

Summary

Where are we?

Food system activities, in particular livestock production, contribute a significant amount of greenhouse gas emissions. If current production and consumption practices continue, these emissions are expected to increase to the point where agriculture will nearly exhaust the 2°C greenhouse gas emissions budget by 2050.

Where do we want to go?

Dramatic reductions in meat and dairy consumption in high-consuming populations, alongside reductions in wasted food, are crucial for avoiding the most catastrophic climate change scenarios. Achieving this goal requires a nuanced approach to food system emissions mitigation strategies. Demand-side mitigation strategies should result in a reduction in the *global average* consumption of animal-based foods from projected amounts, with a particular emphasis on reductions among populations that already consume above-average amounts of animal-based foods.

How do we get there?

1. Include experts on sustainable food consumption and waste in the Talanoa roundtables at COP24, and in other discussions of climate change mitigation pathways leading up to the next round of NDCs.
2. Develop and scale-up frameworks for consumption-based emissions accounting in climate commitments.
3. Build upon existing strategies and efforts to support dietary shifts towards plant-centric diets and wasted food reductions.
4. Draw on the expertise and perspectives of civil society.

CLIMATE SOLUTIONS: SHIFTING DIETS AND REDUCING WASTED FOOD

Talanoa Dialogue Submission

Johns Hopkins Center for a Livable Future

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Introduction

We are researchers at The Johns Hopkins Center for a Livable Future (CLF), based at the Bloomberg School of Public Health in the Department of Environmental Health and Engineering, in Baltimore, Maryland, USA. The CLF engages in research, policy analysis, education, and other activities guided by an ecological perspective that diet, food production, the environment, and public health are interwoven elements of a complex system. For more than 20 years, we have researched the public health and environmental implications of food production and related policies in the United States (US). Recognizing that the food system is global and therefore inextricably linked to the global challenge of climate change, the CLF has conducted research and performed policy analyses to facilitate better understanding of how to support food security and health in a changing climate, with particular emphasis on the greenhouse gas (GHG) emissions associated with dietary changes and wasted food^{1,2,3} and regarding urban food system resilience.^{4,5,6} We welcome the opportunity to share our expertise and insights regarding how best to implement and enhance Nationally Determined Contributions (NDCs) from a food systems and public health perspective.

This document was prepared by researchers at the Johns Hopkins Center for a Livable Future as a non-Party stakeholder submission to the Talanoa Dialogue of the United Nations Framework Convention on Climate Change.

Disclaimer: The opinions expressed herein are our own and do not necessarily reflect the views of The Johns Hopkins University.

In 2015, researchers from the CLF prepared a review of scientific literature on the role of reducing consumption of animal-based foods and wasted food in helping to meet climate change mitigation targets.⁷ Recognizing that few to none of the Intended Nationally Determined Contributions (INDCs) from Parties included wasted food or dietary shifts in their strategies, the report included recommendations for policies and interventions to address this omission. Since the ratification of the Paris Agreement, these demand-side solutions to addressing the food system's contribution to greenhouse gas emissions are still not fully represented in NDCs and are only recently beginning to be part of discussions of climate mitigation more broadly. Given the growing body of evidence highlighted in the recent Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C (SR15), it is urgent that climate commitments and subsequent actions by Parties and non-Party stakeholders incorporate every strategy possible, particularly those as impactful as shifting diets and reducing wasted food. In the spirit of the Talanoa Dialogue, this submission provides a perspective on the current state of food systems GHG emissions and recommends initial steps needed to contribute to 1.5°C-consistent climate action through demand-side food strategies.

Where are we?

Food system activities, including producing, transporting and disposing of food, generate up to 30% of global anthropogenic GHG emissions.^{8,9} Of these sources, livestock production is the largest, accounting for an estimated 14.5% of global GHG emissions from human activities.¹⁰ Meat and dairy from ruminant animals, such as cattle and goats, are particularly emissions-intensive.¹¹ Under the business-as-usual scenario modeled by Bajželj et al.,¹² in which the global population increases to 9.6 billion and global meat and dairy consumption increases with rising GDP, emissions from food production alone would nearly exhaust the emissions budget for all sectors in 2050. This projection includes emissions associated with land-use change, such as deforestation. Without an ambitious, global dietary shift toward plant-centric diets, it will be extremely difficult to meet climate mitigation goals.^{12,13,14,15,16,17}

