Regional Food Biomanufacturing Innovation Hubs Can Catalyze US Biotechnology and National Security

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Executive Summary: Engineering biology and emerging biotechnologies are poised to diversify food production processes and provide sustainable and nutritious foods to consumers. Embracing a regional, food-focused innovation hub network can be a key strategy for advancing US biotechnology. As shown in three relevant case studies, this regional food innovation hub model can boost national security, agricultural opportunities, supply chain resilience, manufacturing capacity, and workforce development. Together, these case studies highlight the public policy opportunity for policymakers in Congress and federal agencies within the executive branch to create regional food innovation hubs across the United States that utilize unique regional biomass assets, consortia-building, and agricultural innovation in service of food and national security.

I. Introduction

"The United States is locked in a competition with China that will define the coming century. Biotechnology is the next phase in that competition. It is no longer constrained to the realm of scientific achievement. It is now an imperative for national security, economic power, and global influence. Biotechnology can ensure our warfighters continue to be the strongest fighting force on tomorrow's battlefields, and reshore supply chains while revitalizing our manufacturing sector, creating jobs here at home." – National Security Commission on Emerging Biotechnology (NSCEB) Chair Senator Todd Young, April 8, 2025 (NSCEB 2025b)

Biotechnology is revolutionizing our everyday lives, with benefits spanning food and agriculture, personal care, healthcare, materials, chemicals, fuels, and energy (Chilukuri and Kelley 2025). The United States has long been a global leader in biotechnology innovation (Grassano et al. 2024), but existing policy gaps and headwinds may threaten that leadership. From the Reagan Administration's *Coordinated Framework for Regulation of Biotechnology* in 1986 to the Biden Administration's 2022 *Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure Bioeconomy*, the past forty years of biotechnology development in the United States have seen repeated shifts in biotechnology prioritization, funding, and regulations. Most recently, President Trump rescinded the 2022 Executive Order along with several Biden-era executive decisions that guided domestic biotechnology and advanced manufacturing (The White House 2025a).

The lack of long-term strategic planning and prioritization, fragmented regulations, insufficient funding, and limited domestic supply chain and infrastructure capacity are threatening US biotechnology leadership (Chilukuri and Kelley 2025). A January 2025 report evaluating the biotech competition between the United States and China indicates that China now dominates biotechnology supply chains, manufacturing, and infrastructure and is closing in on the United States' leadership in cross-cutting biotechnology areas such as synthetic biology (Lin et al. 2025). The Trump Administration's 2025 Annual Threat Assessment of the US Intelligence Community explicitly identifies this growing imbalance: "China also sees biotechnology as critical to becoming a dominant economic power and intends to grow its domestic bioeconomy to $3.3 trillion this year" (Office of the Director of National Intelligence 2025, 13). There is general bipartisan support for biotechnology across the United States (NSCEB 2024) and a recognition amongst national security experts that biotechnology innovation is critical for national security (Petit 2024; Young 2024). In the coming months, the Trump administration is expected to chart its biotechnology policy positions. Now is a critical time to consider how the United States can harness emerging biotechnologies in support of national security, specifically through increases in agricultural biotechnology, regional innovation, and biomanufacturing infrastructure capacity.

This article discusses the importance of food security for national security and aims to provide policymakers in Congress and key executive branch agencies—including the White House Office of Science and Technology Policy, National Science Foundation (NSF), and Departments of Defense, Commerce, Agriculture, and Energy—with a model to coordinate biotechnology innovation, supply chains, and commercialization across the country. The model combines food and agricultural biotechnology research and innovation, private sector infrastructure scale-up, education and workforce development, and regulatory science into a network of regional food innovation hubs. The following sections discuss the importance of food security for national security, the characteristics of successful regional food innovation hubs, examples of three recently implemented regional hubs, and associated policy recommendations that can accelerate the development of additional hubs to help maintain the United States' position as a global biotechnology leader.

II. Food security as national security

Agencies and organizations within and outside of the federal government are united in recognizing food security as a key focus of national security. The US Department of State, in collaboration with the US Department of Agriculture (USDA), prioritizes food security as a matter of national security (US Department of State *n.d.*). Additionally, US Department of Defense (DOD) officials have acknowledged that food security is crucial for defense readiness and national security (US Department of Defense 2021), which they demonstrated by including food as one of the "Five Fs" within the Defense Bioindustrial Manufacturing Program, alongside firepower, fuel, fabrication, and fitness (US Department of Defense 2024). In 2024, the Director of National Intelligence identified food and agriculture as key considerations in the Annual Threat Assessment of the Intelligence Community (Office of the Director of National Intelligence 2024).

