Can we have both human and planetary health?

Food systems transformation in the midst of climate (and pandemic) disruption

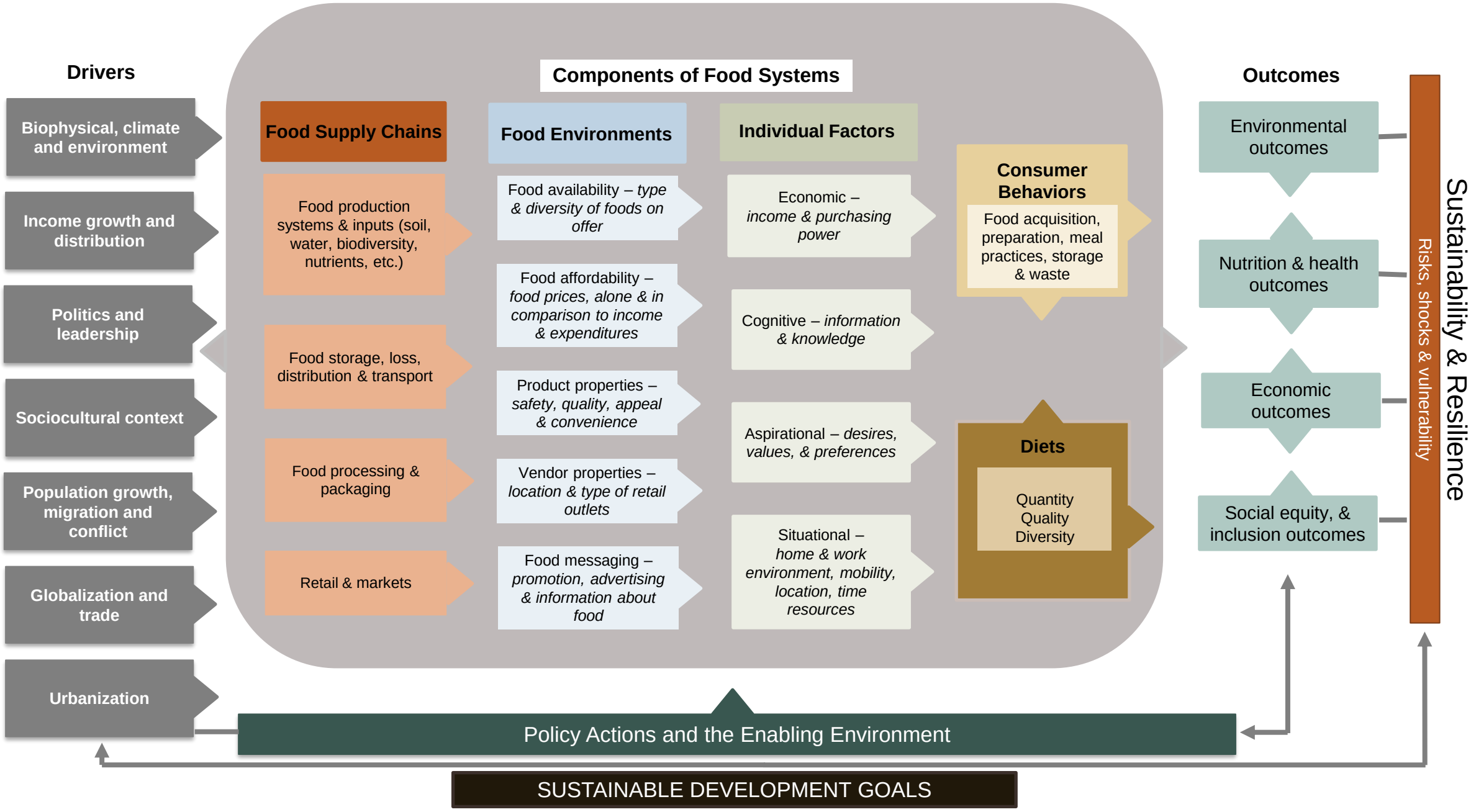
Jess Fanzo PhD

Bloomberg Distinguished Professor of Global Food Policy and Ethics

The Johns Hopkins University

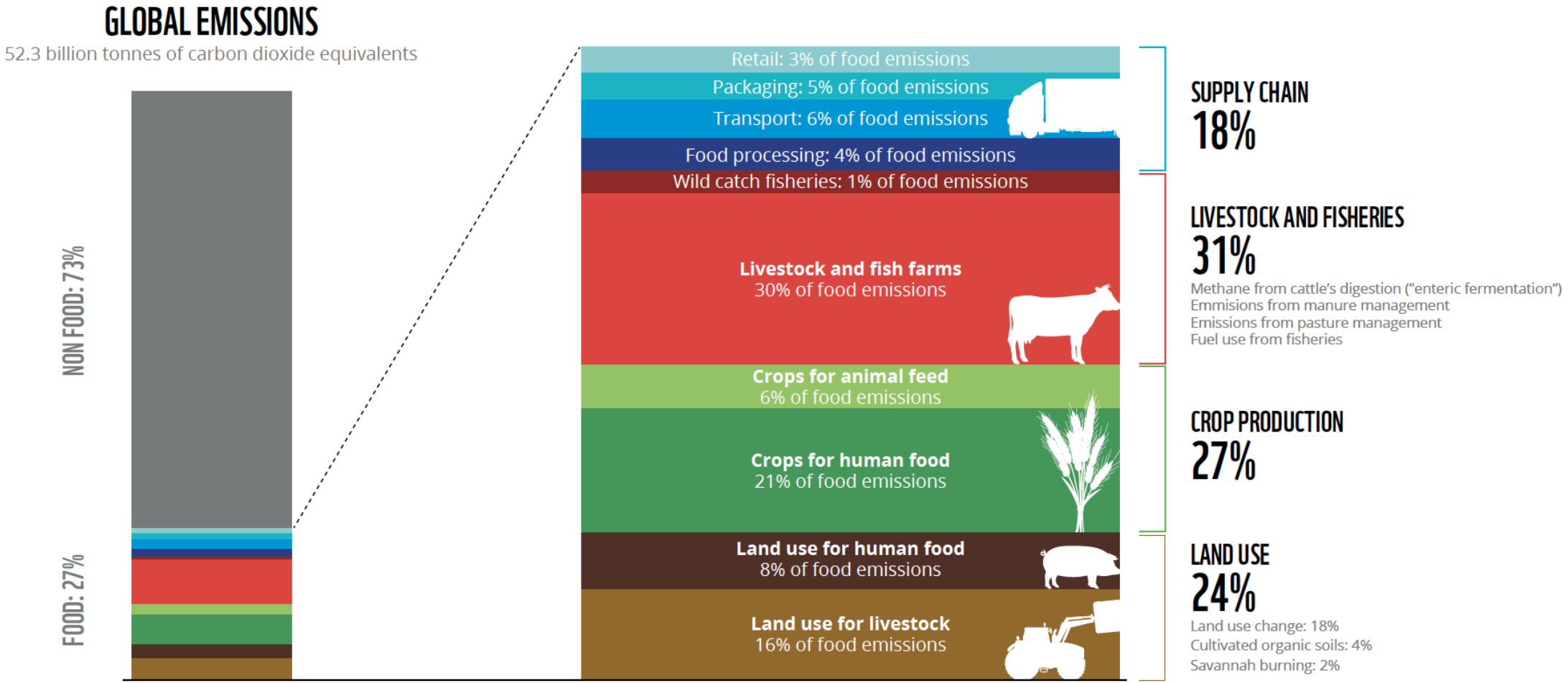
UN Women/Ryan Brown

Food systems: victims and instigators



