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ENVIRONMENTAL IMPACTS OF OUR FOOD CHOICES RESOURCE SHEET

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The Food-Climate Connection - What We Eat Matters!

Our animal-based western diet has a larger impact on climate change than all transportation impacts combined! It can reasonably be argued that the single most important action that each and every one of us can take, is to change what is on the end of our forks.

Key Facts & Sources:

Greenhouse Gas(GHG)

- Livestock and their byproducts account for up to 51% of the annual worldwide greenhouse gas emissions.¹ Depending on what is included in the analysis, reports on the impact range from a quarter to a half of annual worldwide GHG emissions.^{2,3}
- Transportation accounted for 14% of 2014 global greenhouse gas emissions.⁴
- The production of 12,000 tons of nitrogen fertilizer applied each year for animal agriculture alone emits over six million tons of carbon dioxide – the equivalent of about one million cars.⁵
- Livestock-related land use emits 2.4 billion tons of CO₂ per year.⁶
- Even without fossil fuels, we will exceed our 565 gigatons CO₂e (CO₂ equivalent) limit by 2030, all from raising animals.⁷
- In the US, agriculture is responsible for nearly 80% of emissions of nitrous oxide⁸, a greenhouse gas almost 300 times more powerful than carbon dioxide and which stays in the atmosphere for over 100 years.⁹
- The largest source of emissions within agriculture is enteric fermentation – methane produced by livestock during digestion and released via belches.¹⁰
- Methane traps up to 100 times more heat in the atmosphere than carbon dioxide within a 5 year period, and 12 times more within a 20 year period.¹¹

Land & Deforestation - 70% of all agricultural land, and 30%¹² to 45%¹³ of Earth's land surface is used for livestock production.

- Cattle ranching alone is responsible for up to 80% of Amazon rainforest destruction.¹⁴
- 1.5 acres of land can produce up to 39,000 pounds of plant-based food. 1.5 acres can produce 300 pounds of beef.¹⁵
- In the US, the livestock sector is responsible for an estimated 55% of land erosion.¹⁶
- US agricultural sector uses 1.1 billion pounds of pesticides and 43.5 billion pounds of fertilizers each year.¹⁷
- 40% of our world's grain is fed to livestock; while nearly 1 billion people go to bed hungry every night.^{18,19,20}
- A nationwide shift to exclusively grass-fed beef would require a 30% increase in the national cattle herd.²¹



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Water - 1,850 gallons are needed to produce 1 lb of beef²²; the average dairy farm uses 3.4 million gallons of water per day.²³

- In 2015, agriculture consumed 40% of all water withdrawals in the continental US, compared to 1% for private homes.²⁴
- Compare: 46 gallons for 1lb vegetables; 196 gallons for 1lb cereals/grains; 485 gallons for 1lb legumes; 368 gallons for 1lb almonds.²⁵
- Animal agriculture water consumption in 2015 was 730 billion gallons.²⁶
- The livestock sector is responsible for 32% and 33%, respectively, of the nitrogen and phosphorus load into freshwater resources in the US.²⁷
- The pesticide atrazine (commonly used in animal agriculture) is found in almost 80% of drinking water systems.²⁸
- An average corn plant uses less than 40% of the nitrogen fertilizer it receives; the excess isn't just wasted – it pollutes our air & water.²⁹

Oceans & Species Extinction - We are currently experiencing the largest mass extinction in 65 million years.³⁰

- Experts estimate that up to 137 plant, animal and insect species are lost every day due to rainforest destruction.³¹
- We could see fishless oceans by 2048.³²
- For every 1 lb of fish caught, up to 5 lbs of unintended marine species are caught and discarded as by-kill.³³
- Scientists estimate 650,000 whales, dolphins and seals are killed every year by fishing vessels.³⁴
- Pollution from agriculture and livestock on land have contributed to more than 400 “dead zones” around oceans around the world.³⁵

Potential Solutions

- Replacing at least 1/4 of today's livestock products with better alternatives would both reduce emissions and allow forests to regenerate on a vast amount of land, which could then absorb excess atmospheric carbon to reduce it to a safe level.³⁶
- Substituting beans for beef in the U.S. diet could result in 46-74% of the reductions necessary to achieve the GHG emissions target for 2020 set in 2013.³⁷
- Molecule for molecule, methane is about 25 times more potent in trapping heat than carbon dioxide. But more important, methane, with an atmospheric half-life of 7 years, disappears from the atmosphere far faster than carbon dioxide, which has a half-life of more than a century. So almost as soon as we eliminate sources of methane, its contribution to the greenhouse effect begins to wane significantly.³⁸
- Widespread adoption of a plant-based diet would cut food-related emissions by 70%, (and make people healthier too).³⁹ It would also reduce the need for industrial farming.
- End food subsidies that support food producers (not consumers)⁴⁰, so foods that have little environment/climate impact (fruits, vegetables and legumes) are less expensive than foods that accelerate climate change (animal products).



