Nourishing Humanity without Destroying the Planet

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As many expert reports and consensus statements tell it, the fundamental challenge facing the global food system from now until 2050 is how to produce enough healthy food to feed a growing world population without destroying the earth—and how to ensure people get access to and want to eat that healthy food.[1] That is, we face a multipronged challenge of producing enough healthy food to nourish a growing world population while keeping the food system within safe environmental limits and addressing multiple forms of malnutrition, including undernutrition, obesity, and micronutrient deficiencies.

Food production is the largest cause of global environmental change.[2] The food system accounts for a significant proportion of total greenhouse gas emissions (on the order of 25 percent), while 40 percent of global land and 70 percent of total freshwater is used for agriculture.[3] And the environmental impacts of the food system are on track to increase significantly: the global population is continuing to grow rapidly and may reach ten billion by 2050, and global food production will need to expand to meet the increased food demand, perhaps on the order of 60 percent by 2050. If the past is any guide, as more populations rise out of poverty globally, they will shift toward diets containing more animal-source foods, which generally have greater environmental impacts than plant-based diets. If we use this "business as usual" scenario, the environmental impacts of global food production will likely increase by 50–90 percent by 2050.[4] Among other things, business-as-usual increases in agriculture-related greenhouse gas emissions will make it unlikely or impossible to meet targets for reducing these emissions.[5] The numerous other environmental impacts of agriculture (land-system change, freshwater use, nitrogen cycling, phosphorus cycling, and

Ethics & International Affairs, 35, no. 1 (2021), pp. 69–81.
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doi:10.1017/S0892679421000046

https://doi.org/10.1017/S0892679421000046 Published online by Cambridge University Press

biodiversity loss) will also exceed "planetary boundaries" that define a safe operating space for humanity.[6]

To take a "business unusual" approach and keep the environmental impacts of the food system within safer planetary limits, experts have converged on the necessity of three broad changes: a shift toward more plant-based diets; reductions in food waste (on the order of 50 percent); and wider adoption of agricultural practices with a smaller environmental footprint.[7] For example, the EAT-*Lancet* Commission took up the challenge of identifying diets that optimize human health and could be produced sustainably even as the global population increases. It came up with a "healthy reference diet" that allows for optimal human health, and that could be produced for ten billion people in 2050 while keeping the food system within the planetary boundaries determined by the scientific community.[8] As compared to the average American diet, this reference diet includes significantly less animal-source food consumption (on the order of 80 percent less red meat) and greater consumption of fruits, vegetables, pulses (beans, lentils, peas), nuts, and whole grains. However, to produce this diet for ten billion people without transgressing planetary boundaries also requires massive changes to current food production practices and landscapes to lower their environmental impacts as well as significantly reducing food loss and waste (so as to curb the overall amount of production needed).

The next aspects of the challenge of feeding the world are undernutrition (not having adequate quantity and quality of food to meet energy and other critical nutrient requirements for growth and development), micronutrient deficiencies (insufficient intake of vitamins and minerals), and overweight and obesity (excess energy consumption relative to energy needs). All three forms of malnutrition are common globally: 690 million people experience undernutrition (with 48 million children experiencing wasting and 147 million children experiencing stunting);[9] about two billion people experience micronutrient deficiencies; and 2.1 billion adults are overweight and obese.[10] The negative effects of undernutrition and micronutrient deficiencies on lifelong health and wellbeing are profound. As Fanzo writes: "Inadequate nutrition contributes to early deaths for mothers, infants and young children, and impaired and often irreversible physical and brain development in the young. This in turn can lead to poor health into adulthood, which affects not only individual wellbeing but also the social and economic development of nations."[11] Even prior to the COVID-19 pandemic, undernutrition was on the rise, and the economic effects of the pandemic are further

https://doi.org/10.1017/S0892679421000046 Published online by Cambridge University Press

increasing the rates of extreme poverty and food insecurity.[12] Some conditions that lead to undernutrition will be further exacerbated by climate change, which will subject food producers to more frequent and intense storms, floods, drought, and other extreme types of weather, lead to lower yields, and cause an increase in the price of food commodities; and possibly reduce the protein and micronutrient content of plant food.[13]