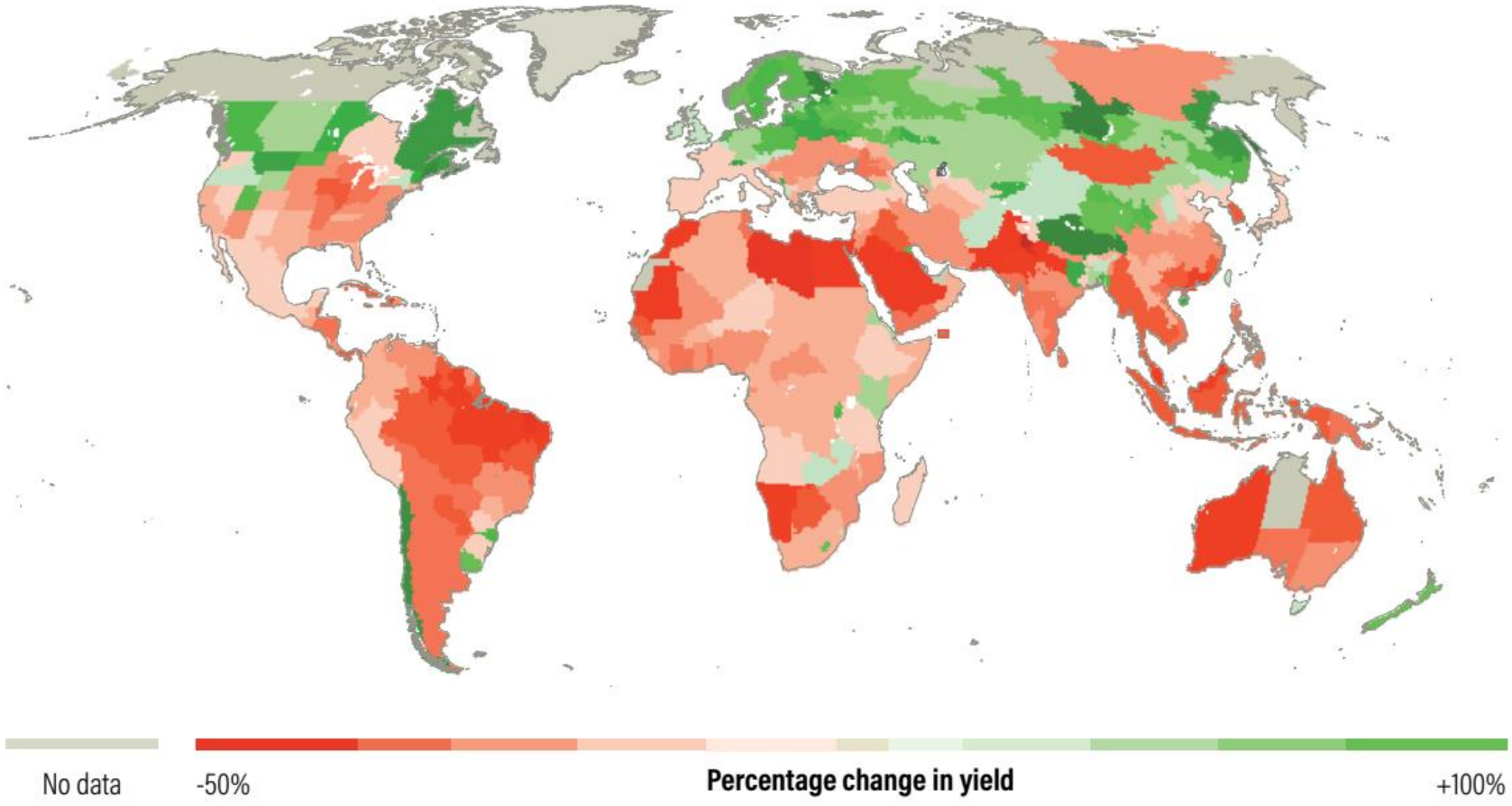
Fanzo, J., et al, 2020. The Food Systems Dashboard is a new tool to inform better food policy. *Nature Food*, *1*(5), pp.243-246.

Food systems are contributing to global greenhouse emissions



WWF (2020). Bending the Curve: The Restorative Power of Planet-Based Diets. Loken, B. et al. WWF, Gland, Switzerland