Outside of the federal government, the nongovernmental organization Center for Strategic and International Studies (CSIS) similarly maintains that national security is food security, and investing in global food and nutritional security advances US security and domestic interests (CSIS *n.d.*). Furthermore, after spending multiple years working with thousands of stakeholders in American biotechnology, the National Security Commission on Emerging Biotechnology (NSCEB) published its final report in April 2025. The report warns that the United States must act decisively now, or risk long-term erosion of leadership in biotechnology and subsequent threats to food and agricultural security (NSCEB 2025a).

In recent years, Americans have seen increases in food prices and living costs due in part to insecure and unreliable supply chains both domestically (US Department of Agriculture 2022) and globally (Rojas-Reyes et al. 2024). The Trump Administration has vowed to address food supply chain resilience over the next four years. In 2017, President Trump signed an executive order to bolster national security by strengthening supply chains, calling for "the availability of substitutes for or alternative sources for [consumer] goods" (Exec. Order No. 13806 2017). As food security remains a national priority in the coming years, the administration is poised to diversify food sources and supply chains, especially by utilizing food biomanufacturing.

As identified in a 2023 CSIS report on mitigating risk and capturing opportunity within the food system (CSIS 2023), many of our current food production methods are vulnerable to global shocks, thereby undermining both food security and broader national security efforts. The global demand for food—especially protein-rich foods like meat, seafood, eggs, and dairy—is expected to increase from 2012 levels by at least 50% by 2050 (FAO 2018) as the global population rises, urbanization increases, and poverty declines. We confront an urgent need to produce more food with fewer resources in the face of continuing economic and geopolitical uncertainty.

But there is reason for optimism. Emerging food biotechnologies have the potential to feed more people with fewer resources than ever before. The same 2023 CSIS report analyzing food system risks concludes, "The rewards of investment in [new food biotechnologies] are clear: realizing a food system with greater ability to provide adequate nutrition for all while mitigating global threats and enhancing US strategic competitiveness" (CSIS 2023). Innovations in food science, crop breeding, advanced manufacturing and bioprocessing, synthetic biology, and computational and data science are enabling the diversification of food production. In addition to conventional methods, protein-rich foods can now be produced from plants, animal cell culture, or microbial fermentation. Several plant-based and fermentation-derived foods are already available to consumers around the world (Battle et al. 2024b; Battle et al. 2024c), while other products, such as cultivated meat and seafood, are earlier in the innovation pipeline (Battle et al. 2024a). The goal of protein diversification is to provide consumers with more options for affordable, familiar, healthy foods as part of a resilient and secure food system.

More investment and innovation are required for protein diversification strategies to reach their full potential (CASA-Bio 2024). During the Biden Administration, US policymakers from both the executive and legislative branches recognized food biomanufacturing as an essential component of the US bioeconomy and worked to increase public investments to drive the necessary innovation (The White House Office of Science and Technology Policy 2023). For example, the Good Food Institute estimates that at $82 million, nearly 60 percent of all-time US public funding for this emerging industry came in 2023 alone (GFI *n.d.*, b). While the current Trump Administration has stated its commitment to promoting national security, domestic manufacturing, stable supply chains, and economic growth (The White House 2025b), it has rescinded much of the bioeconomy-focused policy and funding of the previous administration (The White House 2025a). It is not yet clear what impact the current administration's priorities and policies will have on protein diversification and food biomanufacturing, or whether public investment in these areas will continue to grow over the next few years.

Currently, the United States is home to many leading food biomanufacturing research labs and companies, however, there is no guarantee that the United States will maintain its global leadership in this sector, especially with shifting policy priorities, inconsistent funding, inadequate workforce development, and insufficient infrastructure (Ron and Smith 2022). Many other countries are prioritizing protein diversification strategies within their national bioeconomy policies. In the past year, Israel (Schnarch 2024), Brazil (MDIC 2024), and India (Department of Biotechnology 2024) have all announced bioeconomy initiatives that elevate the role of food innovation and biomanufacturing. In March 2025, China released two official policy documents, followed by statements from top government officials, explicitly stating that building a diversified food and protein supply based on biomanufacturing is a top priority for the nation (GFI APAC 2025a; GFI APAC 2025b).

