

Eating in the Anthropocene:

Can we mitigate climate change through food systems?

Jessica Fanzo, PhD Bloomberg Distinguished Professor Johns Hopkins University, USA

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PART 1:

Food systems are both victims and instigators of climate change

We are in the middle of catastrophic climate breakdown

Socio-economic trends

The Anthropocene defines Earth's most recent geologic time period as being human-influenced, or anthropogenic, based on overwhelming global evidence that atmospheric, geologic, hydrologic, biospheric and other earth system processes are now altered by humans.

Population Foreign direct Real GDP 60 investment 50 ion US dollar 40 S 30 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 Urban Primary Fertilizer 500 160 population consumption energy use <u></u> 400 120 릑 300 80 200 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 Large dams Water use 400 Paper production e 300 2 F 200 15 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 2010 Transportation International *ଘ* 1200 Telecommunications 800 tourism 1000 ·È 600 800 600 ₫ 400 400 200 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 1750 1800 1850 1900 1950 2000 2010

Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O. and Ludwig, C., 2015. The trajectory of the Anthropocene: the great acceleration. The Anthropocene Review, 2(1), pp.81-98.

Climate change is projected to have a net adverse impact on crop yields

3C warmer (scarier) world scenario



Searchinger, T., Waite, R., Hanson, C., Ranganathan, J., Dumas, P., Matthews, E. and Klirs, C., 2019. Creating a sustainable food future: A menu of solutions to feed nearly 10 billion people by 2050. Final report. World Resources Institute, Washington DC. <u>https://research.wri.org/sites/default/files/2019-07/WRR_Food_Full_Report_0.pdf</u>

Nutritional quality of crops are altered by CO2 fertilization effects



20% declines in protein

14% declines in iron

15% declines in zinc

Beach, R.H., et al 2019. Combining the effects of increased atmospheric carbon dioxide on protein, iron, and zinc availability and projected climate change on global diets: a modelling study. *The Lancet Planetary Health*, *3*(7), pp.e307-e317.

Food systems contribute to GHG emissions



OurWorldinData.org - Research and data to make progress against the world's largest problems. Licensed under CC-BY by the author Hannah Ritchie. GHG emissions. Nature Food, 2(3), pp.198-209.

Implications of raising meat for consumption amid hunger

- Approximately ½ of global cereal production is used to meet the demand for animal meats.
- What is ethically permissible when we have people who are going hungry?



Data source: UN Food and Agriculture Organization (FAO)

OurWorldinData.org - Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Hannah Ritchie and Max Roser in 2019.

Pimentel D. Livestock Production: Energy Inputs and the Environment; Water Footprint Network; Wang Y, Beydoun MA, Caballero B et al. Trends and correlates in meat consumption patterns in the US adult population. Public Health Nutr. 2010 Sep;13(9):1333–45

PART 2:

The impacts of climate and food systems on diets and food security

Climate change is a threat to food security



Hasegawa, T., Fujimori, S., Havlík, P., Valin, H., Bodirsky, B.L., Doelman, J.C., Fellmann, T., Kyle, P., Koopman, J.F., Lotze-Campen, H. and Mason-D'Croz, D., 2018. Risk of increased food insecurity under stringent global climate change mitigation policy. *Nature Climate Change*, *8*(8), pp.699-703.

All forms of malnutrition & food insecurity are not improving fast enough or worsening

720 - 811 million (10%) of the world's population are undernourished

149 million children under five years of age are stunted

45 million

children under five years of age are wasted

39 million

children under five years of age are overweight

2.1 billion adults are overweight or obese

B Countries with DBM in the 2010s according to weight and height data



WHD/UNICEF/World Bank Group. Joint Malnutrition Estimates 2021; FAD, IFAD, UNICEF, WFP and WHD. 2020. The State of Food Security and Nutrition in the World 2020. Rome, FAD; Popkin, B.M., Corvalan, C. and Grummer-Strawn, L.M., 2020. Dynamics of the double burden of malnutrition and the changing nutrition reality. *The Lancet, 395*(10217), pp.65-74.

Sub-optimal diets are a top risk factor of disease and death



Afshin, A., Sur, P.J., Fay, K.A., Cornaby, L., Ferrara, G., Salama, J.S., Mullany, E.C., Abate, K.H., Abbafati, C., Abebe, Z. and Afarideh, M., 2019. Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. The Lancet;

Inequities are deepening and plague progress

% of the population who cannot afford a healthy diet



3 billion people cannot afford a healthy diet!

FAD, IFAD, UNICEF, WFP and WHD. 2020. The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. Rome, FAD.

https://doi.org/10.4060/ca9692en; Julio Cortez Associated Press (BLM photo); Belanger, M.J., Hill, M.A., Angelidi, A.M., Dalamaga, M., Sowers, J.R. and Mantzoros, C.S., 2020. Covid-19 and disparities in nutrition and obesity. *New England Journal of Medicine, 383*(11), p.e69; Global Panel on Agriculture and Food Systems for Nutrition. 2020. Future Food Systems: For people, our planet, and prosperity. London, UK.

Some countries/individuals need to make bigger changes to their diets



Source: Food and Agriculture Organization of the United Nations; EAT-Lancet Commission OurWorldInData.org/diet-compositions • CC BY Note: Diets by country are given as food supply – this is higher than actual intakes because it does not correct for consumer waste.

Food prices can lead to social unrest & migration





Source: Hendrix C (2016) When Hunger Strikes: How Food Security Abroad Matters for National Security at Home. The Chicago Council on Global Affairs, Chicago USA; Wiebe et al 2015

PART 3:

How to begin the transformation of our food systems for better diets and nutrition?

