Good Food Institute

Third Party Analyses of Alternative Proteins (all sources available at gfi.org/101)

The World Bank (May 2024)
Recipe for a livable planet: Achieving net zero emissions in the agrifood system (report; 1-pager)

- The Bank ranks alternative proteins #2 of 26 agriculture, forestry, and other land use-related interventions by GHG mitigation potential at 6.1 Gt CO2eq/year, outranked only by afforestation/reforestation (8.5 Gt CO2eq/year) and followed closely by reduced deforestation (6.0 Gt CO2eq/year). Alternative proteins free up vast quantities of land that can be used for the former, and they slash demand for beef and feed crop soy - the top two causes of the latter.
- Alternative proteins have 9x the mitigation potential of the next most promising intervention related to meat production (improved feed digestibility for ruminants, at 680 Mt CO2eq/year). Some other commonly-discussed food systems interventions include: reduced food waste (865 Mt), fertilizer innovation (480 Mt), and feed additives such as algae (380 Mt).

International Institute for Applied Systems Analysis, *Nature Communications* (Sep. 2023)
Feeding climate & biodiversity goals with novel plant-based meat & milk alternatives (paper; 1-pager)

- At 50% alternative proteins: 1) 6.3 Gt CO2eq/year emissions reduction; 2) global agricultural area, instead of expanding, declines by 12% (653 Mha of land released); 3) water use declines by 10% instead of increasing; 4) reduction of forest and natural land almost fully halted.
- "Our main results are based on conservative assumptions about processing and hence the benefits could be even higher if a more efficient processing scenario is realized."

United Nations Environment Programme (Dec. 2023)
What's cooking: An assessment of the potential impacts of [alternative proteins] (report; 1-pager)

- One of three lead authors is former IPCC chair Sir Robert Watson.
- Finds that alternative proteins have climate, biodiversity, and global health benefits over conventional animal products.
- Calls for government support for research and scaling, and international cooperation on both science and regulatory oversight.

Innovation Commission for Climate Change, Food Security, Agriculture (Dec. 2023)
Innovation case for COP28: Alternative proteins (report; 1-pager)

- Nobel Laureate in economics Michael Kremer's commission at the University of Chicago finds that alternative proteins can: 1) relieve food insecurity by lowering food prices; 2) decrease direct climate emissions; 3) alleviate malnutrition; & 4) provide a more climate adaptive way of producing protein.
- Governments and philanthropies should fund alt proteins research, to take advantage of all these benefits.

The Center for Strategic & International Studies (May 2023)
Mitigating risk and capturing opportunity: The future of alternative proteins (report; 1-pager)

- Calls for the U.S. government to fund science and scaling, comparing alternative proteins to biopharma and advanced chips for artificial intelligence in terms of national security and economic benefits.
- Finds that alternative proteins have benefits for food systems resilience, climate adaptation, and global health, compared to conventional animal products.

Global Methane Hub & ClimateWorks Foundation (Apr. 2023)
Global innovation needs assessment: Food system methane (report; 1-pager)

- Across all agricultural methane interventions (food loss & waste; rice methane interventions; livestock interventions; and alternative proteins), 98% of the expected economic benefits ($700b) accrue to alternative proteins.
- See also: PNAS (2022), which reviewed 98 mitigation strategies across 430 peer review publications and found: 1. Adoption barriers will likely prohibit livestock interventions from reaching their full technical potential; 2. Even at 100% adoption, increased consumption of ruminants will more than offset mitigation benefits.
- See also: Climate Advisers (2023), which found that only alternative proteins have significant promise as an agricultural methane mitigation strategy on a global scale.

United Nations Environment Programme (Dec. 2025)
Global environment outlook, seventh edition: A future we choose (GEO-7) (report; 1-pager)

- GEO-7 is the most comprehensive scientific assessment of the global environment ever carried out, and is the product of 287 multi-disciplinary scientists from 82 countries.
- Identifies that decreased conventional meat consumption will pay the greatest dividends for our environment across all food systems interventions, and alternative proteins can enable this decreased consumption. In addition to lower emissions, land and water use, and biodiversity loss than conventional animal products, GEO-7 cites reduced risk of zoonotic diseases and antimicrobial resistance as benefits of alternative proteins.
- Emphasizes the need for more public and private investment in alternative proteins for both research and commercialization - alongside a coordinated international research effort to enhance taste and texture, reduce costs, and assess nutritional and social effects.

Green Alliance (May 2024)
A new land dividend: the opportunity of alternative proteins in Europe (report)

- With supportive policy, a shift towards alternative proteins can 4x the amount of land available for regenerative agriculture and free up vast quantities of land for restoration, rewilding, and agroforestry - providing alternative income for farmers and ranchers.

ClimateWorks Foundation & UK Foreign, Commonwealth and Development Office (Nov. 2021)
Global innovation needs assessment: Protein diversification (report; 1-pager)

- Finds that governments will need to invest $4.4 billion/year in research and development and $5.7 billion/year in private sector incentives to reach 50% market penetration by 2050.
- At this penetration, the mitigation potential of alternative proteins is 5 Gt CO2eq/year by 2050, with a $5.5T economic value of this climate savings.