Good Food Institute

What if we could build a more resilient food system that also satisfies the *growing global demand* for meat?

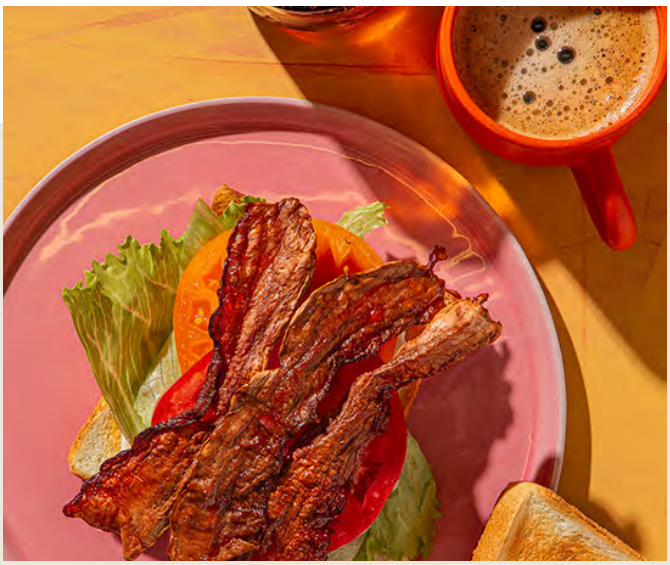
Everyone deserves a nourishing diet, a secure livelihood, and a safe climate. But current methods of meat production are driving food insecurity, deforestation, and 20 percent of greenhouse gas emissions.[1] By 2050, the global population will approach 10 billion, and demand for meat is projected to double.[2] This will coincide with growing food insecurity and biodiversity loss caused by climate change, especially in vulnerable regions.

What if we could build a more resilient, net-zero, nature-positive food system that still provides people with the foods they love? We need new ways of making meat that satisfy growing demand, and reduce pressure on the planet—working with local tastes, creating more sustainable livelihoods for farmers, and increasing resilience across the global food system.

Connect with GFI at COP27: gfi.org/cop27

Enter sustainable proteins.

There are two main categories of sustainable proteins: plant-based and cultivated. Just as the goal with renewable energy and electric vehicles is to make them interchangeable with conventional energy and combustion-powered vehicles, so too are plant-based and cultivated meats focused on winning in the marketplace.



Plant-based meat

looks, tastes, and cooks like conventional meat, but is made entirely from plants. It can cut emissions by 90 percent, and use 99 percent less land and water than conventional meat.[3]

Cultivated meat

is exactly the same as the beef, pork, chicken, and fish we eat today—but grown directly from animal cells, without antibiotics. It can cut emissions by 92 percent, and use up to 95 percent less land and 78 percent less water than conventional meat.[4]

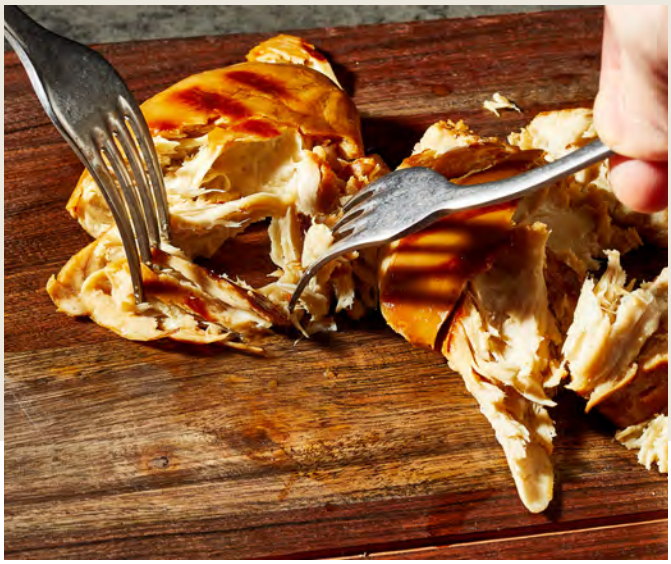


Photo credit: GOOD Meat

By delivering products that taste the same or better and cost the same or less than conventional meat, we can give consumers the foods they love without compromise. Because their production is so much more efficient than conventionally produced meat, as sustainable proteins scale, they should be able to compete on price. Scaling up sustainable proteins could add US $1.1 trillion to the global economy annually, create 10 million jobs, and cut global average crop prices by 10 percent by 2050[5]—making nutritious diets more affordable.

