Agriculture is at a climate crossroads. Alternative proteins are a global solution.

Learn how GFI is advocating for the inclusion of alternative proteins as a climate solution in federal policy and bringing increased visibility to what governments around the world are doing to get us to a better food future.

April 22, 2022 | Madeline Cohen, Sheila Voss, Shira Fischer

The math and science are clear.

To have a shot at achieving net-zero emissions by 2050—the universal goal the world needs to hit to avoid the worst impacts of climate change and have a shot at a sustainable future—we must halve emissions by 2030. Alongside transitions in energy and transport, a food system transition is needed to get on that path. Within that food system transition, alternative ways of

making meat can chart a new course for agriculture—one defined not only by lower emissions but by greater food security, global health, and resilience.

The world's climate experts weigh in on food and agriculture

As part of its Sixth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) found that "the extent and magnitude of climate change impacts are larger than estimated in previous assessments." Some losses due to climate change are already irreversible, while others are approaching irreversibility. In the face of this escalating crisis, mitigation, adaptation, and innovation must go hand in hand. For our food system, that means significantly and quickly reducing the climate impact of agriculture and finding more sustainable, secure, and just ways of feeding billions of people on a rapidly warming planet.

As the IPCC report lays out, agriculture is both a driver and victim of climate change's ecological, economic, and social impacts. Today, food systems cause approximately a third of all human-generated greenhouse gas emissions. Our current system is heavily reliant on conventional animal agriculture, which alone is responsible for more than half of those emissions. Emissions from conventional animal agriculture not only increase global temperatures but reduce crop yields, contribute to devastating droughts, and cause even greater instability within an already vulnerable and complex global food system and supply chain.

Alternative proteins as a climate solution, with co-benefits for land, water, global health, and food security

Fortunately, we have options available that can transform our food and agricultural system into one that is both sustainable and resilient. Alternative proteins—including meat made from plants and cultivated from animal cells—reduce emissions caused by our current system while also providing a host of environmental benefits. The IPCC's draft report on climate change mitigation names plant-based and cultivated meat as transformative solutions that, alongside transitions in the energy and transportation sectors, can significantly reduce emissions. The report explains that not only do alternative proteins emit far less greenhouse gasses compared to conventional meat products, they use less land, water, and soil nutrients and result in less pollution. In other words, alternative proteins are a multi-solver: a climate solution with co-benefits.

Globally, more land is dedicated to animal-based food production than any other purpose. Given the forecasts by agricultural economists that show global meat production and consumption more than doubling by 2050, we are headed for what the World Resource Institute describes as the "global land squeeze"—ever-increasing competition over finite land resources driven by agricultural expansion and the rising demand for meat. With business-as-usual meat production, the basic land math doesn't pencil out: We will be short by approximately 593 million hectares. In addition to reducing direct emissions, changing how we produce meat could free up three billion hectares of land—a land mass larger than China and India combined and then doubled. That land and the livelihoods it supports could be repurposed for regenerative farming, reforestation, renewable energy production, ecosystem recovery, and more.

Conventional animal agriculture is also responsible for about 30 percent of global agricultural water use. Such use impacts both water quantity and quality for communities

worldwide. Animal-based food systems lower water tables, dry floodplains, and cause eutrophication in both freshwater and marine ecosystems, which can harm native species and reduce food sources for rural and coastal communities. In the United States, livestock production causes more than half of soil erosion on agricultural lands and a third of the nitrogen and phosphorus pollution in freshwater sources. According to the IPCC, “current food system trajectories are leading to biodiversity loss, land and aquatic ecosystem degradation without delivering food security and nutrition.” If these impacts are not mitigated, the environmental impacts of our agricultural system could increase by 50–90 percent by 2050, reaching levels beyond our planetary boundaries.

Ironically, agriculture-driven climate impacts threaten our ability to continue feeding the world, causing an increasingly problematic feedback loop. Droughts and extreme weather reduce arable land and threaten water supplies, while rising temperatures increase the prevalence of heat stress, infectious disease, and vector-borne disease among livestock. Likewise, marine fisheries are threatened by heat, eutrophication, reduced oxygen, toxic algae blooms, and sedimentation. These impacts on agriculture and global food security will become increasingly severe as climate change progresses. Major shifts in how we produce food are needed quickly if we are to stand a chance in halving emissions by 2030 on the path to a net-zero food future by 2050.

GFI's expertise and insights in action

We've come to the proverbial fork-in-the-road moment of our times, and face a choice: If we are to feed, fuel, and future-proof the planet, do we continue down the business-as-usual road or chart a new path via sustainable agriculture?

Recently, GFI urged the authors of the Fifth National Climate Assessment to consider alternative proteins as a key aspect of sustainable agricultural systems. The National Climate Assessment is a congressionally-mandated report that helps the U.S. government "understand, assess, predict, and respond to" climate change. The purpose of the report is to set forth the current state of the science and potential solutions to help inform policymakers. The Fifth National Climate Assessment is currently being drafted by representatives from several federal agencies including USDA and NOAA.

In its written comment on the zero order draft of the Climate Assessment, GFI details how alternative proteins can transform our agricultural system:

Energy and emissions

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Compared to conventional animal products, alternative proteins emit fewer greenhouse gasses. Compared to a quarter pound of conventional beef, the plant-based Beyond Burger generates 85 to 90 percent less greenhouse gas emissions and requires 46 percent less energy. Cultivated meat produced using sustainable

renewable energy sources reduces global warming impacts by 17 percent, 52 percent, and 85 to 92 percent compared to conventional chicken, pork, and beef, respectively. By switching from conventional animal products to alternative proteins, we can cut greenhouse gas emissions by about 8 eight metric gigatons per year globally.

Land and water

Food security

Global health

In our comments, GFI emphasizes that alternative proteins can both mitigate the impact our agricultural system has on the climate and help the system adapt to better withstand the very real impacts of climate change. In other words, alternative proteins are better for the planet *and* better for agriculture. Alongside other food system innovations and solutions, they can play a starring role in agriculture's next chapter around the world.

What's next?

Through timely actions like these, GFI's expert policy teams around the world are placing alternative proteins on the agendas of governments and agencies working at the intersection of agriculture, climate, biodiversity, and global health. This summer, look for GFI's first-ever State of Global Policy Report, a comprehensive overview of government policies and programs that are investing in open-access alternative protein R&D, easing

the path to market for novel products, and spurring whole new bioeconomies, jobs, and livelihoods. The report itself will bring much-needed transparency and visibility to how governments around the world are accelerating the transition to far more efficient ways of feeding a growing world.

A full draft of the Fifth National Climate Assessment will be published later this year. Interested stakeholders will have the opportunity to provide comments. If we want federal policies that promote climate-forward agriculture, ensure food security, and protect our planet, it is critical that reports like the Fifth National Climate Assessment reflect the realities of our current agricultural system and highlight the role alternative proteins play as a key solution required for a more sustainable, secure, and just food future.

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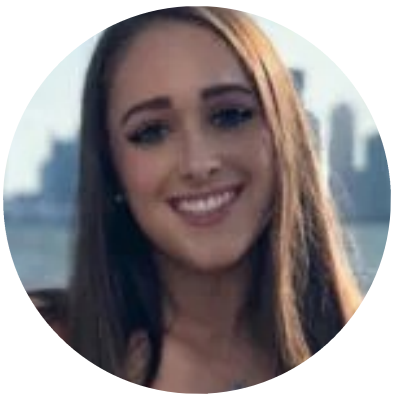

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