

In Support of Sustainable Eating

Why US Dietary Guidelines Should Prioritize Healthy People and a Healthy Planet

HIGHLIGHTS

A growing body of research shows that shifting what we eat could improve the health of the population and the planet. However, the US government has declined to incorporate this evidence into federal food policies. As government agencies develop the 2020-2025 Dietary Guidelines for Americans, a review of recent studies on dietary patterns and sustainability by the Union of Concerned Scientists and colleagues shows that current US dietary advice may not support the long-term environmental sustainability of the food system. This policy brief outlines key actions and recommendations for federal agencies and policymakers to help protect public health and food security for generations to come.

Research has long established the relationship between food and health. The amount and variety of foods a person regularly eats, known as a dietary pattern,¹ is strongly linked to risk of chronic diseases such as cardiovascular disease, obesity, and type 2 diabetes (HHS and USDA 2015; Micha et al. 2017; Willett and Stampfer 2013). Diet-related diseases are among the leading causes of US morbidity and mortality, with an estimated 18 percent of deaths nationwide attributable to dietary factors (Afshin et al. 2019; Mokdad et al. 2018). Previous research by the Union of Concerned Scientists (UCS) has found that if US adults met current dietary recommendations for fruits and vegetables, nearly 110,000 lives and \$32 billion in medical costs could be saved in a single year due to reductions in cardiovascular disease (Reinhardt 2019). Another recent study has estimated the total cost of poor diets at \$50 billion annually (Jardim et al. 2019).

However, the impact of what we eat extends far beyond diseases related to diet. Heat-trapping emissions from food production contribute to climate change, which poses a multitude of risks to public health: higher temperatures, poorer air quality, and more frequent flooding and extreme weather events introduce greater



Schoolchildren are just some of the millions of people nationwide whose food choices are shaped by the Dietary Guidelines for Americans. In addition to promoting better health, these guidelines should prioritize the long-term health and sustainability of the food supply.

risk of chronic health conditions, acute illness, and injury (Browne et al. 2015; Crimmins et al. 2016; Dahl et al. 2019). Furthermore, the consequences of climate change threaten the availability of a healthy food supply in the future, and will put healthy diets further out of reach for many populations (Vermeulen, Campbell, and Ingram 2012). Unsustainable prevailing agricultural practices that drive biodiversity loss and degrade natural resources such as air, soil, and water leave the food system poorly equipped to manage such threats (Basche 2017; Smith, King, and Williams 2015; Veenstra and Burras 2015).

The far-reaching consequences of the food we eat have generated heightened interest in identifying dietary patterns that can deliver broad public health benefits by improving environmental, as well as social and economic, outcomes (see box). Such diets are now generally recognized as “sustainable diets,” defined by the Food and Agriculture Organization of the United Nations as “those with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations” (Burlingame and Dernini 2010). Leading international bodies and nongovernmental organizations, including the Intergovernmental Panel on Climate Change, have called for widespread dietary shifts to curb the impacts of climate change (IPCC 2019; WHO 2016). As a result, countries such as Canada, Germany, the Netherlands, and Sweden have incorporated environmental considerations into national dietary guidance (Gonzalez Fischer and Garnett 2016; Government of Canada 2019).

Yet despite the significant environmental impacts of the US food system, federal agencies have declined to incorporate sustainability principles into the country’s foundational food and nutrition policies, including the *Dietary Guidelines for Americans* (Behrens et al. 2017; Ritchie, Reay, and Higgins 2018). The development of the *2020-2025 Dietary Guidelines*, now under way, offers a critical opportunity for the US government to apply the best available research to advance sustainable diets in the United States.

How the Dietary Guidelines for Americans Has Sidelined Sustainability

The *Dietary Guidelines* is the nation’s leading set of science-based nutrition recommendations aimed at supporting public health and preventing chronic disease. The guidelines are a critical tool for health professionals, policymakers, and administrators of federal food and nutrition programs serving millions of kids, parents, seniors, veterans, and other members of the general public each day (HHS and USDA 2015). Since 1990, Congress has required revision of the guidelines every five years to ensure that they reflect the best available science



Bob Nichols/USDA

Unsustainable agricultural systems contribute to climate change and degrade natural resources such as air, soil, and water that both farmers and the public rely on. Policies that support shifts to more sustainable agricultural practices alongside dietary shifts are needed to ensure a healthy food supply in the future.

and address current challenges to public health (National Nutrition Monitoring and Related Research Act of 1990). Central to this revision process is the scientific report produced by a scientific advisory committee—a panel of independent experts in health, medicine, and nutrition appointed by the US Department of Agriculture and the US Department of Health and Human Services—assessing research on current topics in nutrition. Based on this scientific report, the two agencies develop and issue final dietary guidelines.

