TOWARDS A GLOBAL BAN ON INDUSTRIAL ANIMAL AGRICULTURE BY 2050: LEGAL BASIS, PRECEDENTS, AND INSTRUMENTS

BY

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I. INTRODUCTION

Industrial animal agriculture is both increasingly central to our global economy and increasingly harmful to humans, animals, and the environment. This food system—which encompasses both intensive animal agriculture and extensive animal agriculture that operates at a large scale—contributes significantly to environmental threats such as climate change and biodiversity loss, as well as to public health threats such as antimicrobial resistance and zoonotic disease emergence. This food system also produces extensive social harms, inflicting significant harms to the mental and physical health of farmed animals, farm and slaughterhouse workers, and local community members. Of course, different kinds of industrial animal agriculture produce different kinds of harm. But they all produce large amounts of harm in one or another of these ways.

The global community has a long history of regulating products or processes that cause massive, unnecessary, and transboundary environmental, health, or social harms. Countries have worked together to protect the ozone layer, combat tobacco addiction, prevent forced labor, prevent the spread of nuclear weapons, prevent the torture of enemy combatants, and more. While there are many relevant differences between the products and processes targeted in these precedents and those of industrial animal agriculture, there are many relevant similarities as well. By exploring precedents and instruments drawn from existing international law, this paper will proffer the idea that a global ban on industrial animal agriculture is both possible and

necessary to achieve alongside other global environmental, health, and social targets.

We start by defining "industrial animal agriculture" and describing our proposed global ban in general terms. We then survey the environmental, health, and social harms of industrial animal agriculture in both its intensive form and its extensive form, and we argue that governments have a responsibility to work together to ban this food system by 2050. We then survey legal precedents for such a global ban, noting other cases where governments have pursued international regulation—including bans—of products or processes that cause similar kinds of harm. We close by proposing a pathway towards a global ban by 2050, which proceeds via informational, financial, regulatory, and just transition policies that seek to gradually scale down industrial animal agriculture, gradually scale up alternative food systems, and support everyone as much as possible along the way.

II. BACKGROUND

Our aim in this paper is to make the case for a global ban on industrial animal agriculture by 2050. Of course, any argument for banning a particular practice must begin with a definition of that practice. For present purposes, we consider industrial animal agriculture as falling into two distinct but overlapping categories, both of which are associated with significant harms that necessitate global action: (1) *intensive* systems and (2) *extensive* systems that operate at a large scale. We will not attempt to define these systems with maximum precision here. Instead, we will define them in general terms and propose that governments work together *both* to sharpen these definitions *and* to lay the groundwork for a just transition away from this food system and toward alternatives. (We focus here on the farming of animals for food, though our discussion may apply to other kinds of animal farming too.)

First, we consider industrial animal agriculture to encompass intensive animal farming systems, sometimes described as factory farms or concentrated animal feeding operations (CAFOs). For example, the United States Environmental Protection Agency (EPA) defines CAFOs as feeding operations that contain more than 1,000 individual cows, 2,500 pigs, or 125,000 chickens.[1] Global estimates of the number of animals in industrial agriculture are difficult to find, in part because of a lack of public data and in part because of varying definitions of "industrial animal agriculture." Nonetheless, the Sentience Institute estimates that about 74% of farmed land animals and 99% of farmed

[1] Feeding systems that use liquid manure systems are considered CAFOs if they have only 30,000 chickens. 40 C.F.R. § 122.23(b)(4) (2023).

aquatic animals are factory farmed.[2] This model is already dominant in countries such as Australia,[3] Brazil,[4] Canada,[5] the European Union,[6] the United Kingdom,[7] and the United States and is becoming increasingly dominant elsewhere as well.[8]

Second, we consider industrial animal agriculture to encompass extensive animal farming systems that, due to their large scale, produce significant externalities. For example, large-scale cattle farming is a leading driver of tropical deforestation, particularly in Latin America.[9] It is also a significant driver of other public health[10] and environmental

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[2] Kelly Anthis & Jacy Reese Anthis, *Global Farmed & Factory Farmed Animals Estimates*, SENTIENCE INST., https://www.sentienceinstitute.org/global-animal-farming-estimates (Feb. 21, 2019); *see also* Hannah Ritchie, *How Many Animals are Factory-Farmed?*, OUR WORLD IN DATA (Sept. 25, 2023), https://ourworldindata.org/how-many-animals-are-factory-farmed (corroborating these figures).

[3] Matilde Nuñez del Prado Alanes, *What Is Factory Farming and Why Is It Bad?*, SENTIENT (Oct. 28, 2022), https://sentientmedia.org/factory-farms.

[4] YUKYAN LAM ET AL., INDUSTRIAL FOOD ANIMAL PRODUCTION IN LOW- AND MIDDLE-INCOME COUNTRIES: A LANDSCAPE ASSESSMENT 24 (2016), https://clf.jhsph.edu/sites/default/files/2019-01/IFAP-in-low-and-middle-income-countries-a-landscape-assessment.pdf.

[5] Nuñez del Prado Alanes, *supra* note 3; *see also* Linda McQuaig, *Keeping the Curtains Drawn on Secretive Factory Farm Industry*, TORONTO STAR (Dec. 16, 2020), https://www.thestar.com/opinion/contributors/keeping-the-curtains-drawn-on-secretive-factory-farm-industry/article_26240cc8-1c04-5c21-a02c-02f789128bb5.html (comparing Canada's animal welfare practices to those of Europe, Australia, and New Zealand).

[6] FOOD & WATER ACTION EUR. & FRIENDS OF THE EARTH EUR., THE URGENT CASE TO STOP FACTORY FARMS IN EUROPE 4 (2020), https://www.foodandwatereurope.org/wp-content/uploads/2020/10/Factoryfarms_110920_web.pdf.

[7] Fiona Harvey et al., *Rise of Mega Farms: How the US Model of Intensive Farming is Invading the World*, GUARDIAN (July 18, 2017, 11:06 AM), https://www.theguardian.com/environment/2017/jul/18/rise-of-mega-farms-how-the-us-model-of-intensive-farming-is-invading-the-world; Andrew Wasley & Madlen Davies, *The Rise of the Megafarm: How British Meat is Made*, THE BUREAU OF INVESTIGATIVE JOURNALISM (July 17, 2017), https://www.thebureauinvestigates.com/stories/2017-07-17/megafarms-uk-intensive-farming-meat.

[8] Timothy J. Killeen, *Industrial Infrastructure in the Pan Amazon*, MONGABAY (Oct. 17, 2023), https://news.mongabay.com/2023/10/industrial-infrastructure-in-the-pan-amazon; LAM ET AL., *supra* note 4, at 1; Ken Swenson, *Factory Farming in China and the Developing World*, BRITANNICA, https://www.britannica.com/explore/savingearth/factory-farming-in-china-and-the-developing-world-a-growing-threat (last visited June 9, 2024).

[9] Matthias Baumann et al., *Deforestation and Cattle Expansion in the Paraguayan Chaco 1987–2012*, 17 REG'L ENV'T CHANGE 1179, 1186–87 (2017); HELMUT J. GEIST & ERIC F. LAMBIN, WHAT DRIVES TROPICAL DEFORESTATION? 26 (Land-Use and Land-Cover Change Rep. Series No. 4, 2001).

[10] Edward W. Butt et al., *Large Air Quality and Public Health Impacts due to Amazonian Deforestation Fires in 2019*, GEOHEALTH, July 2021, No. e2021GH000429, at 11–12; Joel Henrique Ellwanger et al., *Beyond Diversity Loss and Climate Change: Impacts of Amazon Deforestation on Infectious Diseases and Public Health*, 92 ANNALS BRAZILIAN ACAD. SCIS., no. 1, 2020, No. e20191375, at 8–9; Jeff Tollefson, *Why Deforestation and Extinctions Make Pandemics More Likely*, 584 NATURE 175, 176 (2020).

threats.[11] Forested areas function as a buffer against the spread of zoonotic diseases, so clearing forests for cattle farming increases the risk of zoonotic disease emergence.[12] Additionally, forests capture and store carbon dioxide, so clearing forests for cattle farming and animal feed releases stored carbon dioxide into the atmosphere and diminishes the planet's ability to capture and store carbon dioxide in the future—all to make way for a food system that releases large quantities of methane into the atmosphere as well.[13]

Each of these kinds of industrial animal agriculture is more associated with some harms than with others. For instance, intensive systems tend to be particularly associated with environmental, health, and social impacts arising from (1) the accumulation of concentrated animal waste and (2) the resulting physical and mental health problems of workers, animals, and community members. In contrast, large-scale extensive systems tend to be particularly associated with environmental, health, and social impacts associated with land use change, climate change, and biodiversity loss. However, we should not conclude from these trends that only intensive systems produce the former harms or that only extensive systems produce the latter ones. Local *and* global environmental, health, *and* social harms are always a possible consequence of both kinds of industrial animal agriculture.

To be clear, this conception of industrial animal agriculture excludes small-scale extensive systems. Particularly in food-insecure and low-income settings, many households still raise animals as an essential source of food or income, and we are bracketing these practices for now. In some cases, it may be difficult to draw a clear line between large-scale extensive systems that count as industrial and the kinds of small-scale extensive—and currently essential—systems that count as non-industrial. Perhaps countries can set national limits on how much animal farming to allow, and then use principles of distributive justice to determine where it can still occur. This is a matter for further research; for now, it will be enough to note that our conception of industrial animal agriculture does not intend to target local, free-range animal farming that occurs at sufficiently small scales.

Before we proceed, we should also emphasize several features of our proposed global ban on industrial animal agriculture by 2050 that will be important throughout this paper. First, we recognize the ambitious

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[11] ICG Vieira et al., *Deforestation and Threats to the Biodiversity of Amazonia*, 68 BRAZILIAN J. BIOLOGY 949, 951 (2008).

[12] ERIC CHIVIAN & AARON BERNSTEIN, HOW OUR HEALTH DEPENDS ON BIODIVERSITY 6, 16–17 (2010), https://www.cbd.int/doc/health/health-biodiversity-hms-en.pdf; Matthew N. Hayek, *The Infectious Disease Trap of Animal Agriculture*, SCI. ADVANCES, Nov. 2022, No. eadd6681, at 1.

[13] Yadvinder Malhi et al., *Forests, Carbon and Global Climate*, 360 PHIL. TRANSACTIONS ROYAL SOC'Y A 1567, 1571, 1575–77 (2002); P.J. GERBER ET AL., TACKLING CLIMATE CHANGE THROUGH LIVESTOCK: A GLOBAL ASSESSMENT OF EMISSIONS AND MITIGATION OPPORTUNITIES 15 (2013), http://www.fao.org/3/a-i3437e.pdf.

nature of this proposal. While there is ample rationale and precedent to justify a global ban on industrial animal agriculture, there will also be ample resistance to this project. Even when policymakers propose modest reforms to animal farming or diets, such as temporary meatless menus at schools and other plant-forward procurement policies, backlash ensues.[14] Since our proposal is more far-reaching than any existing proposal currently being considered, politicians who embrace it could expect a similar, if not more intense, backlash. This backlash will make it difficult for governments to achieve a global ban on industrial animal agriculture by 2050.

However, we will argue that governments should pursue a global ban on industrial animal agriculture despite such obstacles. A global ban is both necessary and possible, albeit difficult, to achieve. Relevant parallels with other areas of international governance—including ozone protection, tobacco control, forced labor prevention, and nuclear weapon non-proliferation—show that when a product or process causes massive, unnecessary, and transboundary harm to vulnerable populations against their will, governments have the capacity to work together to address this harm. Policymakers should proceed on the assumption that a global ban on industrial animal agriculture is similarly feasible, and they should start laying the groundwork for such a ban by implementing the incremental policy reforms that we discuss later.

Second, and relatedly, governments must pursue a global ban on industrial animal agriculture by 2050 in a just and equitable manner. One might reasonably worry that a global ban on this food system would be *illiberal* (since it would remove a freedom that many humans enjoy) and *harmful* (since it would remove a source of food and income on which many humans rely). These concerns are reasonable, and they need to be addressed with care. Drawing on an analogy with energy, we will propose that governments work together towards a global ban on industrial animal agriculture via a multi-decade "just transition" that involves gradually scaling down this food system, gradually scaling up alternatives, and supporting everyone as much as possible along the way. If done well, this project can *expand* freedom and security.

In recognition of these complexities, we do not propose that governments implement a global ban on industrial animal agriculture immediately, nor do we propose that they pursue a global ban on this food system at the expense of other, more modest reforms. Instead, we believe that more modest reforms tackling the adverse impacts of industrial animal farming, including informational, financial,

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[14] Ciara Nugent, *Farmer Protests in the Netherlands Show Just How Messy the Climate Transition Will Be*, TIME (July 29, 2022, 10:45 AM), https://time.com/6201951/dutch-farmers-protests-climate-action; Jon Henley, *Meatless School Menu Sparks Political Row in France*, GUARDIAN (Feb. 24, 2021, 6:31 AM), https://www.theguardian.com/world/2021/feb/24/meatless-school-menu-sparks-political-row-in-france.

regulatory, and just transition policies, are both valuable in themselves and complementary to more ambitious goals. In that spirit, this paper provides a roadmap to a global ban on industrial animal agriculture by 2050—intended as one possible roadmap among many—that includes more modest policy reforms that can be gradually scaled up.

While our definition of "industrial animal agriculture" and our proposal for a global ban by 2050 require more precision before they can be useful for policymaking, the present level of precision is enough to motivate the following general argument: industrial animal agriculture—intensive, extensive, or both—causes massive, unnecessary, and transboundary harm. Unfortunately, this harm is essential to the industry; there is no way to make animal-sourced foods a central part of our global diet without it. But fortunately, this industry is *not* essential to human survival and flourishing. Governments can, and should, work together to build a humane, healthful, and sustainable global food system over the course of the next quarter-century, in very large part by shifting animal-sourced foods to the margins of our global diet and non-animal-sourced foods to the center.

III. THE HARMS OF INDUSTRIAL ANIMAL AGRICULTURE

We start by briefly surveying three general categories of harm that industrial animal agriculture causes. First, these systems cause environmental harms, in part by contributing to climate change and biodiversity loss. Second, they cause public health harms, in part by contributing to antimicrobial resistance and the spread of zoonotic diseases. Third, they cause social harms, in part by harming farm workers and farmed animals. Industrial animal agriculture is necessarily harmful in at least some of these ways, and many of these harms are collective and global rather than individual and local. While no food system is harm-free—for instance, humans and other animals can be harmed and exploited in plant-based food systems too[15]—industrial animal agriculture is distinct for both the many different types of harm it causes and the severity of those harms.

A. Environmental Harms

Industrial animal agriculture places particularly strong pressures on the environment. In general, animal agriculture uses about 83% of global farmland[16] and roughly two-thirds of global freshwater, more

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[15] Gwen M. Pfeifer, *Pesticides, Migrant Farm Workers, and Corporate Agriculture: How Social Work Can Promote Environmental Justice*, 27 J. PROGRESSIVE HUM. SERVS. 175, 176–79 (2016).