Overweight, obesity, and diet-related illness from unhealthy dietary patterns is another major challenge. According to a 2019 study, "Poor diet is the leading risk factor for deaths in the majority of countries in the world."[14] The study further concludes that improving diets could prevent 20 percent of deaths globally.[15] Major dietary risk factors include high intake of sodium, low intake of whole grains, and low intake of fruits. In the United States, for example, 91 percent of people do not meet recommendations for fruit and vegetable consumption, and most exceed sodium consumption recommendations as well as recommendations for limits on added sugar.[16] The problem of overweight and obesity has increased in recent decades: In 2016, 39 percent of adults worldwide were overweight and 13 percent were obese, with much higher rates in some countries;[17] these rates have increased sharply globally since the 1980s across all demographics and in both rural and urban areas.[18] According to public health organizations and experts, these high rates have significant consequences for public health, increasing risk for diet-related disease. Lim and colleagues conclude that overweight and obesity was a significant risk factor for an estimated 3.4 million deaths worldwide in 2010.[19]

Other Food System Challenges

There are other major food system challenges that should be kept in view, as well. One is the situation of smallholder producers and food system workers. Globally, an estimated 1.1 billion people are engaged in agriculture, including waged workers, temporary workers, unpaid family members who work on family farms, and those engaged in subsistence agriculture. Some suggest that food systems are the primary source of livelihood for 4.5 billion people.[20] Smallholder producers have high rates of poverty and food insecurity.[21] Farm workers and other food chain workers may work in dangerous circumstances (being exposed to toxic chemicals, for example) and may perform hard, physically taxing work that results in bodily injury (such as performing repetitive tasks for long hours, resulting in

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musculoskeletal injuries).[22] Many earn poverty wages, receive no medical benefits, and have few opportunities for advancement.[23] In addition, more than 20 million people are trafficked or enslaved and forced into labor globally each year, including agricultural and food processing labor.[24]

Another food system challenge of massive scale is the welfare of the over sixty-five billion land animals that are raised and killed for food each year, most of which are raised in confinement systems.[25] These confinement systems—large indoor facilities where hundreds or thousands of animals are densely packed together, with some animals spending most of their lives confined in cages, pens, or stalls without room to turn around—as well as other practices of industrial animal agriculture, raise a range of animal welfare issues.[26] These animals may not be able to engage in many species-typical behaviors, such as pecking in chickens or rooting in pigs. Many animal species in industrialized animal agriculture have been bred for rapid weight gain, which causes high rates of physical abnormalities in some species, such as lameness in broiler chickens.[27] According to widely accepted conceptions of animal welfare (for example, that animals should be free to engage in a range of species-typical behavior and should be free from fear, distress, pain, and injury),[28] these conditions of confinement are lacking. Thus, another challenge is modifying the ways in which we raise animals, so that we can conform with standards of animal welfare.

A Robust Moral Case for Addressing Food System Challenges

The previous sections have described several large-scale challenges that face the food system. These are devastating states of affairs, and they could get much worse by 2050. It might seem obvious that we have moral reasons to address them, but it is worth emphasizing what a robust conclusion that is. These bad states of affairs matter from a variety of moral perspectives. When thinking about climate change, for example, we may find ourselves compelled to action by considerations of distributive justice, structural injustice, or intergenerational justice; a concern for upholding human rights; or a basic ethical concern to reduce preventable harm to people now and in the future.[29] Each of these considerations brings us to the conclusion that there is an urgent need to reduce the greenhouse gas emissions associated with food production. Similarly, we have a variety of overlapping moral reasons to address undernutrition and food insecurity,

https://doi.org/10.1017/S0892679421000046 Published online by Cambridge University Press