The 2015 scientific advisory committee was charged with reviewing, among other topics, the best available evidence on the relationships among population-level dietary patterns, sustainability, and food security. The committee concluded that “in general, a dietary pattern that is higher in plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts, and seeds, and lower in animal-based foods is more health promoting and is associated with lesser environmental impact ([greenhouse gas] emissions and energy, land, and water use) than is the current average U.S. diet. A diet that is more environmentally sustainable than the average U.S. diet can be achieved without excluding any food groups” (DGAC 2015).

The committee’s findings were supported by leading experts and public health organizations. However, meat industry groups expressed strong opposition (Bottemiller Evich 2016; NAMI 2015). Driven in part by industry opposition, Congress

Sustainable Diets Must Address Social and Economic Inequality

Although research on dietary sustainability has focused primarily on broad-scale environmental impacts, due in part to available data and models, diets that are truly sustainable must also support the long-term social and economic viability of US food production and consumption. Marginalized populations, including low-income communities and many communities of color, disproportionately experience economic and health disparities associated with the current US food system (Kelly et al. 2020). Such disparities are often the direct consequence of a deep history of discrimination and targeted policies, and they compound existing challenges to health and economic stability. For example, the burden of diet-related disease is far higher among many communities of color: non-Hispanic blacks are diagnosed with type 2 diabetes at nearly double the rate of non-Hispanic whites (13.4 versus 7.3 percent) and have higher rates of hypertension and cardiovascular events than any other demographic group (CDC 2017; Graham 2015).

Meanwhile, the people who work throughout the US food system—nearly 40 percent of whom are people of color—

experience greater poverty, poorer healthcare access, and higher occupational health hazards relative to the general population (FCWA and SRC 2016; Moore et al. 2016; NCFH 2017). Agriculture is among the most dangerous industries in the United States, with frequent exposure to hazards such as pesticides, extreme heat, and dangerous machinery resulting in high rates of illness, injury, and death (NCFH 2018; Ferguson, Dahl, and DeLonge 2019). Finally, both low-income populations and many communities of color are more vulnerable to the environmental consequences of unsustainable food systems, such as climate change, water pollution, and other environmental impacts (APHA, n.d.; Harlan et al. 2019). There are many actions the US government can take to address the inequalities produced and perpetuated by the US food system. One important action is to support research and recommendations for dietary patterns and associated agricultural practices that can help improve social, economic, and environmental conditions for families, food producers, and frontline communities experiencing the impacts of climate change and food insecurity firsthand.



Bob Nichols/USDA

People who work in the US food system—such as these migrant workers at a lettuce farm in California—experience greater poverty, poorer healthcare access, and higher occupational health hazards (such as exposure to pesticides and extreme heat) than the general public. A truly sustainable diet must address not only environmental, but also social and economic outcomes associated with food production and healthy food access.

issued a letter of dissent to agency secretaries and passed legislative language limiting the scope of the *Dietary Guidelines* strictly to the topics of diet and nutrient intake (Benjamin 2014; CSPI 2015; HSPH 2015; NAMI 2015; Consolidated Appropriations Act, 2016). Under this political pressure, the secretaries of the US Department of Agriculture and the US Department of Health and Human Services ultimately omitted the committee’s findings related to environmental sustainability from the *2015-2020 Dietary Guidelines*. Experts viewed the decision as an overt override of scientific evidence by industry groups, which spent a total of more than \$77 million in 2014 and 2015 to lobby Congress on issues including the *Dietary Guidelines* (Reinhardt 2019; Sifferlin 2016).

Our findings highlight a pressing need for the federal government to prioritize policies that protect long-term public health and our nation’s future food security.

