

PUBLIC SUBMISSION

Received: May 29, 2025 Tracking No. nba-1cuf-xv00 Comments Due: May 28, 2025 Submission Type: API
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Docket: NSF-2025-OGC-0001
NITRD_FRDOC_0001

Comment On: NSF-2025-OGC-0001-0001
Request for Information: Development of a 2025 National Artificial Intelligence Research and Development Strategic Plan

Document: NSF-2025-OGC-0001-DRAFT-0298
Comment on FR Doc # 2025-07332

Submitter Information

Organization: AI Institute for Next Generation Food Systems (AIFS)

General Comment

See attached file(s)

Attachments

AIFS Response to RFI National AI RD Strategic Plan

AIFS Response_RFI National AI RD Strategic Plan



OFFICE OF THE DIRECTOR
USDA/NIFA AI INSTITUTE FOR NEXT-GENERATION FOOD SYSTEMS

Response to the Request for Information on the Development of a 2025 National Artificial Intelligence (AI) Research and Development (R&D) Strategic Plan

Disclaimer: *This response is submitted by the AI Institute for Next Generation Food Systems (AIFS) as part of the public input to the Request for Information (RFI) on the 2025 National Artificial Intelligence Research and Development Strategic Plan. This submission represents the views of AIFS and does not necessarily represent the views of the United States Government.*

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Executive Summary:

The Artificial Intelligence Institute for Next Generation Food Systems (AIFS) appreciates the opportunity to contribute to the 2025 National AI R&D Strategic Plan. As a federally funded institute at the forefront of AI-driven food systems innovation, AIFS brings a unique perspective on how artificial intelligence can advance national priorities, including food security, public health, economic competitiveness, and national security.

AIFS supports the coordination efforts of the National Science Foundation (NSF) and the Networking and Information Technology Research and Development (NITRD) National Coordination Office to advance the goals outlined in Executive Order 14179, which calls for removing barriers to American leadership in artificial intelligence. We emphasize the essential role of the federal government in supporting long-term, high-impact AI research that serves the public interest, particularly in areas like food systems where commercial investment alone is unlikely to meet national needs.

Our recommendations highlight three strategic imperatives: (1) federal investment in foundational and translational AI research tailored to food systems; (2) workforce development initiatives that build AI fluency across sectors and regions; and (3) innovative partnership models that connect academia, industry, and government to accelerate real-world impact.

With targeted federal investment and coordinated leadership, the United States can enhance resilience in food systems, promote human flourishing, and cultivate a skilled workforce prepared to utilize AI in service of national well-being. AIFS stands ready to support this vision and ensure that AI benefits extend across communities, industries, and future generations.

About AIFS

Established on October 1, 2020, the Artificial Intelligence Institute for Next Generation Food Systems, or AIFS, aims to solve the world's biggest challenges to crop and food production: ensuring a sustainable, nutritious, efficient, and safe food supply.

In order to accelerate critical solutions to these challenges, AIFS brings AI technologies to the entire food system from crop breeding and farming to food production and nutrition. The institute helps to synthesize the latest breakthroughs in artificial intelligence to empower the food and agriculture industries to rapidly adopt them, and to prepare the workforce.

AIFS brings together more than 80 researchers from six institutions: UC Davis; UC Berkeley; Cornell University; the University of Illinois, Urbana-Champaign; UC Agriculture and Natural Resources; and the U.S. Department of Agriculture's Agricultural Research Service.

Our plan is to grow the institute into the world's leading source of research, development, and commercialization of novel AI-based solutions in food and agriculture through a three-pronged strategy of multidisciplinary science, industry engagement, and workforce development.

Funding for the institute is provided by the USDA/NIFA as part of a larger initiative led by the NSF to establish artificial intelligence institutes to accelerate research, expand America's workforce, and transform society in the decades to come.

Addressing Food Systems Security Through AI:

One of the most pressing challenges facing the United States is improving the quality and nutritional value of food to reduce health issues related to poor dietary intakes. Current food production and processing methods often prioritize yield over nutrient density, resulting in diets that lack essential vitamins and minerals. This nutritional gap contributes to chronic health issues, including obesity, diabetes, and cardiovascular diseases, disproportionately affecting vulnerable populations.

Utilizing AI-driven innovations within the food systems can help create smarter, more efficient ways of producing nutrient-rich food. By integrating AI-driven models that analyze crop nutrient profiles, optimize resource utilization and food processing for maximum retention of beneficial compounds, and monitor food quality throughout supply chains, we can address dietary deficiencies at the source. For example, AI-powered tools can guide precision breeding to enhance the nutrient content of staple crops or suggest processing modifications to minimize nutrient loss during food production.

To build a resilient and health-focused food system, we propose a model that integrates AI-driven innovations with dietary guidelines, public health data, and community engagement. This model not only enhances food quality but also supports public health by promoting more balanced and nutrient-dense diets. The Federal government can play a pivotal role by investing in AI applications that prioritize nutrition and quality in food systems, directly contributing to healthier populations and reduced healthcare costs.