III. Adopting regional food innovation hubs to advance biotechnology

To advance protein diversification and biotechnology innovation, the United States must combine agricultural research and innovation, private sector infrastructure scale-up, and education and workforce development. Each of these components is intricately linked to the others. Cross-cutting regional innovation hubs can create the holistic approach needed to advance each portion of the bioeconomy: (1) conducting world-class research that translates to commercialization of new biotechnologies; (2) addressing social and economic risks and opportunities of emerging biotechnologies; (3) building biomanufacturing facilities and accelerating scale-up; and (4) providing adequate education and training across skill types and career levels.

These wide-ranging needs are beyond the scope of a single company, university, or even government agency to address, though some recently launched federal programs can serve as templates for the design of new interagency funding programs focused on strategically building regional food biomanufacturing hubs. For example, the NSF Regional Innovation Engines initiative was launched in 2022 to support regional coalitions in developing technologies to solve economic and societal challenges (US National Science Foundation *n.d.*). Furthermore, the Department of Commerce launched its Economic Development Administration Regional Technology and Innovation Hubs program in 2023 to build US economic and national security through regional investments in technologies and industries of the future (US Economic Development Administration *n.d.,* c). Both of these programs seek to develop regional consortia to advance research, scale-up, and workforce development for emerging tech industries but they do not focus on protein diversification and food security.

If designed correctly, regional food innovation hubs could bring together diverse stakeholders from academia, private industry, philanthropy, and every level of government. This collaboration would accelerate research, innovation, commercialization, and adoption of emerging food biotechnologies while also strengthening partnerships and information flow between stakeholders along the supply chain. Given the cross-cutting nature of this work, stakeholders from other industries would benefit from much of this ecosystem building. In the case of protein diversification, several biomanufacturing industries outside of food—including biomedical, biofuel, and bio-based materials—could benefit from the development of supply chains, infrastructure, workforce, and manufacturing capacity.

The three case studies highlighted below support regional development at the community level, roughly within metropolitan statistical areas (MSAs). MSAs are geographic regions made up of a city and the surrounding counties that have strong socioeconomic ties to the core urban area. This scale naturally lends itself to technological innovation because MSAs have a measurable and skilled workforce, centralized industrial infrastructure, and approximate geographic proximity to higher learning institutions. Because MSAs have distinct assets, they can tailor their specific innovation approaches to focus on regional strengths.

Focusing on regional strengths, especially agricultural strengths, is key to building the bioeconomy. With over 900 MSAs in the country, the United States is a large country with access to varied and abundant biomass (US Department of Agriculture 2024). The biomass, crops, and feedstocks that support biotechnologies are often abundant in rural areas, such as the Great Plains and Midwest regions. Food innovation hubs could be designed to complement the unique opportunities and assets of specific regions. This model would allow policymakers to invest in rural areas and support regional economic development. Creating new economic value from existing food and agriculture outputs—including byproducts left over from crop harvesting and processing (GFI *n.d.,* a)—stands to benefit local farmers and producers. Additionally, by increasing biomanufacturing capacity and facilitating education programs, this model could create biomanufacturing jobs.

In Section V, we recommend specific actions that Congress and the executive branch can take to facilitate this regional ecosystem building. These actions include mapping domestic biomass supplies onto high-potential MSAs, capacity building to develop cross-sectoral consortia and construct food biomanufacturing infrastructure, and coordinating across regions to ensure efficient collaboration.

Finally, by addressing each stage of the value chain, this regional food innovation hub model would bolster supply chain resilience and national security. Tailored regional hubs could form the basis of a national and international innovation network—providing scientific collaboration, information sharing, standardization of data, and regulatory clarity for a safe and equitable bioeconomy.

IV. Case studies

A handful of regional food innovation hubs have launched within the past two years that can serve as models for other regions. We present three as case studies, along with associated policy recommendations. The geographic diversity of the case studies (located in California, Illinois, and North Carolina) indicates that regional food innovation hubs can succeed across the country. However, some specific regions and their associated MSAs will inherently be better positioned to implement food biomanufacturing hubs than others due to the presence of land-grant universities, existing agrifood industries, and access to crop biomass.

The three case studies presented below demonstrate how industry, government, universities, and nonprofits partner to drive food innovation and economic development. These efforts are fostering holistic bioeconomy development through regional innovation. Notably, each of these case studies garnered bipartisan public policy support at various levels of government, making them prime examples for future public policy initiatives.

