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Congressional Testimony

Introduction

Chairman Booker, Ranking Member Braun, and members of the subcommittee, thank you for the opportunity to testify before you today and elaborate on the crucial intersection of agriculture and human health. My name is Dr. Patrick Stover, and I serve as vice chancellor of Texas A&M AgriLife, dean of the College of Agriculture and Life Sciences at Texas A&M University and director for Texas A&M AgriLife Research in The Texas A&M University System.

As vice chancellor of Texas A&M AgriLife, I oversee coordination and collaboration of the agricultural and life sciences academic and research programs across the Texas A&M System, one of the largest systems of higher education in the nation. Texas A&M AgriLife is comprised of four state agencies and the College of Agriculture and Life Sciences. It is one of the largest, most comprehensive agriculture programs in the country, encompassing 5,000 people and a \$400 million budget, while covering the entire agriculture value chain, from food production and farm inputs all the way to consumer behavior and human nutrition. We focus on areas like health and wellness, emerging technologies such as new crops, pests and invasive plants, land use, water, as well as food, nutrition and community health. Our research agency continues to thrive as the top research institution in agriculture and life sciences for six of the last seven years, and our college this year was named the #2 college nationally by Niche for student success and educational value.

Prior to my appointment with Texas A&M AgriLife, I directed the Division of Nutritional Sciences at Cornell University for more than 10 years. In this position, I worked with the World Health Organization to establish a successful summer training program in evidence-based nutrition policy. Additionally, I have consulted for the Centers for Disease Control and Prevention, World Health Organization, and United States Food and Drug Administration on a variety of nutritional topics such as food fortification and vitamin nutrition policy and related research gaps. I have been an expert member, organizer and/or a report reviewer for several National Academies of Sciences, Engineering and Medicine (NASSEM) initiatives

including but not limited to: “Guiding Principles for Developing Dietary Reference Intakes Based on Chronic Disease”¹; “A Framework for Assessing the Effects of the Food System”²; “Redesigning the Process for Establishing the Dietary Guidelines for Americans”³; and “Examining Special Nutritional Requirements in Disease States: Proceedings of a Workshop”⁴.

I am also an elected member of the National Academy of Sciences. My research program specializes in the connection of folic acid to birth defect prevention, notably spina bifida. I was part of a global team who advanced the fortification of folic acid into the food supply, which has been one of the greatest public health successes in using food as medicine and saving health care costs. Spina bifida, a debilitating birth defect, is now rare thanks to changes in food policy. My research in this area led to the Presidential Early Career Award for Scientists and Engineers awarded by President Bill Clinton, the highest honor bestowed by the U.S. government on outstanding scientists and engineers beginning their independent careers. I have served two terms on the NASEM Food and Nutrition Board, which oversees the academies’ nutrition portfolio including the establishment of the Dietary Reference Intakes. I am a Fellow of the American Association for the Advancement of Science (AAAS) and former president of the American Society for Nutrition (ASN). As ASN President, I led a major initiative to understand and address public trust in nutrition science.

Today, I want to provide my perspective on the state of agriculture, the food system, and its connection to hunger, nutrition, and human, environmental and economic health. I will give some context to the enormous challenges and barriers we face, but more importantly, give you a sense of the opportunities to reimagine the role of food and agriculture in transforming our lives and health. Finally, I will update you on efforts we are leading within the state of Texas and Texas A&M AgriLife to position agriculture and our nation’s food supply as the solution to the diet-related chronic disease epidemic, environmental sustainability and economic prosperity.

New expectations of the food system

In 1970, Norman Borlaug won a Nobel Peace Prize for developing disease-resistant wheat plants, which sparked the Green Revolution. Borlaug leveraged science and technology to increase agricultural efficiency, generating more food production from the land. His legacy is the race to feed the world and eliminate hunger. A long-time Distinguished Professor of International Agriculture at Texas A&M University, his scientific and humanitarian achievements are legendary.

