Modernizing Agriculture Data Infrastructure to Improve Economic and Ecological Outcomes

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Modernization of agriculture data infrastructure will better equip farmers and the U.S. Department of Agriculture (USDA) with tools to adapt, innovate, and ensure a food-secure future given the increasingly dynamic conditions in which the sector operates.

Data innovation is necessary to address a growing number of critical short- and long-term food and agricultural issues, including agricultural production, environmental sustainability, nutrition assistance, food waste, and food and farm labor. Though many farmers are already collecting production data about farms that can help solve these issues, this information remains mostly unavailable to other farmers, policymakers, and USDA due to a number of issues.

Improving the national data infrastructure for the agricultural sector is the linchpin to provide critical agricultural insights, improve the effectiveness of farm bill programs, and deliver better value for farmers and taxpayers. Harnessing existing data from government, industry, and individual sources has the potential for farmers to work in a more productive, streamlined manner and economically empower rural America. Realizing those benefits requires policy change and an orientation to using integrated data for analysis while ensuring important privacy and confidentiality protections are provided. Achieving these goals is possible.

USDA has a vital, yet unrealized, leadership role to play in facilitating data collection, utilization, sharing, and research. The lack of a clear mandate across agencies, some gaps in authorities, and privacy concerns have hindered USDA's innovative use of data, including the department's ability to facilitate needed research to support decision-making. Notable challenges at USDA and for integrating agricultural data include:

- **Lack of Consensus, Open Data Standards**
- **Absence of Consistent System Interoperability**
- **Misaligned Incentives**
- **Gaps in Leadership and Governance**
- **Inconsistent Legal Authority and Interpretation**

Given these challenges, this white paper considers key attributes for integrated data infrastructures to improve the current ecosystem for agricultural data sharing. The attributes include farmer and public trust, privacy and confidentiality protections, independence, data acquisition, scalability, stable funding, oversight and accountability, and intergovernmental support. The white paper applies the attributes to explore four solutions to effective data acquisition, management, and use in other policy sectors:

1. **Centralized Data Infrastructure Operated by USDA**
2. **Centralized Data Infrastructure Operated by a Non-Governmental Intermediary**
3. **Data Linkage Hub Operated by a Non-USDA Agency in the Federal Government**
4. **Contractual Model with Relevant Partners**

Each of the considered models offers clear opportunities for collaboration with farmers and other stakeholders to ensure there are clear benefit to address the shortfalls in the current system. Careful consideration of the trade-offs of each option is critical given the dynamic weather and economic challenges the agriculture sector faces and the potential new economic opportunities that may be unlocked by harnessing the power of data.

Fully-integrated agricultural data is essential to continue U.S.'s place as the world's leader in agricultural production. In selecting any of these options for further action, authorizing legislation can further clarify data collection, acquisition, sharing, and protection authorities that are critical for an effective system. In addition, outlining meaningful and realistic mechanisms for oversight and transparency while simultaneously encouraging information sharing about how data are being responsibly used will be important for promoting public trust and accountability.

The USDA has made important strides in improving its data capabilities in recent years, but there remains much room for progress to modernize an infrastructure critical to farmers and policymakers alike. The time has come for USDA and the policy community to consider how to accomplish the joint objective of protecting critical data while also allowing for its use to answer critical questions. Taking action to modernize USDA's data infrastructure will promote much-needed innovation and adaptation by equipping the country's farmers and policymakers with the information they need about farms, farming practices, and agriculture policy.