Though each of these hubs is distinct and still early in its development, there are some shared keys to their successes to date that additional hubs should seek to emulate: (1) early and sustained buy-in from local and state-level industries and governments; (2) intentional consortium building with numerous stakeholders across the supply chain, often in the form of public-private partnerships; (3) an understanding of unique regional assets, including biomass availability, agricultural outputs, and processing infrastructure; and (4) integration of basic research, commercialization, manufacturing, and workforce development. These hubs are unique from—but complementary to—other valuable food research initiatives that have historically focused more on economic development and on-farm innovation in developing countries (APLU *n.d.*).

i. Case study #1: BioEconomy, Agriculture, and Manufacturing (BEAM) Circular - North San Joaquin Valley, CA

BEAM Circular is a nonprofit organization that launched in 2023 as a product of the Stanislaus 2030 Community Strategy and Investment Initiative (BEAM Circular *n.d.,* a). This county-led effort brought together stakeholders across California's North San Joaquin Valley (NSJV) to create a more resilient local economy and advance industry and small business growth (Stanislaus County *n.d.*). The regional innovation hub specifically seeks to transform NSJV's existing biomass outputs and waste streams into new bio-based products. While food biomanufacturing is a key focus, these efforts will strengthen local biomanufacturing capacity as a whole, targeting biofuels and biochemicals in the process.

The NSJV is centrally located within California's agricultural region and neighbors the San Francisco Bay Area, meaning it is a region with deep expertise in agriculture, food production, and manufacturing, as well as easy access to tech and innovation ecosystems. This urban-rural partnership has attracted several biotechnology innovators and bipartisan support. In early 2024, the NSJV was named California's first Certified Bioeconomy Development Opportunity (BDO) Zone due to its abundant, high-quality biomass feedstock supply chains and infrastructure, specifically for orchard biomass, nut tree shells, and almond hulls (BDO Zone Initiative 2024).

BEAM Circular is elevating projects that expand access to biomass feedstocks, drive innovation, grow the local talent pool, and develop cross-sector collaborations (BEAM Circular *n.d.*, a). The organization provides programs and services for community members, small businesses and entrepreneurs, manufacturers, farmers and food processors, educators, and researchers (BEAM Circular *n.d.*, b). These programs and services are possible due to the financial support BEAM Circular has received. Since the initial $10 million in seed funding from Stanislaus County that enabled BEAM Circular to launch, the consortium has successfully secured additional federal, state, local, and private investments (BEAM Circular *n.d.*, a). These partnerships have paved the way for multiple venture capital firms and private investors to invest in local businesses. Notably, BEAM Circular has been awarded an NSF Regional Innovation Engine Development Award to advance circular bioeconomy technologies in the NSJV (US National Science Foundation 2023). Likewise, the organization works closely with UC Merced, UC Berkeley, and the US Department of Energy's Lawrence Berkeley National Laboratory to support small business innovators in the region (Berkeley National Laboratory 2024).

BEAM Circular and the NSJV are successfully using their regional assets—biomass waste streams, proximity to major tech entrepreneurs, local government support, and academic excellence—to turn their waste into social, economic, and environmental value for the local community. Although the NSJV may be unique in its geographic proximity to the Bay Area and Silicon Valley, there are many other MSAs across the United States that have the potential to become tech hubs. For example, in their book *Jump-starting America*, Professors Jonathan Gruber and Simon Johnson identify 93 MSAs across 34 states that, based on population, education, and lifestyle factors, could become significant technology hubs with sufficient federal investment in science and technology development (Gruber and Johnson 2019). In Section V we suggest further exploration of six of these MSAs as strong candidates for food biomanufacturing innovation hubs modeled on BEAM Circular and the following two case studies.

ii. Case study #2: Illinois Fermentation and Agriculture Biomanufacturing (iFAB) Tech Hub - Urbana, IL

iFAB is housed at the University of Illinois Urbana-Champaign and led by the Integrated Bioprocessing Research Laboratory (IBRL). IBRL officially opened in 2018 to serve stakeholders across Illinois by providing lab- and pilot-scale research facilities to create next-generation, biomass-derived products (IBRL *n.d.*). To date, IBRL has partnered with hundreds of private companies, researchers, farmers, and producers—all within a 51-mile radius (US Economic Development Administration *n.d.*, b)—looking to use fermentation processes to create new foods, fuels, and other bio-based products. In July 2024, the US Department of Commerce's Economic Development Administration designated iFAB as one of 12 tech hubs across the country to receive funding under the Regional Technology and Innovation Hubs (Tech Hubs) program (US Economic Development Administration 2024). The Tech Hub program was created by the bipartisan CHIPS and Science Act to make the United States "globally competitive in the industries and technologies of the future" (US Economic Development Administration *n.d.,* c).