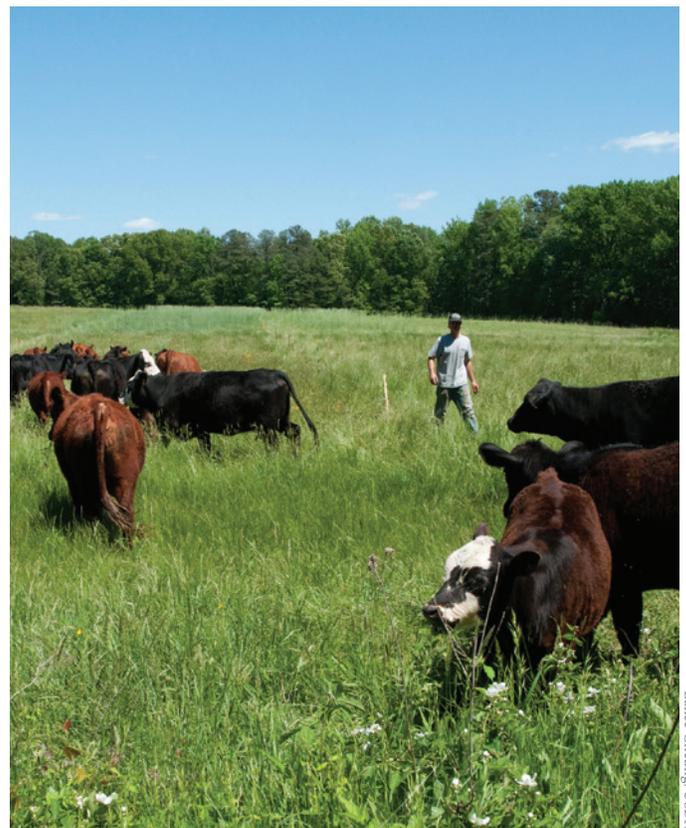
Due in part to the controversy surrounding the *2015-2020 Dietary Guidelines*, the scientific advisory committee established for the *2020-2025 Dietary Guidelines* was not charged with reviewing current literature on the relationship between dietary patterns and sustainability. But given the magnitude and urgency of diet-related threats to public health, UCS and colleagues moved to fill this critical gap in research, applying the methodology used by the committee in 2015 to update the systematic review with recent research on this topic (DGAC 2015; Reinhardt et al., in production). Our findings reveal a growing volume of studies examining the environmental implications of US dietary patterns and highlight a pressing need for the federal government to act on key research and prioritize policies that protect long-term public health and our nation’s future food security.

Rethinking Dietary Recommendations: A New Review of Research on Sustainable Diets

The systematic review by UCS and colleagues addressed the question “what is the relationship between population-level

dietary patterns and food sustainability and related food security?” (DGAC 2015; Nelson et al. 2016; Reinhardt et al., in production). We closely replicated methodology described in the *Scientific Report of the 2015 Dietary Guidelines Advisory Committee* (Appendix E-2.37) (DGAC 2015),² with an exclusive focus on studies examining the impacts of dietary patterns in the United States.

Between July 2015 and September 2019, 22 relevant studies were published, eight of which directly compared the sustainability of current US diets to those recommended by the *Dietary Guidelines*. Our review challenges prior findings that diets aligning with national dietary guidelines are consistently more sustainable than current average diets. Our results show that the primary dietary pattern recommended by the *Dietary Guidelines*—known as the “Healthy U.S.-Style” diet—may result in similar or increased heat-trapping emissions, energy use, and water use compared with the current US diet (Behrens et al. 2017; Birney et al. 2017; Hitaj et al. 2019; Mekonnen and Fulton 2018; Peters et al. 2016; Rehkamp and Canning 2017; Rehkamp and Canning 2018; Tom, Fischbeck, and Hendrickson 2016).



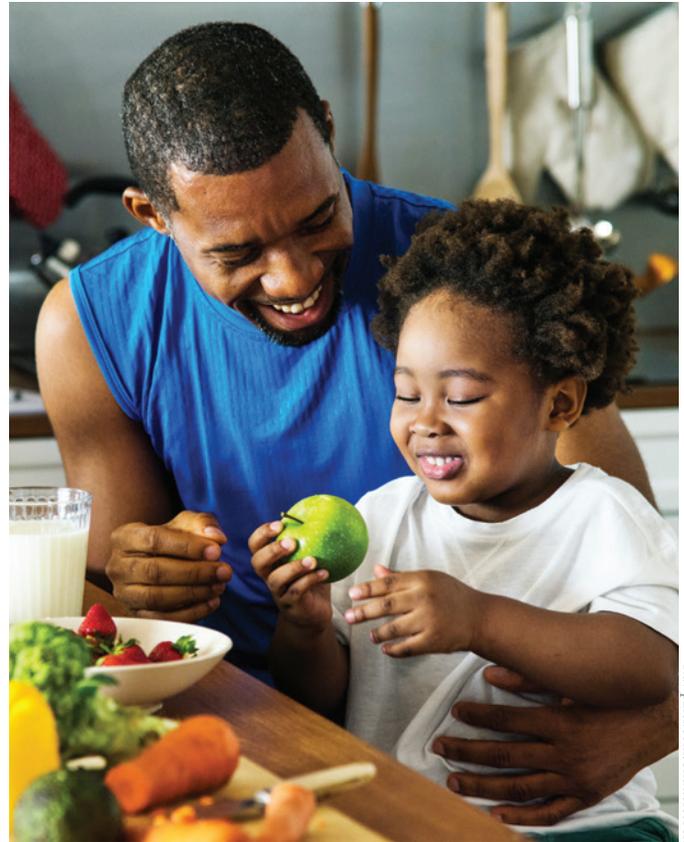
In addition to dietary shifts, changes in farming practices that improve sustainability—such as better grazing management and feed crop production for livestock—can reduce the environmental impact of particular foods and of our overall diets.