Quantity of crops & climate change

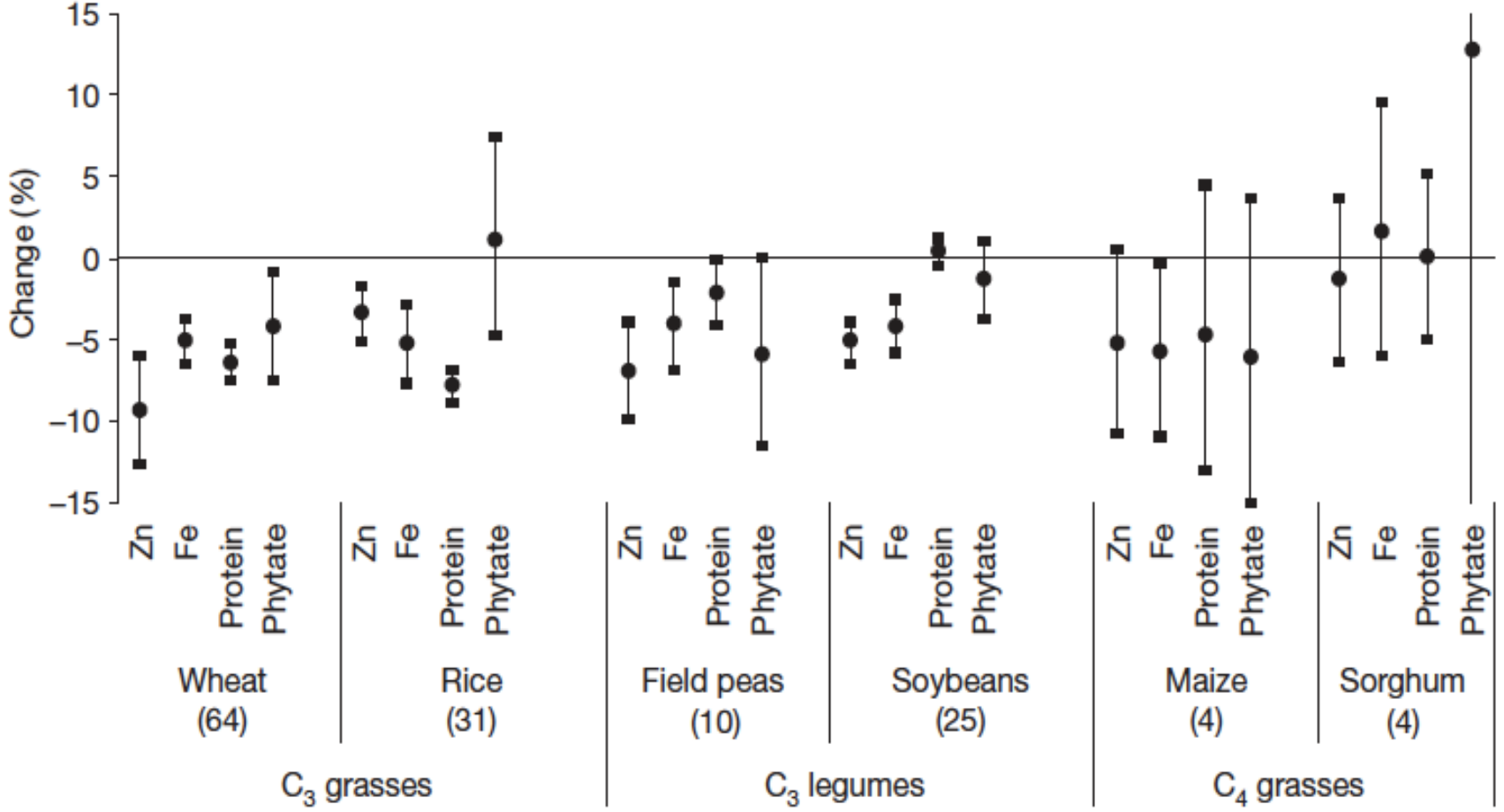


Note: Maps are for illustrative purposes and do not imply the expression of any opinion on the part of WRI concerning the legal status of any country or territory, or concerning the delimitation of frontiers or boundaries.
Source: World Bank (2010).

Climate change is projected to have a net adverse impact on crop yields (3C warmer world scenario)

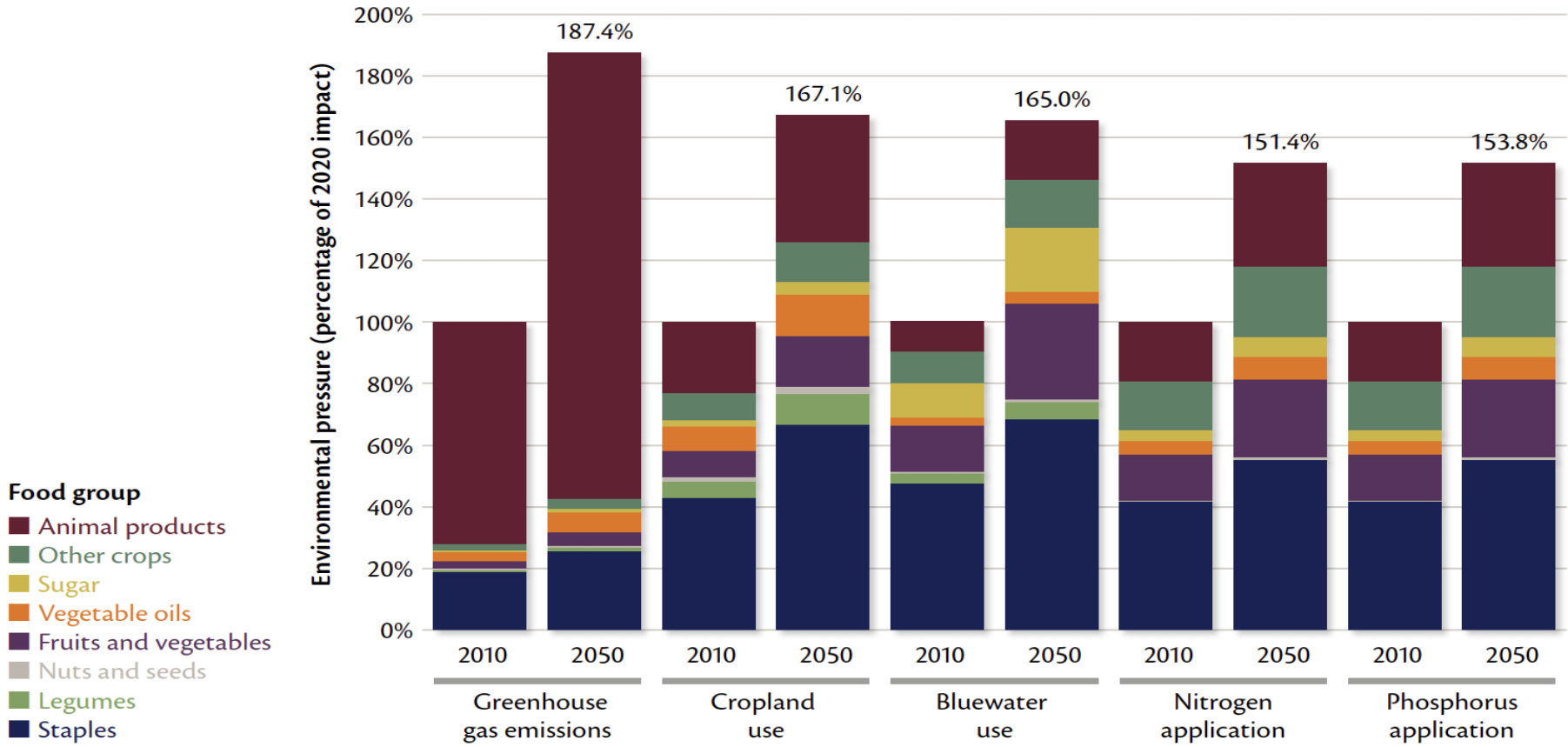
World Resources Institute (2019) Creating a Sustainable Food Future. https://wrr-food.wri.org/sites/default/files/2019-07/WRR_Food_Full_Report_0.pdf

Nutritional quality of crops and elevated CO2 effects



Myers, S.S., Zanobetti, A., Kloog, I., Huybers, P., Leakey, A.D., Bloom, A.J., Carlisle, E., Dietterich, L.H., Fitzgerald, G., Hasegawa, T. and Holbrook, N.M., 2014. Increasing CO 2 threatens human nutrition. *Nature*, *510*(7503), p.139.

Environmental stress of food production will continue in order to meet dietary demands



Note: Bluewater is fresh water in streams, rivers, lakes and aquifers.

