oxford study, each step toward lesser meat and dairy consumption is a positive one, though no dietary shift is ultimately comparable to a completely plant-based diet.

Fortunately, the damage done by our staggering meat consumption is not entirely irreversible. The lifespan of carbon dioxide in the atmosphere is difficult to measure but has been estimated in the hundreds of years. Methane, however, stays in the atmosphere for only twelve years, making it significantly more reversible than carbon dioxide emissions. Revisiting the GWP measures of the two gases, methane’s relative GWPs of 86 over a twenty year period and of about 100 over a five year period evidence its short-term intensity. Methane is an intense warmer within the short term but is not persistent in the long term. This is two-sided: methane can either provide immediate relief from current warming or tip the planet past its breaking point. Consider that for a moment. Consider also that significant reductions in GHG emissions are much easier to make in the livestock industry by diet changes, as well as improved efficiency, than in other industries which require switching to renewable energy sources entirely for equivalent reductions. Consider the health benefits, ethics and environmental grace of veganism.

**Take the first step: Give Meatless Monday a try.**

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CITATIONS


25. Ibid.