[16] J. Poore & T. Nemecek, *Reducing Food's Environmental Impacts through Producers and Consumers*, 360 SCIENCE 987, 990 (2018).

than the (non-agricultural) industrial and municipal sectors combined.[17] In exchange, this food system produces only 17% of the calories that we consume and 38% of the protein we consume.[18] Animal agriculture has particularly high land use requirements at scale, in part because it requires space not only for raising the animals who produce food for humans, but also for growing the plants that produce food for those animals. And since energy is lost in the conversion of plant feed to animal protein, we need to grow more plants to feed farmed animals than we would need to grow to feed humans, increasing the land use required for plant agriculture as well.[19]

In part due to its land use, industrial animal agriculture is also a major contributor to climate change. While estimates vary, greenhouse gas emissions from farmed land animals are likely between 12% and 20% of all anthropogenic emissions.[20] At present, these estimates cover industrial and non-industrial systems, but a significant portion can be ascribed to industrial systems given their scale. Cattle farming is particularly bad in this regard, since it contributes substantially to climate change both directly, by emitting large quantities of methane, and indirectly, by contributing substantially to deforestation—including through the use of land for animal feed[21]—which emits large quantities of carbon dioxide. This is one reason why, at COP28, heads of state and government from more than 150 nations jointly declared that "any path to fully achieving the long-term goals of the Paris Agreement must include agriculture and food systems."[22]

Industrial animal agriculture is also a major contributor to biodiversity loss. Biodiversity, of course, is essential for maintaining global ecosystems and closely related to human, animal, and

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[17] Leo Horrigan et al., *How Sustainable Agriculture Can Address the Environmental and Human Health Harms of Industrial Agriculture*, 110 ENV'T HEALTH PERSPS. 445, 447 (2002).

[18] Hannah Ritchie & Max Roser, *Half of the World's Habitable Land Is Used for Agriculture*, OUR WORLD IN DATA (Feb. 16, 2024), https://ourworldindata.org/global-land-for-agriculture.

[19] Horrigan et al., *supra* note 17, at 445; David Pimentel & Marcia Pimentel, *Sustainability of Meat-Based and Plant-Based Diets and the Environment*, 78 AM. J. CLINICAL NUTRITION 660S, 661S (2003).

[20] U.N. FOOD & AGRIC. ORG., PATHWAYS TOWARDS LOWER EMISSIONS: A GLOBAL ASSESSMENT OF THE GREENHOUSE GAS EMISSIONS AND MITIGATION OPTIONS FROM LIVESTOCK AGRIFOOD SYSTEMS 4 (2023); Richard Twine, *Emissions from Animal Agriculture—16.5% Is the New Minimum Figure*, SUSTAINABILITY, June 2021, No. 6276, at 4; Dan Blaustein-Rejto & Chris Gambino, *Livestock Don't Contribute 14.5% of Global Greenhouse Gas Emissions*, BREAKTHROUGH INST. (Mar. 20, 2023), https://thebreakthrough.org/issues/food-agriculture-environment/livestock-dont-contribute-14-5-of-global-greenhouse-gas-emissions.

[21] Hannah Ritchie, *Drivers of Deforestation*, OUR WORLD IN DATA (Feb. 2021), https://ourworldindata.org/drivers-of-deforestation.

[22] *COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action*, COP28 UAE, https://www.cop28.com/en/food-and-agriculture (last visited June 19, 2024).

environmental health.[23] Extinction rates are already about 1,000 times higher than the historical baseline, and they could be 10,000 times higher by the end of the century.[24] According to the UN Environment Programme, our global food system is the primary driver of biodiversity loss and the sole threat to 86% of the species at risk of extinction.[25] Industrial animal agriculture is a major driver of this problem through its contribution to deforestation and climate change, among other pathways.[26] Thus, meeting global targets for reducing deforestation, climate change, and biodiversity loss requires addressing the role of industrial animal agriculture in all three problems.

Industrial animal agriculture places other strong pressures on the environment as well, especially in its intensive forms. For example, factory farmed animals produce massive quantities of manure, urine, and other forms of waste, and workers routinely dump this waste in the surrounding environment. Normal quantities of animal waste can be good for the local environment, adding organic matter and essential nutrients to the soil, improving the pH balance of the soil, and improving resistance to soil erosion. However, extremely high quantities of animal waste are bad for the environment. The planet is unable to safely absorb such high quantities of waste, and as a result, the waste pollutes the local land, air, and water, distributing pathogens, heavy metals, and antibiotic-resistant bacteria throughout the local environment, driving public health risks for local community members.[27]

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[23] LIVESTOCK, ENV'T & DEV. INITIATIVE & U.N. FOOD & AGRIC. ORG., LIVESTOCK'S LONG SHADOW: ENVIRONMENTAL ISSUES AND OPTIONS 181–82 (2006); JEFF SEBO, SAVING ANIMALS, SAVING OURSELVES: WHY ANIMALS MATTER FOR PANDEMICS, CLIMATE CHANGE, AND OTHER CATASTROPHES 48 (2022).

[24] S.L. Pimm et al., *The Biodiversity of Species and Their Rates of Extinction, Distribution, and Protection*, 344 SCIENCE 987, 987 (2014) (noting a current extinction rate of 1,000 times the historical baseline); Thomas E. Lovejoy, Commentary, *Extinction Tsunami Can Be Avoided*, 114 PROC. NAT'L ACAD. SCIS. U.S. AM. 8440, 8440 (2017) (providing evidence that the extinction rate may increase tenfold by the end of the century).

[25] *Our Global Food System is the Primary Driver of Biodiversity Loss*, U.N. ENV'T PROGRAMME (Feb. 2, 2021), https://www.unep.org/news-and-stories/press-release/our-global-food-system-primary-driver-biodiversity-loss.

[26] Brian Machovina et al., *Biodiversity Conservation: The Key Is Reducing Meat Consumption*, SCI. TOTAL ENV'T, 1 Dec. 2015, at 419, 420.

[27] JoAnn Burkholder et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, 115 ENV'T HEALTH PERSPS. 308, 309 (2007); CLAUDIA COPELAND, CONG. RSCH. SERV., RL31851, ANIMAL WASTE AND WATER QUALITY: EPA REGULATION OF CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS) 4 (2010); DOUG GURIAN-SHERMAN, CAFOS UNCOVERED: THE UNTOLD COSTS OF CONFINED ANIMAL FEEDING OPERATIONS 3–4 (2008), https://www.ucsusa.org/sites/default/files/2019-10/cafos-uncovered-full-report.pdf.

B. Public Health Harms

Industrial animal agriculture also poses a major threat to public health. This food system contributes significantly to the rise of zoonotic diseases in at least two ways. First, this food system—particularly in its intensive form—requires maintaining large, dense populations of farmed animals.[28] Roughly a quarter of all zoonoses stem from contact with domesticated species, and this transmission pathway has led to the emergence of prevalent zoonotic diseases including swine flu and avian flu.[29] Second, industrial animal agriculture—particularly in its extensive form—destroys habitats, which "brings the interface between humans and wild animals closer, and thereby increases the risk of disease transmission from wild animals" by creating "novel 'species assemblages' that allow pathogens the opportunity to find new host species."[30]

Industrial animal agriculture is also a significant driver of antimicrobial resistance, which the World Health Organization (WHO) has characterized as "one of the top global public health and development threats."[31] For example, since factory farms contain too many animals for individualized veterinary care to be possible or desirable, factory farmed animals are routinely administered medically important antibiotics to promote growth and prevent illnesses from spreading.[32] This practice makes factory farms an ideal breeding ground for antibiotic-resistant bacteria, which are "pathogenic to humans, easily transmitted to humans via food chains, and widely disseminated in the environment via animal wastes," thereby posing a grave public health threat.[33] As a result, the WHO has called on animal product producers to halt their use of medically important antibiotics.[34]

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[28] Justin Bernstein & Jan Dutkiewicz, *A Public Health Ethics Case for Mitigating Zoonotic Disease Risk in Food Production*, FOOD ETHICS, May 2021, No. 9, at 4; Mary J. Gilchrist et al., *The Potential Role of Concentrated Animal Feeding Operations in Infectious Disease Epidemics and Antibiotic Resistance*, 115 ENV'T HEALTH PERSPS. 313, 313 (2007).

[29] Bernstein & Dutkiewicz, *supra* note 28; Jenny L. Mace & Andrew Knight, *Influenza Risks Arising from Mixed Intensive Pig and Poultry Farms, with a Spotlight on the United Kingdom*, FRONTIERS VETERINARY SCI, Dec. 2023, No. 1310303, at 2.

[30] Mace & Knight, *supra* note 29; Bernstein & Dutkiewicz, *supra* note 28.

[31] *Antimicrobial Resistance*, WORLD HEALTH ORG. (Nov. 21, 2023), https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance.

[32] *Stop Using Antibiotics in Healthy Animals to Prevent the Spread of Antibiotic Resistance*, WORLD HEALTH ORG. (Nov. 7, 2017), https://www.who.int/news/item/07-11-2017-stop-using-antibiotics-in-healthy-animals-to-prevent-the-spread-of-antibiotic-resistance.

[33] Christy Manyi-Loh et al., *Antibiotic Use in Agriculture and Its Consequential Resistance in Environmental Sources: Potential Public Health Implications*, MOLECULES, Apr. 2018, No. 795, at 1 (2018).

[34] *Stop Using Antibiotics in Healthy Animals to Prevent the Spread of Antibiotic Resistance, supra* note 32.

At the level of individual health, there are documented risks associated with the consumption of high levels of processed meat and red meat. The WHO considers processed meat as a carcinogen and red meat as a probable carcinogen.[35] The consumption of red and processed meat and dairy has also been linked to other non-communicable diseases including type 2 diabetes and heart disease.[36] These individualized harms also impose a substantial economic burden on healthcare systems; one study estimates the annual global cost of healthcare associated with red and processed meat consumption is $285 billion.[37] While these individualized harms are not our primary focus here, it is worth noting that the widespread availability of these animal products is a recent phenomenon, made possible through industrial animal agriculture.

The environmental and public health harms of industrial animal agriculture are linked. One estimate suggests that improved air quality as a result of dietary changes away from animal products could reduce premature mortality by 108,000–236,000 deaths each year.[38] Another estimate suggests that agricultural air pollution is responsible for more than 12,000 deaths annually in the United States alone.[39] Additionally, factory farms are often built adjacent to low-income communities or communities of color;[40] thus, the public health threats associated with factory farming have a disproportionate impact on these communities, making this not only a public health issue but also a social justice issue. In part for these reasons, the American Public Health Association and other organizations have called for a "moratorium on the establishment of new CAFOs and expansion of existing CAFOs."[41]

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[35] *Cancer: Carcinogenicity of the Consumption of Red Meat and Processed Meat*, WORLD HEALTH ORG. (Oct. 26, 2015), https://www.who.int/news-room/questions-and-answers/item/cancer-carcinogenicity-of-the-consumption-of-red-meat-and-processed-meat; Marco Springmann et al., *Health-Motivated Taxes on Red and Processed Meat: A Modelling Study on Optimal Tax Levels and Associated Health Impacts*, PLOS ONE, Nov. 2018, No. e0204139, at 2.

[36] Y. Wang & M.A. Beydoun, *Meat Consumption Is Associated with Obesity and Central Obesity Among US Adults*, 33 INT'L J. OBESITY 621, 621 (2009).

[37] Springmann et al., *supra* note 35, at 6.

[38] Marco Springmann et al., *The Global and Regional Air Quality Impacts of Dietary Change*, NATURE COMMC'NS, Oct. 2023, No. 6227, at 1.

[39] Nina G.G. Domingo et al., *Air Quality–Related Health Damages of Food*, PROC. NAT'L ACAD. SCIS. U.S. AM., May 2021, No. e2013637118, at 2.

[40] Wendee Nicole, *CAFOs and Environmental Justice: The Case of North Carolina*, 121 ENV'T HEALTH PERSP. a182, a183 (2013).

[41] *Precautionary Moratorium on New and Expanding Concentrated Animal Feeding Operations*, AM. PUB. HEALTH ASS'N (Nov. 5, 2019), https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2020/01/13/precautionary-moratorium-on-new-and-expanding-concentrated-animal-feeding-operations.

C. Social Harms

Finally, industrial animal agriculture—particularly in its intensive form—is known for its negative mental and physical health effects on workers and animals. Many industrial farm workers perform strenuous labor for long hours.[42] The work is monotonous but high-risk,[43] and the environment is often dusty, damp, and foul-smelling.[44] Physical health risks include exposure to zoonotic diseases like H1N1, H5N1, SARS-CoV, MERS-CoV, and SARS-CoV-2.[45] Dusts and allergens can also cause breathing problems like asthma, rhinitis, chronic bronchitis, and COPD.[46] In the United States, an average of two slaughterhouse workers per week experience an accidental amputation.[47] Mental health risks include anxiety, depression, and isolation.[48] Perhaps as a result of these risks, slaughterhouse workers are at an elevated risk of nightmares, PTSD, and substance abuse.[49]

In part because industrial farm and slaughterhouse jobs are undesirable, these jobs tend to be filled by vulnerable individuals such as people from low-income households, migrants, and prisoners.[50] Indeed, most migrant workers in U.S. CAFOs and slaughterhouses are refugees or undocumented immigrants.[51] Europe's meat industry relies heavily on migrant labor as well.[52] Migrant groups are susceptible to exploitation because (1) farms treat them as replaceable; (2) they may not be familiar with the host country's language or civil rights; and (3) they may not self-advocate out of fear of retaliation, job loss, or

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[42] Caitlin Kelly, *Exploited: The Unexpected Victims of Animal Agriculture*, 30 ANIMAL L. 103, 131 (2024).

[43] Jessica Slade & Emma Alleyne, *The Psychological Impact of Slaughterhouse Employment: A Systematic Literature Review*, 24 TRAUMA, VIOLENCE, & ABUSE 429, 436 (2023).

[44] HUM. RTS. WATCH, BLOOD, SWEAT, AND FEAR: WORKERS' RIGHTS IN U.S. MEAT AND POULTRY PLANTS 144 (2004), https://www.hrw.org/sites/default/files/reports/usa0105.pdf.

[45] Alyssa Marchese, & Alice Hovorka, *Zoonoses Transfer, Factory Farms and Unsustainable Human–Animal Relations*, SUSTAINABILITY, Oct. 2022, No. 12806, at 1, 2.

[46] T. Sigsgaard et al., *Respiratory Diseases and Allergy in Farmers Working with Livestock: A EAACI Position Paper*, CLINICAL & TRANSLATIONAL ALLERGY, July 2020, No. 29, at 1, 2; Kelly, *supra* note 42, at 108–09.

[47] Andrew Wasley et al., *Two Amputations a Week: The Cost of Working in a US Meat Plant*, THE GUARDIAN (July 5, 2018, 7:00 AM), https://www.theguardian.com/environment/2018/jul/05/amputations-serious-injuries-us-meat-industry-plant.

[48] A. Gregoire, *The Mental Health of Farmers*, 52 OCCUPATIONAL MED. 471, 472, 472 tbl.1 (2002).

[49] Slade & Alleyne, *supra* note 43, at 430.

[50] Kelly, *supra* note 42, at 111, 123; Shawn Fremstad et al., *Meatpacking Workers Are a Diverse Group Who Need Better Protections*, CTR. FOR ECON. & POL'Y RSCH. (Apr. 29, 2020), https://cepr.net/meatpacking-workers-are-a-diverse-group-who-need-better-protections.