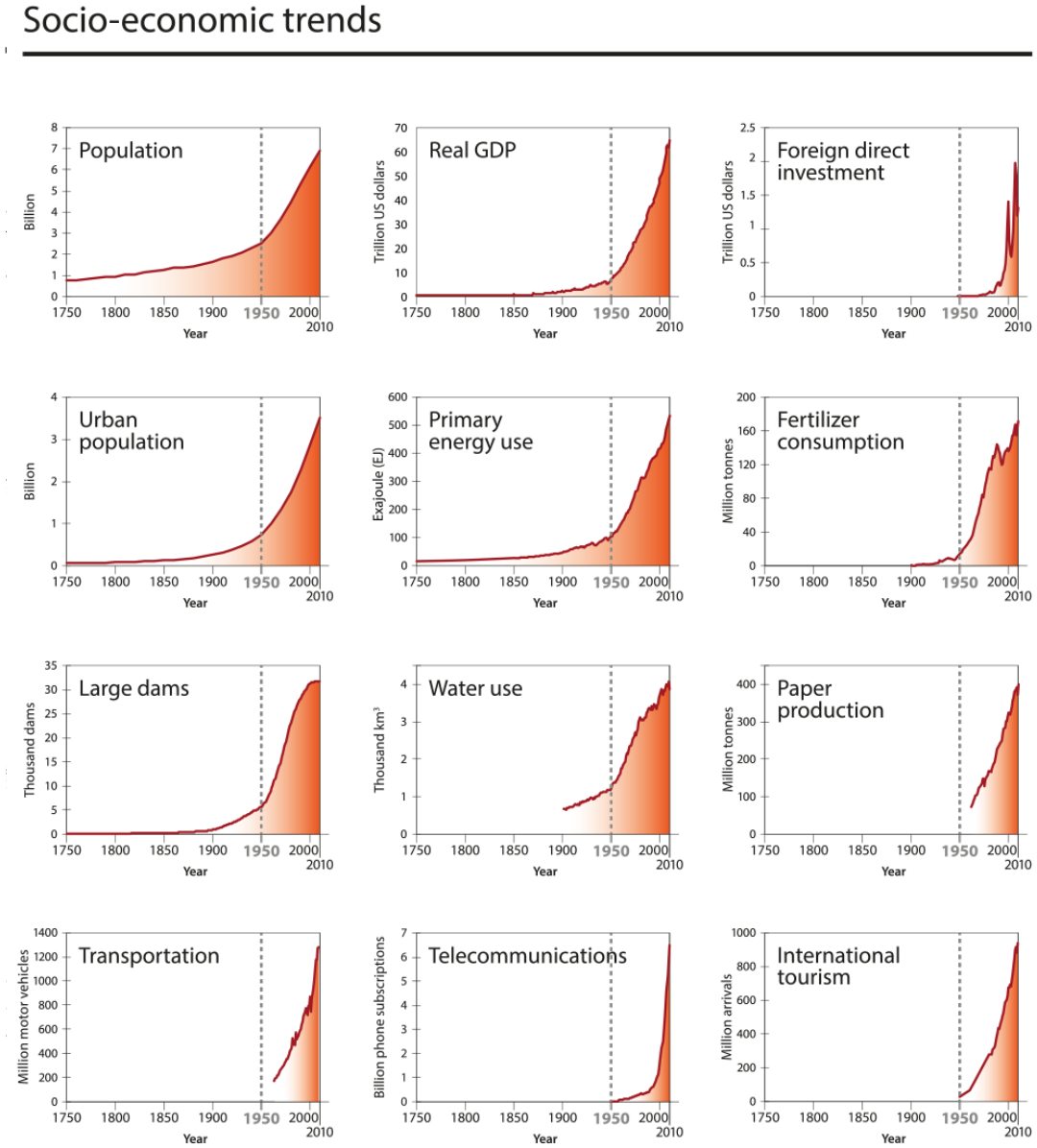
Source: Global Nutrition Report (2020)[5]

Springmann, M., Clark, M., [illegible], Zurayk, R., Scarborough, P., Rayner, M., Loken, B., Fanzo, J., Godfray, H.C.J., Tilman, D., Rockström, J., Willett, W., n.d. Options for keeping the food system within environmental limits. *Nature*. doi:10.1038/s41586-018-0594-0; Global Panel on Agriculture and Food Systems for Nutrition. 2020. Future Food Systems: For people, our planet, and prosperity. London, UK.

Why do we need a food transformation?

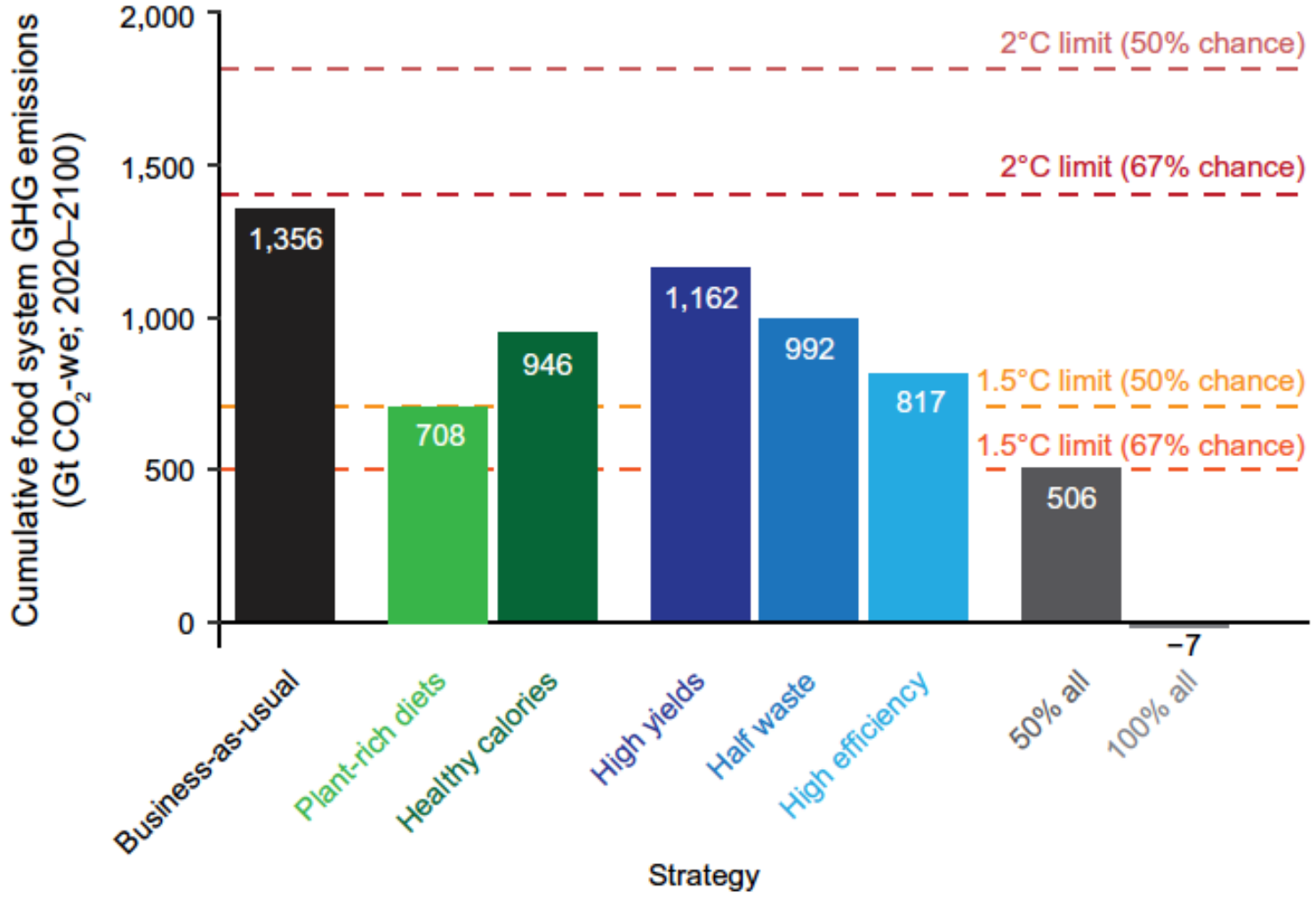
1. Because we are in the middle of catastrophic climate breakdown.

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.



