Testimony

Of Roger Royse

Royse Law Firm, PC and Royse AgTech Innovation Network

To

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Committee on Agriculture

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Introduction

Thank you for the opportunity to present my testimony and share my view from Silicon Valley and beyond on the AgTech Revolution and the potential role of Congress in its development. My name is Roger Royse. I grew up in western North Dakota, where my family has been (and still is) involved in the produce business since 1948, both in trucking produce from around the country to the Midwest as well as sales of produce to the public. I now reside in northern California and am the founder of the Royse Law Firm, PC, a business law firm based in Silicon Valley with offices in San Francisco and southern California. The Royse Law Firm conducts one of the premier AgTech law practices in the country, helping tech companies with legal transactions including entity formation, financings, commercial contracts, and M&A.

Five years ago, as an adjunct to our AgTech law practice, I started an AgTech group in Silicon Valley. That program has since evolved into the Royse AgTech Innovation Network. Our mandate has been to promote the growing field of AgTech through conferences, events, webinars, white papers, and facilitated meetings between tech companies and the farmers, big Ag and Food, investors, and potential partners. The Network sponsored an accelerator for AgTech companies recently and has taken its message worldwide. I can report that we have been spectacularly successful in our mission, as many of our constituents have launched from our platform, found funding, gained customers, and struck deals with partners. We are on the web at www.royseAgTech.com and www.svAgTech.org.

I am here today to give you my view of this developing movement that I call the AgTech Revolution, including where it is, where it is going, and how you can help.

Background

American agriculture has undergone several eras of technological innovation. Agriculture was transformed by an industrial revolution through the transition to new manufacturing processes, a green revolution that increased agricultural production worldwide in the latter part of the last century, a genetic revolution that increased crop and livestock production, an information revolution that realized the value of data, and now an AgTech revolution that pushes every acre to its maximum potential. The current AgTech Revolution will be no less significant or sudden than any technological change that has come before it, and Congress has an opportunity to pave the way for this new day by reviewing existing law, considering new incentives and in some cases allowing the market to sort it out.

Numerous factors have enabled the AgTech Revolution, and I summarize a few of them here:

1. Food Security. Climate change, a growing global population, rising food prices and environmental pressures are factors that have impacted people's physical, social, and economic access to sufficient, safe, and nutritious food. Such pressures prompted a revolution in the agricultural industry that embraces technological innovation to optimize food safety and production.

2. The Rise of Consumerism. The "Grow Local Movement," fueled by the growing middle class' desire for convenience and year-round food, has encouraged development for technologies in urban and vertical farming, waste, transport, and packaging. Additionally, there has been increased consumer support for transparency in the supply chain and GMO and gene editing practices, as well as environmental sustainability.

3. The Declining Labor Market. Farm labor shortages and rising wages have resulted in increased labor costs, which then contribute to increased investments in technologies that would replace the manual labor part of the farming process. The average farm worker in California is middle aged, and the problem will get worse before it gets better.

4. The Changing Agricultural Markets. A comparison of agricultural production patterns in the U.S. between 1920 and 1995 shows that harvested cropland has declined from 350 to 320 million acres, and the agricultural labor work force has decreased from 26 to just 2.6 percent. In spite of this, agricultural production in 1995 was 3.3 times greater than in 1920 to account for greater demand, demonstrating that productivity has increased and agricultural production methods have changed. Likewise, as the world population has more than doubled between 1950 and 1998, grain production per person has increased by about 12 percent to keep up with the greater world demand.

5. Increased Rural Internet Connectivity. The adoption and application of AgTech rests on the availability of the internet. Due to the accelerating development of AgTech, it is the new rural driver for internet utilization. As of 2012, about 70% of farms in the U.S. had Internet connectivity.

6. The Introduction of Venture Capital. AgTech startups raised more than $320 million this year so far as a result of an uptick in rounds of Series B financings. Funding recipients, equipped with a diverse range of investment themes, are backed by willing and active venture investors who have become more comfortable with this space.