1. Take a business *un*usual approach to achieve the Paris climate change targets



*Based on the EAT-Lancet Planetary Health diet which includes reduces but does not eliminate meat or dairy consumption. Source: Michael Clark et al. (2020). Global food system emissions could preclude achieving the 1.5° and 2°C climate change targets. Science. OurWorldinData.org - Research and data to make progress against the world's largest problems.

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2. Harness the political momentum we have now but let's not make these moments meaningless





Food Systems Summit 2021



UNITED NATIONS DECADE OF ACTION ON NUTRITION 2016-2025



Convention on Biological Diversity





INTERNATIONAL YEAR OF FRUITS AND VEGETABLES 2 2 2 1

3. Use the evidence and data to help policymakers make informed decisions

www.foodsystemsdashboard.org



Food Systems Countdown Initiative to 2030

Food Policy 104 (2021) 102163



Viewpoint

Viewpoint: Rigorous monitoring is necessary to guide food system transformation in the countdown to the 2030 global goals^{\ddagger}

Jessica Fanzo^{a,b,c,*,1,2}, Lawrence Haddad^{d,1,2}, Kate R. Schneider^{a,1}, Christophe Béné^{e,3}, Namukolo M. Covic^{f,3}, Alejandro Guarin^{8,3}, Anna W. Herforth^{h,3}, Mario Herrero^{1,3}, U. Rashid Sumaila^{j,3}, Nancy J. Aburto^k, Mary Amuyunzu-Nyamongo¹, Simon Barquera^m, Jane Battersbyⁿ, Ty Beal^d, Paulina Bizzotto Molina⁰, Emery Brusset^P, Carlo Cafiero^k, Christine Campeau^q, Patrick Caron[†], Andrea Cattaneo^k, Piero Conforti^k, Claire Davis^b, Fabrice A.J. DeClerck^{*}, Ismahane Elouafi^k, Carola Fabi^k, Jessica A. Gephart[†], Christopher D. Golden^u, Sheryl L. Hendriks[×], Jikun Huang^w, Amos Laar[×], Rattan Lal[×], Preetmoninder Lidder^k, Brent Loken^z, Quinn Marshall^c, Yuta J. Masuda^{aa}, Rebecca McLaren^b, Lynnette M. Neufeld^d, Stella Nordhagen^d, Roseline Remans^{ab}, Danielle Resnick^{ac}, Marissa Silverberg^c, Maximo Torero Cullen^k, Francesco N. Tubiello^k, Jose-Luis Vivero-Pol^{ad}, Shijin Wei^{ae}, Jose Rosero Moncayo^{k,2}

Fanzo, J., Haddad, L., McLaren, R., Marshall, Q., Davis, C., Herforth, A., Jones, A., Beal, T., Tschirley, D., Bellows, A. and Miachon, L., 2020. The Food Systems Dashboard is a new tool to inform better food policy. *Nature Food*, pp.1-4.

4. Use all the tools in the toolbox

None

Limited High

Mitigation and adaptation potential



Very high



Rosenzweig, C., Mbow, C., Barioni, L.G., Benton, T.G., Herrero, M., Krishnapillai, M., Liwenga, E.T., Pradhan, P., Rivera-Ferre, M.G., Sapkota, T. and Tubiello, F.N., 2020. Climate change responses benefit from a global food system approach. *Nature Food*, *1*(2), pp.94-97.

5. Consider how people make decisions about what to eat - what is ethically permissible, acceptable and affordable?

Global consumption of ultra-processed food and drink products (change 2002–2016)



The neglected environmental impacts of ultra-processed foods

impacts, with 26% of anthropogenic greenhouse gas that environmental considerations of diets capture the emissions globally attributed to the total food supply overall impact of UPFs from farm to fork, including the chain.¹ As a response to the urgent need to address the stages of processing, packaging, and distribution. climate emergency, research assessing the environmental Established methods should specifically address ultra

What and how we eat have important environmental (ie, vegetable oils and refined sugar). It is imperative

Comment

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Global Panel on Agriculture and Food Systems for Nutrition. 2020. Future Food Systems: For people, our planet, and prosperity. London, UK.

COVID-19 and World Order

THE FUTURE OF CONFLICT, COMPETITION, AND COOPERATION

EDITED BY HAL BRANDS I FRANCIS J. GAVIN

6. Learn from COVID

- 1. Food systems engage in a dance of complex societal systems
- 2. "We are all in this together" type problems require strong public institutions at national and supranational levels
- 3. Stabilize food systems and keep trade open and flowing
- 4. Support and protect food system workers
- 5. Govern the regulation of illegal sales of wildlife in global food trade and food markets
- 6. Link social protection programs to delivering healthy diets
- 7. Consider a **One Health** approach for research collaborations
- 8. Institute a systematic global effort to monitor pathogens emerging from animals

Fanzo, J (2020) No Food Security, No World Order. Chapter 8 In: COVID-19 and World Order The Future of Conflict, Competition, and Cooperation. Edited by Hal Brands and Francis J. Gavin. Read for Free on Project MUSE September 1. JHU Press.

7. Fix the elephants in the room head-on

- Build a supportive political environment
- Invest in the right places
- Develop human capacity
- Cultivate movements, coalitions & networks
- Champion human rights & equity
- Balance power
- Mitigate conflicts of interest
- Consider incentives



Thank you!

@jessfanzo jfanzo1@jhu.edu



JESSICA FANZO

Can Fixing Dinner Fix the Planet?