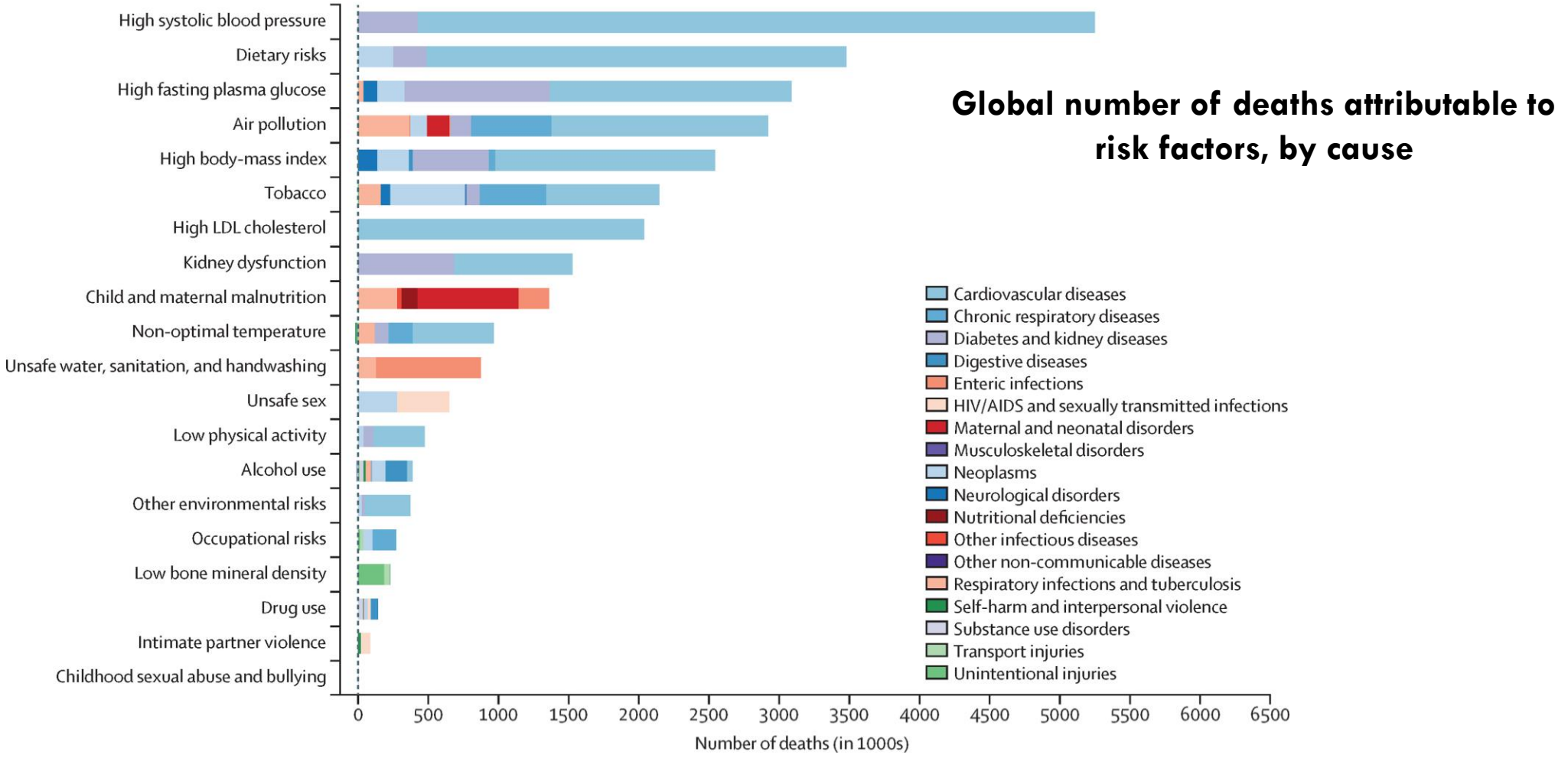
Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O. and Ludwig, C., 2015. The trajectory of the Anthropocene: the great acceleration. The Anthropocene Review, 2(1), pp.81-98.

2. Because a business *as usual* for food systems is not sufficient for the Paris climate change targets.



Clark, M.A., Domingo, N.G., Colgan, K., Thakrar, S.K., Tilman, D., Lynch, J., Azevedo, I.L. and Hill, J.D., 2020. Global food system emissions could preclude achieving the 1.5° and 2° C climate change targets. *Science*, *370*(6517), pp.705-708.