7. The Rise of Big Data. Farm data includes site-specific data (e.g., information about seeding rates, soil nutrients, fertilizer, pesticides, water, yield data), meta data (e.g., information about number of acres, inputs applied, crops) and big data (i.e., the aggregation of farm data from numerous operations). Technology now enables farmers to utilize farm data to help inform their work decisions and optimize production.

New Technologies

A list all of the new technologies informing modern agriculture would fill a book, and I do not attempt to list them all here. However, it is worth pointing out a few of the new technologies that I have seen being developed or implemented in the field.

1. Precision Agriculture. Precision Ag refers to the suite of hardware and software solutions that allow farmers to optimize efficiencies, reduce inputs, increase production and capture useful data. Precision Ag includes the sensors that gather information, the devices that transmit information, and the software programs that convert the data to actionable information. Sensor tech and the Internet of things (IoT) has gone from merely being able to report information back to the farmer to being able to make recommendations based on that data. The tech can make these recommendations at the level of the individual plant, can deliver that data to a handheld device, and now can even automatically adjust an input to optimize production.

   Many companies have automated the process to a degree previously not thought possible. Self-driving tractors, robotic weeders and thinners, and artificial intelligence (AI) and imaging enabled fruit sorters are in beta or in use. The rise in labor costs have made automation a necessity for farmers, and technology has stepped up to fill the need.

2. GMO and Gene Editing. Almost none of our food today is made independent of some form of genetic engineering. A carrot today is a much different plant than a carrot of 100 years ago. The same is true of grains, fruits, and vegetables. The science of genetic engineering has now advanced beyond its original applications, breeding, and GMOs. Recently, genome editing (GEEN) has entered the market place. GEEN is a type of genetic engineering in which DNA is inserted, deleted or replaced in the genome using engineered nucleases, or "molecular scissors." GEEN technologies are being developed for both plants and animals that change the food we eat.

3. Controlled Environment Agriculture. Controlled environment Ag ("CEA") is also referred to as urban Ag, vertical farming, and indoor Ag. The application of hydroponics, aeroponics, solar tech, LED lighting and advanced building techniques to agriculture has spurred an entire industry designed to grow anything, anywhere at any time. Previously CEA was challenged by high energy costs but advances in technology are making CEA an environmentally friendly solution to many of the world's problems in food production.

4. Soil Health or Quality. Soil health (or soil quality) is the capacity of soil to function as an ecosystem that sustains plants, animals, and humans. Many technologies address soil processes to increase productivity, resilience, and environmental quality. Some technologies use biochar or biomass to add nutrients to the soil and some use natural agents to replace insecticides.

5. Water. California's recent drought has highlighted the need for water tech. Many of the new technologies are aimed at dealing with the next drought, and take new and innovative approaches. Some of these technologies convert salty or briny water to water that may be used for Ag, through desalination or filtering. Other technologies pull water from air, provide for transport, create water markets to more efficiently distribute water, assist in storage, prevent evaporation, or provide cheap access to groundwater.

6. Food supply chain. Having been in the produce business, I have seen in-person the large amount of waste, damage and loss to food from the time it is harvested until it gets to the consumer. Retailers today still rely on methods that existed 50 years ago, but new and developing technologies will monitor produce from field to table so that the ripest product is sold first. Ecommerce technologies provide new efficiencies in the shipment and marketing of produce. This is an area where information has real value in preventing losses.

Farm Policy

Today, I would like to propose a few areas where I believe the federal government can help agriculture solve the challenges facing it and assist the adoption of new technologies that are designed to help solve some of the problems described above.

1. Rural Broadband Access. Broadband access is the key to adoption of AgTech. Farmers and their fields usually have reduced accessibility to high-speed Internet provided by the telephone or cable companies. We need federal assistance to bring high-speed Internet service to these farms that are located in rural, sparsely-populated areas. Just as 19th century railroads and 20th century interstate highways played leading roles in American prosperity, high-speed Internet is the factor that determines which rural communities, and which farms, will enjoy economic growth and prosperity in the 21st century.