[51] Kelly, *supra* note 42, at 115.

[52] CLEO VERKUIJL ET AL., A JUST TRANSITION IN THE MEAT SECTOR: WHY, WHO, AND HOW? 20 (2022), https://www.sei.org/wp-content/uploads/2022/11/just-transition-meat-sector.pdf.

deportation.[53] Incarcerated workers can be coerced into farm labor as well; in the United States, they are not protected by the Thirteenth Amendment's prohibition of slavery and involuntary servitude,[54] and they are generally denied worker protections like the right to unionize.[55]

Industrial animal agriculture harms nonhuman animals as well. It routinely breeds animals to be as large or "productive" as possible.[56] It separates them from their families. It keeps them in cramped, toxic conditions that sometimes lead to aggression and cannibalism.[57] It routinely mutilates them without anesthesia, for instance by debeaking chickens or tail docking pigs.[58] It transports them across great distances with little or no access to food, water, or temperature control.[59] Finally, it kills them on industrial "disassembly lines" that regularly operate at too fast a pace to ensure animal welfare.[60] An estimated 80 billion terrestrial vertebrates meet this fate every year,[61] and the vast majority are raised in intensive settings.[62] While extensively farmed animals might be spared some of these harms, they are still bred, raised, and killed for human use and are still vulnerable to harm and neglect.[63]

The rise of aquatic and invertebrate animal farming is now extending these welfare risks to new species. For example, fish aquaculture has been expanding rapidly,[64] yet early research suggests that most aquaculture farms fail to meet basic welfare standards.[65] Octopus farming is on the rise as well, with one company planning to farm nearly a million octopuses per year at a single facility.[66] However, octopuses are highly sensitive and intelligent creatures, and without sufficient mental stimulation, they are at risk of boredom, frustration,

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[53] Kelly, *supra* note 42, at 116–17.

[54] Chin Jou, *Greenwashing 'Modern Day Slavery' Through the Mystique of Prison Farm Labor*, 106 INT'L LAB. & WORKING-CLASS HIST. (forthcoming Fall 2024) (manuscript at 4), https://www.cambridge.org/core/services/aop-cambridge-core/content/view/5C66A5DC08405FD09D9F08D99BF4113D/S0147547923000467a.pdf.

[55] *Id.* at 5.

[56] Joyce D'Silva, *Adverse Impact of Industrial Animal Agriculture on the Health and Welfare of Farmed Animals*, 1 INTEGRATIVE ZOOLOGY 53, 53 (2006).

[57] Horrigan et al., *supra* note 17, at 449.

[58] *Id.*

[59] Michael Greger, *The Long Haul: Risks Associated with Livestock Transport*, 5 BIOSECURITY & BIOTERRORISM: BIODEFENSE STRATEGY, PRAC., & SCI. 301, 304 (2007).

[60] TIMOTHY PACHIRAT, EVERY TWELVE SECONDS: INDUSTRIALIZED SLAUGHTER AND THE POLITICS OF SIGHT 118–19 (2011).

[61] Ritchie, *supra* note 2, at n.1.

[62] Anthis & Anthis, *supra* note 2.

[63] Cleo Verkuijl et al., *Climate Change, Public Health, and Animal Welfare: Towards a One Health Approach to Reducing Animal Agriculture's Climate Footprint*, FRONTIERS ANIMAL SCI., May 2024, No. 1281450, at 5–6.

[64] Walter Sánchez-Suárez et al., *From Land to Water: Taking Fish Welfare Seriously*, ANIMALS, Sept. 2020, No. 1585, at 1.

[65] João Luis Saraiva et al., *A Global Assessment of Welfare in Farmed Fishes: The FishEthoBase*, FISHES, May 2019, No. 30, at 12.

[66] Michael Gross, *Octopus Etiquette*, 33 CURRENT BIOLOGY R1068, R1069 (2023).

and aggression.[67] In artificial environments, they are also at elevated risk of parasitic infections, digestive problems, and mortality.[68] And while octopuses might receive more attention than other farmed aquatic and (especially) invertebrate species, recent research suggests that welfare risks apply for a wide range of these other species too.[69]

D. Conclusion

For the vast majority of farmed species, industrial animal agriculture is *necessarily* harmful in at least some of these ways; there is no way to farm cows, pigs, chickens, fishes, octopuses, lobsters, or other such animals at scale without causing excessive harm in one way or another. Of course, there might be limited exceptions to this rule. For instance, some researchers have proposed that we can farm bivalves without causing excessive harm, since bivalves are less likely than other farmed animals—including farmed invertebrates such as cephalopod mollusks, decapod crustaceans, and insects—to experience a significant amount of pain, suffering, or frustration in captivity.[70] However, these limited exceptions are not at the heart of our current global food system. Our global system of industrial animal agriculture is *extremely* bad for humans, animals, and the planet.

IV. THE CASE FOR A GLOBAL BAN ON INDUSTRIAL ANIMAL AGRICULTURE

We are now in a position to see why a global ban on industrial animal agriculture is warranted. The environmental, public health, and social harms that this activity causes have several features that make it a paradigm candidate for a global ban. These harms are intentional and foreseeable, they are imposed on vulnerable populations against their will, they are a necessary part of industrial animal agriculture, and yet industrial animal agriculture is *not* a necessary part of our global food system. Furthermore, these harms span nations and generations and raise several collective action problems—involving free riding, international leakage, high administrative costs, and global injustice—that require international coordination to solve. Taken together, these considerations imply that governments have a responsibility to pursue a global ban on industrial animal agriculture.

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[67] Jennifer Jacquet et al., *The Case Against Octopus Farming*, ISSUES SCI. & TECH., Winter 2019, at 37, 44.

[68] *Id.*

[69] Kristen Andrews et al., *Background*, N.Y. DECLARATION ON ANIMAL CONSCIOUSNESS (Apr. 19, 2024), https://sites.google.com/nyu.edu/nydeclaration/background.

[70] Jennifer Jacquet et al., *Seafood in the Future: Bivalves are Better*, 8 SOLS. 27, 32 (2017).

A. Why a Ban Is Warranted

We can start by considering why a ban on industrial animal agriculture might be warranted in general. First, the harms of industrial animal agriculture are *intentional* and *foreseeable*. This food system exploits workers and animals as a means to its ends, and it contributes to disease outbreaks, extreme weather events, and other such global threats as a result of its activities. Moreover, since these global threats are "threat multipliers," this food system also contributes to the amplification of ordinary threats such as hunger and thirst. Yes, we might not always be able to tell whether a particular farm contributed to a particular disease outbreak or extreme weather event. But we might *sometimes* be able to do so, and either way, we can tell that a world with industrial animal agriculture will have more frequent and intense disease outbreaks and extreme weather events than a world without this industry.

Second, industrial animal agriculture imposes these harms on vulnerable populations against their will. The harms of this industry are not restricted to people who opt into it. Yes, this industry produces high quantities of processed meat, red meat, and other such products that may be bad for consumers. But while these individualized risks and harms are noteworthy, they are not our primary concern here. Industrial animal agriculture is also a major contributor to environmental, health, and social harms that imperil a wide range of vulnerable populations whether or not they opt into this system. Indeed, the vast majority of victims of industrial animal agriculture are nonparticipating stakeholders, including not only fellow citizens who are unable or unwilling to participate but also and especially members of other nations, future generations, or species who have no say in the matter.

Third, these harms are a necessary part of industrial animal agriculture. In order to reduce many of the harms associated with antimicrobial use, concentrated waste, and intensive confinement, we would need to provide animals with much more space on average. Yet in order to reduce many of the harms associated with deforestation, climate change, and biodiversity loss, we would need to provide animals with much *less* space on average. This is why strategies for reducing some harms *without* reducing scale—for instance, proposals to reduce deforestation by increasing intensification—risk maintaining or even increasing other harms such as harms associated with antimicrobial use, concentrated waste, and intensive confinement.[71] Ultimately, the only way to meaningfully reduce all these harms at once is to dramatically reduce the scale of animal farming.[72]

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[71] Verkuijl et al., *supra* note 63, at 4.

[72] Cleo Verkuijl et al., *FAO's 1.5 °C Roadmap for Food Systems Falls Short*, 5 NATURE FOOD 264, 265 (2024).

Fourth, industrial animal agriculture is *not* a necessary part of our global food system. Plant agriculture has the potential to feed the human population at a fraction of the harm of animal farming. Alternative proteins like plant-based, cell-based, and fermentation-derived meats can potentially expand our options as well.[73] Yes, these alternatives might not be able to feed everyone at present; we would need to scale them up first. And yes, no global food system is completely harm-free; even plant agriculture can be harmful and exploitative, though typically much less than industrial animal agriculture. Still, our species has the ability to scale up other food systems that have the potential to be much less harmful at scale. By gradually replacing industrial animal agriculture with these and other alternatives, we can improve outcomes for humans, animals, and the environment at the same time.

Governments routinely, and appropriately, ban practices when these conditions hold. In particular, when a practice intentionally or foreseeably causes massive and unnecessary harm to vulnerable populations against their will, we should aspire to not only *end* that practice but also to *ban* it. In this case, even if we were to eventually end industrial animal agriculture through other means—such as a combination of informational, financial, and regulatory policies—banning this practice at that point would still serve both a practical function and an expressive function. The practical function would be to lock in this new status quo, reducing the risk of backsliding in the future. And the expressive function would be to make it clear that this kind of harm and exploitation has no place in modern society—at least not to the extent that other, better alternatives are available.

Of course, as previously noted, when we say that these considerations support banning industrial animal agriculture, we are not saying that governments should ban this industry *now*, or that they should ban this industry instead of implementing other, more moderate policies in the short term. Instead, the idea is that governments should lay the groundwork for a ban on industrial animal agriculture by using other, more moderate policies. More moderate policies can be valuable on their own, and they can also complement a global ban by scaling down this industry, scaling up alternative sectors, and supporting everyone who relies on this industry as much as possible along the way. According to our proposal, a ban on industrial animal agriculture is not an *alternative* to other policy solutions. Instead, as we will see, other policies can be complementary to a ban and, indeed, can support an eventual ban by helping to reduce the current prevalence of industrial animal agriculture.

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[73] U.N. ENV'T PROGRAMME, WHAT'S COOKING? AN ASSESSMENT OF THE POTENTIAL IMPACTS OF SELECTED NOVEL ALTERNATIVES TO CONVENTIONAL ANIMAL PRODUCTS 17, 19, 22 (2023), https://wedocs.unep.org/bitstream/handle/20.500.11822/44236/whats_cooking_frontiers.pdf.

B. Why a Global Ban Is Warranted

We can now consider why a *global* ban on industrial animal agriculture is warranted in particular. First, international governance is appropriate where necessary to *prevent transboundary rights violations.* Specifically, international regulation is appropriate when countries engage in "domestic conduct with extraterritorial effects" and cause an "intrusion upon the enjoyment of human rights abroad."[74] Industrial animal agriculture clearly satisfies this condition. Ratified by 171 countries, the International Covenant on Economic Social and Cultural Rights articulates the right to the "highest attainable standard of physical and mental health."[75] And many of the global threats to which industrial animal agriculture contributes—including climate change, biodiversity loss, antimicrobial resistance, and infectious disease emergence—infringe on this codified right.[76]

Second, international regulation is appropriate where necessary to *prevent free-riding*—that is, to prevent governments from accepting the benefits of abatement without assuming the burdens.[77] Industrial animal agriculture satisfies this condition as well. Again, many of the externalities of this industry transcend national boundaries. Abating many of these externalities requires accepting local costs (such as transition costs associated with food system reform) in exchange for global benefits (such as reduced deforestation, climate change, and biodiversity loss). In this kind of case, each government has a strong incentive to wait for other governments to act first so that they can reap the benefits of abatement without assuming the burdens. International regulation is necessary to solve this collective action problem and ensure that governments work together on food system reform.

Third, international regulation is appropriate where necessary to *prevent leakage*—that is, to prevent harmful activities from moving from regulated areas to unregulated areas.[78] Industrial animal agriculture satisfies this condition as well. For example, a ban on this industry in one country can raise the global price of animal products in other countries, leading unregulated countries to increase production in order to obtain the economic benefit.[79] Leakage can also occur through capital relocation; for example, a ban on industrial animal agriculture in one country can induce producers to relocate their business to unregulated

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[74] Tilmann Altwicker, *Transnationalizing Rights: International Human Rights Law in Cross-Border Contexts*, 29 EUR. J. INT'L L. 581, 585 (2018).

[75] G.A. Res. 2200A (XXI), at 12 (Dec. 16, 1966).

[76] Laurie Sellars at al., *One Health, COVID-19, and a Right to Health for Human and Nonhuman Animals*, HEALTH & HUM. RTS., Dec. 2021, at 35, 36, 39.

[77] Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 689–90 (1999).

[78] *Id.* at 692.

[79] *Id.* at 693, 693 n.67.

countries.[80] This leakage can offset the effectiveness of regional regulation, and even the fear of leakage can create a "political obstacle to [national-level] action," which might ultimately disincentivize participation in regional regulation efforts.[81]

Fourth, international regulation is appropriate where necessary to *prevent unacceptably high administrative costs*. Industrial animal agriculture satisfies this condition as well. A unified regulatory framework reduces the risk that different standards in different areas will increase the cost of compliance. In general, regulatory divergence between nations can impose costs on businesses and consumers when producers and traders "face significant costs to identify the relevant regulatory requirements, adapt their production processes to comply with them, and prove conformity in order to sell them abroad."[82] In contrast, a coherent international regulatory scheme can reduce the need for country-specific adaptations. In this way, international regulation can improve efficiency, particularly for food products that are widely bought and sold on international markets.

Fifth, international regulation is appropriate where necessary to *empower global participation*. Industrial animal agriculture satisfies this condition as well. Different governments can, and should, have differentiated responsibilities with respect to solving this problem, since (1) some countries are more responsible for the harms of industrial animal agriculture than others, (2) some countries benefit from this food system more than others, and (3) some nations have a greater ability to support the development of alternative food systems without imposing unacceptably high burdens on their populations than others. In this kind of case, international cooperation is needed to empower all countries to participate in food system reform while supporting their populations. International cooperation is also needed to ensure that these efforts can be just and equitable.

Of course, to say that a global ban on industrial animal agriculture is warranted is not to say that such a ban will be simple. For example, some countries might need to pursue this ban on different timelines than others, owing to their different responsibilities or capacities. So, when we suggest 2050 as a target for a global ban later on, we can treat that as a kind of *average*, with some countries responsible for arriving sooner and others later. That means that even if governments work toward a global ban, they still need to think carefully about how to manage coordination problems during the transition, implementing policies to address free riding, leakage, high administrative costs, and

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[80] *Id.* at 694.

[81] *Id.* at 695–96.

[82] ORG. FOR ECON. COOP. & DEV., INTERNATIONAL REGULATORY CO-OPERATION: ADAPTING RULEMAKING FOR AN INTERCONNECTED WORLD 3 (2020), https://www.regulation.org.uk/library/2020-OECD-international-regulatory-cooperation-policy-brief.pdf.

global injustices for as long as countries remain out of sync. Fortunately, governments can, and have, overcome this kind of complication in the past. They can, and should, do the same here.