3. Because sub-optimal diets are a top risk factor of disease and death.

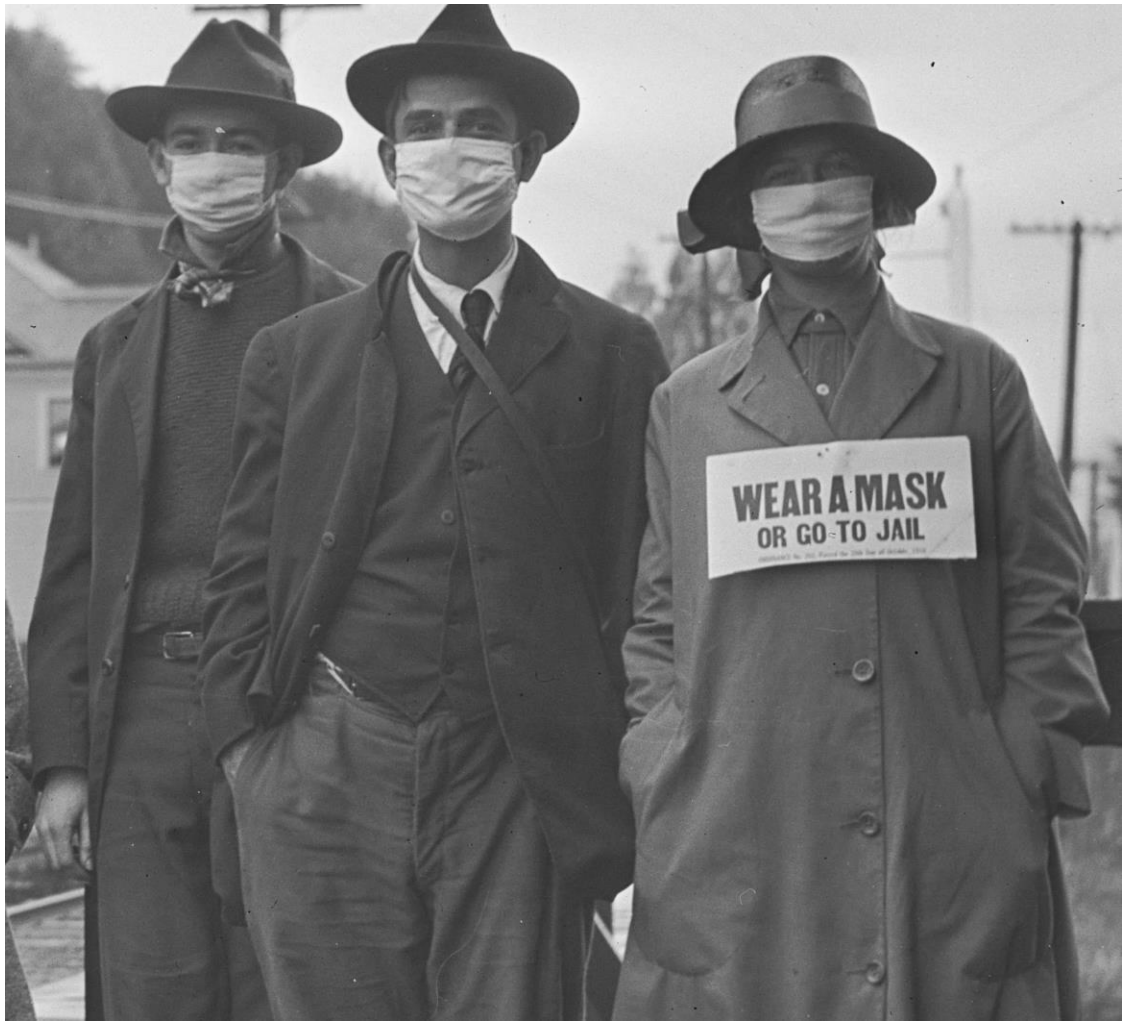


Global number of deaths attributable to risk factors, by cause

Murray, C.J., Aravkin, A.Y., Zheng, P., Abbafati, C., Abbas, K.M., Abbasi-Kangevari, M., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I. and Abegaz, K.H., 2020. Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, *396*(10258), pp.1223-1249.

4. Because zoonotic pandemics are not going anywhere.

- COVID-19 is a zoonotic disease due to a spillover event that jumped from animals to humans.
- 60% of emerging infectious diseases are zoonotic, and of that 60%, 72% originate in wildlife.
- Food and agriculture have a big part to in the rise of zoonotic spillover events - animals are in close proximity to humans, either because their natural habitat has shrunk or been destroyed, or they are moved from their habitats.



Cutler, S.J., Fooks, A.R. and Van der Poel, W.H., 2010. Public health threat of new, reemerging, and neglected zoonoses in the industrialized world. *Emerging infectious diseases*, *16*(1), p.1; New York Times 2020. How Humanity Unleashed a Flood of New Diseases: https://www.nytimes.com/2020/06/17/magazine/animal-disease-covid.html

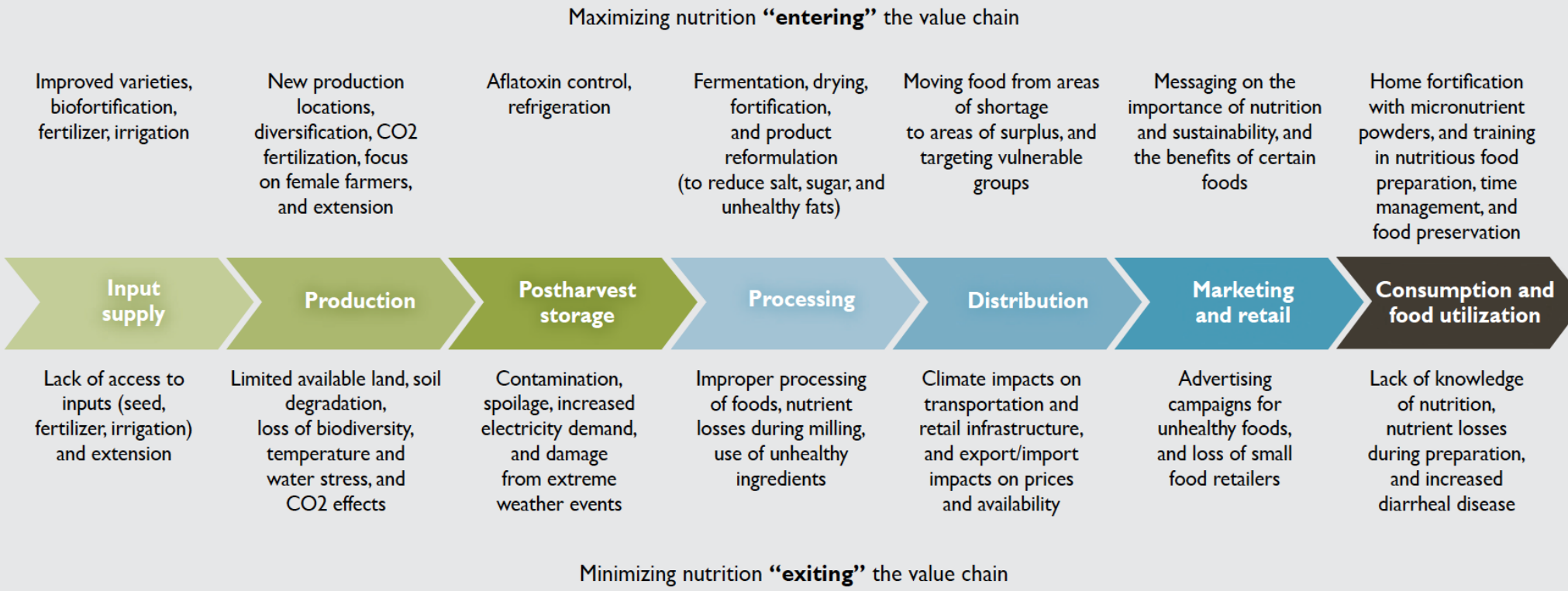
Can we have both human and planetary health?

Can we have it all? It DEPENDS!

- **D**ecision-making: prioritizing, cooperating, systems thinking
- **E**vidence: generating it, sharing it, using it
- **P**olitical will and action: being cautiously bold, learning from the past
- **E**mpowerment: of who, for who, and with balance
- **N**egotiation: providing room to move and incentives
- **D**ata: to inform and predict future scenarios of decisions
- **S**haring the planet: global citizenry and sustainability

1. Focus on the entire system

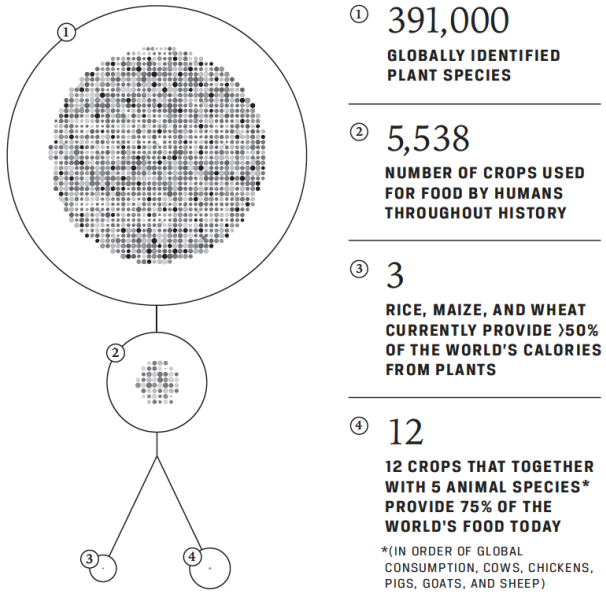
FIGURE 1. Entry and exit points for increasing net nutrition along the food value chain under climate change



Source: Fanzo et al. (2017b).

Fanzo, J., Davis, C., McLaren, R. and Choufani, J., 2018. The effect of climate change across food systems: Implications for nutrition outcomes. *Global food security*, *18*, pp.12-19.