including human rights (rights to an adequate standard of living, to food, and to health); distributive justice; reparative justice; and a basic ethical concern to reduce preventable harm and promote wellbeing for everyone. Likewise, with overweight and obesity, a similar range of moral considerations justify promoting population health and addressing the negative public health effects of unhealthy dietary patterns, including the human right to health, distributive justice, and, again, a basic ethical concern to reduce preventable harm and promote wellbeing.[30] The treatment of workers and the situation of smallholder food producers matter from these same perspectives and also raise distinct ethical concerns (exploitation, coercion, and enslavement; collective self-determination; and food sovereignty). Lastly, there are multiple moral perspectives from which the treatment of nonhuman animals in confinement systems is wrongful, including a basic ethical concern with minimizing suffering, ensuring the rights of animals, and upholding a reciprocity-based obligation to provide good lives to animals before killing them for their meat.[31] In short, the challenges in the global food system matter from multiple, distinct moral starting points, and even those employing different theoretical and ethical frameworks can converge on the conclusion that these states of affairs demand action.

The Challenge of Political Inertia

The previous section argued that there is a robust moral case for addressing the challenges in the global food system. There is a drumbeat of calls from experts and institutions for urgent and dramatic action on healthy and sustainable diets (and perhaps less so on protecting workers and nonhuman animals).[32] As Swinburn and colleagues put it, "The number of authoritative reports that have called for fundamental changes to food systems to make them healthier, more sustainable, and more equitable is large and growing rapidly."[33] Yet, generally speaking, that dramatic action does not presently occur. This brings us to an undergirding challenge for feeding the world in 2050: political inertia.[34]

As a first pass, let us consider how one authoritative expert group, the *Lancet* Commission on Obesity, describes the problems facing the food system and the solutions to those problems. Originally tasked with addressing obesity and diet-related illness, the commission broadened its scope to address the interrelated challenges of climate change and undernutrition, framing these problems as three interrelated pandemics, which they refer to as "The Global Syndemic." The group

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provides a systems analysis of the syndemic, the drivers of it, and the challenges in addressing it.[35] At the risk of oversimplifying a detailed and multifaceted analysis, the *Lancet* Commission's core analysis is that effective policies for addressing the challenges of climate change and malnutrition have been clearly identified, but that these policies do not get implemented as a result of policy inertia.[36] This policy inertia in part results from a lack of coherent and sustained policy action across sectors (such as health, agriculture, environment, and urban planning) and across levels of governance (local, national, and international). The underlying drivers of policy inertia include weak public demand for policy action and, especially, the asymmetrical power of the food and agriculture industries:[37]

> Key aspects of the political economy have been recognised as the deep drivers that shape the very nature of the systems creating The Global Syndemic. For example, economic power has become increasingly concentrated into fewer and fewer transnational corporations, and this is certainly true in the food sector. According to the former Director General of WHO, this "market power readily translates into political power". Specifically, the transnational corporations lobby for fewer regulations that apply to them (eg, no regulations on marketing unhealthy food to children or warning labels on processed foods), promote regulations that apply to other sectors (eg, trade and investment agreements that bind governments to protect corporate investment interests), resist or reject taxes that apply to their products (eg, taxes on sugary drinks and energy dense, nutrient poor foods), and lobby policy makers for subsidies that benefit their businesses (eg, agricultural and transportation subsidies). The fossil fuel and food industries that are responsible for driving The Global Syndemic receive more than $5 trillion in annual subsidies from governments.[38]