Consistent with the *Scientific Report of the 2015 Dietary Guidelines Advisory Committee*, new research supports past findings that diets higher in plant-based foods and lower in animal-based foods can provide greater benefits for both human health and the environment (Aleksandrowicz et al. 2016; Clark et al. 2019; Willett et al. 2019). Specifically, 16 studies in our systematic review attributed the increased environmental impacts of diets higher in animal-based foods primarily to the amount of meat (e.g., beef, lamb, pork) or dairy in the diet.

Policy and Research Recommendations

The federal government must act with urgency to meet the pressing public health challenges of climate change, pollution, and chronic diseases by ensuring the long-term health and sustainability of our food supply. To develop sustainable food policy with the potential to support current and future population health across environmental, social, and economic domains, we recommend the following actions:

- **The scientific advisory committee for the 2020-2025 Dietary Guidelines for Americans must address the relationship between dietary patterns and environmental sustainability in its report, and the US Department of Agriculture and US Department of Health and Human Services must respond to these recommendations publicly.** Research has established that current dietary patterns are environmentally unsustainable and has identified dietary shifts that could both reduce chronic disease risk and support long-term food security. The scientific advisory committee is charged with providing independent, science-based recommendations on dietary guidelines based on the preponderance of current scientific knowledge. Given the strength of the evidence connecting dietary patterns and environmental impacts and the importance of this relationship for long-term public health, the scientific advisory committee has an obligation to address this topic, relying on the results of the *Scientific Report of the 2015 Dietary Guidelines Advisory Committee* and our update to the systematic review. In turn, the US Department of Agriculture and the US Department of Health and Human Services have an obligation to provide a public response to the committee's recommendations.
- **Congress must support the inclusion of sustainability in the 2020-2025 Dietary Guidelines for Americans.** Policy solutions that generate net public benefit across sectors demonstrate responsible stewardship of public



The Dietary Guidelines for Americans should recommend dietary shifts that not only improve public health through chronic disease prevention, but also mitigate climate change and help protect a healthy food supply for future generations.

resources and should appeal to members of Congress representing a range of interests. Congress should actively support the inclusion of sustainability principles and research in the *2020-2025 Dietary Guidelines for Americans*—ensuring that public health, rather than food industry interests, remains the driving force in federal policymaking—and should provide federal agencies with the funding and resources needed to effectively implement dietary guidance across key federal nutrition programs.

- **Congress should enable more publicly funded research on diets that are both healthy and sustainable.** Congress can support continued interdisciplinary research on dietary sustainability by providing government agencies and research institutions with greater funding opportunities in this field. Although much is understood about the environmental impacts of current diets, more research is required to evaluate the synergies and tradeoffs between healthy diets and the environmental, social, and economic dimensions of sustainability.

It is past time that the Dietary Guidelines for Americans, supported by the best available research, be equipped to address the most pressing public health challenges of our lifetime.

More work is needed on the cost of sustainable diets, how dietary choices affect the livelihoods and well-being of people and communities, and the impacts and trade-offs of various measures of environmental sustainability (for example, air pollution, biodiversity, heat-trapping emissions, land use, soil health, and water pollution and use). Greater breadth and depth of data is also needed to assess the environmental impact associated with a wider range of foods, production practices, and geographic regions with specificity. Further developing this body of research is essential to understanding the ways in which healthy dietary patterns can support the viability of small and mid-sized farms and food businesses and facilitate equitable opportunities for communities to build wealth and resilience in the face of climate change.