2. Get over our staple fetish



① 391,000
GLOBALLY IDENTIFIED PLANT SPECIES

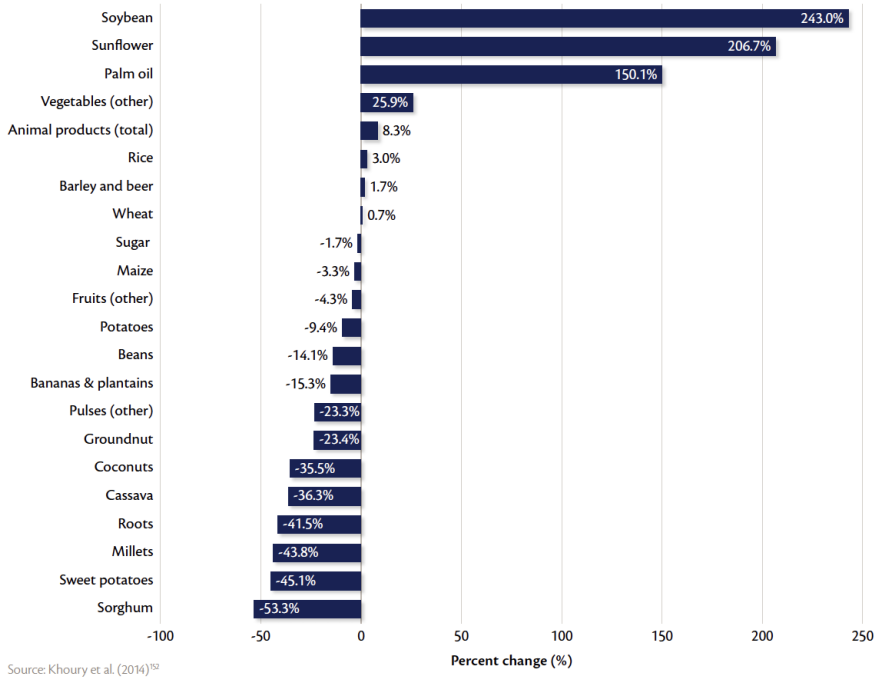
② 5,538
NUMBER OF CROPS USED FOR FOOD BY HUMANS THROUGHOUT HISTORY

③ 3
RICE, MAIZE, AND WHEAT CURRENTLY PROVIDE >50% OF THE WORLD'S CALORIES FROM PLANTS

④ 12
12 CROPS THAT TOGETHER WITH 5 ANIMAL SPECIES* PROVIDE 75% OF THE WORLD'S FOOD TODAY

*(IN ORDER OF GLOBAL CONSUMPTION, COWS, CHICKENS, PIGS, GOATS, AND SHEEP)

Changes in relative abundance of crops (1960–2009 in terms of calories)

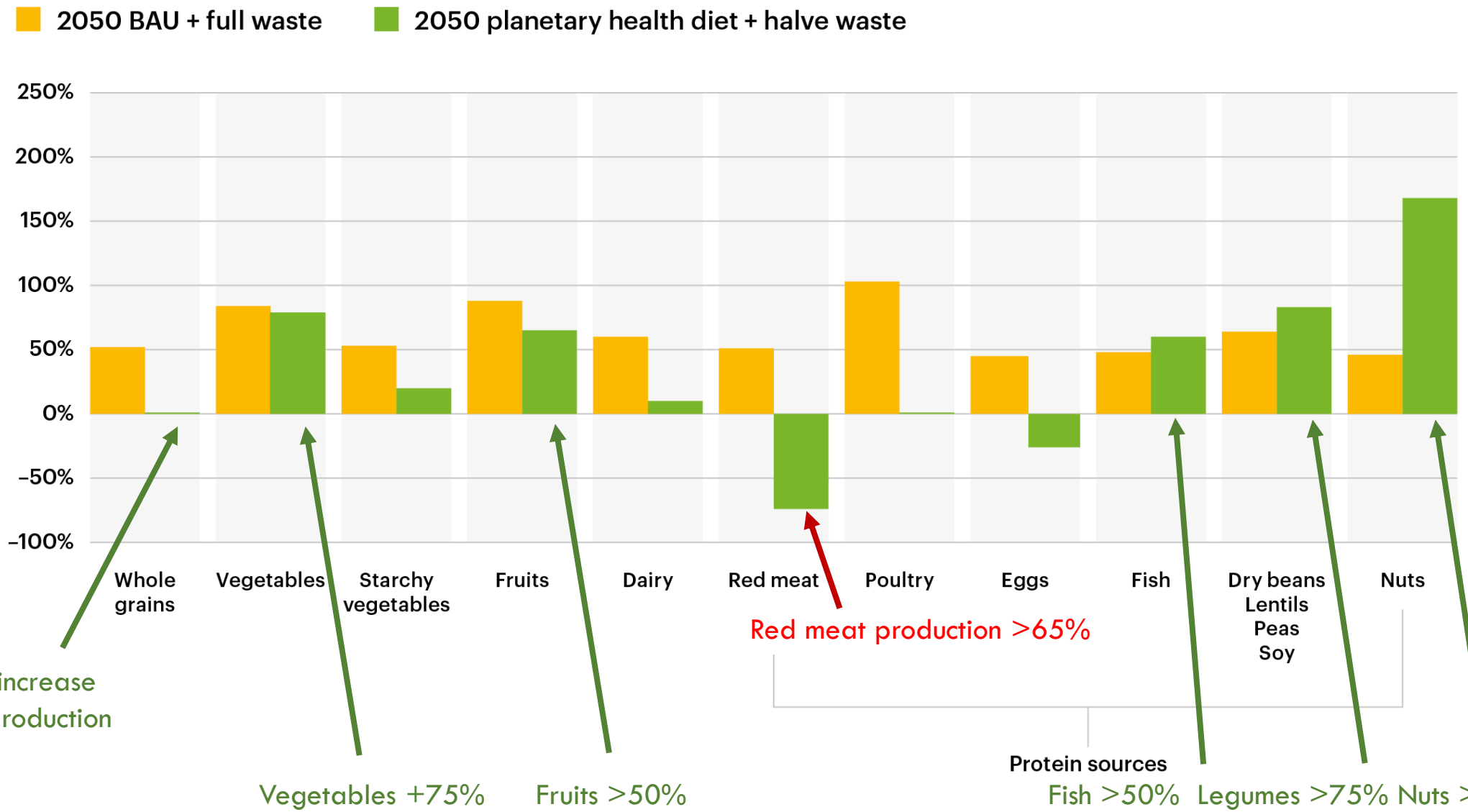


Source: Khoury et al. (2014)[152]

Most research on the impact of climate change on the nutrient content of crops has focused on staple crops; to date, very few studies have examined how climate change may influence changes in production and consumption of non-staple food groups. More research is needed on how different kinds of crops – particularly those that are nutrient-dense such as fruits, vegetables, and legumes – will fare in a +2 C degree world.

Khoury, C.K., Bjorkman, A.D., Dempewolf, H., Ramirez-Villegas, J., Guarino, L., Jarvis, A., Rieseberg, L.H. and Struik, P.C., 2014. Increasing homogeneity in global food supplies and the implications for food security. Proceedings of the National Academy of Sciences, 111(11), pp.4001-4006; Global Panel on Agriculture and Food Systems for Nutrition. 2020. Future Food Systems: For people, our planet, and prosperity. London, UK.

