

Alternative protein innovation bolsters national security

A robust and secure food system is integral to domestic national security. Alternative protein technologies can produce meat with remarkable efficiency, providing an excellent fortification for our food system and defense against growing global threats. Worldwide, several foreign governments are ramping up investments in the sector. In the interest of national security, the United States should accelerate support for alternative protein innovation.

Investment in alternative protein innovation will:

1. Advance supply chain resilience, as production processes require fewer inputs and supply chain links.
2. Reduce our vulnerability to zoonotic disease outbreaks such as avian or swine flu.
3. Mitigate agricultural bioterrorism risks in our food supply.¹
4. Support a U.S. export market that meets growing global food demand and mitigates future food-related conflict.
5. Enable point-of-need food manufacturing for U.S. defense forces in deployed settings.

Supply chain resilience and agility

Advancing alternative protein technologies bolsters supply chain resilience and agility. According to the Center for Strategic and International Studies (CSIS), alternative proteins are less vulnerable to supply disruptions due to their simplified and localized production processes.² Producing plant-based, fermentation-derived, and cultivated meat requires fewer inputs—including land, water, and crops—and supply chain links.³ For example, plant-based meat requires up to 98 percent less land than conventional meat.⁴ In addition, alternative protein production facilities are adaptable to versatile locations and can be placed close to existing supply chains. Alternative protein production at scale can, therefore, improve the U.S. food system's resistance to shocks and disruptions.

Alternative protein technologies:

Fermentation is a powerful, flexible process using microorganisms to produce food. Biomass fermentation efficiently produces large amounts of protein-rich food, while precision fermentation produces specific proteins, fats, flavor molecules, and vitamins. These technologies, which have long been employed in the medical field, can create food in low-resource areas, including on military bases, at sea, or in space.

Plant-based food manufacturing produces food from crops and plant ingredients. Plant-based food production is resource-efficient and adaptable, directly converting plants into meat, dairy, and other products.

Cultivated meat produces food directly from animal cells. Meat and seafood cultivation uses inputs like those that build muscle and fat in livestock—and is deployable in diverse settings, including austere conditions.

Biosecurity and global stability

Investment in alternative protein technology promotes biosecurity in our food supply. The U.S. supply chain for conventional meat is highly centralized, making it susceptible to potential attack or disruption—as demonstrated during the Covid-19 pandemic.⁵ According to CSIS, alternative protein production mitigates risks of potential agricultural bioterrorism. These technologies can insulate the country from attacks targeting agricultural production infrastructure, as well as from the introduction of animal diseases that could quickly compromise significant portions of our protein supply.⁶ Fermentation-derived, plant-based,

and cultivated meat are protected from animal disease outbreaks, as they do not rely on livestock.

An expanded alternative protein sector also promotes food security through supply chain diversification. Rising food demand is expected to coincide with declines in global crop yields.⁷ Expanding U.S. protein production can mitigate future food-related conflicts and humanitarian crises, allowing us to address rising food demand as the planet nears 10 billion people by 2050. As a high-value export industry, U.S. alternative protein companies will also help rebuild a U.S. trade surplus after years of agricultural trade deficits.⁸

Defense capabilities

Maintaining the readiness of military personnel and operational continuity depends on secure food supplies. With simplified production processes—requiring less land and other resources—alternative protein technologies enable point-of-need food production at military bases, at sea, or in space, in addition to producing healthy, nutritious ingredients for Meals Ready to Eat (MRE).⁹ Point-of-need production reduces logistical costs and saves lives. For example, between 2005 and 2011 the Department of Defense (DoD) spent \$5.5 billion to deliver food to U.S. military sites in Afghanistan, and more than 300 truck drivers and security guards were killed in the process.¹⁰

For these reasons, DoD has invested in alternative protein innovation. According to the Pentagon: “The ability of the U.S. military to project power entails an equally imposing logistical chain to maintain stocks of food, water, medicines, fuel, and other supplies . . . DoD is actively investigating ways critical supplies are procured in addition to creating systems that can rapidly produce materials, including food onsite, when and where they are needed.”¹¹

American competitiveness

While American researchers have been at the forefront of alternative protein innovation, the United States faces steep competition from several countries. China has made alternative proteins a governmental priority, in line with a broader commitment to agricultural biotechnology—a sector which China is now positioned

to lead, according to the U.S. Director of National Intelligence.¹² While the U.S. private sector has led the way in alternative protein innovation, on the public sector side, the United States has invested only \$128 million to date. In contrast, governments worldwide invested \$523 million in 2023, for an all-time investment total of \$1.67 billion.¹³ To maintain global leadership, the United States must increase public investments.

Research, development, and commercialization of food technologies will also grow the economy. Globally, the alternative protein industry can support up to 9.8 million jobs and generate \$1.1 trillion in economic value.¹⁴ With proper investment, the United States will lead in job creation and economic growth.

Conclusion

Alternative protein R&D and commercialization should be a top national priority. Sufficient public investment will fortify our food system, drive American innovation, and expand defense capabilities. By harnessing the power of alternative protein technologies, the United States can build a resilient food system and promote national security for future generations.

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