Climate Mitigation Opportunities in Alternative Proteins Liz Specht, PhD

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Animals are fundamentally inefficient protein producers



Implications: lower agricultural inputs across the board (fertilizer, water, etc.) and more judicious use of resources, plus less impact on environment (nutrient runoff, etc.)

Cycling calories through animals is equivalent to >90% food waste in production.

How does the carbon footprint of protein-rich foods compare? Our World in Data

Greenhouse gas emissions from protein-rich foods are shown per 100 grams of protein across a global sample of

The height of the curve represents the amount of production globally with that specific footprint. The white dot marks the median greenhouse gas emissions for each food product.

Producing 100 grams of protein from beef emits 25 kilograms of CO.eq, on average.

The climate implications are profound

Even the *lowest-carbon* forms of animal protein cause higher GHG emissions than even the most carbon-intensive plant proteins.

Figure at right is per 100g protein.

Plant-based meat offers 30-90% reduction in GHG.

Source: Our World in Data; Plant-based Meat for a Growing World factsheet, Growing Meat Sustainably factsheet



Note: Data refers to the greenhouse gas emissions of food products across a global sample of 38,700 commercially viable farms in 119 countries. Data source: Joseph Poore and ThomasNemecek (2018). Reducing food's environmental impacts through producers and consumers. Science. OurWorldinData.org – Research and data to make progress against the world's largest problems. Licensed under CC-BY by the authors Joseph Poore & Hannah Ritchie.

Yet despite decades of growing awareness, global meat demand shows no sign of slowing



Source: Our World in Data; FAO statistics

Alternative proteins present a tractable, viable solution



Alternative proteins have hit an inflection point

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This is a global phenomenon

China is leading the meatless revolution with its vegetarian 'mock meat'

Meat-loving Brazil joins the search for plant-based alternatives Europe's Vegan Meat Sales Increased 451% in 4 Years

Fake meat boom gets real in Korea as major players fight for a stake

One Woman's Quest To Help Africa Leapfrog To Plant-Based Foods

Plant power: More urban Thais and Indonesians consuming non-meat sources of protein How can we accelerate this trend? What are the bottlenecks? How can we accelerate this trend? What are the bottlenecks?

Alternative proteins are handicapped not by consumer demand but by R&D resources and manufacturing capacity

Key market challenges that federal efforts can address

1) Supply chain constraints

Alternative proteins will require novel crop development, innovation in ingredient fractionation and processing methods, and new predictive tools for adaptability and robustness to shifting availability of — and demands for — various biomass fractions within food and agriculture and within the broader bioeconomy.

2) Production capacity limitations

Production capacity is one of the most significant constraints facing the alternative protein industry. Producers lack the right types and quantities of ingredients and other inputs, and production equipment is highly specialized and requires uncommon operational expertise.

3) Information gaps

Because the alternative protein sector is still nascent, gaps in fundamental research areas and poor market information lead to redundant efforts and high barriers to entry.

Opportunities to improve upon sustainability and scalability along the entire value chain



Source: GFI analysis; value chain design inspired by Wild Type's Food for Thought Medium post.

Interdisciplinary research centers and manufacturing innovation institutes are mission-critical



An interagency initiative to prioritize alternative protein-relevant research across many technical domains and to launch a manufacturing innovation institute could dramatically accelerate this sector.

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EDUCATION

Build alternative protein classes and majors to train future scientists and engineers

INNOVATION

Commercialize technological advancements to make real-world impact

RESEARCH

Investigate critical, foundational questions to advance the state of alternative protein science

COMMUNITY

Breakdown interdisciplinary siloes and act as a force multiplier for the field



Alternative protein development will benefit from increased investment (both public and private)



Source: Global Trends in Renewable Energy 2012

GFI's role in supporting the innovation ecosystem

GFI is a 501(c)(3)nonprofit working to create a sustainable, healthy, and just food system through three key areas of work:



Science and Technology

Bridging gaps in scientific research, funding, and talent across the alternative protein sector.

Corporate Engagement

Helping the food industry and investor communities put delicious, affordable alternative proteins on every menu and in every food retailer.

Policy

Advancing government investment in sustainable proteins as well as fair regulation and legislation.



GFI officially earned GuideStar's 2019 and 2020 Platinum Seal of Transparency—obtained by less than 1% of nonprofits—reflecting our commitment to maximum impact, efficiency, and inclusion. Our international affiliates work as a force multiplier, bringing the expertise of our departments to the rest of the world.



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100+ staff in 6 countries



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