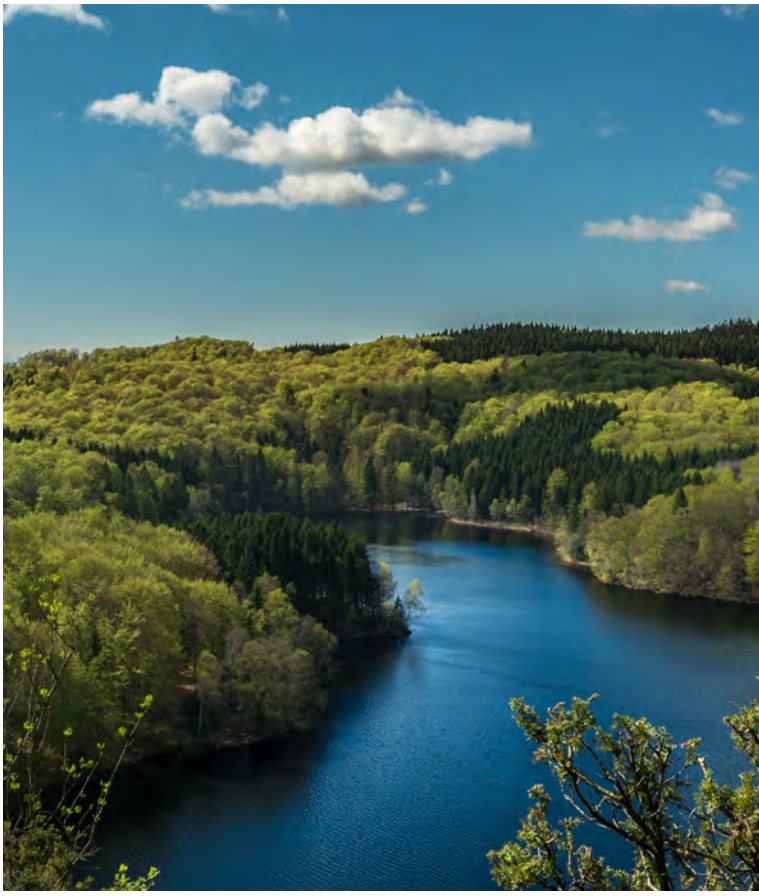
Safe climate, resilient food supply chains, abundant biodiversity—all made possible by transforming meat production

Safe climate

Governments around the world are driving a renewable energy revolution, but research shows it will be impossible to meet the Paris Agreement goals without addressing the 20 percent of global emissions caused by animal agriculture.

Just as the world is changing how energy is produced and cars are powered, we need to change how meat is made. This will take time, and just like eliminating fossil fuels and combustion engines requires government support, so too do alternative methods of making meat. With global demand for meat rising, we need a way of delivering the meat people want with a fraction of the climate impact.

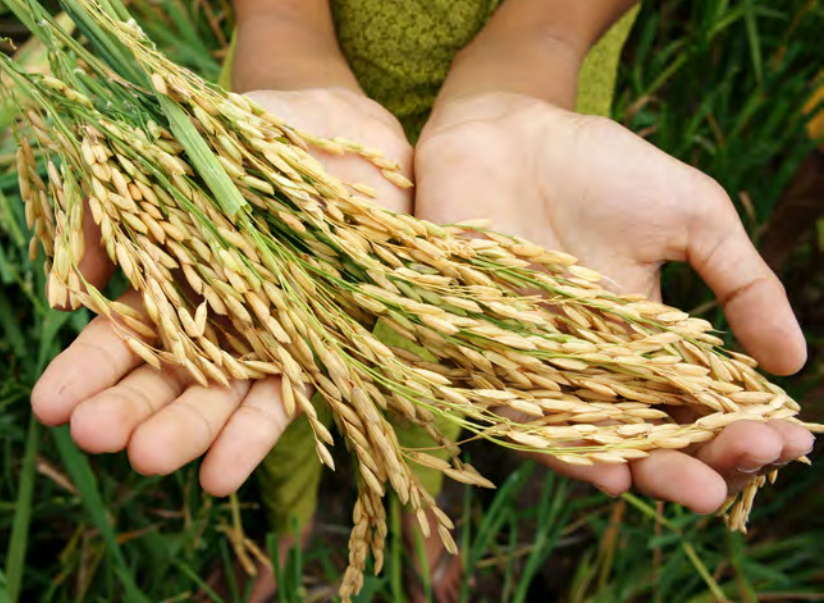
Research shows that plant-based and cultivated meat could cut emissions by up to 92 percent compared with conventional meat. They have the potential to reduce global emissions by 10 to 14 Gt CO2-eq per year by 2050. That's 14 to 20 percent of the mitigation necessary to meet the Paris Agreement.[6]



Talk to us about how sustainable proteins could play a role in your NDCs.