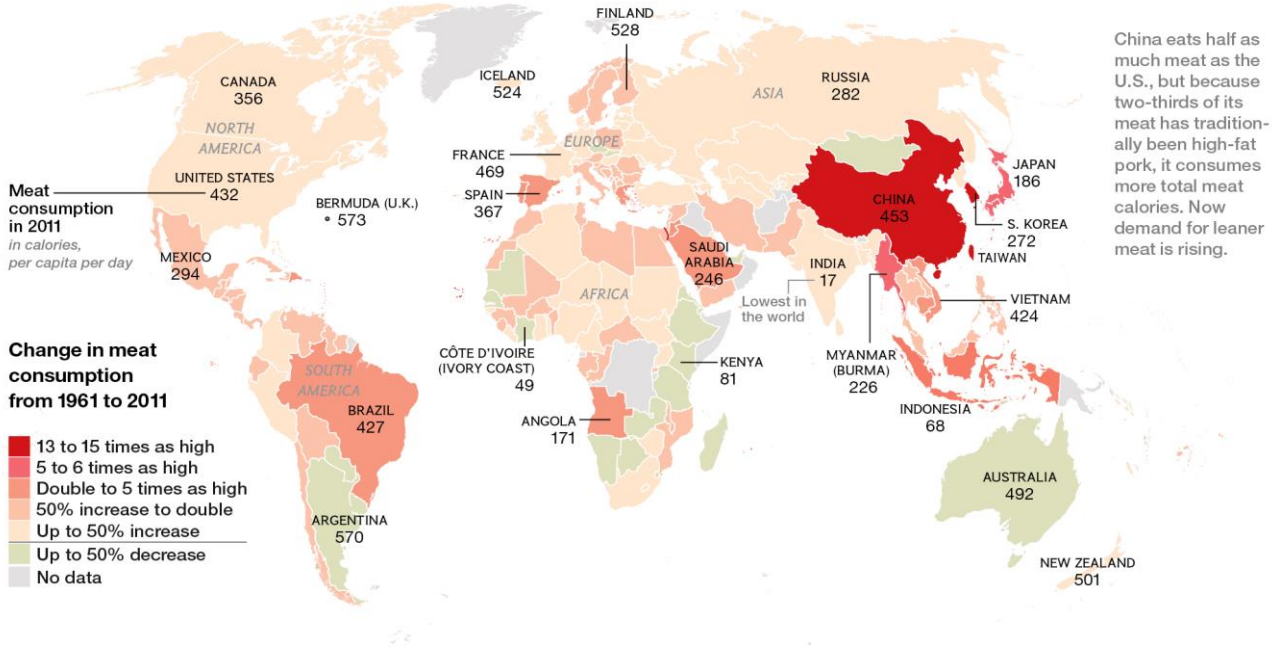
Do we have what it takes to totally change food production systems?



Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A. and Jonell, M., 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, *393*(10170), pp.447-492.

3. Consider environmental motivations for dietary change

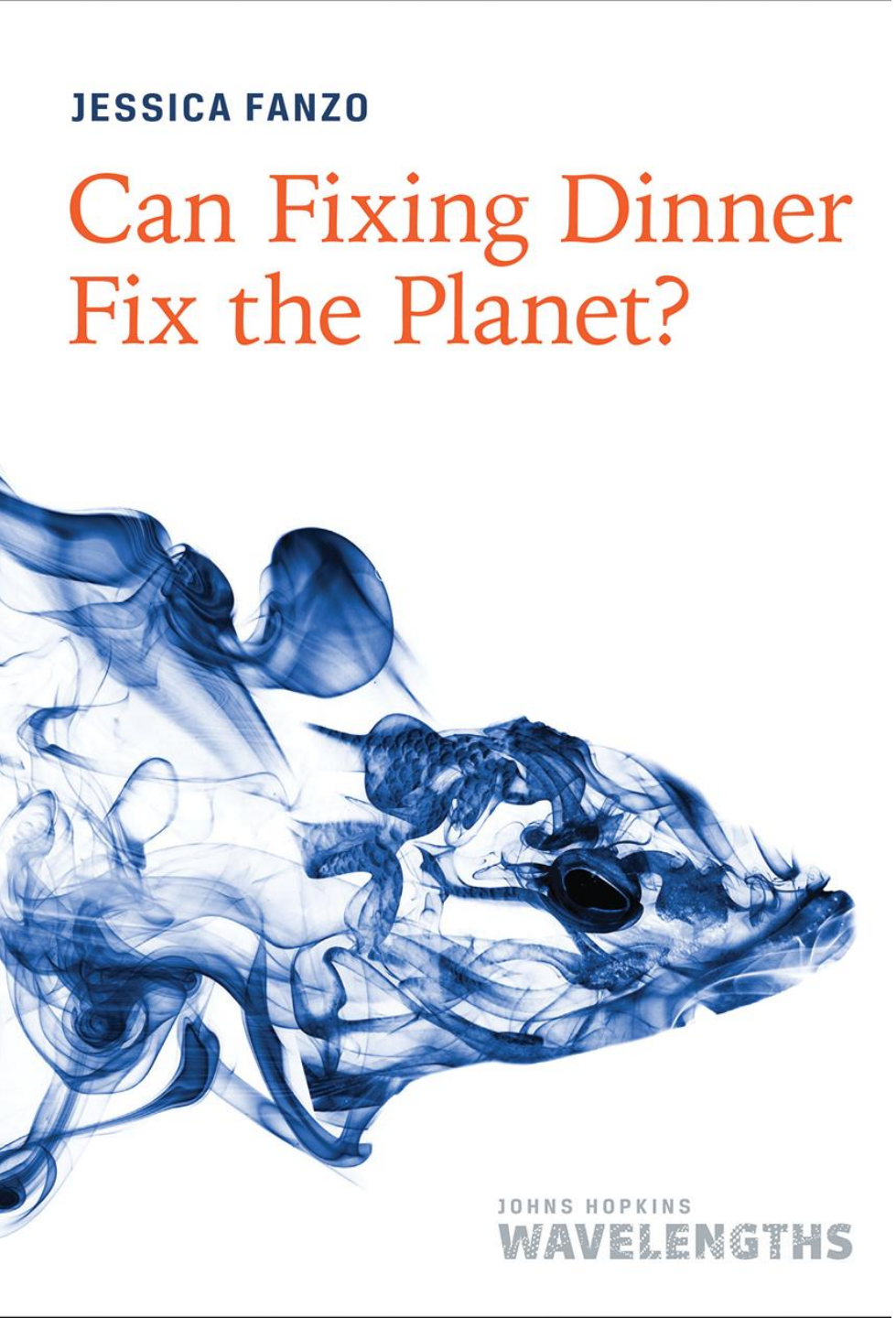
The environmental motivation for dietary change is related to a question of resource use: even if the food system can produce adequate calories for a growing global population, can food production systems keep up with the demand for more resource-intensive foods?



Ranganathan, J. et al. 2016. "Shifting Diets for a Sustainable Food Future." Working Paper, Installment 11 of Creating a Sustainable Food Future. Washington, DC: World Resources Institute. Accessible at http://www.worldresourcesreport.org

Mitigate, and adapt through food system responses

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.



Thank you!

@jessfanzo

jfanzo1@jhu.edu