C. Conclusion

As explained by the Organisation for Economic Co-operation and Development (OECD), many "regulations often have domestic reach, while many of today's most pressing policy challenges transcend national borders."[83] This mismatch diminishes our ability to solve international problems through national policy alone, implicating the need for international policy as well. And as we have now seen, industrial animal agriculture is a paradigmatic example of this kind of international problem. This industry foreseeably imposes massive and unnecessary harm on vulnerable populations against their will. Additionally, many of these harms cross national boundaries, and subnational solutions could lead to free-riding, leakage, high administrative costs, and global injustice. Thus, governments should work together to achieve a global ban on industrial animal agriculture.

V. OBJECTIONS AND REPLIES

We can further unpack our argument by considering three standard objections. First, some will argue that a global ban on industrial animal agriculture is *impossible*, since this food system is deeply entrenched in our global economy. Second, some will argue that such a global ban is *illiberal*, since it would remove an individual freedom that many humans enjoy. Finally, some will argue that such a global ban is *harmful*, since it would remove a source of food or income on which many humans rely. As we will see, each of these objections contains an element of truth, and they provide us with grounds for sharpening our proposal. But, as we discuss in this Part, none of these objections provides us with grounds for abandoning our proposal. Instead, they strengthen the rationale for approaching a ban on industrial animal agriculture in a thoughtful and planned-out way.

A. Is a Global Ban on Industrial Animal Agriculture Impossible?

There are many global changes that seem impossible before they happen—and then seem inevitable after they happen. Yet in reality, many of these global changes are neither impossible nor inevitable. Instead, they are *possible but hard*. We should proceed on the assumption that a global ban on industrial animal agriculture is similar. As we have already noted, this is not to say that such a ban is

[83] *Id.* at 1.

feasible in the short term. However, if governments lay the groundwork for such a ban carefully and thoughtfully, then it will become increasingly feasible over time. By reducing support for industrial animal agriculture, increasing support for humane, healthful, and sustainable alternatives, and implementing just transition policies as described below, governments can motivate a natural shift away from industrial animal agriculture and towards alternatives over time.

Governments are already taking steps in the right direction. For instance, Austria, Germany, Slovakia, Czechia, and Luxembourg have banned the use of hen cages; Sweden and Norway have eliminated the use of gestation crates for pigs; Germany plans to phase gestation crates out by 2028; and France has required that all shell eggs (that is, eggs sold whole) come from cage-free hens as of 2022.[84] Sub-national actors are taking steps in the right direction too. For example, in 2018, the State of California passed Proposition 12, which prohibited the in-state production and sale of eggs, pork, and veal from facilities that do not meet minimum space requirements for captive animals, and which cited both animal welfare and public health grounds.[85] After facing legal challenges from the National Pork Producers Council, the law was upheld by the Supreme Court in 2023.[86]

Meanwhile, traditional plant products such as legumes, whole grains, nuts and seeds, and fruits and vegetables are already available in many places (though as we noted above, animal protein may continue to be necessary in many food-insecure settings for the foreseeable future as well). Additionally, plant-based meats—meats derived from plants—are increasingly available in high- and middle-income countries,[87] and cell-based meats—meats derived from cell cultures—are starting to become available at select locations as well.[88] To be clear, plant-based and cell-based meats are still relatively expensive[89] and still represent only a tiny percentage of the meat market,[90] and cell-based meats still

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[84] Jonathan Moens, *The Worst Horrors of Factory Farming Could Soon Be Phased Out in Europe*, VOX (Sept. 29, 2021, 10:30 AM), https://www.vox.com/future-perfect/22698265/europe-cage-ban-animal-welfare-eggs-pork-united-states; Niamh Michail, *France Confirms 2022 Cage Ban for Shell Eggs*, FOOD NAVIGATOR EUR. (Feb. 20, 2018, 1:57 PM), https://www.foodnavigator.com/Article/2018/02/20/France-confirms-2022-cage-ban-for-shell-eggs.

[85] CAL. HEALTH & SAFETY CODE §§ 25990–25993.1 (2018).

[86] Nat'l Pork Producers Council v. Ross, 598 U.S. 356, 390–91 (2023).

[87] *See, e.g.*, BEYOND MEAT, https://www.beyondmeat.com/en-US (last visited June 21, 2024); IMPOSSIBLE, https://impossiblefoods.com (last visited June 21, 2024).

[88] Jonathan Smith, *Future Meat Lands €308M in Biggest-Ever Cultured Meat Investment,* LABIOTECH, https://www.labiotech.eu/trends-news/future-cultured-meat-investment (June 25, 2022).

[89] GOOD FOOD INST., REDUCING THE PRICE OF ALTERNATIVE PROTEINS 1 (2022), https://gfi.org/wp-content/uploads/2021/12/Reducing-the-price-of-alternative-proteins_GFI_2022.pdf.

[90] Poulson Joseph et al., *Alternative Proteins: Market Research on Consumer Trends and Emerging Landscape*, MEAT & MUSCLE BIOLOGY, July 2020, No. 16, at 3.

have major technical obstacles to overcome.[91] But as governments and companies scale up these and other alternative proteins, industrial animal agriculture will become less essential.

With that said, it is clear that there are significant social, legal, political, and economic challenges on the road to a global ban on industrial animal agriculture. This food system is still on the rise, fueled by massive investments from governments and companies.[92] Moreover, recent protests across Europe, including in response to proposed cuts in animal farming,[93] suggest that a proposed global ban on industrial animal agriculture may receive substantial opposition, at least initially. Insofar as a global ban requires global cooperation, this opposition will be a major obstacle. In Part VII we discuss how governments, companies, and other actors can pave the way for a global ban despite this potential opposition, emphasizing the importance of holistic structural changes that engage with affected stakeholders to minimize disruptions and maximize co-benefits.

B. Is a Global Ban on Industrial Animal Agriculture Illiberal?

A global ban on industrial animal agriculture would, indeed, remove a freedom that many humans currently enjoy. However, that does not mean that it would be illiberal. As John Stuart Mill argued in his landmark book *On Liberty* in 1859,[94] the right to liberty might be a right to harm *ourselves*, but it is not a right to harm *others* against their will. Indeed, in a liberal society, individuals have a duty to *avoid* harming others against their will. Thus, far from *violating* the right to individual liberty, a global ban on industrial animal agriculture is necessary for *respecting* this right. As we have seen, industrial animal agriculture causes massive, necessary, and transboundary environmental, health, and social harms against vulnerable populations against their will. The right to individual liberty thus implies that governments are not only *permitted* but *required* to pursue such a ban.

Moreover, a world without industrial animal agriculture has the potential to contain much more individual liberty than a world with it. With alternative proteins, we can do more than replicate the taste, texture, and nutritional profile of animal-based foods; we can create

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91 U.N. ENV'T PROGRAMME, *supra* note 73, at 21.

92 Andrew Wasley & Alexandra Heal, *Revealed: Development Banks Funding Industrial Livestock Farms Around the World*, THE GUARDIAN (July 2, 2020, 3:00 AM), https://www.theguardian.com/environment/2020/jul/02/revealed-development-banks-funding-industrial-livestock-farms-around-the-world; Simona Vallone & Eric F. Lambin, *Public Policies and Vested Interests Preserve the Animal Farming Status Quo at the Expense of Animal Product Analogs*, 6 ONE EARTH 1213, 1217–19 (2023).

93 Ajit Niranjan, *Why Europe's Farmers are Protesting—and the Far Right is Taking Note*, GUARDIAN (Jan. 15, 2024, 12:00 AM), https://www.theguardian.com/environment/2024/jan/15/why-europe-farmers-are-protesting.

94 JOHN STEWART MILL, ON LIBERTY 13 (Batoche Books 2001) (1859).

brand new kinds of foods, with brand new tastes, textures, and nutritional profiles as well. We can also produce these foods without consuming as much land or water, producing as much waste or pollution, enduring as many disease outbreaks or extreme weather events, or spending as much money to address such global threats. Together, these ecological and economic benefits would significantly expand individual liberty overall, not only by ensuring that our food system harms and exploits many fewer individuals, but also by ensuring that it can be part of a world with fewer restrictions and more opportunities for all.

We can also keep in mind that the public already supports a ban on industrial animal agriculture to a greater extent than many assume. In the United States, a 2020 Sentience Institute survey found that 50% of respondents were in favor of banning factory farming, and 44% were in favor of banning slaughterhouses.[95] Likewise, in Europe, a 2023 Eurobarometer survey found that 84% of respondents believe that "the welfare of farmed animals should be better protected in their country than it is now."[96] And in a study of international perceptions of the importance of animal welfare, more than 90% of participants in each of Chile, Pakistan, Australia, and Brazil agreed that farmed animal welfare is important.[97] The more governments support producers and consumers in transitioning away from industrial animal agriculture, the more space there will be for further such shifts.

Of course, this is not to say that the pursuit of a global ban on industrial animal agriculture is *necessarily* consistent with the right to individual liberty. As with all major global policy changes, some ways of pursuing a global ban are more compatible with maintaining respect for individual liberty than others. But our claim here is not that a liberal approach to a global ban on industrial animal agriculture is *inevitable*, but rather, simply, that such an approach is *available*. In Part VII we discuss features that a liberal approach might take, emphasizing the need to scale down industrial animal agriculture, scale up less harmful alternatives, and support individuals who currently rely on industrial animal agriculture as much as possible along the way—along with the value of involving affected stakeholders ranging from farmers to workers to consumers in that process.

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[95] Ali Ladak & Jacy Reese Anthis, *Animals, Food, and Technology (AFT) Survey: 2020 Update*, SENTIENCE INST. (Mar. 17, 2021), https://www.sentienceinstitute.org/aft-survey-2020.

[96] European Commission Press Release IP/23/4951, Eurobarometer Shows How Important Animal Welfare is for Europeans (Oct. 19, 2023).

[97] Michelle Sinclair et al., *International Perceptions of Animals and the Importance of Their Welfare*, FRONTIERS ANIMAL SCI., Aug. 2022, No. 960379, at 1, 6. Chile (96.8%), Pakistan (95.2%), Australia (91.2%), and Brazil (90.2%) had the highest relative levels of agreement. *Id.*

C. Is a Global Ban on Industrial Animal Agriculture Harmful?

Finally, and relatedly, a global ban on industrial animal agriculture might indeed harm humans who currently depend on this industry, whether for food security, livelihoods, or both. However, as we know from efforts to transform other harmful systems, the risk that food system reform will be harmful is not a reason to maintain the status quo. Since the status quo is harmful as well, the question is not which option *eliminates* harm but rather which option *minimizes* harm. And when we compare the harms of industrial animal agriculture (consumption of land and water, production of waste and pollution, increases in disease outbreaks and extreme weather events, and more—all of which affect food security and livelihoods as well) with the harms of food system reform (social and economic disruption), we can see that the former harms are often worse—particularly if governments take steps to minimize the latter harms.

This last point is crucial. As we have already noted, governments can minimize the harmful effects of food system reform by pursuing a *just transition*. In general, this involves replacing a harmful system with a less harmful alternative in an equitable and inclusive manner. For instance, policymakers have begun to pursue just transition planning and support in the energy system by phasing down fossil fuels while supporting humans who depend on fossil fuels in seeking alternative sources of income or energy.[98] Similarly, policymakers can pursue a just transition in the food system by phasing down industrial animal agriculture while supporting humans who depend on this industry in seeking alternative sources of food or income.[99] In both cases, a just transition might also require the creation of a general social safety net to help individuals and communities make ends meet.

In the context of food system reform, a number of initiatives are starting to emerge. In the Netherlands, for example, the government announced a multibillion-euro plan to buy out farmers and help them transition to other work.[100] In the United States, the Rancher Advocacy Program is working to provide "inspiration and education" for ranchers considering transitioning to different careers.[101] Likewise, the Transfarmation Project aims to help farmers transition from farming animals to farming crops.[102] And the proposed U.S. Farm System Reform Act includes a provision that requires the Department of

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[98] Tamara Antonia Krawchenko & Megan Gordon, *How Do We Manage a Just Transition? A Comparative Review of National and Regional Just Transition Initiatives*, SUSTAINABILITY, May 2021, No. 6070, at 1, 5–6.

[99] VERKUIJL ET AL., *supra* note 52, at 32–33.

[100] Tom Levitt, *Netherlands Announces €25bn Plan to Radically Reduce Livestock Numbers*, GUARDIAN (Dec. 15, 2021, 9:00 AM), https://www.theguardian.com/environment/2021/dec/15/netherlands-announces-25bn-plan-to-radically-reduce-livestock-numbers.

[101] RANCHER ADVOC. PROGRAM, https://rancheradvocacy.org (last visited June 21, 2024).

[102] TRANSFARMATION, https://thetransfarmationproject.org (last visited June 21, 2024).

Agriculture to provide grants to owners of animal feed operations who wish to transition to "alternative agriculture activities."[103] By supporting these and other aligned initiatives (which we discuss in more detail below), governments can seek food system reform and support farmers, workers, and consumers alike.

However, we should make the same kind of caveat here that we did in our responses to the previous two objections. There is no guarantee that a transition to a better food system will minimize harmful side effects for producers, consumers, or other stakeholders. Ensuring that we make a just transition requires considering a wide range of issues holistically (considering each issue at the same time), structurally (considering how our social, legal, political, economic, and technological systems limit the options available to us), and comprehensively (considering the direct as well as indirect effects of all options). This will require new institutions and infrastructure, which will be difficult to achieve and sustain. In Part VII, we discuss what this approach to a just transition might involve, and we also discuss first steps that governments can take in this direction in the short term.

D. Conclusion

These three objections to our proposal—that a global ban on industrial animal agriculture is impossible, illiberal, and harmful—merit serious consideration. Industrial animal agriculture is deeply rooted in our global economy, and achieving a global ban in a just and equitable manner will be difficult. However, when an industry causes this much harm to this many individuals, preserving the status quo is not an option. Achieving a global ban on industrial animal agriculture in a just and equitable manner is both necessary and possible, and this is all that should matter at present. Governments must work together to ban this industry on environmental, health, *and* social grounds. Yes, there are obstacles on the path towards a global ban, but these obstacles provide governments with reason to tread carefully, not with reason to remain in place or keep moving in the wrong direction.

VI. PRECEDENTS FOR A GLOBAL BAN ON INDUSTRIAL ANIMAL AGRICULTURE

Fortunately, we have many examples that we can consider when contemplating a global ban on industrial animal agriculture. Specifically, governments have already worked together to achieve international regulation—including international bans—of many products and processes that cause massive, unnecessary, and transboundary environmental, health, and social harms. These

[103] Farm System Reform Act of 2023, S. 271, 118th Cong. (2023).

precedents—whether adhered to by all or many countries—range in subject matter, and the products or processes that they address are similar to those of industrial animal agriculture in some ways and different in others. But together, they paint a clear picture: when governments recognize that a particular product or process poses a global threat, they have the ability to work together to address that threat, and they also have legal precedents and instruments to use in doing so.