Strengthening the Workforce for an AI-Enabled Food System:

The rapid advancement of AI technologies in the food sector presents both opportunities and challenges for the workforce. Despite growing demand for AI-driven innovations in agriculture and food systems, a significant gap remains between the technical skills required and the current

competencies of the workforce. Many professionals in agriculture, food processing, and supply chain management are not equipped to fully harvest AI tools, resulting in underutilization of cutting-edge technologies and missed opportunities for optimization and efficiency.

To address these gaps, it is crucial to develop training programs that go beyond technical skills and include interdisciplinary thinking, problem-solving, and practical applications. The workforce must be prepared to understand, implement, and adapt AI-driven solutions within diverse food system contexts, including production, processing, distribution, and health monitoring. This requires not only technical education but also training that bridges the gap between theoretical AI concepts and real-world applications.

Additionally, there is a need to democratize AI knowledge across various sectors. By fostering a broad training ecosystem that reaches community colleges, rural extension programs, and professional networks, we can ensure that AI expertise is available to individuals from a wide range of fields. Such an approach will help build a resilient, adaptable workforce capable of leading the transition to an AI-enabled food system.

The Federal government can play a pivotal role by supporting initiatives that address existing skill gaps while promoting lifelong learning and career development. This investment will not only enhance the adoption of AI-driven technologies but also ensure that the workforce is prepared to lead, innovate, and thrive in a rapidly evolving food system landscape.

To sustain leadership in AI-driven food innovation, it is vital to invest in workforce development that equips agricultural workers, data scientists, and policymakers with the skills to deploy AI technologies effectively. AIFS supports initiatives that bridge technical education with practical applications, including training programs for rural communities and collaborative projects with industry stakeholders. Building AI literacy at all levels will democratize the adoption of advanced technologies, fostering resilience and skill growth within the workforce.

Novel Mechanisms for Research Partnerships:

Traditional research approaches often operate in silos, limiting collaboration and slowing down the adoption of new technologies. To drive innovation and real-world impact, the federal government should support new models of research partnerships that bring together public agencies, universities, and the private sector.

We recommend creating a federally supported *Food-AI Research Network* that allows institutions to work together on shared challenges while maintaining control over their data and intellectual property. This approach, known as *Federated Research*, enables partners to collaborate without centralizing sensitive data, which is especially important in food and agriculture.

We also recommend launching *Living Labs for AI in Food and Nutrition*, community-based research sites where scientists, food producers, processors, and public health professionals can test and refine AI tools in real-world settings. These labs would ensure that research is grounded in practical needs and local realities.

Finally, we propose the creation of *AI-Food System Innovation Consortia* focused on key national challenges such as food safety, nutrient-rich agriculture, and personalized nutrition. These consortia would coordinate public and private partners to define shared research goals, share tools and data, and accelerate the path from discovery to implementation.

Together, these mechanisms would reduce barriers to innovation, improve coordination, and ensure that AI tools are developed with real-world impact in mind.

Research Priorities and Recommendations:

While industry investment typically focuses on short-term returns, many of the most impactful AI applications in food systems, such as improving nutrient density, building rural workforce capacity, developing open data infrastructure, and supporting collaborative testbeds, require long-term federal support. These areas deliver significant public value over time by strengthening national resilience, advancing public health, and ensuring equitable access to innovation, yet lack the immediate profitability to attract sustained private-sector funding. Federal leadership is therefore essential to drive these efforts forward in alignment with national priorities.

To support the future of food systems and maintain U.S. leadership in AI, we recommend that federal agencies focus AI research and development investments on the following priorities:

- Core AI Research focused on improving how food is grown, processed, distributed, and consumed;
- Resilient and Responsive Supply Chains powered by AI to improve efficiency, traceability, and economic security;
- Health and Nutrition Applications that use AI to help deliver healthier, more personalized diets;
- Workforce Development to ensure that current and future workers are prepared to use AI tools effectively; and
- Open Data Infrastructure to enable secure, ethical sharing of data across public, private, and academic sectors.

Conclusion:

Sustaining U.S. leadership in artificial intelligence will require bold, coordinated federal investment in areas where innovation serves the public good but may not attract near-term private funding. Food systems are one such critical sector, essential to national security, public health, and economic competitiveness. AIFS is committed to advancing AI-driven solutions that improve nutrition, enhance supply chain resilience, and promote human flourishing.

We support a strategic plan that reflects the federal government's unique role in driving long-term, interdisciplinary research; expanding workforce capacity in underserved regions; and fostering cross-sector partnerships through shared infrastructure and pre-competitive collaboration. In alignment with Executive Order 14179, we stand ready to help ensure that AI benefits every community and delivers measurable progress toward national priorities.