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- Employ organic farming and other more climate-friendly farming systems.⁴¹
- According to one study⁴², by transitioning toward a diet that is predominately plant-based/vegetarian, we could reduce global mortality by 6 to 10 percent, food-related greenhouse gas emissions by 29 to 70 percent, and the economic benefits of the change could be 1 to 31 trillion dollars by midcentury thanks to fewer damaging environmental impacts, premature deaths worldwide, and lost working days, as well as reduced health care costs.⁴³

“We’ve got a host of interconnected problems that all stem from our addiction to an animal-protein-based diet. Simply put, our industrial system of animal production is unsustainable. We’re using up our natural resources, such as fresh water and healthy soil, faster than we can replenish them. And the side effects of our animal-protein-driven food economy include environmental toxins and poisoning of the very air we all depend on for life.”⁴⁴

-- T. Colin Campbell, PhD, *Whole: Rethinking the Science of Nutrition*



Worth Reading & Viewing

- Zacharias, Nil, and Gene Stone. [Eat For The Planet: Saving The World, One Bite At A Time](#). Abrams Image, 2018. - This book provides footnoted data and infographics on the full range of relevant factors that connect food choices with climate.
- [The Five-Step Plan to Feed the World](#) - This article touches on the impact that animal agriculture has on climate change and poses solutions for feeding our world more sustainably.
- [A Farm Bill to Help Farmers Weather Climate Change](#) - This article provides an overview of the Farm Bill and provides potential solutions for reforming it.
- [Livestock and Climate Change, by Robert Goodland and Jeff Anhang](#) - This report describes the role of livestock in all aspects of climate change and analyzes data found in the report, *Livestock’s Long Shadow*.
- [Livestock’s Long Shadow](#) - This FAO report describes the role of livestock in all aspects of climate change and offers potential solutions for the future.
- [FAO Yields to Meat Industry Pressure on Climate Change, Robert Goodland, July 11, 2012, New York Times](#) - This article discusses the alarming influence that animal agriculture has on the publicly reported statistics on the warming of our planet.
- [Healing America presentation by Nelson Campbell](#) - In this video, Nelson Campbell, founder of PlantPure Communities, links climate change with dietary choices.
- [Agronomy - Feeding More with Less by Peter Lehner](#) - This article offers solutions for our climate change problem that reduce waste and meet human hunger needs.
- [Legal Pathways to Carbon Neutral Agriculture by Peter Lehner and Nathan A. Rosenberg](#) - This article covers a number of potential solutions, local and governmental, for a carbon neutral farming future.
- [Ravenous for Meat, China Faces a Climate Quandary](#) - This article explains the struggle China is facing behind their growing appetite for meat, and how this is undermining their commitment to reduce global warming.



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- [TEEB FOR AGRICULTURE & FOOD SCIENTIFIC AND ECONOMIC FOUNDATIONS REPORT](#) - This groundbreaking report explains how to understand, evaluate, and manage the 'true' costs and benefits of agriculture and food systems. With input from over 150 experts in 33 countries, it argues that our agri-food systems today are being viewed and evaluated through a narrow, incomplete and distorting lens by focusing on per-hectare-productivity. To fix our food system, our food metrics need to be fixed.
- [Trajectories of the Earth System in the Anthropocene](#) - This report explores the risk that self-reinforcing feedbacks could push the Earth System toward a planetary threshold that, if crossed, could prevent stabilization of the climate at intermediate temperature rises and cause continued warming on a "Hothouse Earth" pathway even as human emissions are reduced.

Endnotes

- 1 <http://www.worldwatch.org/files/pdf/Livestock%20and%20Climate%20Change.pdf>
- 2 <http://www.worldwatch.org/files/pdf/Livestock%20and%20Climate%20Change.pdf>
- 3 <https://bittman.blogs.nytimes.com/2012/07/11/fao-yields-to-meat-industry-pressure-on-climate-change/>
- 4 <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>
- 5 <https://earthjustice.org/sites/default/files/Feed%20More%20With%20Less%202017May%20ELI.pdf>
- 6 <http://www.fao.org/docrep/010/a0701e/a0701e.pdf>
- 7 [Oppenlander, Richard A. Food Choice and Sustainability: Why Buying Local, Eating Less Meat, and Taking Baby Steps Won't Work.](#) MN : Langdon Street, 2013, pp. 28.
- 8 https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf
- 9 https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html
- 10 <https://news.un.org/en/story/2014/04/466012>
- 11 <http://www.onegreenplanet.org/animalsandnature/methane-vs-carbon-dioxide-a-greenhouse-gas-showdown/>
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- 14 <https://globalforestatlas.yale.edu/amazon/land-use/cattle-ranching>
- 15 [Oppenlander, Richard A. Food Choice and Sustainability: Why Buying Local, Eating Less Meat, and Taking Baby Steps Won't Work.](#) MN : Langdon Street, 2013. Print.
- 16 <http://www.fao.org/docrep/010/a0701e/a0701e.pdf>
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- 18 [Zacharias, Nil, and Gene Stone. Eat For The Planet: Saving the World, One Bite at a Time.](#) Abrams Image, pp 55, 2018.
- 19 <http://news.cornell.edu/stories/1997/08/us-could-feed-800-million-people-grain-livestock-eat>
- 20 <https://www.worldhunger.org/world-hunger-and-poverty-facts-and-statistics/>
- 21 <http://iopscience.iop.org/article/10.1088/1748-9326/aad401/pdf>
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- 35 <https://www.scientificamerican.com/article/ocean-dead-zones/>
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- 37 [Harwatt, H., Sabate, J., Eshel, G., Soret, S., Ripple, W. 2017. Substituting beans for beef as a contribution toward US cli-](#)



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40 <https://nutritionstudies.org/2015-dietary-guidelines-commentary/>

41 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3040919

42 <http://www.pnas.org/content/113/15/4146>

43 Zacharias, Nil, and Gene Stone. Eat For The Planet: Saving the World, One Bite at a Time. Abrams Image, pg. 86, 2018.

44 Campbell, T. Colin, and Howard Jacobson. Whole: Rethinking the Science of Nutrition. Benbella Books, pg. 166, 2014.