In addition, globally about 30% of the food supply (by mass) is wasted.¹⁸ If all the world's food losses and waste were represented as a country, that "country" would globally be the third highest GHG emitter, after China and the US.¹⁹ Discarding food is akin to discarding all the embodied GHG emissions involved in its production, processing, transportation, cold storage, and preparation.²⁰ Additionally, when food decomposes in landfills, it generates significant quantities of methane, a GHG which is up to 84 times more potent than carbon dioxide.²¹

Mitigation potential of demand-side agricultural solutions

As highlighted in SR15, demand-side solutions offer significant climate mitigation potential if realized. Substantially reducing global average meat intake by 2050, particularly among the highest-consuming populations, could reduce global agriculture emissions by an estimated 55-72%.^{22,23,24} Halving global wasted food by 2050 could additionally reduce food production-related emissions by 22% compared to projected emissions.¹² An October 2018 study found that mitigating GHG emissions cannot be achieved without a combination of measures, including dietary shifts and reductions in food loss and waste.¹³

Absence of dietary shifts and wasted food in climate change commitments

Addressing animal-based food consumption and wasted food are crucial for reaching Paris Agreement goals and keeping global temperature rise within 1.5°C. Yet these topics have thus far not received attention commensurate with their mitigation potential in discussions of national climate commitments and strategies. Thus far, country-level efforts related to agriculture's role in climate change have focused primarily on adaptation measures, and to some extent on mitigating GHGs by supporting and investigating interventions that improve production practices, limit deforestation, and enhance carbon sequestration. While the role of food production in climate change policy has certainly been enhanced over the years, these existing approaches do not take advantage of the significant mitigation potential of demand-side food system solutions, nor the potential for co-benefits to health and environment^{25,26,27} and progress toward meeting the Sustainable Development Goals. According to the IPCC, a significant shift from over-consumption of animal-based food products toward plant-centric diets, as well as wasted food reductions, will provide many co-benefits to achieving Sustainable Development Goals 2 (Zero Hunger), 6 (Clean Water and Sanitation), 3 (Good Health and Well-Being), 12 (Responsible Consumption and Production), and 15 (Land) (IPCC SR15, 5.4.1.3).²⁸

Few to no NDCs explicitly mention dietary shifts or reducing wasted food as ways to mitigate GHGs.⁷ Without measurable commitments to address these issues as part of national climate strategies, there is little incentive to develop and implement the full range of food systems solutions needed to mitigate climate change. Furthermore, concrete commitments are invaluable for measuring and tracking progress. Acknowledging this gap and establishing measurable goals is a necessary step towards affecting change.

Where do we want to go?

We envision a future in which a more sustainable, resilient, equitable, and less wasteful global food system supports healthy, balanced diets, without overstepping planetary boundaries.

Dramatic reductions in meat and dairy consumption in high-consuming populations, alongside reductions in wasted food, are crucial for avoiding the most catastrophic climate change scenarios. Achieving this goal requires a nuanced approach to food system emissions mitigation strategies.

Efforts to shift diets should be context-specific and sensitive to the nutritional needs and food security of different populations. Undernourished populations could benefit from increased animal product consumption. For the growing proportion of the global population with diet-related non-communicable diseases, diets that are high in plant-based foods and low in animal-based foods can offer health co-benefits. Excessive red and processed meat consumption is associated with increased risk of diabetes and heart disease,²⁹ while plant-rich diets can help decrease the risks of those diseases.^{30,31,32} In addition, plant-based diets offer several other environmental benefits, including more efficient use of land, water, nitrogen, and other resources.^{33,34,35}

Therefore, demand-side food system GHG mitigation strategies should result in a reduction in the *global average* consumption of animal-based foods from projected amounts, with a particular emphasis on reductions among populations that already consume above-average amounts of animal foods.

How do we get there?

More than ever, the world needs global collaboration and local action to keep global temperature rise below 1.5°C. Although no single approach will be enough to meet climate goals in the agriculture, food and land use sector,¹³ the recent IPCC report recognizes the critical role of the food system in this crisis and asserts that agriculture and dietary change are critical parts of the transitions they say are needed. We present actions that Party and non-Party stakeholders should consider in preparation for the Talanoa Dialogue, and as countries work to enhance their climate commitments:

1) Include perspectives from experts on sustainable food consumption and waste in the Talanoa roundtables at COP24, and in other discussions of climate change mitigation pathways leading up to the next round of NDCs.