With approximately $51 million in funding from the Department of Commerce, iFAB will capitalize on its research leadership, food processing infrastructure, and regional corn and soy feedstocks to scale precision fermentation and biomanufacturing. In 2024, the Illinois General Assembly earmarked $5 million to advance this work—with state agencies and private sector companies pledging hundreds of millions more (State of Illinois 2024). This structure will create zero-emission, high-value foods and food ingredients and bio-based materials (US Economic Development Administration *n.d.,* a). In addition to pursuing research and commercialization of these new biotechnologies and products, iFAB will provide state-of-the-art physical infrastructure and scale-up capacity for stakeholders to develop new products. It will also provide sector-specific biomanufacturing workforce training across all skill levels.

Similar to BEAM Circular, iFAB has assembled a strong group of partners. iFAB's partners include universities, community colleges, state and local economic development organizations, companies, industry groups, labor organizations, manufacturing extension centers, state and federal government units, venture development organizations, and workforce training organizations (iFAB *n.d.,* a). Also comparable to BEAM Circular, iFAB has a clear understanding of its regional strengths, including the availability of corn- and soy-based feedstocks. iFAB taps into the presence of agricultural technology leaders in Illinois and the Midwest, as well as its proximity to commercial transportation routes and one of the largest concentrations of food-related businesses in the world (iFAB *n.d.,* b). iFAB is a strong example of coalition building across the supply chain, the catalytic power of federal funding, and how well-suited midwest crop-producing regions can be to developing food biomanufacturing innovation and scale-up.

iii. Case study #3: Bezos Center for Sustainable Protein at North Carolina State University - Raleigh, NC

Unique from the previous two case studies that were initiated primarily through government funding, the Bezos Center for Sustainable Protein at NC State has its roots in philanthropic funding. The Bezos Center for Sustainable Protein launched after a five-year, $30 million investment from the Bezos Earth Fund. This Center aims to become a food biomanufacturing hub "for dietary proteins that are environmentally friendly, healthy, accessible, and affordable" (NC State University *n.d.*). The Center will address challenges across research and development, industry, policy, and consumer needs. Locating the center at NC State, which is adjacent to North Carolina's Research Triangle Park, allows it to take advantage of the existing expertise, infrastructure, and programming at one of the country's top land-grant universities—including the NC Food Innovation Lab and the NC State Biomanufacturing Training and Education Center—along with the biotechnology, advanced manufacturing, and information technology expertise of the Research Triangle.

Like iFAB, this innovation hub is university-led but involves multi-sector partners from the region. The center is partnering with notable industry leaders, including large food companies and local start-ups. The center is already part of an international network of sustainable protein innovation hubs in the UK and Singapore (Imperial 2024; NUS 2024). Philanthropic organizations identified the overarching innovation priorities, provided the crucial seed funding, and established the international collaborations. In this case, philanthropy's broader geographic scope, focused mission, and ability to mobilize funds quickly relative to the United States government enabled the launch of a unique network of food innovation hubs. However, philanthropy on its own does not have the ability to scale its funding programs to the size of government programs. Therefore, to catalyze this type of innovation hub building and networking at scale, significant federal and state government involvement along with philanthropic partnerships will be necessary.

V. Conclusion and policy recommendations

The food innovation regional hub model can advance domestic biotechnology and biomanufacturing, create new markets for American farmers, and support small businesses in regional economies. To avoid falling behind other countries that are already actively prioritizing food biomanufacturing innovation, the United States needs to act. Over the next two to five years, policymakers should enact the following policies to expand the regional food innovation hub model across the United States and build the bioeconomy in service of food and national security. These policy proposals closely relate to the successful programs and actions found in the three case studies above—but add the scale, coordination, and specificity necessary to meet the needs of the food biotechnology industry.

i. Executive Action and Strategy on Biomanufacturing

The White House, acting through the Office of Science and Technology Policy, should adopt whole-of-government policies that elevate the role of food biomanufacturing within national security and advanced manufacturing initiatives. This executive-level action should replace the rescinded 2022 Executive Order, directing relevant executive agencies to prioritize biotechnology, biomanufacturing, and the bioworkforce, especially as they relate to food and agriculture in the United States. Ideally this action would emphasize the need for regional tailoring of biomanufacturing initiatives in order to take advantage of MSA-level assets, as discussed in the three case studies above. The National Biomanufacturing Strategy should follow this effort—with the executive branch collecting input from industry, academia, and NGOs, and playing the role of facilitator along with a national advisory board dedicated to Biotech and Rural Prosperity. The Bezos Center case study highlights the policy benefits of combining cross-sector expertise from every link of the biotech value chain, from technical scientists, to industry leaders, to investors.