Thus the commission identifies that a core underlying challenge in addressing the syndemic is the tremendous power of these industries—power that has increased as a result of trade liberalization and forms of deregulation, and that is used to increase profit at the expense of the public good, be it in terms of health, the environment, or livelihood outcomes. To address this challenge, the commission concludes, industry self-regulation should be rejected, the role of governments should be strengthened, industry influence on policymaking should be diminished so that policymaking will be firmly oriented around the public good, and congenial civil society organizations should be empowered to work in tandem with governments to advocate and generate support for and enact these policy agendas. The commission acknowledges that there is currently weak public demand for policies to address undernutrition and insufficient public demand for policies to address overnutrition. But the report gives the impression

https://doi.org/10.1017/S0892679421000046 Published online by Cambridge University Press

that while the public may be undermotivated, sufficient public support can be generated by enlisting civil society organizations, developing social movements around these issues, and changing public beliefs and norms by communicating with the public in the right way; for example, by strategically framing problems and solutions so that they resonate.[39]

This is a familiar and largely optimistic story: experts have properly identified the problems and effective policy solutions, and governments are generally capable of addressing these problems through effective policymaking, supported by civil society organizations. The root problem is the enormous power of industry and its disregard for the public good, but this problem can be solved. True, the public may be undermotivated, but it is not *hostile* to this policy agenda, and it can be made to care.

It is worth emphasizing that many food system advocates and scholars might object to this analysis as failing to diagnose the true root problems: the globalization of the food system, national and international systems of governance that are fundamentally undemocratic (even in the absence of industry manipulation), the commodification of food, and perhaps capitalism itself (not just the excesses of deregulation and trade liberalization).[40]

We would like to offer a different critical take and argue that the *Lancet* Commission's account of the drivers of and solutions to food system challenges is too optimistic and does not recognize the depth of our epistemic challenges, political challenges, and moral disagreement.

First, can we reliably identify effective policies to address food system challenges? When it comes to overweight and obesity, and diet-related illness, at least, there is cause for skepticism.[41] After decades of effort at obesity prevention, there is little apparent progress.[42] Even obesity prevention policies that are considered effective may shift consumption only modestly. Given the quite significant and rapid shifts toward plant-based diets called for by expert groups,[43] we perhaps should be skeptical that we can identify policies that will achieve these dietary shifts.

Second, is political inertia just a result of (reversible) industry influence and (remediable) insufficient political will, or are our political institutions and political cultures more deeply troubled than that? Writing amid the COVID-19 pandemic in the United States, we have seen dramatic political failures to adopt effective policies. Some of this policy inaction may be explained by genuine disagreement about policies and the values that underlie them (more about that below). But

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even efforts with broad support—for example, enacting a massive, efficient vaccination effort—have not been implemented effectively. Why? There are various features of political cultures that may encourage political inertia and otherwise stymie effective policymaking, such as polarization; negative partisanship; distrust of government and other institutions; extremism; and misinformation, disinformation, and conspiracy theories. All of these features can be found in the current political environment of the United States.[44] The concern is that these are endemic features of political cultures around the world, and these problems, plus geopolitical standoffs, may produce continued political failures to enact effective policies.

If we acknowledge that we may have a limited ability to incentivize effective policies, and acknowledge the possibility of continued political failure to enact such policies, what are the implications for addressing food system challenges? Let us tentatively suggest one (likely controversial) implication: We should welcome market-based approaches to these problems.[45] For example, if there is an urgent need to shift diets toward plant-based diets, but we do not know how to directly induce populations to shift their diets, and political inertia makes us unlikely to adopt policies (such as regulations on animal agriculture) that would indirectly encourage plant-based diets, then we should embrace market-based approaches to promoting plant-based diets, such as the development and marketing of plant-based meat alternatives.

In addition to the two critiques above, we suggest that the *Lancet* Commission account might be too optimistic in an additional way: by assuming that sufficient public demand and support for policy agendas can be generated. By making this assumption, it is possible that it downplays the level of actual moral disagreement about policies among members of the public, as well as the level of hostility toward them. Public values may not in fact line up behind the policy agendas set by experts. After all, policy approaches to food system challenges involve trade-offs: trade-offs between worthy objectives (such as between environmental sustainability and food security), between the interests of different groups (producers vs. consumers), between humans and nonhuman animals, and between current and future generations of people. Which trade-offs are the right ones to make will depend upon one's underlying values and how they are prioritized (for example, should human health always prevail over the welfare of nonhuman animals?), and upon one's specific normative views (for example, to what extent does corrective justice demand reparations for past harms, requiring reparations to be

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incorporated into climate policy?[46] What forms of collective self-determination vis-à-vis food are groups entitled to?[47]). There may be significant moral disagreement about these underlying values, value prioritizations, and normative views, and thus disagreement about which policies are ethically preferable and acceptable.

