Science Societies

A vision for the future of sustainable agriculture

By Elizabeth Stulberg

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In February, USDA rolled out a new, Department-wide initiative—the Agriculture Innovation Agenda. It aims to align resources, programs, and research across the Department to advance the dual goals of increasing the United States' agricultural productivity by 40% while cutting its environmental footprint in half by 2050. These are ambitious goals, so what needs to happen to make them reality? USDA has pledged to fast-track the integration of new conservation practices across its programs, ramp up data collection, and hold itself accountable to its conservation and productivity benchmarks.

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Leading this effort is Deputy Undersecretary for Research, Education, and Economics, Scott Hutchins, who appealed to *CSA News* magazine readers in the June issue (**https://doi.org/10.1002/csan.20152**) to submit ideas for the most important, transformational innovations that USDA should address and the types of research needed to achieve them. The Societies' Science Policy Office sprang into action, designing a survey for all members and then convening a task force to answer this call.

Broad Vision of Agriculture's Future

Because USDA is looking for a broad vision of the future of agriculture, the Societies invited members from partner scientific societies to join the task force and share their views. The group included members from ASA, CSSA, SSSA, the American Society of Agricultural and Biological Engineers, American Society of Plant Biologists,

Entomological Society of America, National Association of Plant Breeders, and the International Certified Crop Adviser Program.

The Societies have been involved in past efforts to synthesize agriculture research goals. Just last year, Societies' member Dr. Raj Khosla of Colorado State University participated on a National Academies of Sciences committee to produce the report *Science Breakthroughs 2030: A Strategy for Food and Agricultural Research*, funded in part by the Societies and the Agronomic Science Foundation. This report laid out a series of research areas to dramatically advance agriculture over the next 10 years.

To its credit, USDA is not attempting to reassess or re-synthesize research goals. In fact, Dr. Hutchins has already incorporated the research areas from *Breakthroughs 2030* into the Agriculture Innovation Agenda. These research areas are the "how," i.e., how agriculture will achieve USDA's ambitious productivity and environmental goals; the request for comments asked for the "what," i.e., what products or services do farmers need and which of these research goals will be needed to create them.

Scientific societies generally represent researchers, and although our task force included a CCA and members from the private sector, members agreed that it would be prudent to consult with organizations whose members have different types of relationships with growers. The Science Policy Office arranged consultations with a commodity group, the American Soybean Association; a trade group, the American Seed Trade Association; and a conservation NGO, the American Farmland Trust. Each meeting was a gut check for the task force members' ideas, and because each of these organizations were planning to submit comments of their own, ideas flowed in both directions.

Science Task Force Members

The task force members from ASA, CSSA, and SSSA included Dr. Rob Malone of USDA ARS, Dr. Raj Khosla of Colorado State University, Dr. Meagan Schipanski of Colorado State University, Dr. Maria Monteros of the Noble Foundation, Dr. Davide Cammarano of Purdue University, and Ms. Amy Asmus, an ASA member and Certified Crop Adviser.

Making Agriculture Diverse, Understood, and Resilient

The task force's final comments are posted on ASA's Science Policy webpage (**www.agronomy.org/news/science-policy-news/societies-urge-usda-embrace-diversity-develop-products**). The comments begin with a vision of the future of American agriculture, a future that includes a food and agriculture industry that reflects the diversity of America. The task force noted that as rural communities shrink and cities swell, agriculture education among those who may not have grown up in farming communities becomes even more important. The food and agriculture industry needs talented individuals who are aware of its opportunities, but agricultural education is not just for those who may one day join the industry. Producers depend on a national community that understands food and farming. The Societies suggested USDA invest in agricultural education, student research programs, internships, and Extension, noting that the 1890 and 1990 land grant universities and non-land grant historically black colleges and universities (HBCUs), Hispanic-serving institutions, and Native American-serving institutions should be at the forefront of this effort.

The Societies' comments also provide suggestions for increasing agricultural resilience, including providing economic opportunities, such as whole-farm crop insurance and

the development of an ecosystem services market that would pay growers for things like sequestering carbon and capturing water. Strategies for water management are also noted. But the primary focus of the task force's vision for future agriculture were on the many tools and products that farmers will need to make agriculture more resilient and sustainable—the very things USDA had asked for to make its Agriculture Innovation Agenda successful.

These tools include: true sustainability models to help farmers optimize their land management; a data repository that maintains FAIR (findable, accessible, interoperable, reusable) standards; a new generation of soil testing that links to improvements in crop productivity and environmental outcomes; ubiquitous, universally compatible sensors; autonomous or robotic systems for agriculture's repetitive or otherwise dangerous tasks; and a "breeding toolbox" that includes minor agronomic and specialty crops, including cover crops and perennials, and that could be used to create important traits, such as stress tolerances and increase photosynthetic efficiency, or could breed plants for new functions, such as biodegradable packaging materials.

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