The systematic review completed by UCS and colleagues adds to a growing body of scientific evidence that dietary shifts can improve public health through chronic disease prevention, climate change mitigation, and the preservation of the future food supply. As the nation's leading set of science-based nutrition recommendations, the *Dietary Guidelines* should reflect this body of evidence. It is past time that the *US Dietary Guidelines*, supported by the best available research and implemented alongside other key federal food and agricultural policies, be equipped to address the most pressing public health challenges of our lifetime.

Sarah Reinhardt is the lead food systems and health analyst in the UCS Food and Environment Program.

ACKNOWLEDGMENTS

This report was made possible in part through the generous support of The Lumpkin Family Foundation, The Martin Foundation, the W.K. Kellogg Foundation, and UCS members.

The author would like to thank Nicole Tichenor Blackstone of the Friedman School of Nutrition Science and Policy for her review of the report.

At UCS, the author thanks Rebecca Boehm, Marcia DeLonge, Samantha Eley, Ricardo Salvador, Karen Perry Stillerman, Heather Tuttle, Bryan Wadsworth, and Ja-Rei Wang for their help in developing and refining this report. Finally, we'd like to thank Karin Matchett and Bradie Bradshaw for their editing and design work, respectively.

Organizational affiliations are listed for identification purposes only. The opinions expressed herein do not necessarily reflect those of the organizations that funded the work or the individuals who reviewed it. The Union of Concerned Scientists bears sole responsibility for the report's contents.

ENDNOTES

- 1 Dietary patterns are defined as the quantities, proportions, variety, or combinations of different foods and beverages in diets and the frequency with which they are habitually consumed (DGAC 2015).
- 2 We followed the 2015 methodology as closely as possible to ensure consistency, searching six major health and environmental science databases for relevant articles published between July 2015 and September 2019. (An update to the 2015 systematic review completed by the Dietary Guidelines Advisory Committee was published by Nelson et al. (2016), including articles from February 2014 to July 2015.) The literature search yielded 1,821 articles that we reviewed for their relevance to the topic. We completed these steps using search terms, inclusion criteria, and exclusion criteria adapted from the Scientific Report of the 2015 Dietary Guidelines Advisory Committee (DGAC 2015).

REFERENCES

- Afshin, A., P.J. Sur, K.A. Fay, L. Cornaby, G. Ferrara, J.S. Salama, E.C. Mullany, et al. 2019. "Health Effects of Dietary Risks in 195 Countries, 1990-2017: A Systematic Analysis for the Global Burden of Disease Study 2017." *The Lancet* 393 (10184): 1958-1972. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(19\)30041-8/fulltext#%20](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)30041-8/fulltext#%20)
- Aleksandrowicz, L., R. Green, E.J.M. Joy, P. Smith, and A. Haines. 2016. "The Impacts of Dietary Change on Greenhouse Gas Emissions, Land Use, Water Use, and Health: A Systematic Review." *PLoS ONE* 11 (11): e0165797. <https://doi.org/10.1371/journal.pone.0165797>
- APHA (American Public Health Association). n.d. "Creating the Healthiest Nation: Environmental Justice for All." Washington, DC. http://www.apha.org/-/media/files/pdf/factsheets/environmental_justice.ashx?la=en&hash=BF2694E6A2FC6707C373F1E1DC60243BF333CACE
- Basche, Andrea. 2017. *Turning Soils into Sponges: How Farmers Can Fight Floods and Droughts*. Cambridge, MA: Union of Concerned Scientists. <https://www.ucsusa.org/resources/turning-soils-sponges>
- Behrens, P., J.C. Kieffe-de Jong, T. Bosker, J.F.D. Rodrigues, A. de Koning, and A. Tukker. 2017. "Evaluating the Environmental Impacts of Dietary Recommendations." *Proceedings of the National Academy of Sciences* 114 (51): 13412-13417. <https://doi.org/10.1073/pnas.1711889114>
- Benjamin, Georges. 2014. Public comment by the American Public Health Association Regarding Key Principles for the 2015 Dietary Guidelines Advisory Committee. July 7, 2014. Washington, DC. https://health.gov/dietaryguidelines/dga2015/comments/uploads/CID590_140717_APHA_DGAccomments.pdf
- Birney, C.I., K.F. Franklin, F.T. Davidson, and M.E. Webber. 2017. "An Assessment of Individual Foodprints Attributed to Diets and Food Waste in the United States." *Environmental Research Letters* 12 (10). <https://iopscience.iop.org/article/10.1088/1748-9326/aa8494>
- Bottemiller Evich, Helena. 2016. "Meat Industry Wins Round in War Over Federal Nutrition Advice." *Politico*, January 7, 2016. <https://www.politico.com/story/2016/01/2015-dietary-guidelines-217438>
- Browne, M.E., J.M. Antle, P. Backlund, E.R. Carr, W.E. Easterling, M.K. Walsh, C. Ammann, et al. 2015. *Climate Change, Global Food Security, and the U.S. Food System*. Washington, DC: US Department of Agriculture. http://www.usda.gov/oce/climate_change/FoodSecurity2015Assessment/FullAssessment.pdf