During COP27, find GFI experts at the Food Systems Pavilion in the Blue Zone—the first of its kind—where we are joining forces with partner organizations from around the world to work toward a common aim: Transform the world's food systems to create a net-zero, nature-positive world.

Visit FoodSystemsPavilion.com for day-by-day programming details.



Resilient food supply chains

As global temperatures rise, communities have been forced to adapt to increasing droughts, floods, fires, and crop failures, all while demand for meat is set to double by 2050.

Given finite land and water, a growing global population, and crisis-level food security issues, we can no longer afford the inefficiencies and risks of cycling crops through animals to produce protein. According to the World Resources Institute, chicken is the most efficient animal at turning crops into meat, and yet chicken production requires nine calories of feed to create one calorie of chicken.[7] One-third of all staple crops grown today are fed to farmed animals,[8] while one in nine people around the world are undernourished.[9] Today, the total global volume of human-grade crops that are used as animal feed exceeds 968 million metric tons.[10] When considering the 46 MMT gap in the global grain trade brought on just by the Russian war on Ukraine, that's enough to solve that shortage almost 20 times over.[11]

More efficient ways of producing protein exist that can enhance food security even in land- and water-constrained environments. A study funded by the UK Government and ClimateWorks Foundation found diversifying the world's protein supply could reduce global crop prices by 10 to 12 percent.[5] Compared with conventional meat, cultivated meat could require up to 95 percent less land and 78 percent less water, while plant-based meat uses up to 99 percent less land and 99 percent less water.

Sustainable proteins can, at once, be a globally scalable solution and a regional food solution—produced by both large, multinational companies and by small-scale farmers with indigenous crops adapted to local climates and suited to the needs and tastes of local communities. Similar to the ecological dynamics within natural ecosystems, in which diversity equals resilience, a diversity of people, crops, models, and solutions will be needed to infuse much needed resilience to our global food system.

Abundant biodiversity

At COP26, more than 100 world leaders promised to end and reverse deforestation by 2030.[12] Expanding forests, restoring damaged ecosystems, and farming sustainably will be essential for limiting and adapting to climate change—but we can't make space for nature without changing how we produce meat.

The expansion of pasture land for cattle is responsible for 41 percent of tropical deforestation[13]—and demand for meat is continuing to grow. Soy is yet another driver of forest loss, with more than three-quarters (77 percent) of global soy fed to farmed animals for meat and dairy production.[14] According to the UN Environment Programme, we must restore at least a billion hectares of degraded land to meet the Paris Agreement, ensure food security, and slow the rate of species extinction.[15] Diversifying our protein supply could free up 640 million hectares of land—an area larger than the Amazon rainforest.[5]

Because plant-based and cultivated meat require up to 95 percent less land, they can reduce pressure on biodiversity. Expanding forests, restoring ecosystems, and farming sustainably will be essential for limiting and adapting to climate change—but to reach this goal, we have to change how we produce meat.

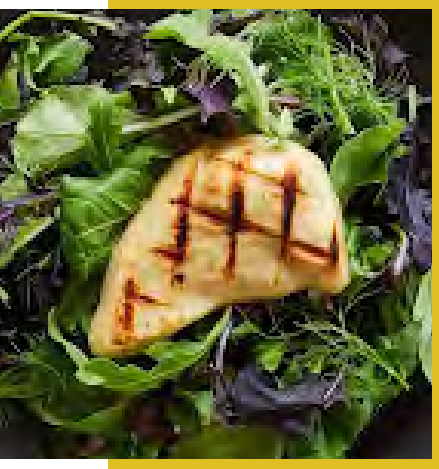
Four actions governments can take to advance sustainable proteins in support of a safe climate, resilient food supply chains, and abundant biodiversity:

1. **Invest in open-access research to advance global sustainable protein science** aimed at making plant-based and cultivated meat taste as good or better and cost the same or less than conventional animal proteins so these sustainable foods can benefit everyone. Unlock public funding and pursue multilateral research and development partnerships that can address the industry's biggest technical challenges, inspire additional research, and create new opportunities for growth.

2. **In partnership with farmers and other frontline food system workers, create opportunities that enable new livelihoods in sustainable protein supply chains.** Prioritize transition-focused policies that ease and accelerate the shift from animal farming to sustainable protein production in ways that revitalize rural economies by incentivizing growth of sustainable protein crops and bolstering rural manufacturing and food processing infrastructure and job creation.