To support a sustainable and healthy global food system of the future, Parties and non-Party Stakeholders must recognize the need to implement demand-side food system strategies to mitigate climate change and identify concrete, measurable, and effective interventions to achieve them.

2) Develop and scale-up frameworks for including consumption-based emissions accounting in national and sub-national climate commitments.

SR15 specifically discusses the benefits of mitigation pathways that involve reducing animal-based food consumption, as well as reduced demand in other sectors. Governments, from the local to national level, need to be able to more easily account for and track this critical component of mitigation in their NDCs and other climate commitments. Such accounting methods exist, but have not yet been adopted widely by governments. Measuring both consumption and production-based emissions can provide a more complete picture of mitigation pathways and progress.

3) Build upon existing strategies and efforts to support dietary shifts and wasted food reductions.

Many stakeholders from sub-national governments, businesses, non-governmental organizations (NGOs), and academia have already begun integrating dietary change and wasted food into their climate action work. These innovative leaders should be included in the Talanoa process and invited to share their successes, challenges, and ideas for collaborative demand-side solutions. Engaging with and learning from these stakeholders and their experiences is important for expanding and scaling up demand-side food system mitigation strategies. Examples of ongoing actions include:

Dietary Shifts

- ▶ Cities, such as those in the C40 group, are measuring consumption-based food emissions as a step towards taking action and tracking progress of demand-side interventions.³⁶
- ▶ Other cities are adopting behavioral campaigns such as Meatless Monday to raise awareness of the impacts of dietary shifts on health and climate and to introduce consumers to plant-based foods.³⁷
- ▶ NGOs, food service providers, institutions, and governments from local to federal levels are partnering to develop and adopt procurement standards that support purchasing and serving more plant-centric meals.^{38,39,40}
- ▶ Several countries have recommended reducing meat consumption in their dietary guidelines.⁴¹

Many of these innovators shared their work at the September 2018 Global Climate Action Summit in California, demonstrating that governments and businesses can play a role in demand-side climate solutions.

Reducing Wasted Food

The United Nations Sustainable Development Goal 12.3 calls for cutting

wasted food in half by 2030. Many individual countries and sub-national governments have set similar goals and are investing in research, innovation, and policies to tackle lost and wasted food.⁴² Interventions to reduce wasted food in higher income countries should focus on the consumer, including expiration date labeling and quality standards, changing conditions to support consumers in improving their shopping/eating practices, and controlling market supply. In lower- and middle-income countries, the greatest need for change is in reducing loss through shifts in production and distribution, including improvements to infrastructure, storage capacity, mechanization, and packaging.

4) Utilize the expertise and perspectives of civil society.

Recognizing this issue in the Talanoa Dialogue as well as other discussions of how to meet climate commitments can empower civil society and businesses to contribute meaningfully to meeting global climate goals and make use of the unharnessed resources, expertise, and grassroots support of civil society.

A growing number of academics and NGOs are focusing their attention and efforts on the necessity of including demand-side food system solutions in climate change mitigation strategies. For example, in April 2017 our organization hosted a workshop for academic and non-profit organizations based in Europe and the United States who are already working to support shifts to more sustainable global food consumption. The workshop attendees and other interested groups formed the *Food and Climate Alliance*, which has grown to include representatives of more than 45 organizations from 13 countries. The Alliance provides a platform for communication and collaboration between academic researchers and non-profit organizations working to inform, evaluate, and implement international, national, and sub-national policies that reduce greenhouse gas emissions through demand-side actions.

Such groups, as well as the individuals and organizations represented by them, present avenues for collaboration between civil society, business, and government institutions. To fully harness the energy and expertise of civil society groups, however, Parties and the UNFCCC Secretariat must highlight this important issue in discussions of evidence-based strategies for addressing climate mitigation and make strong efforts to include civil society groups in the conversation.

Conclusion

Demand-side food system solutions such as shifting diets and reducing wasted food have vast potential for helping to achieve the Paris Agreement goals and keep global warming within 1.5°C. Without recognizing this and taking action, there is virtually zero chance we as a global community can meet our climate goals. Without recognizing and implementing this critical solution, the global community will also miss out on opportunities for supporting health and environmental co-benefits. We look forward to the opportunities that the Talanoa Dialogue brings to this process.