- Burlingame, B., and S. Dernini. 2010. "Sustainable Diets and Biodiversity: Directions and Solutions for Policy, Research, and Action." In *Proceedings of the International Scientific Symposium, Biodiversity and Sustainable Diets United against Hunger*. Rome, Italy: Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/i3004e/i3004e.pdf>
- CDC (Centers for Disease Control and Prevention). 2017. *National Diabetes Statistics Report, 2017*. Washington, DC: US Department of Health and Human Services. <http://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>
- Clark, M.A., M. Springmann, J. Hill, and D. Tilman. 2019. "Multiple Health and Environmental Impacts of Foods." *Proceedings of the National Academy of Sciences* 116 (46): 23357–23362. <https://doi.org/10.1073/pnas.1906908116>
- Consolidated Appropriations Act, 2016. 2015. Pub. L. No. 114-113, 129 Stat. 2242.
- Crimmins, A., J. Balbus, J.L. Gamble, C.B. Beard, J.E. Bell, D. Dodgen, R.J. Eisen, et al. 2016. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*. Washington, DC: US Global Change Research Program. <https://health2016.globalchange.gov/>
- CSPI (Center for Science in the Public Interest). 2015. *Congressional Catering: How Big Food and Agricultural Special Interests Wield Influence in Congress and Undermine Public Health*. Washington, DC. <https://cspinet.org/resource/congressional-catering-report>
- Dahl, K., E. Spanger-Siegfried, R. Licker, A. Caldas, J. Abatzoglou, N. Mailloux, R. Cleetus, S. Uvardy, J. Declat-Barreto, and P. Worth. 2019. *Killer Heat in the United States: Climate Choices and the Future of Dangerously Hot Days*. Cambridge, MA: Union of Concerned Scientists. <http://www.ucsusa.org/killer-heat>
- DGAC (Dietary Guidelines Advisory Committee). 2015. *Scientific Report of the 2015 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture*. Washington, DC: US Department of Agriculture. <https://health.gov/dietaryguidelines/2015-scientific-report>
- FCWA and SRC (Food Chain Workers Alliance and Solidarity Research Cooperative). 2016. *No Piece of the Pie: US Food Workers in 2016*. Los Angeles, CA. http://foodchainworkers.org/wp-content/uploads/2011/05/FCWA_NoPieceOfThePie_P.pdf
- Ferguson, Rafter, Kristina Dahl, and Marcia DeLonge. 2019. *Farmworkers at Risk: The Growing Dangers of Pesticides and Heat*. Cambridge, MA: Union of Concerned Scientists. <https://www.ucsusa.org/resources/farmworkers-at-risk>
- Gonzalez Fischer, C., and T. Garnett. 2016. *Plates, Pyramids, Planet: Developments in National Health and Sustainable Dietary Guidelines: A State of Play Assessment*. Rome, Italy: Food and Agriculture Organization of the United Nations; Oxford, England: Food Climate Research Network. <http://www.fao.org/3/i5640E/i5640e.pdf>
- Government of Canada. 2019. "Canada's Dietary Guidelines." Ottawa, Ontario. <https://food-guide.canada.ca/en/guidelines/>
- Graham, G. 2015. "Disparities in Cardiovascular Disease Risk in the United States." *Current Cardiology Reviews* 11 (3): 238–245. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4558355>
- Harlan, S.L., P. Chakalian, J. Declat-Barreto, D.M. Hondula, and G.D. Jenerette. 2019. "Pathways to Climate Justice in a Desert Metropolis." In *People and Climate Change: Vulnerability, Adaptation, and Social Justice*, edited by L. Reyes Mason and J. Rigg. New York: Oxford University Press. <http://www.oxfordscholarship.com/view/10.1093/oso/9780190886455.001.0001/oso-9780190886455-chapter-2>