These efforts led to a national and global food system that was abundant, affordable and high in caloric density—hunger results from a deficit in calories. While this system proved successful in its intended mission, one of the biggest challenges we face today is addressing obesity and related health conditions. Diet-related chronic diseases cost the U.S. economy well over \$1 trillion annually and affect 50% of adults. In Texas alone, obesity costs businesses \$11 billion

¹ <https://www.nap.edu/catalog/24828/guiding-principles-for-developing-dietary-reference-intakes-based-on-chronic-disease>

² <https://www.nap.edu/catalog/18846/a-framework-for-assessing-effects-of-the-food-system>

³ <https://www.nap.edu/catalog/24883/redesigning-the-process-for-establishing-the-dietary-guidelines-for-americans>

⁴ <https://www.nap.edu/read/25164/chapter/1>

per year, and that is expected to reach \$30 billion by 2030. We need to build upon Borlaug's legacy in a revolutionary new way, expanding our mission from simply using food to eliminate hunger and undernutrition to also using food to become healthier. This necessarily involves innovating throughout the food supply chain and not merely focusing on what some deem to be "healthy foods."

But, urbanization, underinvestment in agricultural research, gaps in knowledge and a deficit in public trust all contribute to the growing disconnect between people and their knowledge of food production and the role of agriculture in human, environmental and economic health. This disconnect threatens the very system that puts food on their plate—agriculture.

Food-to-population disconnect

The modernization and mechanization of agriculture made our present-day urbanization possible. However, today, with fewer than two percent of Americans living on farms—compared to nearly half of them a century ago—people have become increasingly disconnected from, and less knowledgeable about, how food is produced.

A number of studies have found that people do not understand very fundamental principles about the food they eat, and they don't understand food technologies. Because of urbanization and the highly efficient agricultural system, too few people have a connection with food production, understand where their food comes from, or grasp fundamental biological principles of food and its effects on health. To put it bluntly, urbanization and the disconnect between the vast majority of the population and their knowledge of food production threaten agriculture and the food supply.

The divide between agricultural production and the new and necessary expectations of agricultural systems—transitioning from hunger to human, environmental and economic nourishment, amounts to one of the greatest challenges facing our society. However, agriculture is positioned uniquely to be the solution—to lead the world in bridging this divide, supporting human, environmental, social and economic health. As such, agriculture must have a seat at the table, engaged in conversations to address these grand challenges where they persist, at the nexus of agriculture, food systems, nutrition and health.

On a related note, I appreciate the efforts to convene another White House Conference on Food, Nutrition, Hunger, and Health. As a nutrition scientist who has dedicated my career to advancing research between nutrition and disease, I know these conversations are vitally important to identifying solutions to some of the world's greatest challenges. Again, agriculture must have a seat at the table for these conversations.

Building public trust in nutrition

A 2019 report from the Pew Research Center, and a publication from the American Society for Nutrition, which I co-authored, indicated trust gaps between the public and nutrition research scientists. The science of nutrition is still in its infancy and today is rife with misunderstanding that leaves consumers confused. Inconclusive, emerging research on the nutrition needs of

individual persons, which has led to flip-flopping dietary recommendations over time, has bred distrust in the science around the food we eat and the way that food is made. That's why another piece to this puzzle is public trust. That is, everyone engaged in research, practice and policy must work even harder to ensure scientific rigor is our highest priority, especially research that underpins our food intake recommendations. We can only earn that trust by not fearing where the science takes us, by being transparent about the state of knowledge and the certainty of our recommendations, and by respecting the tight linkages between cultures and their food systems.

There are major efforts underway to improve the rigor and reproducibility of agriculture and nutrition research. I served as chair of an invited experts workshop to advise the National Institutes of Health on a major initiative in "Precision Nutrition," which seeks to understand the high levels of variability in how individuals react differently to foods in the relationship between diet and chronic disease. Furthermore, over the past two decades, nutrition has been moving from an approach of convening a group of experts to advise on policies and practices, to a two-tiered "evidence-informed" approach that considers and evaluates the totality of the scientific literature and data by agnostic methodologists or data experts, followed by the convening of experts. These advances are focused on removing the many biases we all have based on individual preferences and values around food choice when evaluating scientific data, but there is still much work to be done as discussed in more detail below.