3. **Create strategic incentives and include support for scaling sustainable proteins** within national economic development plans to build internationally competitive businesses. Investment tax credits, loan guarantees, demonstration projects, and other forms of financial support have catalyzed explosive growth in the renewable energy and electric vehicle sectors and can stimulate similar progress for sustainable protein infrastructure.

4. **Embed sustainable proteins in national climate change implementation plans**, including in food innovation and agriculture-related climate adaptation and mitigation strategies.



GOVERNMENTS LEADING THE WAY:

Spotlight on Singapore and Israel

Singapore has demonstrated unparalleled regulatory leadership in novel foods. It is the first country in the world to approve the sale of a cultivated meat product, GOOD Meat cultivated chicken, which has been served at select restaurants and eateries since December 2020. The Singaporean government has funded startups, built infrastructure and pilot facilities, sponsored research and development, and publicly declared its support for sustainable proteins as critical to their food security and climate goals.

Israel is an undisputed global force in plant-based and cultivated meat. The nation's leaders have been publicly outspoken about support for the sector and have invested $18 million in a cultivated meat research consortium. The Israeli government has also funded startups, built pilot plants, and taken steps to ensure a robust regulatory framework.

As a science-driven nonprofit and international network of organizations, GFI offers expertise and resources to governments around the world working to decarbonize food and agricultural systems in ways that achieve food security, biodiversity, and global health goals:

Data and insights on how other countries are navigating and developing regulatory frameworks that streamline the path to market for sustainable proteins, and global and regional "state of the industry" reports that highlight replicable successes.

Regional approaches to policy-shaping that are grounded in country-level climate and food security goals, regional assets and strengths (e.g., indigenous crops), economic development and equitable job creation, and protection of local lands and waters.

Expertly curated "Advancing Solutions for Alternative Proteins" database. Discover ideas for research projects, find inspiration for new commercial ventures and products, and explore ecosystem-level interventions to accelerate the field.

Grant programs and community-building for open-access sustainable protein research. GFI allocates grant funding toward the highest-impact research projects that address key knowledge gaps and technical challenges, and publishes tools, databases, reports, and analyses that serve as the research hub and foundation for the field. We cultivate an engaged community of scientists to forge collaborations and bolster the technical talent pipeline.

Trusted, targeted platform for amplifying and sharing progress. GFI's comprehensive website, in-depth newsletters, webinars, and signature reports are highly valued, trusted resources of information for scientists, policymakers, industry professionals, and civil society leaders who are working toward a more sustainable, secure, and just global food system.

About the Good Food Institute

The Good Food Institute is a nonprofit think tank working to make the global food system better for the planet, people, and animals. Alongside scientists, businesses, and policymakers, GFI's teams focus on making plant-based and cultivated meat delicious, affordable, and accessible. Powered by philanthropy, GFI is an international network of organizations advancing alternative proteins as an essential solution needed to meet the world's climate, global health, food security, and biodiversity goals.

Learn more: gfi.org

1) nature.com/articles/s43016-021-00358-x **2)** doi.org/10.1111/agec.12089 **3)** css.umich.edu/publications/research-publications/beyond-meats-beyond-burger-life-cycle-assessment-detailed **4)** cedelft.eu/en/publications/2610/lca-of-cultivated-meat-future-projections-for-different-scenarios **5)** climateworks.org/wp-content/uploads/2021/11/GINAs-Protein-Diversity.pdf **6)** gfi.org/resource/a-global-protein-transition-is-necessary-to-keep-warming-below-1-5c/ **7)** gfi.org/images/uploads/2018/05/WRISustainableFoodFuture.pdf **8)** iopscience.iop.org/article/10.1088/1748-9326/8/3/034015 **9)** fao.org/3/CA1564EN/CA1564EN.pdf **10)** economist.com/graphic-detail/2022/06/23/most-of-the-worlds-grain-is-not-eaten-by-humans?utm_medium=social-media.content.np&utm_source=twitter&utm_campaign=editorial-social&utm_content=discovery.content **11)** https://ourworldindata.org/grapher/wheat-exports-ukraine-russia-perspective?country=Ukraine+and+Russia+exports~US%3A+Biofuels~EU-27+%2B+UK%3A+Biofuels~US%3A+Animal+feed~EU-27+%2B+UK%3A+Animal+feed **12)** gov.uk/government/news/over-100-leaders-make-landmark-pledge-to-end-deforestation-at-cop26 **13)** ourworldindata.org/drivers-of-deforestation **14)** ourworldindata.org/soy **15)** unep.org/resources/ecosystem-restoration-people-nature-climate