A. Regulation of Environmental Harms

First, there are many international agreements aimed at protecting the environment. For example, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer "regulates the production and consumption" of nearly 100 ozone-depleting substances (ODS) that expose the planet to ultraviolet radiation.[104] Since its ratification, almost all ODS have been phased out, and the ozone layer is on track to recover to pre-1980 levels.[105] Similarly, the 2013 Minamata Convention on Mercury seeks to phase out mercury use in products, ban new mercury mines, and phase out existing mines.[106] There are dozens of other precedents as well, including agreements related to climate change, biodiversity loss, forest management, ocean management, whaling, and various kinds of waste and pollution.[107]

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[104] *About Montreal Protocol*, U.N. ENV'T PROGRAMME, https://www.unep.org/ozonaction/who-we-are/about-montreal-protocol (last visited Mar. 28, 2024).

[105] Press Release, U.N. Env't Programme, Ozone Layer Recovery is on Track, Helping Avoid Global Warming by 0.5°C (Jan. 9, 2023), https://www.unep.org/news-and-stories/press-release/ozone-layer-recovery-track-helping-avoid-global-warming-05degc.

[106] *Minamata Convention on Mercury*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/international-cooperation/minamata-convention-mercury#global (last visited Mar. 28, 2024) (explaining that the Minamata Convention is a "multilateral environmental agreement that addresses specific human activities which are contributing to widespread mercury pollution" and was "adopted by delegates from over 140 countries on January 19, 2013, after three years of negotiation"); Minamata Convention on Mercury art. 3, *adopted* Oct. 10, 2013, T.I.A.S. No. 17-816, 3202 U.N.T.S. 54669.

[107] There are several examples related to waste and pollution. *See Basel, Rotterdam, Stockholm Conventions*, U.N. INST. FOR TRAINING & RSCH., https://www.unitar.org/sustainable-development-goals/planet/our-portfolio/basel-rotterdam-stockholm-conventions (last visited Aug. 19, 2024) (discussing the Basel, Rotterdam, and Stockholm Conventions and how they share the goal of protecting human health and the environment); Sulan Chen, *A Global Treaty to End Plastic Pollution is in Sight*, U.N. DEV. PROGRAM (Nov. 22, 2023), https://www.undp.org/blog/global-treaty-end-plastic-pollution-sight (discussing efforts of the Intergovernmental Negotiating Committee on Plastic Pollution to produce treaty for reducing plastic use); International Convention for the Regulation of Whaling, Dec. 2, 1946, 62 Stat. 1716, 161 U.N.T.S. 72; *see generally* David Hunter, *International Environmental Law*, INSIGHTS ON L. AND SOC'Y, FALL 2018, AT 1.1.

New proposals are being explored in the environmental domain as well. Consider current efforts to address key gaps in the Paris Agreement.[108] Adopted in 2015, the Paris Agreement sets goals to limit global warming to well below 2°C and guide international action on issues such as climate change adaptation, finance, and loss and damage.[109] However, the Paris Agreement is held back by its failure to directly mention fossil fuels at all.[110] To close this gap, experts are now exploring the adoption of a global fossil fuel non-proliferation treaty (FF-NPT) that would phase out fossil fuel production over time. First presented by academics, the idea of an FF-NPT has now been endorsed by 117 cities and subnational governments, and 13 countries have formally called for fossil fuel non-proliferation on an international stage.[111]

Many of these precedents are directly relevant in this context because industrial animal agriculture is a major contributor to the environmental harms that they seek to address, such as deforestation, climate change, and biodiversity loss.[112] Thus, the same rationale might support adopting *two* FF-NPTs: one for fossil fuels and the other for factory farming, along with other kinds of industrial animal agriculture. Governments will not be able to meet existing environmental targets unless they phase out *both* of these industries. Many of these precedents are also indirectly relevant in this context because they show that when governments face an environmental threat that crosses national boundaries and creates international coordination problems, they have the capacity—the knowledge, power, political will, and legal rationale—necessary to work together to address it.

B. Regulation of Products Harmful to Human Health

Second, there are precedents for international agreements aimed at protecting public health. Consider the WHO Framework Convention on Tobacco Control (FCTC), which seeks to address the globalized health threat of tobacco addiction by regulating the "packaging and labeling of tobacco products," banning "tobacco advertising, promotion and sponsorship," banning sales of tobacco products to minors, and providing

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108 *The Paris Agreement: What Is the Paris Agreement?*, U.N. CLIMATE CHANGE, https://unfccc.int/process-and-meetings/the-paris-agreement (last visited Mar. 19, 2024).

109 *Id.*; Ruth Townend, *COP28: What Was Achieved, and What Needs to Happen Now*, CHATHAM HOUSE (Dec. 14, 2023), https://www.chathamhouse.org/2023/12/cop28-what-was-achieved-and-what-needs-happen-now.

110 Nicholas Kusnetz, *Q&A: How a Fossil Fuel Treaty Could Support the Paris Agreement and Wind Down Production*, INSIDE CLIMATE NEWS (Dec. 6, 2023), https://insideclimatenews.org/news/06122023/fossil-fuel-treaty-could-support-paris-agreement/.

111 *Who Has Joined the Call for a Fossil Fuel Non-Proliferation Treaty?*, FOSSIL FUEL NON-PROLIFERATION TREATY INITIATIVE, https://fossilfueltreaty.org/endorsements/#governments (last visited Aug. 19, 2024).

112 *See* discussion *supra* Part II. Background.

"health or other appropriate warnings or messages."[113] The FCTC has been signed by 168 countries and acceded to or ratified by 183,[114] and one study found that the FCTC "played a key role in accelerating the development and implementation of tobacco control legislation" at the national level.[115] Other precedents in this category include the regulation of certain narcotic or psychotropic drugs and the mandatory reporting of public health crises to the WHO.[116]

Policymakers are now exploring new proposals in the domain of human health. For example, countries are currently negotiating a new international agreement that seeks to address the threat of pandemics.[117] According to the WHO, the goals of the accord are to "build resilience to pandemics; support prevention, detection, and responses to outbreaks with pandemic potential; ensure equitable access to pandemic countermeasures; and support global coordination through a stronger and more accountable WHO."[118] Current negotiations suggest that the international community continues to see value in working together to address this kind of threat. That said, some have criticized the draft negotiating text for failing to recognize the need to prevent spillover of disease between animals and humans, the origin of the majority of recent pandemics.[119]

As with the environmental examples, many of these health precedents are directly relevant in this context because industrial animal agriculture is a major contributor to the public health threats that they seek to address, such as outbreaks, epidemics, and pandemics.[120] Phasing out industrial animal agriculture is thus

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113 WHO Framework Convention on Tobacco Control art. 11, 13, 16, *opened for signature* June 16, 2003, 2302 U.N.T.S. 166.

114 *Parties*, WHO FRAMEWORK CONVENTION ON TOBACCO CONTROL, https://fctc.who.int/who-fctc/overview/parties (last visited Aug. 30, 2024).

115 Lorraine Craig et al., *Impact of the WHO FCTC on Tobacco Control: Perspectives from Stakeholders in 12 Countries*, 28 TOBACCO CONTROL s129, s130 (2019).

116 *See* Single Convention on Narcotic Drugs, Mar. 30, 1961, 18 U.S.T. 1407, 520 U.N.T.S. 204; *see also* United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, Dec. 20, 1988, S. TREATY DOC. No. 101-4 (1989), 1582 U.N.T.S. 165; *see also* Emily Fearnley & Ailan Li, *International Health Regulations (2005): Public Health Event Communications in the Western Pacific Region*, W. PAC. SURVEILLANCE & RESPONSE J., July–Sep. 2013, at 26, 26.

117 Vijay Shankar Balakrishnan, *WHO Pandemic Treaty: The Good, the Bad, & the Ugly—An Interview with Larry Gostin,* HEALTH POL'Y WATCH (Sept. 14, 2023), https://healthpolicy-watch.news/who-pandemic-treaty-the-good-the-bad-the-ugly-an-interview-with-larry-gostin.

118 *Pandemic Prevention, Preparedness and Response Accord*, WORLD HEALTH ORG. (June 28, 2023), https://www.who.int/news-room/questions-and-answers/item/pandemic-prevention—preparedness-and-response-accord.

119 *See* The *Lancet*-PPATS Comm'n on Prevention of Viral Spillover et al., *Draft of WHO Pandemic Agreement Plays Down Primary Prevention*, 403 LANCET 525, 526 (2024).

120 *See* Ellwanger, *supra* note 10 (describing how expanding animal agriculture has caused deforestation in Amazon rainforest, which in turn has led to increased spread of disease).

necessary for meeting key environmental *and* public health targets. Many of these precedents are also indirectly relevant in this context for the same reason as before: they serve as a reminder that governments both *can* and *do* work together to address global threats that imperil us all. Yes, governments might not always act swiftly, as ongoing negotiations related to climate change, pandemics, and other global threats illustrate. But they do have the capacity to act, and the first step towards effective action is recognizing that a practice is an apt target for international regulation.

C. Regulation of Social Harms

Third, there are also many precedents of international agreements aimed at preventing social harms. One example is the International Labor Organisation (ILO) Minimum Age Convention.[121] Ratified by 176 countries, this Convention established a global standard for protecting young workers, setting a general minimum working age of 15, though it can be lowered to 14 in nations "whose economy and educational facilities are insufficiently developed."[122] For any job that is a threat to employees' "health, safety or morals," the minimum age requirement is 18.[123] Rooted in the idea that "child labour is a violation of fundamental human rights," it seeks to prevent the exploitation of children and ensure that they are not subjected to hazardous conditions that could jeopardize their health, safety, or wellbeing.[124]

A related example is the Forced Labor Convention of 1930.[125] Ratified by 181 countries, the Convention requires parties to suppress or eliminate forced or compulsory labor, except in certain limited circumstances such as certain military service.[126] While the Convention

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121 Convention Concerning Minimum Age for Admission to Employment, June 26, 1973, 1015 U.N.T.S. 297.

122 *Id.* art. 1–2; *Ratifications of C138 - Minimum Age Convention, 1973 (No. 138)*, INT'L LABOUR ORG., https://www.ilo.org/dyn/normlex/en/f?p=1000:11300:0::NO:11300:P11300_INSTRUMENT_ID:312283 (last visited Aug. 24, 2024).

123 Convention Concerning Minimum Age for Admission to Employment, *supra* note 121, art. 3.

124 *See* INT'L LABOUR ORG., PAKISTAN'S JOURNEY TOWARDS THE ELIMINATION OF CHILD LABOUR 1 (2021), https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@asia/@ro-bangkok/@ilo-islamabad/documents/publication/wcms_819050.pdf (describing harms inflicted by child labor and the Minimum Age Convention's role in addressing those harms).

125 Convention Concerning Forced or Compulsory Labour, *adopted* June 28, 1930, 39 U.N.T.S. 55.

126 *Forced Labour Convention, 1930 (No. 29)*, U.N. OFFICE OF THE HIGH COMMISSIONER FOR HUMAN RIGHTS, https://www.ohchr.org/en/instruments-mechanisms/instruments/forced-labour-convention-1930-no-29 (last visited Aug. 20, 2024); *Ratifications of C029 - Forced Labour Convention, 1930 (No. 29),* INT'L LABOUR ORG., https://www.ilo.org/dyn/normlex/en/f?p=1000:11300:0::NO:11300:P11300_INSTRUMENT_ID:312174 (last visited Mar. 20, 2024).

was a first step towards regulating this social atrocity, activists have noted that its outdated language and significant loopholes have allowed for the continued existence of forced labor in many countries.[127] In 2014, the Convention was updated via a Protocol that includes more comprehensive and concrete guidance for enforcement as well as provisions for better supporting victims and their families.[128] Of course, there are several other international agreements that seek to address forced labor, including agreements related to addressing trafficking, slavery, and organized crime, as well.[129]

Of course, the social harms that these agreements address differ in many ways from the exploitation of workers and animals associated with industrial animal agriculture. Thus, it would be a mistake to assume that the rationales for these international agreements fully extend to this context without modification; each kind of harm must be considered separately on the merits. Still, these agreements show that global bans can address harmful *processes*, not merely harmful *products*, and can do so on *social and ethical* grounds, not merely *environmental* or *health* grounds. Industrial animal agriculture arguably merits international regulation *both* because of the social harms inherent to this industry—including harms to workers and widespread animal suffering—*and* because of its health and environmental effects.

D. A Case Study in Combined Harm: Weapons and Conduct in War

For a case study involving environmental, health, and social harms, consider international agreements on weapons and conduct in war. The Nuclear Nonproliferation Treaty of 1968, signed by 191 countries, seeks to prevent the spread of nuclear weapons and promote the peaceful use of nuclear technology.[130] The 1972 Biological Weapons Convention, with almost universal membership, prohibits state efforts to "develop, produce, stockpile, or otherwise acquire or retain" microbial or biological agents with no beneficial use.[131] The 1993 Chemical Weapons

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[127] *International Law on Forced Labor (C29)*, FREEDOM UNITED, https://www.freedomunited.org/landing/forced-labor-c29 (last visited Aug. 20, 2024).

[128] *New at the ILO: Updates to the Forced Labor Convention*, U.S. DEP'T OF STATE (July 27, 2015), https://2009-2017.state.gov/j/tip/rls/fs/2015/245178.htm.

[129] *See* WOMEN'S RIGHTS & GENDER SECTION, U.N. OFFICE OF THE HIGH COMMISSIONER FOR HUMAN RIGHTS, INTERNATIONAL INSTRUMENTS CONCERNING TRAFFICKING IN PERSONS (2014), https://www.ohchr.org/sites/default/files/Documents/Issues/Women/WRGS/OnePagers/IntInstrumentsconcerningTraffickingpersons_Aug2014.pdf (discussing international agreements that aim to prevent trafficking and slavery); U.N. Convention Against Transnational Organized Crime, *adopted* Nov. 15, 2000, T.I.A.S. No. 13127, 2225 U.N.T.S. 209.

[130] Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, 21 U.S.T. 483, 729 U.N.T.S. 161; *The Nuclear Nonproliferation Treaty*, COUNCIL ON FOREIGN RELS., https://education.cfr.org/learn/reading/nuclear-nonproliferation-treaty (July 27, 2023).

[131] *Biological Weapons Convention*, U.N. OFFICE FOR DISARMAMENT AFFS., https://disarmament.unoda.org/biological-weapons (last visited Mar. 21, 2024); Convention on the

Convention, signed by 193 countries, prohibits the development, production, acquisition, stockpiling, retention, transfer or use of chemical weapons.[132] And the Ottawa Treaty of 1997 commits 164 countries to "not using, developing, producing, acquiring, retaining, stockpiling, or transferring anti-personnel landmines."[133]

There are also international bans on particular kinds of wartime conduct. The Geneva Conventions uphold such bans in four contexts: the treatment of wounded and sick armed forces in the field (First Geneva Convention),[134] the treatment of wounded, sick, and shipwrecked members of armed forces at sea (Second Geneva Convention),[135] the treatment of prisoners of war (Third Geneva Convention),[136] and the protection of civilians in times of war (Fourth Geneva Convention).[137] The Geneva Conventions are supplemented by other international treaties like the Convention Against Torture.[138] As with laws involving forced labor, these laws demonstrate that governments are both able and willing to work together to ban harmful processes, not merely harmful products, and to implement such bans on social and ethical grounds, not merely on environmental and public health grounds.