There is an urgent need to bring agriculture, food, nutrition, the environment and human health into better alignment through science. In order to have confidence that our investments and interventions in the food system—whether new policy actions or recommendations—achieve the intended outcome, we must have confidence in the quality of the scientific evidence that serves as the foundation.

Agriculture as the solution

The power of transforming health through food cannot be understated. With current and emerging technologies, we can tailor agriculture and food systems to support any and all desired outcomes. The same can be said about the power of the nation's land-grant institutions. Land-grant universities are, by definition, tasked with being responsive to the needs of the population in education, service, extension and research and they are well-positioned to lead. These institutions are a national treasure, publicly funded and therefore independent, with the mission of improving the quality of life for all members of society. They conduct research, education, and extension across the entire agriculture value chain, from food production to consumer health. They provide a unique synergy in that their agricultural expertise and their focus on developing more nutritious foods and sharing cutting-edge nutrition research is supported by a statewide network of trained professionals who can translate that research into best practices and practical actions to improve individual health and wellness. This statewide network of agents is extremely important in Texas, home to 254 counties, where our Texas A&M AgriLife Extension Service agents help translate the results of our extensive food and nutrition research to the 29 million people of all ages in their respective communities spread across approximately 800 miles both north to south and east to west. Put simply, the extension service is an extraordinary resource that could be playing a much more active role in nutrition education across the nation.

Texas A&M AgriLife is well-positioned to lead the charge and collaborate with other land-grant universities and U.S. Department of Agriculture Agricultural Research Service (USDA-ARS) centers nationally to connect our nation's food supply and the way it is produced to substantially reducing diet-related chronic diseases. We cannot continue to fragment the food system into "production" and "consumer" domains—we must take a connected systems approach as the two are inextricably linked. With generous support from Congress, the State of Texas, and USDA-ARS, Texas A&M AgriLife is launching two innovative efforts to connect agriculture and health: the Institute for Advancing Health Through Agriculture (IHA), which will advance research that connects production agriculture with human, environmental and economic health outcomes and the Agriculture, Food and Nutrition Scientific Evidence Center, which will be a global resource for policy makers in providing nonbiased, expert scientific information concerning the human, environmental and economic health effects of proposed changes to the food system.

Institute for Advancing Health Through Agriculture

As a research accelerator, Texas A&M AgriLife's new Institute for Advancing Health Through Agriculture (IHA) is the world's first research institute to bring together precision nutrition and responsive agriculture research, linking food production to human consumption, to improve public health and lower health care costs. The IHA will also advance research to help agricultural producers harness big data, artificial intelligence and machine learning to produce food that improves public health. A few recent successes include an enhanced variety of spinach that requires far less fertilizer, a modified sorghum variety with a higher micronutrient content for human food and animal feed, and, most impressively, a previously inedible cotton byproduct that can now be a highly nutritious food source worldwide.

The IHA includes a USDA-ARS program called "A Systems Approach to Responsive Agriculture." We define "responsive agriculture" as approaches that increase both the quantity of food produced (to eliminate hunger) and the quality of food produced in that it supports human, environmental and economic health. The program will work with other land-grant universities and USDA-ARS centers to bring big data, state-of-the-art sensors and computational systems approaches to responsive agriculture and precision nutrition. IHA has a strong emphasis on minority food systems and health and respects the importance of all cultures and their connection to food. We have entered into a full collaboration with The Texas A&M University System member Prairie View A&M University, an 1890 institution, which includes three post-docs for collaborative projects.

Development and use of new tools and technologies that are needed to drive transformation and innovation are critical, but there is an additional challenge in making new research accessible to the broadest audience possible. As a majority minority state, working within all Texas communities will also be part of the IHA's mission.