ii. National Biomass Supply Development Initiative

Working with stakeholders in academia, industry, and state agencies, the executive branch should map crop biomass and food biomanufacturing capacity in the United States. The Departments of Agriculture and Energy should build on their existing efforts to identify, evaluate, and map the quantity and quality of existing biomass across the United States (US Department of Energy 2024; US Department of Agriculture 2024). The initiative should implement the action plans and next steps outlined in previous assessments. As part of the initiative, the Department of Commerce should work with industry and academic stakeholders to map the existing food biomanufacturing capacity in the United States, including public and private facilities operating in microbial fermentation and animal cell culture at the pilot, demonstration, and commercial levels. The data generated by this initiative can identify and support future regional bioeconomies in food, agriculture, and other biotech industries.

iii. Food Biomanufacturing Partnerships Planning Grants Program

Executive branch agencies that focus on biotechnology, including the Department of Commerce, Department of Agriculture, and National Science Foundation, should work with Congress to create a new interagency program to distribute planning grants to food biomanufacturing partnerships. The Food Biomanufacturing

Partnerships Planning Grants Program should work toward the purpose of enabling regional stakeholder groups to build their coalition and identify their unique food biomanufacturing innovation hubs. Policymakers should use NSF's Regional Innovation Engine Development Award that funded BEAM Circular planning efforts as a template for this new interagency program, targeting awards between $1-5 million.

iv. Food Biomanufacturing Implementation Grants Program

As a follow-on program to the Partnerships Planning Grant Program, executive branch agencies should work with Congress to create a new interagency program that partners with state governments to distribute regional innovation grants to public-private partnerships between academia, industry, and local governments focused on food biomanufacturing. The program should advance the purpose of implementing and constructing food biomanufacturing innovation hubs that were developed from planning awards distributed as part of the Food Biomanufacturing Partnerships Grants Program. Agencies should model this new grant program on the Regional Technology and Innovation Hub program that created the iFAB Tech Hub. Just as with the iFAB case study, this program should target projects that advance biomanufacturing capacity, production scale-up, co-manufacturing facilities, and workforce development with awards between $50-100 million.

v. Biotech and Rural Prosperity Advisory Board

The executive branch should create a national advisory board with representatives from industry, academia, government, and the nonprofit sector to facilitate communication and coordination across regional bioeconomy hubs, analogous to the multi-sector advisory board supporting the international network of Bezos Sustainable Protein Centers. The advisory board should inform high-level policies and executive-level actions, as well as technical resources for regional projects. Additionally, the advisory board should connect with BEAM Circular, iFAB, and the Bezos Center for Sustainable Protein at NC State University so that it can communicate successes and lessons learned by existing food biomanufacturing hubs to ensure the efficient development of new hubs.

Implementation of these five policy recommendations can help identify strong geographical prospects, catalyze partnerships, and build infrastructure for new food biomanufacturing hubs to join BEAM Circular, iFAB, and the Bezos Center for Sustainable Protein at North Carolina State University. Though a thorough evaluation is beyond the scope of this article, back-of-the-envelope analysis that overlays biomass and crop production with a map of land-grant universities and Gruber and Johnson's map of 102 promising tech hub MSAs, suggests an initial list of six MSAs to explore for the next wave of food biomanufacturing hubs. These include, from roughly east to west: Binghamton/Ithaca, NY; Indianapolis-Carmel-Anderson/Lafayette-West Lafayette, IN; Fayetteville-Springdale-Rogers, AR-MO; Lincoln, NE; Fargo, ND-MN; and Spokane-Spokane Valley, WA.

The coming years could be transformative for US biotechnology, supply chain resiliency, and national security, especially with a focus on food and agricultural opportunities that increase economic opportunities for American farmers and build a resilient domestic food biomanufacturing industry. The need exists, momentum is growing, and researchers and industry leaders are poised to act. Food biomanufacturing can become an important piece of American bioeconomy policy with regional hubs being a key tool to deliver success.

"Technology hubs are a proven way to drive local economic development and forge partnerships across government, industry, and educational organizations. … If the United States is going to capture the opportunities that biotechnology and biomanufacturing present, Tech Hubs across the country will lead the way. The future of biotechnology is local, but the impact will be global." – NSCEB Final Report, April 8, 2025 (NSCEB 2025a).

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