Last spring, the National Academies of Sciences, Engineering, and Medicine assembled a study committee charged with a lofty goal: to develop an innovative strategy for the future of food and agricultural research. While the challenge of feeding more than 9 billion people by 2050 is a goalpost that everyone in agricultural research is all too aware of, this study, called Science Breakthroughs 2030, was tasked with identifying the scientific initiatives that could transform food and agriculture research in the next decade.

The model for the study was partially derived from the planetary science community, who have developed decadal research plans for more than 50 years. These reports are regularly referenced by Congress as a justification for federal funding. The National Institutes of Health and the National Science Foundation have also focused on developing big ideas to inspire scientists, the public, and policymakers. Science Breakthroughs 2030 could similarly be useful in informing strategic planning and advocacy for food and agricultural research.

I was fortunate enough to serve on the study committee and represent interests from the agronomy, crop, and soil communities. The committee relied heavily on stakeholder and community input to develop the report. We held multiple virtual and in-person listening sessions and asked the scientific community to identify the most pressing challenges facing food and agriculture through an online platform. ASA, CSSA, and SSSA encouraged its members to submit their ideas and participate in as many events as possible.

Building consensus among the committee members to identify the top five or six most pressing science breakthroughs needed in the field of agriculture and food research was not easy. It felt like a long journey at times. After a little more than a year of work, the committee released the final report, Science Breakthroughs to Advance Food and Agricultural Research by 2030 (www.nap.edu/25059), on 18 July.

Goals and Needed Breakthroughs

The report identified three goals for food and agriculture research in the next decade: to increase the (1) efficiency, (2) sustainability, and (3) resiliency of agricultural systems. These goals resulted from the research challenges identified by the community, which included soil loss and degradation, nutrient efficiency in crop systems, water use, plant and animal diseases, climate variability, and food waste.

In order to achieve these goals, the report identified five science breakthrough opportunities and recommended building significant research efforts around them.

1. Prioritize transdisciplinary science and systems approaches
2. Effectively employ and develop sensing technologies
3. Facilitate adoption and development of data science, AI, and informatics
4. Exploit genomics and precision breeding
5. Increase the understanding of the animal, soil, and plant microbiomes

Due to the complex and interconnected nature of the challenges facing food and agriculture, the report also emphasized the importance of utilizing convergent research approaches. Broadening traditional agriculture research fields to include data science, materials science, information technology, behavioral sciences, and economics is necessary to find holistic solutions to address the needs of our future agricultural systems.

Further Considerations for Success

The report also stipulates that scientific breakthroughs alone cannot transform agricultural research. The committee identified five further considerations that would contribute to the success of food and agriculture research.

1. Invest in equipment, infrastructure, and human capital
2. Continue to support the experiment stations and Cooperative Extension
We welcome the following new members who joined the Societies in July 2018.

**Australia**  
Aryal, Mela, Toowoomba, QLD, ASA, CSSA

**Canada**  
Daly, Erin Jane, Edmonton, AB, CSSA, SSSA  
Chizen, Chantel, Vancouver, BC, ASA, CSSA, SSSA  
Porter, Maria Teresa, Vancouver, BC, ASA, CSSA, SSSA  
Adesanya, Theresa D., Winnipeg, MB, ASA, CSSA, SSSA  
King, Alison E., Guelph, ON, ASA, CSSA, SSSA  
Alzaben, Heba, Waterlo, ON, ASA, CSSA, SSSA  
Clément, Chedzer-Clarc, Quebec City, QC, ASA, CSSA, SSSA  
Bertholon, Alexia Marie, Saint-Jean-Sur-Richelieu, QC, ASA, CSSA, SSSA  
Bourdon, Karolane, Ste Foy, QC, ASA, CSSA, SSSA  
Rémy, Mathieu, Ste Foy, QC, ASA, CSSA, SSSA  
Ejack, Leanne, Ste. Anne de Bellevue, QC, ASA, CSSA, SSSA  
Vargas Palacios, Ana Gabriela, Saskatoon, SK, ASA

**China**  
Zhang, Yan, Changchun, SSSA  
Liang, Yongchao, Hangzhou, SSSA  
Lu, Zhiqiang, Hangzhou, SSSA  
He, Hailong, Xianyang, SSSA

**Denmark**  
Jensen, Peter Weber, Tjele, ASA, CSSA, SSSA  
Rehman, Hafeez Ur, Tjele, SSSA  
Nair, Drishya, Viborg, ASA, CSSA, SSSA

**Germany**  
Jackisch, Conrad, Karlsruhe, SSSA

**Italy**  
Giannetta, Beatrice, Ancona, ASA, CSSA, SSSA

**Japan**  
Ishii, Yuma, Kawasaki, Kanagawa, ASA, CSSA, SSSA  
Naganuma, Natsumi, Kawasaki, Kanagawa, ASA, CSSA, SSSA

**Netherlands**  
Zhuang, Luwen, Utrecht, SSSA

**Nigeria**  
Chukwu, Jerry Nonso, Enugu, SSSA  
Fadeyi, Olaiya Oluwatosin, Osogbo, OSUN, ASA

**Switzerland**  
Feola Conz, Rafaela, Zurich, ASA, CSSA, SSSA

**Taiwan, R.O.C.**  
Wang, Ching-Hsiung, Douliou, SSSA  
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3. Prioritize public and private investments in research funding  
4. Renew interest in food and agriculture to attract a robust workforce  
5. Enhance the role of social science

The committee recognized the need, importance, and challenge of communicating science to the public, especially in the era of social media, so that they can fully understand the complexities of the issues and the potential solutions. Likewise, the committee also recognized the growing need for attracting, encouraging, and engaging young talent from Generation Z to be part of the robust workforce in order to execute the findings of this study and beyond.

ASA, CSSA, and SSSA plan to use the report as part of its advocacy strategy to increase federal funding for food, agriculture, and natural resources research. I encourage all Society members to read through the report and participate in future advocacy opportunities offered through the ASA, CSSA, and SSSA Science Policy Office. If we work together with a unified message, we can meet the challenges facing agriculture in the next decade and beyond.

R. Khosla, member of the Science Breakthroughs report committee and ASA, CSSA, and SSSA

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