

AI and Food Security

Advancing U.S. Leadership at Home and Abroad

KEY TAKEAWAYS

- Global food systems are struggling to manage shocks that are increasingly frequent and complex. Conflicts have disrupted energy and fertilizer exports from the [Strait of Hormuz](#) and energy, grain, and oilseed exports from the [Black Sea](#), while a record-breaking [El Niño](#) drives extreme weather and agricultural conditions. Together, these shocks strain farmers' resilience and increase the risk of food insecurity worldwide.
- While challenges mount, solutions to global food insecurity evolve. AI has emerged as an invaluable tool for farmers, researchers, and policymakers. Already, AI can strengthen food security early warning systems, enhance precision agriculture tools and techniques, revolutionize crop breeding, optimize supply chains, and transform humanitarian assistance delivery.
- Spending on foreign aid, including humanitarian assistance, has declined significantly in recent years. In this new fiscal reality, efforts to improve global food security require better efficiency, coordination, and return on investment.
- There is an opportunity for the U.S. government to lead the advancement of AI applications for food security globally through policies that support agricultural research, cross-sectoral partnerships, and investments in data infrastructure to deploy these technologies safely and effectively.

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BACKGROUND AND CONTEXT

While there is no shortage of attention on AI—through its impacts on domestic and global economies, its centrality to U.S.-China competition, and debates over regulation of frontier models—attention to AI's integration across agrifood systems is relatively sparse. Yet, AI has the potential to transform nearly every aspect of food production, processing, and distribution, and can strengthen both domestic agricultural productivity and global investments in hunger reduction. For these reasons, AI applications for food security merit increased attention among U.S. policymakers.

AI offers experts and decisionmakers enhanced capabilities to respond to food insecurity, as well as new ways to predict, absorb, and adapt to shocks earlier and more effectively. Recent investments by major [technology companies](#) and [foundations](#) advance [promising AI applications](#) for smallholder farmers. Yet the full breadth of active and potential applications of AI in this field includes helping [anticipate crises](#) with greater foresight and precision, producing [higher-yielding crop varieties](#) that are also more resilient and nutritious, and [optimizing food supply chains](#) for improved affordability and quality for the benefit of food-insecure people everywhere.

While AI's integration into food systems is accelerating rapidly, it carries real risks, necessitating forward-looking policies to protect data privacy, livelihoods, and food security for all.

LEGISLATIVE AND POLICY IMPLICATIONS

Several bills in progress and upcoming provide Congress the opportunity to both strengthen U.S. agriculture and bolster U.S. leadership on AI for food security through agricultural research investments, improved coordination among federal agencies, and strategic multilateral partnerships:

- The **Farm, Food, and National Security Act of 2026 (Farm Bill)**, the House-passed bill and Senate discussion draft, provides opportunities to support the development, validation, and adoption of AI-enabled tools for research and precision agriculture domestically. The international food assistance, market access, and technical assistance and exchange programs authorized by the Farm Bill also offer opportunities to apply U.S. agricultural innovation abroad, strengthen partnerships with food-insecure countries, and position the United States as a leader in the responsible use of AI to advance global food security.

- The **FARM AI Act** would expand access to AI through USDA programs, providing the opportunity to strengthen the development and adoption of AI-enabled tools across U.S. agriculture and build federal capacity to support responsible AI use in agriculture.
- The **Global Food Security Act**, up for reauthorization in 2028, gives Congress the opportunity to incorporate U.S.-led, AI-enabled technologies into U.S. international food security efforts, strengthening partner countries' capacities to apply emerging technologies to agricultural and food security challenges.

CHALLENGES AND RISKS

Roadblocks to policy action include:

- **Data limitations:** AI models are only as good as the data used to build them. Data of poor quality and insufficient quantity risk inaccurate or biased outputs that can cause AI systems to fail. In recent years, U.S. funding for food security data—including data collected by the UN World Food Programme, the Famine Early Warning Systems Network (FEWSNET), and numerous datasets collected by USDA and USAID—has been reduced or eliminated. AI cannot replace primary data, the loss of which threatens poorer outcomes for food security and technology development.
- **The information-action gap:** Better insights alone do not produce better outcomes. Institutions and governments require the resources, authority, and expertise to respond to the threats identified by AI systems. Funding models for AI-enabled tools should therefore include strategies for long-term capacity building of the policymakers and communities intended to use them, not just the tools themselves.
- **Trust building and data sovereignty:** AI's potential is limited when individuals and governments do not trust the tools or the organizations that build them. Policymakers can help alleviate this mistrust by clearly defining the requirements of transparency, validation, responsibility sharing, and human oversight in AI systems. Clear standards for data ownership and privacy are prerequisite to positive food security outcomes.
- **Embedded bias and misalignment:** Without deliberate integration, AI can widen inequalities within communities of farmers and food-insecure people. The inclusion of perspectives of all potential beneficiaries of AI is necessary for the design and evaluation of AI systems that ultimately improve agricultural and food security outcomes.

RECOMMENDATIONS

- **Technology leadership:** Invest in foundational science, with safeguards for data privacy and intellectual property to foster trust among stakeholders and maintain competitiveness among technology and model developers.
- **Primary data:** Invest in primary data collection related to agriculture production and food security. A robust information system regarding the food, water, and economic security of populations, and the forces that affect it, is vital for innovation and the well-being of Americans and people everywhere.
- **Coherent strategies:** Leverage existing agriculture, biotechnology, and consumer protection regulatory frameworks to develop proactive approaches that provide needed safeguards while not hampering innovation.
- **Intellectual capital:** Engage regularly with research organizations, technology companies, and end users to develop shared expertise, and to define the transparency, validation, and responsibility-sharing requirements needed for effective implementation of emerging capabilities.

Additional Resources and Contact Information

[AI & Global Food Security: A Focus on Precision Agriculture](#); [AI and Global Food Security: A Focus on Early Warning Systems](#); [AI and Global Food Security: A Focus on Crop Breeding](#); [AI and Global Food Security: A Focus on Food Systems](#); [The Next Revolution: AI to Fight World Hunger](#).

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