   One way to implement a rural broadband infrastructure is through FirstNet. FirstNet is the largest amount of federal funding available for broadband infrastructure. Its purpose

is to create a national system of emergency communications between all first responders. We propose that Congress ensure that FirstNet emergency communications are provided to rural regions of the U.S. and not limited to making urban population centers a priority like most broadband infrastructure initiatives.

Alternatively, or contemporaneously, the federal government may implement a program that assists and encourages state and local governments to invest in rural broadband infrastructure. Congress can realize such a program by offering states like California a match of federal resources. This way, from both federal and state perspectives, the public resources that are invested will be leveraged. Notably, any leveraged public resources under this program would need to be invested in the form of grants in order to actually benefit the unserved and underserved areas of California. Successful funding models include the Internet For All Now Act in California and the broadband infrastructure in the state of New York.

If we increase access to rural broadband in our nation's rural areas, the same Internet platform used for farming in the fields can be used to increase the overall prosperity and quality of life in our nation's rural communities. For example, broadband-enabled enterprises include health care, education, job training, public safety, and technology. Thus, funding rural broadband infrastructure is the single most promising public resource investment the federal government can make to provide unserved and underserved regions of the country with economic prosperity, opportunity, and technological innovation.

2. Specialty Crops In the Farm Bill. Specialty crops generally consist of plants used by people for food, medicinal purposes, and aesthetic gratification. They are defined by the USDA as "fruits and vegetables, tree nuts, dried fruits, and horticulture and nursery crops (including floriculture)." The diversity of specialty crops and their variety of uses make the task of developing policy in this area particularly challenging. Federal funds can be used to support projects ranging from food safety compliance to distribution systems and marketing.

   Federal funds can also provide scientific advances that enable our country to use the most efficient and environmentally sound agriculture technology in the world. Funding this research is imperative due to the industry's increasing reliance on science and technology to maintain profitable production. Likewise, labor dependency is an ongoing concern in the absence of labor saving technology. Federal support for specialty crops still differs in significant ways from commodity crops. Farm Bills have historically focused on farm commodity program support for the staple, non-perishable, and generally storable commodities such as corn, soybeans, wheat, cotton, rice, and sugar until specialty crops and organic agriculture were included in a separate title in the 2008 Farm Bill.

   Federal investment in agriculture technology is a promising use of farm bill funds to stabilize prices, reduce manual labor, and create permanent jobs with higher income for

domestic workers. Thus, adequate funding for the research and development of agriculture technology protects U.S. crop production and keeps producers in business.

3. Privacy and Data Security in AgTech. A major issue that farmers are concerned about is whether they have sole ownership of farm data.[1] Because farm data, if kept secret, is information that derives independent economic value from not being publicly known, it could possibly be accorded trade secret protection. Aside from trade secret protection, there are currently no other laws in place to protect the data farmers transfer to AgTech companies.

   Existing legislation and regulations regarding privacy and data security are applicable to personal information. In light of the importance of maintaining the security and confidentiality of farm data, Congress might consider legislation to demand accountability and transparency for AgTech Providers ("ATPs") entrusted with managing farm data.

   The American Farm Bureau Federation has said that big data can do for agriculture what the Green Revolution and biotechnology did for agriculture. While big data analytics has resulted in improvements in farming, some farmers are concerned that, unless restrictions are imposed on the ATP's use and disclosure of farm data, ATPs might share farm data, including farm research and specialist practices, of one farmer with competing farmers or with third parties, such as environmental and animal welfare lobbies, in a manner disadvantageous to farmers. There is also concern that ATPs might sell farm data to third parties in connection with marketing such third parties' own products and services without compensating farmers for the revenue generated by the ATP from the sale of their farm data.