- HHS and USDA (US Department of Health and Human Services and US Department of Agriculture). 2015. *2015–2020 Dietary Guidelines for Americans*, eighth edition. Washington, DC. https://health.gov/dietaryguidelines/2015/resources/2015-2020_Dietary_Guidelines.pdf
- Hitaj, C., S. Rehkamp, P. Canning, and C.J. Peters. 2019. "Greenhouse Gas Emissions in the United States Food System: Current and Healthy Diet Scenarios." *Environmental Science and Technology* 53 (9): 5493–5503. <https://doi.org/10.1021/acs.est.8b06828>
- HSPH (Harvard T.H. Chan School of Public Health). 2015. "2015 Dietary Guidelines Will Not Include a Focus on Sustainability." Cambridge, MA: Harvard University. <https://www.hsph.harvard.edu/nutritionsource/2015/10/08/2015-dietary-guidelines-will-not-include-a-focus-on-sustainability>
- IPCC (Intergovernmental Panel on Climate Change). 2019. *Climate Change and Land*. Geneva, Switzerland: World Meteorological Organization; Nairobi, Kenya: United Nations Environment Programme. <http://www.ipcc.ch/report/srccl/>
- Jardim, T.V., D. Mozaffarian, S. Abrahams-Gessel, S. Sy, Y. Lee, J. Liu, Y. Huang, C. Rehm, P. Wilde, R. Micha, and T.A. Gaziano. 2019. "Cardiometabolic Disease Costs Associated with Suboptimal Diet in the United States: A Cost Analysis Based on a Microsimulation Model." *PLOS Medicine* 16 (12): e1002981. <https://doi.org/10.1371/journal.pmed.1002981>
- Kelly, Rachel, Rich Pirog, Anel Guel, Vanessa García Polanco, Jane Henderson, Kyeesha Wilcox, Taylor Wimberg, Daniel Babayode, and Emettra Nelson. 2020. *An Annotated Bibliography on Structural Racism Present in the US Food System*. East Lansing, MI: Michigan State University Center for Regional Food Systems. <http://www.canr.msu.edu/foodsystems/uploads/files/Annotated-Bibliography-on-Structural-Racism-Seventh-Edition.pdf>
- Mekonnen, M.M., and J. Fulton. 2018. "The Effect of Diet Changes and Food Loss Reduction in Reducing the Water Footprint of an Average American." *Water International* 43:860–870. <http://www.tandfonline.com/doi/abs/10.1080/02508060.2018.1515571?journalCode=rwin20>
- Micha, R., M.L. Shulkin, J.L. Penalvo, S. Khatibzadeh, G.M. Singh, M. Rao, S. Fahimi, J. Powles, and D. Mozaffarian. 2017. "Etiologic Effects and Optimal Intakes of Foods and Nutrients for Risk of Cardiovascular Diseases and Diabetes: Systematic Reviews and Meta-Analyses from the Nutrition and Chronic Diseases Expert Group (NutriCoDE)." *PLoS ONE* 12 (4): e0175149. <https://doi.org/10.1371/journal.pone.0175149>
- Mokdad, A.H., K. Ballestros, M. Echko, S. Glenn, H.E. Olsen, E. Mullany, A. Lee, et al. 2018. "The State of US Health, 1990–2016: Burden of Diseases, Injuries, and Risk Factors among US States." *Journal of American Medicine* 319 (14): 1444–1472. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC5933332/>
- Moore, K.L., J. Mercado, J. Hill, and S.C. Katz. 2016. "Disparities in Health Insurance Coverage and Health Status among Farmworkers, Sonoma County, California, 2013–2014." *Preventing Chronic Disease* 13:E45. <http://www.ncbi.nlm.nih.gov/pubmed/27032988>