References

- 1 Kim, B., & Neff, R.A. (2009). Measurement and communication of greenhouse gas emissions from U.S. food consumption via carbon calculators: A review of scope, methods and communication. *Ecological Economics* 69(1):186-196.
- 2 Laestadius, L.I., Neff, R.A., Barry, C.L., & Frattaroli, S. (2013). Meat consumption and climate change: The role of non-governmental organizations. *Climatic Change* 120(1):25-38.
- 3 Neff, R.A., Parker, C.I., Kirschenmann, F., Tinch, J., & Lawrence, R.S. (2011). Peak oil, food systems and public health. *American Journal of Public Health* 101(9):1587-97.
- 4 Biehl, E., Buzogany, S., Huang, A., Chodur, G., Neff, R. (2017). *Baltimore Food System Resilience Advisory Report*. Baltimore, MD: Johns Hopkins Center for a Livable Future.
- 5 Hecht, A., Biehl, E., Buzogany, S., Neff, R.A. (2018) Using a trauma-informed policy approach to create a resilient urban food system. *Public Health Nutr*, 21(10), 1961-70. doi: 10.1017/S1368980018000198
- 6 Chodur, G., Zhao, X., Biehl, E., Mitrani-Reiser, J., Neff, R.A. (2018). Assessing food system vulnerabilities: a fault tree modeling approach. *BMC Public Health*, 18(817). <https://doi.org/10.1186/s12889-018-5563-x>.
- 7 Kim, B., Neff, R., Santo, R., & Vigorito, J. (2015). *The Importance of Reducing Animal Product Consumption and Wasted Food in Mitigating Catastrophic Climate Change*. Baltimore, MD: Johns Hopkins Center for a Livable Future.
- 8 Vermeulen, S. J., Campbell, B. M., & Ingram, J. S. (2012). Climate change and food systems. *Annual Review of Environment and Resources*, 37.
- 9 Garnett, T. (2011). Where are the best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)? *Food Policy* 36, S23-S32.
- 10 Gerber, P. J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., ... & Tempio, G. (2013). *Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities*. Food and Agriculture Organization of the United Nations (FAO).
- 11 Tilman, D., & Clark, M. (2014). Global diets link environmental sustainability and human health. *Nature*, 515(7528), 518-522.
- 12 Bajželj, B., Richards, K. S., Allwood, J. M., Smith, P., Dennis, J. S., Curmi, E., & Gilligan, C. A. (2014). Importance of food-demand management for climate mitigation. *Nature Climate Change*, 4(10), 924-929.
- 13 Springmann, M., Clark, M., Mason-D'Croz, D., Weibe, K., Bodirsky, B., Lassaletta, L., ... Willet, W. (2018) Options for keeping the food system within environmental limits. *Nature*. <https://doi.org/10.1038/s41586-018-0594-0>
- 14 Hedenus, F., Wirsenius, S., & Johansson, D. J. (2014). The importance of reduced meat and dairy consumption for meeting stringent climate change targets. *Climatic Change*, 124(1-2), 79-91.

- 15 Bryngelsson, D., Wirsenius, S., Hedenus, F. & Sonesson, U. (2016). How can the EU climate targets be met? A combined analysis of technological and demand-side changes in food and agriculture. *Food Policy*, 59,152–64.
- 16 Bennetzen, E. H., Smith, P., & Porter, J.R. (2016). Decoupling of greenhouse gas emissions from global agricultural production: 1970–2050. *Glob. Change Biol*, 22, 763–81
- 17 Ranganathan, J. *et al.* Shifting Diets for a Sustainable Food Future. (2016). World Resources Institute, Washington, D.C.
- 18 Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). *Global food losses and food waste* (pp. 1-38). Rome: FAO.
- 19 Food and Agriculture Organization of the United Nations. (2013). *Food Wastage Footprint: Impacts on Natural Resources*. Rome: FAO.
- 20 Food and Agriculture Organization of the United Nations (2013).
- 21 Allen, M. (2015). *Short-lived promise? The science and policy of cumulative short-lived climate pollutants*. Oxford Martin School Policy Paper. Retrieved from http://www.oxfordmartin.ox.ac.uk/downloads/briefings/Short_Lived_Promise.pdf
- 22 Tilman, D. & Clark, M. (2014). Global diets link environmental sustainability and human health. *Nature*, 515(7528), 518-522.
doi:<http://www.nature.com/nature/journal/v515/n7528/full/nature13959.html>.
- 23 Stehfest, E., Bouwman, L., van Vuuren, D.P., den Elzen, M.G.J., Eickhout, B., Kabat, P. (2009). Climate Benefits of Changing Diet. *Clim Change*, 95, 83-102.
- 24 Popp, A., Lotze-Campen, H., Bodirsky, B. (2010). Food consumption, diet shifts and associated non-CO2 greenhouse gases from agricultural production. *Glob Environ Chang*, 20(3), 451-462.
doi:10.1016/j.gloenvcha.2010.02.001.
- 25 Gao, J., Kovats, S., Vardoulakis, S., Wilkinson, P., Woodward, A., Li, J., ... & Song, X. (2018). Public health co-benefits of greenhouse gas emissions reduction: A systematic review. *Science of The Total Environment*, 627, 388-402.
- 26 Friel, S. *et al.* (2009). Public health benefits of strategies to reduce greenhouse-gas emissions: food and agriculture. *The Lancet*, 374, 2016-2025. doi:10.1016/S0140-6736(09)61753-0 (2009).
- 27 Nelson, M.E., Hamm, M.W., Hu, F.B., Abrams, S.A., & Griffin, T.S. (2016). Alignment of healthy dietary patterns and environmental sustainability: A systematic review. *Advances in Nutrition*, 7, 1005-1025
- 28 Intergovernmental Panel on Climate Change. (2018). Global Warming of 1.5°C (Special Report 15). Section 5.4.1.3.
- 29 Micha, R., Wallace, S. K., & Mozaffarian, D. (2010). Red and processed meat consumption and risk of incident coronary heart disease, stroke, and diabetes: A systematic review and meta-analysis. *Circulation*, 121(21), 2271–2283. <http://doi.org/10.1161/CIRCULATIONAHA.109.924977>