It is notable how rarely high-level expert discourse and advocacy work mentions the possibility of deep moral disagreement. What might this indicate? Is moral disagreement just not on the radar of influential voices in food systems? If so, could this be because ethicists are not communicating about the possibility of moral disagreement and the underlying moral issues in sufficiently clear terms? Or are food system experts and advocates alert to the possibility of moral disagreement, but confident that this moral disagreement is not significant? If so, might this confidence be misplaced? Are they willing to proceed with their policy agendas even in the face of significant moral disagreement about them, thus making the facts about underlying moral disagreement seem less important to them? This latter stance would raise important questions about the democratic legitimacy of these policy agendas.

If we acknowledge the possibility of significant moral disagreement, what are the implications for addressing food system challenges? An interesting empirical research question is whether moral disagreement about policies (and/or the failure to acknowledge moral disagreement, or to engage respectfully with it) contributes to policy inertia. If it does, then grappling with moral disagreement, and incorporating this more fully into policy design and policymaking processes, may be helpful. But whether or not grappling with moral disagreement is helpful at overcoming policy inertia, it has normative value. Engaging with public values, recognizing moral disagreement, and identifying policies that are justifiable in light of it helps to ensure the legitimacy of policies. Political theorists and practical ethicists have designed deliberative techniques and practical ethical tools to enable this and should work to ensure they are understandable to those outside the field of ethics, to demonstrate how they can be used, and to incorporate their use into policy decision-making.[48]

Conclusion

The global community faces a set of interrelated challenges in feeding the world in 2050, including producing enough healthy food to feed a growing world

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population while keeping the food system within safe environmental limits, addressing multiple forms of malnutrition, ensuring fair livelihoods and treatment of food system workers, and addressing the inadequate living conditions of farm animals. These are problems on a massive scale, and problems that matter from a range of moral perspectives. There is a robust case for addressing these problems. The underlying problem, however, may be political: a widespread failure at multiple levels of government and governance to take significant-enough action on these problems. Correctly understanding these political failures and their causes, and finding solutions that are robust in the face of them, may be the biggest challenge of all for feeding the world in 2050.

NOTES

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[2] Willett et al., "Food in the Anthropocene," p. 3.

[3] Marco Springmann, Michael Clark, Daniel Mason-D'Croz, Keith Wiebe, Benjamin Leon Bodirsky, Luis Lassaletta, Wim de Vries, et al., "Options for Keeping the Food System within Environmental Limits," *Nature* 562, no. 7728 (October 10, 2018), pp. 519–25, www.nature.com/articles/s41586-018-0594-0. Willett et al., "Food in the Anthropocene."

[4] Springmann et al., "Options for Keeping the Food System within Environmental Limits."

[5] For example, in a business-as-usual scenario, agricultural emissions in 2050 may make up 70 percent of total allowable emissions across all sectors of the economy (where allowable emissions refers to the level that allows us to keep global warming at two degrees Celsius). See Searchinger et al., *Creating a Sustainable Food Future*, p. 24.

[6] Willett et al., "Food in the Anthropocene"; and Springmann et al., "Options for Keeping the Food System within Environmental Limits."

[7] Springmann et al., "Options for Keeping the Food System within Environmental Limits"; and Willett et al., "Food in the Anthropocene."

[8] Willett et al., "Food in the Anthropocene."