   As a first step towards dealing with these concerns, a coalition of certain farm organizations, including the American Farm Bureau Organization, and certain ATPs, have agreed to a set of non-binding "Privacy and Security Principles for Farm Data" that they hope will be adopted by other ATPs. The complete text of the Privacy and Security Principles for Farm Data is available on the American Farm Bureau Organization's website. It reads very much like privacy and security principles for personally identifiable information, including that the ATP must provide farmers with notice that farm data is being collected and about how the farm data will be disclosed and used. Among other things, it requires that an ATP's collection, access and use of farm data should be granted

[1] 1. Digital data is data that represents forms of data, including elements of the physical world, by using specific machine language systems that can be interpreted by various technologies (e.g., conversion of a physical scene into a digital image). Digital data collected from farming operations becomes farm data. Farm data includes site-specific data (e.g., information about seeding rates, soil nutrients, fertilizer, pesticides, water, yield data), meta data (e.g., information about number of acres, inputs applied, crops) and big data (i.e., the aggregation of farm data from numerous operations). Farmers can utilize farm data to help inform their work decisions and optimize production.

only with the affirmative and explicit consent of the farmer and that the ATP will not change the customer's contract without his or her agreement.

The above standards are not law, however, and farmers must prioritize the availability and usability of big data over their own privacy and security. Farmers must also negotiate with data management companies regarding the use of their farm data. There is precedent for federal regulation of data privacy, although not specifically directed at farming.

The FTC Act (section 5) provides the Federal Trade Commission (the FTC) with broad discretion and authority to regulate data privacy and protection practices of companies across all industries[2]. The FTC imposes sanctions on companies that (i) disclose sensitive information (without consent); (ii) fail to adequately keep consumer's personal information secure; and (iii) fail to follow their own privacy policies.[3]

We suggest that, given the unique nature of agriculture, Congress consider an enforcement regime for farm data that is similar to that granted to the FTC under section 5 the FTC Act.

4. AgTech Adoption Tax Credits. Despite the huge advances to be made in agriculture through technology, there are still challenges in its adoption. One of the first problems the Royse AgTech Innovation Network encountered was the disconnect between the technology entrepreneurs and the farmers who would use their tech. There was and is, to be sure, a difference between what technologists think farmers want and what they actually can use, but that gap has been closing as we reach out and involve the grower community in our efforts. The much bigger hurdle is the fact that investing in technology is risky for any business, but especially so for farmers. A grower in California might only have 50 harvests in his lifetime, and cannot gamble a crop on an untested technology. In addition, a grower might be presented with numerous similar technologies. How is he or she to justify the investment in evaluating them all? A partial solution may lie in the Internal Revenue Code of 1986, as amended (the "Code").

[2] The FTC's primary legal authority to regulate consumer privacy and data security coms from Section 5 of the FTC Act, which prohibits entities from engage in unfair or deceptive acts or practices in interstate commerce. It states in pertinent part: "(1) Unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce, are hereby declared unlawful. (2) The Commission is hereby empowered and directed to prevent persons, partnerships, or corporations, [except certain specified financial and industrial sectors] from using unfair methods of competition in or affecting commerce and unfair or deceptive acts or practices in or affecting commerce."

[3] California has regulations in place regarding privacy and data protection that Congress can adopt and apply to farm data. First, the California Online Privacy Protection Act requires operators of commercial websites and online services (including mobile apps) that collect CA residents' personally identifiable information through a website to conspicuously post their privacy policies. Second, S.B. 1386 (the California Breach Notification Law) requires notification to affected individuals of an unauthorized acquisition of unencrypted computerized data that compromises security, confidentiality, or integrity of personal info of any CA resident. If applied to farm data, the provider of AgTech services would be obligated to notify all farmers whose data had been compromised.

The Code currently allows for a research and development credit ("R&D Credit"), which was recently extended by the PATH Act to benefit startups. The R&D Credit is a general business tax credit under Code section 41 for companies that incur research and development (R&D) costs in the United States. While that credit incentivizes development, it does not incentive adoption.

The investment tax credit (ITC), by contrast, allows a taxpayer to deduct part of the cost of installing certain types of energy systems and has been effective in promoting the adoption of solar technology. The ITC, however, is aimed at only a handful of qualifying uses, some of which could be called AgTech. We propose that the ITC be broadened and modified to encourage a wider range of Ag Technologies.

The Royse AgTech Innovation Network is in the process of preparing a white paper on this topic, which will detail how such a credit would work.

Conclusion

Thank you for the opportunity to speak with you today and share my thoughts on the AgTech Revolution, current challenges, and possible solutions. I look forward to taking questions and continuing our dialogue