Consider the similarities between military activity and food production. Military activity can serve a valuable purpose (defense), yet some means of fulfilling this purpose (including the torture of combatants, the targeting of civilians, and the use of nuclear, biological, or chemical weapons) and some effects of this activity (including

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Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, Apr. 10, 1972, 26 U.S.T. 583, 1015 U.N.T.S. 163.

132 *Chemical Weapons Convention Signatories and States-Parties*, ARMS CONTROL ASS'N, https://www.armscontrol.org/factsheets/cwcsig# (June 2018); Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, Jan. 13, 1993, T.I.A.S. No. 97-525, 1974 U.N.T.S. 45.

133 Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, *adopted* Sept. 18, 1997, 2056 U.N.T.S. 211; *The Ottawa Convention at a Glance*, ARMS CONTROL ASS'N, https://www.armscontrol.org/factsheets/ottawa (Aug. 2022).

134 Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Aug. 12, 1949, 6 U.S.T. 3114, 75 U.N.T.S. 31.

135 Geneva Convention for the Amelioration of the Condition of Wounded, Sick, and Shipwrecked Members of Armed Forces at Sea, Aug. 12, 1949, 6 U.S.T. 3217, 75 U.N.T.S. 85.

136 Geneva Convention Relative to the Treatment of Prisoners of War, Aug. 12, 1949, 6 U.S.T. 3316, 75 U.N.T.S. 135.

137 Geneva Convention Relative to the Protection of Civilian Persons in Time of War, Aug. 12, 1949, 6 U.S.T. 3516, 75 U.N.T.S. 287; AM. RED CROSS, SUMMARY OF THE GENEVA CONVENTIONS OF 1949 AND THEIR ADDITIONAL PROTOCOLS 2–4 (2011), https://www.redcross.org/content/dam/redcross/atg/PDF_s/International_Services/International_Humanitarian_Law/IHL_SummaryGenevaConv.pdf.

138 HANS DANELIUS, CONVENTION AGAINST TORTURE AND OTHER CRUEL, INHUMAN OR DEGRADING TREATMENT OR PUNISHMENT 1 (2008), https://legal.un.org/avl/ha/catcidtp/catcidtp.html.

excessive civilian casualties or other hazards) are unacceptable. Similarly, food production serves a valuable purpose (sustenance), yet some means of fulfilling this purpose (including exploitation of workers and animals) and some effects of this activity (including pandemics and climate change) are unacceptable, particularly when alternative sources of nutrition are available. While there are relevant differences as well, these similarities constitute a compelling case for international action on industrial animal agriculture.

E. Conclusion

Together, these examples show that governments have ample precedent for pursuing a global ban on industrial animal agriculture. To be clear, this is not to downplay the obstacles discussed in the previous Part. On the contrary, these precedents reinforce our analysis in that Part, showing that international regulation—including international bans—involving products or processes that cause massive, unnecessary, and transboundary harms are *possible but hard*. Governments can and should draw inspiration from their own hard-fought victories. They should pursue a global ban on industrial animal agriculture *both* as a means of achieving existing goals (including but not limited to goals related to deforestation, climate change, biodiversity loss, antimicrobial resistance, and pandemic prevention) *and* as a natural extension of the rationales underlying these goals.

Table 1. ***Select examples of international efforts to address global harms. These examples are illustrative, not comprehensive.***

Industrial animal agriculture shares similarities with many products or processes that international agreements seek to regulate, phase out, or abolish. Regulating, phasing out, and abolishing industrial animal agriculture would similarly advance environmental protection, public health, human rights, and animal welfare globally.

Domain	Treaty	Year of Adoption	Description
Environmental Concerns Relevance: Industrial animal agriculture causes substantial harm to the	International Convention for the Regulation of Whaling	1946	Introduces a moratorium on commercial whaling to prevent overhunting and preserve future generations of whales.

environment, and these agreements show that governments can act together to address such harm.	Montreal Protocol on Substances that Deplete the Ozone Layer	1987	Aims to protect the ozone layer by phasing out the production of numerous substances responsible for ozone depletion.
	Stockholm Convention on Persistent Organic Pollutants	2001	Bans or restricts the production and use of certain persistent organic pollutants that have significant adverse environmental impacts.
	The Minamata Convention on Mercury	2013	Addresses the use of mercury to protect human health and the environment from emissions and releases of mercury and mercury compounds.
Health Concerns Relevance: Industrial animal agriculture causes substantial harm to public health, and these agreements show that governments can act together to address such harm.	Single Convention on Narcotic Drugs	1961	Establishes international control over narcotic drugs, emphasizing the need to regulate substances that pose health risks.
	WHO Framework Convention on Tobacco Control (FCTC)	2003	Aims to combat the tobacco addiction epidemic by setting evidence-based measures to reduce tobacco usage and

			minimize secondhand exposure.
	International Health Regulations	2005	Defines countries' rights and obligations in handling public health events and emergencies that can cross borders, signaling the importance of regulating cross-border threats.
	International pandemic accord (under negotiation)	To be determined	Addresses pandemic prevention and response preparedness, with the goals of addressing perceived failures of the COVID-19 response and preventing another global crisis.
Social and Ethical Concerns Relevance: These agreements show that global bans can address harmful processes, not merely harmful products, and can do so on social and	The Slavery Convention	1923	Confirms and advances the suppression of slavery and the slave trade; amended in 1956 to abolish forced labor, debt bondage, serfdom, child exploitation, and servile marriage.

ethical grounds, not merely environmental or health grounds.	International Labor Organization Forced Labor Convention	1930	Requires parties to suppress or eliminate forced or compulsory labor, except in certain limited circumstances such as certain military service.
	International Labor Organization Minimum Age Convention	1973	Requires countries to establish national policy frameworks to abolish child labor and set a minimum age for employment.
	The Palermo Protocol to Suppress and Punish Trafficking in Persons, Especially Women and Children	2000	Requires nations to criminalize trafficking, attempted trafficking, and intentionally working with a trafficking organization; protects and assists trafficking victims.
Warfare Relevance: Military activity combines environmental, public health, and social risks and harms, making it a valuable case study in this context.	Geneva Conventions	1949	Introduces standards for acceptable conduct in war, including ensuring care for wounded combatants, providing protections for prisoners of war, and protecting civilians.

	Nuclear Non-Proliferation Treaty	1968	Seeks to prevent the spread of nuclear weapons and weapons technology, promote peaceful uses of nuclear energy, and further the goal of achieving nuclear disarmament.
	Chemical Weapons Convention	1993	Prohibits the development, production, acquisition, stockpiling, and use of chemical weapons and their precursors.
	Ottawa Treaty on Anti-Personnel Landmines	1997	Prohibits the use, stockpiling, production, and transfer of anti-personnel landmines.

VII. A PATHWAY TO A GLOBAL BAN ON INDUSTRIAL ANIMAL AGRICULTURE

We have argued that a global ban on industrial animal agriculture is both necessary and possible, albeit difficult, to achieve. We have also suggested that governments can pursue such a ban ethically and effectively via informational, financial, regulatory, and just transition policies that gradually scale down this industry, gradually scale up alternatives, and support those affected as much as possible along the way. We close by discussing this pathway in more detail, drawing inspiration from ongoing efforts to phase out fossil fuels. We start by discussing the timeline for a global ban, noting that a 2050 target fits well with similar targets related to climate change and biodiversity loss. We then discuss informational, financial, regulatory, and just transition policies that governments can implement in the short term to build momentum towards an eventual global ban.

A. Timeline

We propose 2050 as a target for a global ban on industrial animal agriculture for several reasons. First, this timeline is consistent with existing climate targets. More than 140 countries, including the largest emitters (China, India, the United States, and the EU) have set net-zero targets, constituting almost 90% of global emissions.[139] Many of these national pledges identify a range of 2040–2070 as the date for achieving greenhouse gas (GHG) and/or carbon neutrality, depending on issues such as levels of economic development, capacity, and responsibility for climate change. Both the United States and EU have committed to achieving net zero emissions at the latest by 2050, a target that includes all GHGs,[140] while China has set a goal of achieving neutrality of carbon emissions before 2060, and India has set a goal of achieving neutrality by 2070 (though the scope of GHGs in this commitment is unclear).[141]

Second, this timeline is consistent with national and international biodiversity targets. For example, the 2022 Kunming-Montreal Global Biodiversity Framework sets a vision of a world in which humans live in harmony with nature: "by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people."[142] The Framework introduces 23 goals for 2030 as well as four overarching goals for 2050 to achieve this vision, including to halt human-induced extinction of known threatened species, reduce the extinction rate and risk of all species tenfold, maintain genetic diversity within populations of both wild and domestic species, achieve sustainable use and management of biodiversity, and ensure international support to achieve these aims.[143]

Third, as we have seen, meeting these targets—as well as other important targets—requires addressing industrial animal agriculture. As the Intergovernmental Panel on Climate Change (IPCC) notes:

> Limiting [global] warming to 1.5°C implies reaching net zero CO2 emissions globally around 2050 and concurrent deep reductions in emissions of non-CO2 forcers, particularly methane. Such mitigation

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139 *For a Livable Climate: Net-Zero Commitments Must be Backed by Credible Action*, UNITED NATIONS, https://www.un.org/en/climatechange/net-zero-coalition (last visited Aug. 24, 2024).

140 *USA*, CLIMATE ACTION TRACKER (Nov. 1, 2023), https://climateactiontracker.org/countries/usa/net-zero-targets; *EU*, CLIMATE ACTION TRACKER (Feb. 6, 2024.), https://climateactiontracker.org/countries/eu/net-zero-targets.

141 *China*, CLIMATE ACTION TRACKER, https://climateactiontracker.org/countries/china/net-zero-targets (Sept. 17, 2024); *India*, CLIMATE ACTION TRACKER, https://climateactiontracker.org/countries/india/net-zero-targets (Sept. 27, 2024).

142 Conference of the Parties to the Convention on Biological Diversity, *Report of the Conference of the Parties to the Convention on Biological Diversity on the Second Part of Its Fifteenth Meeting*, ¶ 10, U.N. Doc. CBD/COP/15/17 (Oct. 20, 2023).

143 *Id.* ¶¶ 12–13.

> pathways are characterized by energy-demand reductions, decarbonization of electricity and other fuels, electrification of energy end use, deep reductions in agricultural emissions, and some form of [carbon dioxide removal] with carbon storage on land or sequestration in geological reservoirs. Low energy demand and low demand for land- and GHG-intensive consumption goods facilitate limiting warming to as close as possible to 1.5° C.[144]

Is there a case for seeking a global ban on industrial animal agriculture on a faster timeline? Yes and no. While limiting the harms of this industry is urgent, societies need time to make significant transitions ethically and effectively. The 2050 timeline provides time for such a transition. By seeking to ban industrial animal agriculture by 2050, governments can pursue food system reform aggressively while taking the time that they need to predict and address risks, costs, and harms associated with this undertaking. This deadline will also provide companies with the time that they need to develop new technologies to facilitate a transition, such as improving the price, taste, and convenience of alternative proteins. This is, of course, similar to the rationale for a 2050 target in the energy context, since societies need time to make this transition ethically and effectively.

That said, it will be essential for governments to set interim milestones as well, to help ensure a credible phase-out plan, metrics for tracking progress towards this goal, and sound policy and investment decisions along the way. In the case of food system reform, these interim milestones could involve targets for reducing support for industrial animal agriculture, increasing support for alternative sources of nutrition, banning the creation of new industrial farms, and closing particular percentages of industrial farms by particular deadlines (say, by aiming for a 50% reduction by 2035). Moreover, while 2050 is an appropriate global milestone, an equitable pathway towards this goal will require countries with greater capacity and historic responsibility for the harms caused by industrial animal agriculture to phase out this practice sooner, as discussed below.

B. Policies that Improve Transparency

One step on the path towards a global ban is increased transparency about industrial animal agriculture and its support systems. For example, governments can work to end "ag-gag laws" that

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144 Joeri Rogelj et al., *Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development*, *in* GLOBAL WARMING OF 1.5°C: AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5°C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GLOBAL GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY 93, 95 (Valérie Masson-Delmotte et al. eds., 2022) (emphasis added).

criminalize whistleblowing, undercover investigations, and other activities that educate the public about animal agriculture.[145] The earliest ag-gag laws, passed in 1990 and 1991 in the U.S. states of Kansas, Montana, and North Dakota, threatened undercover investigators with civil and criminal penalties.[146] Ten states have now adopted such laws.[147] For example, the North Carolina "Property Protection Act"[148] targets not only undercover investigators but also anyone who assists, compensates, or encourages them.[149] While ending ag-gag laws will not ensure sufficient transparency around industrial animal agriculture, it will remove a major obstacle that stands in the way of this goal.

Additionally, governments can regulate food labeling to ensure accuracy and transparency. In the United States, for example, while the Department of Agriculture (USDA) and the Food and Drug Administration (FDA) have the authority to regulate false or misleading information on product labels,[150] their enforcement mechanisms are lacking.[151] The USDA verifies only that product labels are consistent with manufacturers' own affidavits, and the FDA reviews only a small sample of product labels each year after the products are already on the market.[152] Governments can and should require that food labels include clear, accurate, and standardized information about the origin, production methods, and health and environmental effects associated with particular food products so that consumers can make informed decisions about which products to support.

Governments have similar opportunities regarding advertising. For example, they can prohibit advertisements that misrepresent the impacts of industrial animal agriculture. Such regulations could require disclosures about the welfare standards, nutritional content, and public health and environmental impacts of the food products advertised. False advertising laws also afford advocates and policymakers the opportunity to challenge manufacturers on their practices and impacts and have

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145 *Ag-Gag Laws*, ANIMAL LEGAL DEF. FUND, https://aldf.org/issue/ag-gag (last visited Apr. 1, 2024).

146 Caitlin A. Ceryes & Christopher D. Heaney, *'Ag-Gag' Laws: Evolution, Resurgence, and Public Health Implications*, 28 NEW SOLS. 664, 666 (2019).

147 *Id.*

148 N.C. GEN. STAT. § 99A-2 (2023), *invalidated by* People for the Ethical Treatment of Animals, Inc. v. N.C. Farm Bureau Fed'n, Inc., 60 F.4th 815 (4th Cir. 2023).

149 *Id.* § 99A-2(a)–(c); Ceryes & Heaney, *supra* note 146, at 668.

150 Jana Caracciolo, *The Legality of Food Labeling Claims: FSIS's Regulations for Meat and Poultry Labeling*, NAT'L AGRIC. L. CTR. (June 7, 2022), https://nationalaglawcenter.org/the-legality-of-food-labeling-claims-fsiss-regulations-for-meat-and-poultry-labeling.

151 *See generally* A. Bryan Endres & Nicholas R. Johnson, *United States Food Law Update: The FDA Food Safety Modernization Act, Obesity and Deceptive Labeling Enforcement*, 7 J. FOOD L. & POL'Y 135 (2011).