[9] As explained by the World Health Organization, "Wasting is defined as low weight-for-height. It often indicates recent and severe weight loss, although it can also persist for a long time. It usually occurs when a person has not had food of adequate quality and quantity and/or they have had frequent or prolonged illnesses. Wasting in children is associated with a higher risk of death if not treated properly. Stunting is defined as low height-for-age. It is the result of chronic or recurrent undernutrition, usually associated with poverty, poor maternal health and nutrition, frequent illness and/or inappropriate feeding and care in early life. Stunting prevents children from reaching their physical and cognitive potential." "Malnutrition," World Health Organization, n.d., www.who.int/health-topics/malnutrition#tab=tab_1.

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[11] Jessica Fanzo, "Ethical Issues for Human Nutrition in the Context of Global Food Security and Sustainable Development," *Global Food Security* 7 (December 2015), pp. 15–23, at p. 15, www.sciencedirect.com/science/article/pii/S2211912415300158?via%3Dihub.

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[12] As Jessica Fanzo writes in *Nature*: "The World Bank estimates that up to 115 million extra people will fall into extreme poverty (living on less than US$1.90 per day) in 2020 owing to the economic shocks of the pandemic. This, in turn, will have significant impacts on food security, nutrition and health. It is projected that 130 million more people will face acute food insecurity by the end of 2020, in addition to the estimated 135 million who faced it in 2019." Jessica Fanzo, "Cooperate to Prevent Food-System Failure," *Nature*, December 9, 2020, www.nature.com/articles/d41586-020-03444-5.

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[14] Ashkan Afshin, quoted in Allison Aubrey, "Bad Diets Are Responsible for More Deaths than Smoking, Global Study Finds" (transcription of radio program, *All Things Considered*), NPR, April 3, 2019, www.npr.org/sections/thesalt/2019/04/03/709507504/bad-diets-are-responsible-for-more-deaths-than-smoking-global-study-finds.

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[33] Swinburn et al., *The Global Syndemic of Obesity, Undernutrition, and Climate Change*, p. 806.

[34] Ibid.

[35] Ibid.

[36] *Lancet* Commission, quoted in ibid., p. 795.

[37] Ibid., pp. 815–18.

[38] Ibid., p. 802.

[39] For increase of power, see ibid., p. 814; for weak demand for policies addressing undernutrition, ibid., p. 816; for insufficient demand for policies addressing overnutrition, ibid., p. 791; for framing problems and solutions to resonate, ibid., p. 825.

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https://doi.org/10.1017/S0892679421000046 Published online by Cambridge University Press

Abstract: As part of the roundtable, "Ethics and the Future of the Global Food System," this essay discusses some of the major challenges we will face in feeding the world in 2050. A first challenge is nutritional: 690 million people (9 percent of the world's population) are currently undernourished, while 2.1 billion adults (28 percent of the population) are overweight or obese. The current global food system is insufficient in ensuring that the nutritious foods that make up healthy diets are available and accessible for the world's population. Moreover, by 2050, as the global population increases, food demand will increase by 50–60 percent. A fundamental challenge is meeting this demand while not wreaking irreversible havoc on natural resources, the environment, and planetary systems. A body of scientific research has coalesced around the need to reduce food loss and waste, adopt environmentally sustainable production practices, and shift toward plant-dominant diets. Other long-standing food system problems include deficits in providing fair wages and decent working conditions for food system workers, threats to smallholder farmer livelihoods, and tens of billions of animals kept in welfare-deficit confinement conditions. These food system challenges are bad states of affairs that matter from a variety of moral perspectives. In other words, there is a robust moral case for addressing these challenges. Yet concerted policy action in this area is insufficient and largely absent, pointing to the underlying challenge and complexity of political inertia.

Keywords: food systems, ethics, malnutrition, obesity, undernutrition, sustainability, healthy diets, animal welfare, food and agricultural ethics, animal agriculture

https://doi.org/10.1017/S0892679421000046 Published online by Cambridge University Press