There are three popular and distinct food traditions in Texas: African American, Hispanic and European. Our food preferences are one of the many things that make our state one of the most culturally diverse. In fact, recent reports show an increase in consumers' preference for ethnic foods nationwide. The United States is a melting pot of people with various ethnicities and

heritages, and the current menu landscape at all types of restaurants and food-service operations certainly reflects that. Our Texas A&M AgriLife Extension Service networks have the trust of all communities they serve and do an incredible amount of community-based education to encourage healthy living, and we know, firsthand, how food selections can differ from person to person. Food incorporates our cultural heritage better than anything else and provides a mechanism of communication with others. It is not just a part of culture; it can define culture. Traditional foods are passed down from one generation to the next within families and communities. However, it is important to note that food traditions such as those we have in Texas and in many parts of the country provide different nutritional benefits, as well as challenges to consumers. We must use certain science to work within these cultural contexts to improve lives through food systems and avoid the temptation to simply “tell people what to eat.”

Additionally, the IHA will deploy mobile health units to perform community-based scientific research that seeks to understand the connection between food systems and individual health (i.e. precision nutrition) and improve health habits in urban and underserved communities, populations that are not normally accessible to university-based research. These “labs on wheels” will house tools like body composition scanners, biometric recorders and blood pressure monitors and may partner with local farmers markets to deliver healthy food to residents. In collaboration with the NIH “All of Us” project, they will generate data that connects food to an individual’s health. Equipped with information about healthy living, the mobile health units will also generate research data by surveying citizens about their current food habits. For many Texans, they will be the IHA’s first touchpoint and the first connection residents have with agriculture.

Agriculture, Food and Nutrition Scientific Evidence Center

In a separate but parallel initiative, the Agriculture, Food and Nutrition Scientific Evidence Center will conduct state-of-the-art scientific evidence synthesis studies to address pressing public issues where agriculture, food and health intersect. The center will serve as a place where policymakers can ask questions related to connections among food, agriculture, the environment and the economy, and research specialists will gather and combine existing data on any topic pertaining to diet and health or economic and environmental policy by performing rigorous systematic reviews. And then, they will interpret the data for a non-science audience. The center will be a non-biased source of comprehensive scientific information for decision-makers, akin to evidence centers in the medical science domain.

Conclusion

While historic efforts to eliminate hunger and food insecurity were important and well-intentioned, hunger cannot be considered in the absence of agriculture and health. We need to develop a systems approach to connecting agriculture, food, environment, economic and human health.

The costs of the current situation are hard to overstate. Diet-related chronic diseases place a huge financial burden on individuals, the health care system, and the American economy as a whole— as well as a heavy toll on life expectancy and quality of life. We must ensure our practices across

the entire food and agriculture value chain support environmental and economic health, or future generations will not have reliable sources of food. Our society needs help improving health outcomes and re-establishing trust in the science of nutrition and all of agriculture.

Fortunately, there are solutions on the horizon. Achieving those improvements requires that the bridge between producers and consumers be rebuilt and no longer fragmented. It also requires that policies and practices must be informed by the best available science, and that nutrition and food needs must be based on people's specific biology and physiology, cultural preferences, transparency regarding scientific certainty and current health needs as they change over a lifetime. And, finally, it requires us to bolster citizen education to bring consumers along with the evolving field to earn their trust, ultimately allowing them to make the best decisions for themselves—benefitting the whole population in the aggregate.

It is also critical to restore trust across the entire food value chain, from producers to consumers. To meet these critical expectations of the food system, all actors and players in the food system must have a seat at the table to ensure collaboration and cooperation, while keeping rigorous and transparent science and the goals of eliminating hunger while advancing human, environmental and economic health, as paramount. Land-grant universities were created for this purpose. They are publicly funded with academic freedom to serve the public interests, and they have the capacity, knowledge, relationships and expertise to be responsive to societal needs and solve problems through science.

Thank you for the opportunity to testify. I look forward to your questions.