152 Sean P. Sullivan, *Empowering Market Regulation of Agricultural Animal Welfare Through Product Labeling*, 19 ANIMAL L. 391, 410 (2013).

their claims heard in court.[153] For instance, in early 2024 the State of New York launched a lawsuit against the U.S. arm of the world's largest meat packer, JBS, over misleading claims about its efforts to reduce GHG emissions.[154] Also in 2024, a Danish high court ruling found the pork giant Danish Crown's claim of selling "climate controlled pork" to be misleading.[155]

Finally, there is a critical need for effective monitoring, reporting, and verification processes. Monitoring industrial animal agriculture and its support systems is a daunting task given the absence of a unified database for these practices. An important step is thus for governments to improve the tracking and disclosure of such activities. In practice, there has been a noticeable hesitance to disclose such information. For instance, there are considerable deficiencies in the permit processes for CAFOs within the United States.[156] At the international level, nothing approaching a global database of factory farms currently exists, to say nothing of a global database for extensive animal farms that operate at a large scale, and governments have often been reluctant to be transparent about other activities with negative environmental impacts such as activities related to fossil fuels.[157]

International and civil society organizations can play an important role as well. There is already a push for an international governance framework to facilitate transparency and cooperation on reducing fossil fuel use.[158] Bodies such as the Organisation for Economic Co-operation and Development (OECD), International Energy Agency (IEA), and International Monetary Fund (IMF) regularly publish estimates of national fossil fuel subsidies,[159] and the civil-society-led Global Registry

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153 Carter Dillard, *False Advertising, Animals, and Ethical Consumption*, 10 ANIMAL L. 25, 27 (2004).

154 David Gelles & Manuela Andreoni, *N.Y. State Sues JBS, the Brazilian Beef Giant, Over Its Climate Claims*, N.Y. TIMES (Feb. 28, 2024), https://www.nytimes.com/2024/02/28/climate/jbs-new-york-climate-lawsuit.html.

155 Ajit Niranjan, *Danish Firm's 'Climate-Controlled Pork' Claim Misleading, Court Rules*, GUARDIAN (Mar. 1, 2024, 9:53 AM), https://www.theguardian.com/environment/2024/mar/01/danish-firm-climate-controlled-pork-claim-misleading-court-rules.

156 Cassandra Handan-Nader et al., *Deep Learning with Satellite Imagery to Enhance Environmental Enforcement*, *in* DATA SCIENCE APPLIED TO SUSTAINABILITY ANALYSIS 205, 216 (Jennifer Dunn & Prasanna Balaprakash eds., 2021) (noting how CAFOs often defy traditional land-use categories and thus, non-permitted CAFOs may be classified as cultivated cropland instead).

157 STOCKHOLM ENV'T INST. ET AL., PHASING DOWN OR PHASING UP? TOP FOSSIL FUEL PRODUCERS PLAN EVEN MORE EXTRACTION DESPITE CLIMATE PROMISES 36 (2023), http://www.unep.org/resources/production-gap-report-2023.

158 Harro van Asselt & Ellycia Harrould-Kolieb, *Toward an Intergovernmental Transparency Arrangement for Fossil Fuel Production*, 16 CARBON & CLIMATE L. REV. 161, 163–65 (2022).

159 Cleo Verkuijl & Harro van Asselt, *Fossil Fuel Subsidy Reform: Interactions Between International Cooperative Institutions. The More, the Merrier?*, *in* GOVERNING THE CLIMATE-ENERGY NEXUS: INSTITUTIONAL COMPLEXITY AND ITS CHALLENGES TO EFFECTIVENESS AND LEGITIMACY 131, 132 (Fariborz Zelli et al. eds., 2020).

of Fossil Fuels is the first open-source database of oil, gas and coal production and reserves.[160] International and civil society organizations can and should replicate this model for industrial animal agriculture; for instance, satellite data analyzed with artificial intelligence may be able to help shed light on the number and size of industrial animal farms in different parts of the world.[161]

C. Financial Policies that Support a Transition

A crucial step on the path towards a global ban is developing *financial policies* that support a gradual transition away from industrial animal agriculture. Governments can take this step in part by reducing direct financial support for this industry.[162] A 2021 UN report found that the production and consumption of many animal products enjoy high levels of financial support from governments, and that governments contribute a majority of agricultural subsidies to industrial methods.[163] Governments have pledged to phase out fossil fuel subsidies in light of the link between fossil fuels and the climate crisis,[164] although implementation continues to lag.[165] Governments should similarly pledge to phase out factory farming subsidies in light of the industry's links to public health and environmental threats, harms to workers, and the cruelty and exploitation experienced by farmed animals.

Governments can also take this step in part by increasing direct financial support for humane, healthful, and sustainable alternatives to industrial animal agriculture. As noted previously, non-animal-sourced alternatives include traditional plant agriculture, plant-based meat, and

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160 GLOB. REGISTRY OF FOSSIL FUELS https://fossilfuelregistry.org (last visited Aug. 29, 2024).

161 *See* Ben Chugg et al., *Detecting Environmental Violations with Satellite Imagery in Near Real Time: Land Application Under the Clean Water Act*, *in* CIKM '22: PROCEEDINGS OF THE 31ST INTERNATIONAL CONFERENCE ON INFORMATION & KNOWLEDGE MANAGEMENT 3052, 3060 (2022) (noting how AI analysis of satellite imagery can assist in the identification of CAFOs).

162 VERKUIJL ET AL., *supra* note 52, at 29.

163 U.N. FOOD & AGRIC. ORG. ET AL., A MULTI-BILLION-DOLLAR OPPORTUNITY: REPURPOSING AGRICULTURAL SUPPORT TO TRANSFORM FOOD SYSTEMS 4–5, 13 (2021), https://openknowledge.fao.org/server/api/core/bitstreams/58af8d5b-eaa8-4620-8b16-3e715f9db7f3/content.

164 Cleo Verkuijl et al., *Tackling Fossil Fuel Subsidies Through International Trade Agreements: Taking Stock, Looking Forward*, 58 VA. J. INT'L L. 309, 313 (2019).

165 INDIRA URAZOVA ET AL., SHIFTING PUBLIC FINANCIAL FLOWS FROM FOSSIL FUELS TO CLEAN ENERGY UNDER THE PARIS AGREEMENT 14–18 (2023), https://www.iisd.org/system/files/2023-03/global-stocktake-shifting-public-financial-flows.pdf; Jennifer McDermott, *Governments Plan More Fossil Fuel Production Despite Climate Pledges, Report Says*, ASSOCIATED PRESS (Nov. 7, 2023, 9:25 PM), https://apnews.com/article/climate-change-coal-oil-gas-production-gap-fossil-fuels-united-nations-cop28-b70d0387dcb26553a52e5ce7697d226d.

cell-based meat. Of course, reasonable people can disagree about how much governments should support these alternatives; for instance, some may prefer to invest more in whole plant-based food systems on the basis of their lower environmental[166] and health impacts,[167] while others may prefer to invest more in plant-based, cell-based, and fermentation-derived animal product alternatives due to their ability to more closely match the taste and texture of animal-sourced foods.[168] Regardless, governments can and should support alternatives to industrial animal agriculture much more in general.[169]

Governments can also address this issue by implementing "full-cost pricing" policies that internalize currently externalized costs. At present, the price of industrially produced animal products is artificially low, not only because governments directly subsidize this industry, but also because they indirectly subsidize it by shifting the costs of the public health and environmental threats that this industry creates and amplifies to taxpayers. In some cases, governments also help industrial animal farms to survive these threats, as recently happened with factory farms facing avian influenza outbreaks.[170] By taxing industrial animal farms to pay for the harms that they cause instead of further subsidizing them in the face of these harms, governments can incentivize better practices and allow food prices to better reflect the true costs of their methods of production.

International coordination is important as well. At present, governments in the Global North and international development banks

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166 *See* Carolyn S. Mattick et al., *Anticipatory Life Cycle Analysis of In Vitro Biomass Cultivation for Cultured Meat Production in the United States*, 49 ENV'T SCI. & TECH. 11941, 11945 (2015) (finding that cell-based meat grown *in vitro* requires more industrial energy than livestock production).

167 *See* Frank B. Hu et al., *Can Plant-Based Meat Alternatives Be Part of a Healthy and Sustainable Diet?*, 322 JAMA 1547, 1548 (2019) (noting that popular plant-based meat alternatives contain high amounts of sodium, saturated fat, and heme, which is linked to type 2 diabetes).

168 Jeff Sebo, *The Ethics and Politics of Plant-Based and Cultured Meat,* ETHICS FORUM, Winter 2018, at 159, 165 (describing how plant-based meat is becoming harder to distinguish from conventional meat).

169 For instance, they can divert public funding from animal agriculture to these alternatives. Currently, animal agriculture receives 1,200 times more funding than alternative technology in Europe and 800 times more funding in the United States. *See* Simona Vallone & Eric F. Lambin, *Public Policies and Vested Interests Preserve the Animal Farming Status Quo at the Expense of Animal Product Analogs*, 6 ONE EARTH 1213, 1213 (2023).

170 The 2022 Avian flu outbreak in the United States resulted in the loss of more than 40 million birds and 2.5–3 million USD. Ramadan Abdelmoez Farahat et al., *The Resurgence of Avian Influenza and Human Infection: A Brief Outlook*, NEW MICROBES & NEW INFECTIONS, June 2023, No. 101122, at 2. Rather than addressing the root causes of the outbreak, however, the U.S. government paid poultry producers more than 500 million USD to compensate for culled animals. Andrew Jacobs, *A Cruel Way to Control Bird Flu? Poultry Giants Cull and Cash In*, THE N.Y. TIMES (Apr. 2, 2024), https://www.nytimes.com/2024/04/02/science/bird-flu-aid-animal-welfare.html.

are funding industrial animal agriculture in the Global South, often with little scrutiny. An investigation by the Bureau of Investigative Journalism and *The Guardian* revealed that the commercial lending arm of the World Bank and the European Bank for Reconstruction and Development jointly provided $2.6 billion in financial support for pig, poultry and beef farming, as well as dairy and meat processing in the decade leading up to 2020.[171] Some of this funding supported "industrial-scale mega-farms, abattoirs and the expansion of multinational meat and dairy corporations," including Smithfield Foods, the world's largest pork company.[172] Governments and other actors can and should shift these forms of support as well.

To be clear, supporting food security in low-income countries and communities is essential for achieving UN Sustainable Development Goal 2: zero hunger by 2030.[173] However, that does not mean that supporting *industrial animal agriculture* is essential for this purpose. Indeed, supporting this industry may even be *counterproductive*, since it risks displacing existing diversified food supply chains in the Global South, locking this region into a food system that causes massive amounts of local *and* global harm for decades.[174] Fortunately, governments and other actors have a better option: as with energy system reform, they can support low-income countries and communities in developing humane, healthful, and sustainable food systems that can contribute to meeting both zero hunger by 2030 *and* climate and biodiversity targets by 2050.

D. Regulatory Policies that Support a Transition

A third step on the path towards a global ban is *regulatory policies* that support a gradual transition away from industrial animal agriculture. Drawing inspiration from nuclear non-proliferation, proponents of fossil fuel non-proliferation identify two key stages: first, the halting of expansion ("non-proliferation"), and second, the phasing down of existing operations ("disarmament").[175] Proponents of "industrial animal agriculture non-proliferation" can similarly identify two key stages: first, ending the opening of new industrial animal farms,

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171 Andrew Wasley & Alexandra Heal, *Revealed: Development Banks Funding Industrial Livestock Farms Around the World*, GUARDIAN (June 2, 2020, 3:00 AM), https://www.theguardian.com/environment/2020/jul/02/revealed-development-banks-funding-industrial-livestock-farms-around-the-world.

172 *Id.*

173 *Goal 2: Zero Hunger*, U.N. SUSTAINABLE DEV., https://www.un.org/sustainabledevelopment/hunger (last visited Aug. 31, 2024).

174 Philip McMichael, *Political Economy of the Global Food and Agriculture System, in* RETHINKING FOOD AND AGRICULTURE 53, 61–62, 64 (Amir Kassam & Laila Kassam eds., 2021).

175 Peter Newell et al., *Building a Fossil Fuel Non-Proliferation Treaty: Key Elements*, EARTH SYS. GOVERNANCE, Dec. 2022, No. 100159, at 4.

and second, closing existing industrial animal farms. Both these stages are essential because investing in infrastructure like coal mines, oil fields, and factory farms "locks in" social, political, and economic dependencies, and associated harms, decades into the future.[176]

Governments are already paving the way for this work by banning particularly harmful practices within industrial animal agriculture. As we have seen, the price of meat is artificially low not only because of subsidies but also because of deregulation—industrial animal farming is able to save money by harming workers, animals, public health, and the environment. In addition to addressing these problems through financial policies, governments can address them through regulatory policies that hold industrial animal agriculture to a higher standard, for instance by banning cage systems that intensively confine animals. While not enough to solve these problems, such policies can still marginally reduce the harms of industrial animal agriculture and marginally increase the costs associated with this food system, further incentivizing shifts in production and consumption.

As governments ban the worst excesses of industrial animal agriculture, they can also work toward a broader ban by setting a target to end the opening of new industrial animal farms. Experts are already calling for such policies in the context of factory farming. For example, the American Public Health Association has called for a "precautionary moratorium on new and expanding [CAFOs]."[177] U.S. Senator Cory Booker has similarly proposed legislation that includes a moratorium on large factory farms.[178] Policymakers in the State of Oregon have also proposed a bill that includes a pause on all new and expanding factory farms.[179] And in 2024, residents of Berkeley, California will vote on a

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176 Peter Erickson et al., *Assessing Carbon Lock-In*, ENV'T. RSCH. LETTERS, Aug. 2015, No. 084023, at 1.

177 *Precautionary Moratorium on New and Expanding Concentrated Animal Feeding Operations*, AM. PUB. HEALTH ASS'N (Nov. 5, 2019), https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2020/01/13/precautionary-moratorium-on-new-and-expanding-concentrated-animal-feeding-operations.

178 *Booker Reintroduces Bill to Reform Farm System with Expanded Support from Farm, Labor, Environment, Public Health, Faith Based and Animal Welfare Groups*, U.S. SEN. CORY BOOKER OF N.J. (July 15, 2021), https://www.booker.senate.gov/news/press/booker-reintroduces-bill-to-reform-farm-system-with-expanded-support-from-farm-labor-environment-public-health-faith-based-and-animal-welfare-groups.

179 Lilli DiPaola, *Oregonians Fight for a Moratorium on Factory Farms*, OR. CAP. CHRON. (Jan. 30, 2023, 5:30 AM), https://oregoncapitalchronicle.com/2023/01/30/oregonians-fight-for-a-moratorium-on-factory-farms. The bill passed in July of 2023, although the language instituting a moratorium was removed. Press Release, Food & Water Watch, OR Governor Signs First Reform of Industrial Farm Regulation in Decades (July 31, 2023), https://www.foodandwaterwatch.org/2023/07/31/or-governor-signs-first-reform-of-industrial-factory-farm-regulation-in-decades.

ban on factory farming within their city limits.[180] Other governments could pursue similar policies addressing industrial animal farms.

Governments can then set targets for closing particular percentages of industrial animal farms, culminating in a target of closing all industrial animal farms by a particular deadline—2050 on average—with an earlier deadline in some areas and a later deadline in others. In the energy space, governments are increasingly introducing measures to phase out particular kinds of fossil fuel infrastructure. For instance, Germany is phasing out coal extraction and has developed transition plans with affected workers and communities.[181] The Beyond Oil and Gas Alliance is a coalition of 15 "core member" countries and regions, plus additional supporting countries and regions, that is committed to phasing out oil and gas production both within their borders and internationally.[182] Governments should make similar commitments regarding industrial animal agriculture to further pave the way for a global ban.