- NAMI (North American Meat Institute). 2015. "North American Meat Institute Argues for Scientific Evidence as Foundation of Nutrition Policy." Washington, DC. <http://www.meatinstitute.org/ht/display/ReleaseDetails/i/111303>
- National Nutrition Monitoring and Related Research Act of 1990. 1990. Pub. L. No. 101-445, 104 Stat. 1034.
- NCFH (National Center for Farmworker Health). 2017. *A Profile of Migrant Health*. Buda, TX. <http://www.ncfh.org/fact-sheets--research.html>
- NCFH (National Center for Farmworker Health). 2018. *Occupational Health and Safety*. Buda, TX. <http://www.ncfh.org/fact-sheets--research.html>
- Nelson, M.E., M.W. Hamm, F.B. Hu, S.A. Abrams, and T.S. Griffin. 2016. "Alignment of Healthy Dietary Patterns and Environmental Sustainability: A Systematic Review." *Advances in Nutrition* 7:10005–10025. <https://academic.oup.com/advances/article/7/6/1005/4568646>
- Peters, C.J., J. Picardy, J.L. Wilkins, T.S. Griffin, G.W. Fick, and A.F. Darrouzet-Nardi. 2016. "Carrying Capacity of US Agricultural Land: Ten Diet Scenarios." *Elementa: Science of the Anthropocene* 4:p.000116. <http://doi.org/10.12952/journal.elementa.000116>
- Rehkamp, S., and P. Canning. 2017. "The Potential for Healthier and Energy-Efficient American Diets." *Choices* 32:1–9. <http://www.choicesmagazine.org/choices-magazine/submitted-articles/the-potential-for-healthier-and-energy-efficient-american-diets>
- Rehkamp, S., and P. Canning. 2018. "Measuring Embodied Blue Water in American Diets: An EIO Supply Chain Approach." *Ecological Economics* 147:179–188. <http://www.sciencedirect.com/science/article/abs/pii/S092180091730455X>
- Reinhardt, S. 2019. *Delivering on the Dietary Guidelines: How Stronger Nutrition Policy Can Cut Healthcare Costs and Save Lives*. Cambridge, MA: Union of Concerned Scientists. <http://www.ucsusa.org/dietary-guidelines>
- Reinhardt, S., R. Boehm, N. Tichenor Blackstone, N.H. El-Abbadi, J.S. McNally Brandow, S.F. Taylor, and M.S. DeLonge. In production. "Review of Dietary Patterns and Sustainability in the United States." *Advances in Nutrition*. doi: 10.1093/advances/nmaa026
- Ritchie, H., D.S. Reay, and P. Higgins. 2018. "The Impact of Global Dietary Guidance on Climate Change." *Global Environmental Change* 49:46–55. <https://doi.org/10.1016/j.gloenvcha.2018.02.005>
- Sifferlin, A. 2016. "Here's What 10 Experts Think of the Government's New Diet Advice." *Time*, September 7, 2016. <https://time.com/4170928/dietary-guidelines-nutrition-experts>
- Smith, D.R., K.W. King, and M.R. Williams. 2015. What is causing the harmful algal blooms in Lake Erie? *Journal of Soil and Water Conservation* 70(2):27A–29A. <http://dx.doi.org/10.2489/jswc.70.2.27a>
- Tom, M.S., P.S. Fischbeck, and C.T. Hendrickson. 2016. "Energy Use, Blue Water Footprint, and Greenhouse Gas Emissions for Current Food Consumption Patterns and Dietary Recommendations in the US." *Environment Systems and Decisions* 36:92–103. <https://link.springer.com/article/10.1007/s10669-015-9577-y>
- Veenstra, J.J., and C.L. Burras. 2015. Soil profile transformation after 50 years of agricultural land use. *Soil Science Society of America Journal* 79(4):1154–1162. doi:10.2136/sssaj2015.01.0027
- Vermeulen, S.J., B.M. Campbell, and J.S.I. Ingram. 2012. "Climate Change and Food Systems." *Annual Review of Environment and Resources* 37:195–222. <http://www.annualreviews.org/doi/10.1146/annurev-environ-020411-130608>
- WHO (World Health Organization). 2016. "Decade of Action on Nutrition." Geneva, Switzerland. http://www.who.int/nutrition/decade-of-action/information_flyer/en/
- Willett, W.C., and M.J. Stampfer. 2013. "Current Evidence on Healthy Eating." *Annual Review of Public Health* 34:77–95. <http://www.annualreviews.org/doi/abs/10.1146/annurev-publhealth-031811-124646>
- Willett, W.C., J. Rockstrom, B. Loken, M. Springmann, T. Lang, S. Vermeulen, T. Garnett, et al. 2019. "Food in the Anthropocene: The EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems." *The Lancet* 393 (10170): 447–492. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)

The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with people across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

NATIONAL HEADQUARTERS

Two Brattle Square
Cambridge, MA 02138-3780
Phone: (617) 547-5552
Fax: (617) 864-9405

WASHINGTON, DC, OFFICE

1825 K St. NW, Suite 800
Washington, DC 20006-1232
Phone: (202) 223-6133
Fax: (202) 223-6162

WEST COAST OFFICE

500 12th St., Suite 340
Oakland, CA 94607-4087
Phone: (510) 843-1872
Fax: (510) 451-3785

MIDWEST OFFICE

One N. LaSalle St., Suite 1904
Chicago, IL 60602-4064
Phone: (312) 578-1750
Fax: (312) 578-1751