- 30 American Dietetic Association. Position of the American Dietetic Association: Vegetarian Diets. *J Am Diet Assoc.* 2009; 109:1266-1282
- 31 Crowe, F. L., Appleby, P. N., Travis, R. C., & Key, T. J. (2013). Risk of hospitalization or death from ischemic heart disease among British vegetarians and nonvegetarians: results from the EPIC-Oxford cohort study. *The American Journal of Clinical Nutrition*, 97(3), 597-603.
- 32 Schwingshackl, L., Hoffmann, G., Lampousi, A.M. et al. (2017). Food groups and risk of type 2 diabetes mellitus: a systematic review and meta-analysis of prospective studies. *Eur J Epidemiol* doi:10.1007/s10654-017-0246-y
- 33 Nelson, M. E., Hamm, M. W., Hu, F. B., Abrams, S. A., & Griffin, T. S. (2016). Alignment of healthy dietary patterns and environmental sustainability: A systematic review. *Advances in Nutrition: An International Review Journal*, 7(6), 1005-1025.
- 34 Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A. G., de Souza Dias, B. F., ... & Horton, R. (2015). Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health. *The Lancet*, 386(10007), 1973-2028.
- 35 Springmann, M., Godfray, H. C. J., Rayner, M., & Scarborough, P. (2016). Analysis and valuation of the health and climate change cobenefits of dietary change. *Proceedings of the National Academy of Sciences*, 113(15), 4146-4151.
- 36 C40 Cities Climate Leadership Group. (2018). Consumption-based GHG Emissions of C40 Cities.
- 37 City of New York. (October 2017). "Mayor de Blasio, Chancellor Fariña and Borough President Adams Announce 15 Brooklyn Schools to Participate in Meatless Mondays." Available at: <http://www1.nyc.gov/office-of-the-mayor/news/675-17/mayor-de-blasio-chancellor-fari-a-borough-president-adams-15-brooklyn-schools-to>
- 38 Footprint Intelligence and Nestlé Professional. (2018). Action on Sustainable Diets.
- 39 Compass Group. (September 2017). "School and Hospital Menus Add More Plant-Based Options to Meet Growing Demand." Available at: <http://www.compass-usa.com/school-hospital-menus-add-plant-based-options-meet-growing-demand/>
- 40 Health Care Without Harm. (2017). *Redefining Protein: Adjusting Diets to Protect Public Health and Conserve Resources*.
- 41 Fischer, C. G., and Garnett, T. (2016). Plates, Pyramids and Planets: Developments in National Healthy and Sustainable Dietary Guidelines. Food and Agriculture Organization of the United Nations and Food Climate Research Network.
- 42 Gorski, I., Siddiqi, S. & Neff, R. (2017). *Governmental Plans to Address Waste of Food*. Johns Hopkins Center for a Livable Future. Available at: https://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/_pdf/projects/wasted-food/governmental-plans-to-address-waste-of-food.pdf