Precedents are starting to emerge in the realm of industrial animal agriculture—although not without challenges. In 2021, the Netherlands, spurred by a ruling regarding nitrogen pollution from the highest Dutch administrative court, announced a plan to reduce the number of farmed animals by 30% by 2030.[183] This initiative is backed by a 25 billion EUR package to finance reforms, including the buyout of animal farmers; however, this policy was met with strong backlash from farmers and its future is unclear.[184] Similarly, in 2022, Switzerland voted on an initiative to ban factory farming over a 25-year transition period.[185] Unfortunately, this initiative was then rejected by 63% of voters.[186] These precedents highlight both the possibility and the difficulty of strong regulation at this stage—a difficulty that we hope incremental informational, financial, and regulatory policies can gradually overcome.

E. Additional Policies that Support a Just and Equitable Transition

Finally, as we have noted throughout this paper, governments can and should ensure that the transition away from industrial animal

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[180] Katie Rodriguez, *A California Town Will Vote on Banning Factory Farms. What Does That Mean for the Rest of the US?,* GUARDIAN (Jan. 30, 2024, 8:00 AM), https://www.theguardian.com/environment/2024/jan/30/berkeley-ban-factory-farm-california.

[181] STOCKHOLM ENV'T INST. ET AL., *supra* note 157, at 85.

[182] *Who We Are*, BEYOND OIL & GAS ALL., https://beyondoilandgasalliance.org/who-we-are (last visited Sept. 1, 2024).

[183] VERKUIJL ET AL., *supra* note 52, at 18.

[184] *Id.*

[185] Lisa Abend, *Switzerland Could Be the First Country to Ban Factory Farming*, TIME (Sept 22,2022). https://time.com/6215645/switzerland-factory-farming-protect-animals.

[186] Cecile Mantovani, *Swiss Reject Initiative to Ban Factory Farming*, REUTERS (Sept. 25, 2022, 10:09 AM), https://www.reuters.com/world/europe/swiss-course-reject-initiative-ban-factory-farming-2022-09-25.

agriculture is just, equitable, and inclusive for all affected stakeholders.[187] Just transition planning is currently primarily limited to the energy and industrial sectors, but many are now calling for it to extend to the agricultural sector as well.[188] In the case of industrial animal agriculture, such planning can include farmers, workers, consumers, and specially affected rural communities, among other stakeholders. And, as in the energy and industrial sectors, just transition measures can include social protections for vulnerable consumers, investments in local economic diversification, establishment of dedicated funding mechanisms, reskilling and retraining of individuals in the industrial animal agriculture supply chain, and more.[189]

Safeguarding the food security of vulnerable groups is particularly important, since reducing the supply of animal products will likely drive up prices, making these products less accessible to vulnerable groups who currently depend on them. Just transition policies should thus ensure that these groups do not bear the brunt of the transition.[190] Measures can include targeted cash transfers to vulnerable groups, tax reductions for fruits and vegetables, subsidies for traditional plant agriculture, and subsidies for research and development of plant-based and/or cell-based meat.[191] Many jurisdictions, including Brazil, China, the EU, India, the United States, and Singapore, are already making significant investments in their domestic alternative protein markets, as well as in training and capacity development in this new sector.[192]

Internationally, the Paris Agreement recognizes "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs."[193] Just transition policies are necessary to address the historic drivers of public health and environmental problems and to distribute the burdens of mitigation proportionally by calling on wealthier, historically responsible actors to lead the reduction efforts. Additionally, the IPCC recognizes that outcomes considered equitable

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187 *See* Newell et al., *supra* note 175, at 3 (calling for just transition in context of fossil fuels).

188 Giuliana Viglione, *Climate Justice: The Challenge of Achieving a 'Just Transition' in Agriculture*, CARBONBRIEF (Oct. 6, 2021, 2:00 PM), https://www.carbonbrief.org/climate-justice-the-challenge-of-achieving-a-just-transition-in-agriculture.

189 Cleo Verkuijl et al., *A Just Transition in Animal Agriculture Is Necessary for More Effective and Equitable One Health Outcomes*, CABI ONE HEALTH, Oct. 2023, No. ohcs202300021, at 3–4.

190 PATRICK WEBB ET AL., THE TRANSITION STEPS NEEDED TO TRANSFORM OUR FOOD SYSTEMS 2–3 (2021), https://www.glopan.org/wp-content/uploads/2021/05/FSS_Brief_Food_System_Transformation.pdf.

191 *See* U.N. ENV'T PROGRAMME, *supra* note 73, at 41–44, 46–48 (offering suggested policies to facilitate a just transition away from conventional animal products).

192 *Id.* at 41.

193 Paris Agreement preamble, *adopted* Dec. 12, 2015, T.I.A.S. No. 16-1104, 3156 U.N.T.S. 79.

"can lead to more effective cooperation."[194] In other words, just transition policies are also necessary to ensure broad support for a global ban, as some governments will be unwilling to participate in an agreement that does not consider issues of fairness, and others will be unable to participate in an agreement that does not involve significant financial assistance for food system reform.

In general, the need to distribute the burdens of mitigation proportionally is a well-established implication of "Common But Differentiated Responsibilities and Respective Capabilities" (CBDR-RC). This principle implies that different countries can have different responsibilities for addressing global problems, based in part on how responsible they are for these problems and how capable they are of addressing them.[195] In the case of industrial animal agriculture, this principle might imply that different countries should work on different timelines as well, for example by requiring high-income countries with more responsibility and capacity to phase down industrial animal agriculture by, say, 2040 or 2045 (though, as we have noted, this approach might create coordination problems during the transition, which governments would need to carefully manage).

More generally, an equitable approach to a global ban on industrial animal agriculture should also include support from higher-income countries for lower-income countries, which can include financial support, capacity building, and technology transfer.[196] A potential emerging example in the energy field is that of "Just Energy Transition Partnerships" (JETPs). These are financing cooperation mechanisms through which several higher-income countries seek to aggregate and deploy billions of dollars to support lower-income countries in developing cleaner alternatives to fossil fuel use (although they still face challenges in practice, including insufficient capital).[197] While overcoming such challenges is a significant hurdle, we can imagine such

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194 Ottmar Edenhofer et al., *Summary for Policymakers*, *in* CLIMATE CHANGE 2014: MITIGATION OF CLIMATE CHANGE 1, 5 (Ottmar Edenhofer et al. eds., 2014).

195 Ben Milligan & Richard Macrory, *The History and Evolution of Legal Principles Concerning the Environment, in* 6 ELGAR ENCYCLOPEDIA OF ENVIRONMENTAL LAW 23, 31–32 (Michael Faure ed., 2023); *see also* Chenguang Wang & Yi Zhang, *Common but Differentiated Responsibilities and Respective Capabilities as a Guiding Principle in International Health Law in Times of Pandemics*, 2020 NETH. Y.B. INT'L L. 257, 258, 272 (making the case for adapting the CBDR-RC principle for the health system to support pandemic prevention).

196 U.N. TECH. SUPPORT TEAM, TST ISSUES BRIEF: MEANS OF IMPLEMENTATION; GLOBAL PARTNERSHIP FOR ACHIEVING SUSTAINABLE DEVELOPMENT 1 (2013), https://sdgs.un.org/documents/tst-issues-brief-means-implementation-global-19911.

197 Katherine Kramer, *Just Energy Transition Partnerships: An Opportunity to Leapfrog from Coal to Clean Energy*, INT'L INST. FOR SUSTAINABLE DEV. (Dec. 7, 2022), https://www.iisd.org/articles/insight/just-energy-transition-partnerships; JOSEPH CURTIN ET AL., SCALING THE JETP MODEL: PROSPECTS AND PATHWAYS FOR ACTION 8, 12 (2024) https://www.rockefellerfoundation.org/wp-content/uploads/2024/02/Scaling-the-JETP-Model-Prospects-and-Pathways-for-Action.pdf.

a model could also be used for the food system, with higher-income countries providing appropriate support for lower-income countries in developing better alternatives to industrial animal agriculture.

VIII. CONCLUSION: FIRST STEPS TOWARDS A GLOBAL BAN

We have argued that governments have a responsibility to work towards a global ban on industrial animal agriculture by 2050. This industry causes massive, unnecessary, and transboundary harm to vulnerable populations against their will. While significant obstacles stand in the way of a global ban, governments have the rationale, precedents, and instruments necessary to overcome these obstacles via a gradual just transition. Of course, the world is in a period of significant tension and uncertainty, and governments will not be able to negotiate a global ban immediately. However, they can start by pursuing the incremental policies that we propose in this paper. There are a wide range of other concrete steps that they can take in the short term as well, including making commitments to address industrial animal agriculture through existing international processes.

The coming years will be critical for global environmental policy. For example, governments will soon need to take steps towards considering a "post-2030" UN development agenda, which presents an opportunity to introduce targets and indicators related to industrial animal agriculture.[198] In 2025, parties to the Paris Agreement will be required to submit economy-wide domestic climate pledges, which presents another opportunity to implement our proposals.[199] National Biodiversity Strategies and Action Plans pursuant to the Convention on Biological Diversity likewise allow for updated strategies related to agriculture and biodiversity,[200] and possible reforms to the international financial structure may allow for updated strategies that align financing with sustainable development goals. Finally, frontrunner countries could signal that industrial animal agriculture is incompatible with a sustainable, healthy, and ethical future.[201]

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198 *See* G.A. Res. 70/1, ¶ 2 (Sept. 25, 2015) (resolving to fully implement the current Sustainable Development Goals by 2030).

199 *Nationally Determined Contributions (NDCs)*, U.N. CLIMATE CHANGE, https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs (last visited Sept. 1, 2024). In addition, nearly 160 countries have explicitly pledged to address food systems in their next NDCs. *See COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action*, *supra* note 22.

200 *See National Biodiversity Strategies and Action Plans (NBSAPs): What Is an NBSAP?*, CONVENTION ON BIOLOGICAL DIVERSITY (Oct. 10, 2023), https://www.cbd.int/nbsap/introduction.shtml.

201 *See* UNITED NATIONS, SUMMIT OF THE FUTURE: WHAT WILL IT DELIVER? 1 (2024), https://www.un.org/sites/un2.un.org/files/our-common-agenda-summit-of-the-future-what-would-it-deliver.pdf (describing sustainable development and climate change as key topics for Summit of the Future).

The coming years will also be critical for global health policy. As discussed above, international negotiations continue on a treaty that aims to strengthen global pandemic prevention, preparedness, and response.[202] International actors are also increasingly highlighting the need to address antimicrobial resistance,[203] and the need to consider human, animal, and environmental health together through a "One Health" approach.[204] Given the significant role of industrial animal agriculture in creating and amplifying public health risks, these developments represent another opportunity to highlight the need for a global ban on this industry. And as governments recognize the public health and environmental harms of industrial animal agriculture, perhaps they will also have occasion to highlight its social harms, for both workers and animals.

Additionally, governments can impose moratoria on the creation of new industrial animal farms and set targets for reducing the number of existing industrial animal farms in their jurisdictions. They can also form "coalitions of the willing" committed to phasing out industrial animal agriculture by 2050 (or by earlier or later dates, as appropriate).[205] Various precedents exist in climate change policy, including the international "Powering Past Coal Alliance" consisting of 60 national governments and over 50 sub-national governments seeking to phase out coal power[206] and the aforementioned "Beyond Oil and Gas Alliance" promoting a phase-out of oil and gas production.[207] Several governments are also taking proactive steps to tackle fossil fuel subsidies, including as part of commitments made by the Group of 20 (G20)[208] and through the World Trade Organization (WTO).[209]

Importantly, such activities need not be restricted to national governments. Many of these recommended policies can also be pursued at the city, state, or province levels. Policymakers in the Dutch city of Haarlem recently introduced a ban on advertising many types of

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202 *WHO Member States Agree to Resume Negotiations Aimed at Finalizing the World's First Pandemic Agreement*, WORLD HEALTH ORG. (Mar. 28, 2024), https://www.who.int/news/item/28-03-2024-who-member-states-agree-to-resume-negotiations-aimed-at-finalizing-the-world-s-first-pandemic-agreement.

203 *See, e.g.,* Serena Tejpar et al., *Taking Stock of Global Commitments on Antimicrobial Resistance*, BMJ GLOB. HEALTH, May 2022, No. e008159, at 1.

204 Thomas C. Mettenleiter et al., *The One Health High-Level Expert Panel (OHHLEP)*, ONE HEALTH OUTLOOK, Dec. 2023, No. 18, at 1.

205 *See* Louise Michelle Fitzgerald, *Winning Coalitions for Just Transitions: Insights from the Environmental Justice Movement*, ENERGY RSCH. & SOC. SCI., Oct. 2022, No. 102780, at 2–3 (explaining the concept of coalitions of the willing).

206 POWERING PAST COAL ALLIANCE, https://www.poweringpastcoal.org (last visited Sept. 1, 2024).

207 *Who We Are*, *supra* note 182.

208 Verkuijl & van Asselt, *supra* note 159, at 134.

209 *WTO Members Working on Fossil Fuel Subsidy Reform Unveil Plan to Ramp Up Efforts*, WORLD TRADE ORG. (Feb. 27, 2024), https://www.wto.org/english/news_e/news24_e/ffsr_27feb24_e.htm.

meat.[210] And as mentioned previously, Berkeley, California will soon be voting on a factory farming ban.[211] Policymakers at different levels can also change their procurement policies to eliminate industrial animal products and help build momentum for a just transition from the ground up. Several examples already exist of schools and city councils that have gone plant-forward, including the cities of Amsterdam,[212] New York,[213] and Oxford.[214] Such policies can be useful for building momentum towards stronger regulations at higher scales, including an eventual global ban.

The question is not *whether* industrial animal agriculture will end. No industry this inhumane, unhealthful, and unsustainable can last forever, and the case for a global ban on this industry is overdetermined. Again, this industry imposes massive, unnecessary, *and* transboundary environmental, public health, *and* social harms on vulnerable populations against their will. The international community thus has a clear rationale for pursuing a global ban, as well as ample precedents and instruments available to scale this industry down, scale alternatives up, and support those affected as much as possible along the way. The only question is *when* and *how* this harmful activity will end and what role each actor will have played. The international community owes it to everyone—within and across species, nations, and generations—to ban industrial animal agriculture by 2050.

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210 George Wright, *Dutch City of Haarlem May Be World's First to Ban Most Meat Ads*, BBC NEWS (Sept. 6, 2022), https://www.bbc.com/news/world-europe-62810867.

211 Rodriguez, *supra* note 180.

212 *Amsterdam Becomes First EU Capital to Endorse Global Plant Based Treaty*, VEGCONOMIST (Feb. 2, 2024), https://vegconomist.com/society/charity-campaigns/amsterdam-first-eu-capital-endorse-plant-based-treaty.

213 Press Release, NYC Health, Eat Plants! (May 16, 2023), https://www.nyc.gov/site/doh/about/press/pr2023/nyc-launches-eat-a-whole-lot-more-plants.page.

214 *Oxford City Council Votes to Make All Internal Events Fully Plant-Based*, VEGCONOMIST (Mar. 22, 2023), https://vegconomist.com/politics-law/oxford-city-council-internal-events-plant-based.