Senator Jerry Moran
Questions for the Record
Subcommittee on Consumer Protection, Product Safety, Insurance & Data Security
"Technology in Agriculture: Data-Driven Farming"
November 14, 2017

*Question 1.* Your testimony described the usage of data as a "driver of economical sustainability and environmental stewardship." As a Kansas farmer focused on both being a good steward of the land and making a living to provide for your family, could you please further describe your efforts to balance sustainable farming practices with improving efficiencies to increase profits? Can the two goals go hand in hand?

Yes, often the two goals can go hand in hand. I believe most "sustainable farming practices" will have positive impacts on profit in the long term. The challenge is "the long term" might be ten years, or twenty, or a lifetime. There are numerous examples of sustainable farming practices which evidence would point to having a long term positive impact on profit, yet be a possible net cost in the short term. These types of practices will tend to have slower adoption curves. An example of one of these practices on our farm would be cover crops. They are crops planted between our main grain crops solely intended to provide environmental benefits to soil protection and health. The seed and investment in time and machinery to plant them is a significant cost and we have yet to document a yield or economic benefit to the subsequent grain crop. However, evidence and agronomic principles predict that across time, the environmental and biological benefits from cover crops in our climate and soils will improve the resiliency of our farm and perhaps the productivity, and therefore profit. In the meantime, we utilize data from both on farm research trials and field scale to evaluate what cover crops in which part of our cropping sequence will have the most impact with the least amount of cost. We then start with limited acreage and hopefully scale the practice to broader implementation as we learn and begin to reap some benefits over time.
There are other examples of sustainable farming practices that will also improve efficiencies to increase profit as well in the short term. An example from our farm is zone management. We utilize various sources of data, typically multi-year yield maps, satellite imagery, and soil maps, to divide a field into zones based on productivity. Then, the more productive zones of the field receive the right amount of fertilizer to sustain that productivity while fertilizer rates are cut on less productive zones. Right away, we have improved the efficiency of our fertilizer which increases our return on that investment, plus reduces fertilizer carryover and loss into the environment.

*Question 2.* How does data collection and sharing specifically assist farmers in striking the appropriate balance, including innovations in live-time monitoring of crops and measurements of surrounding conditions?

Data collection and sharing improves our understanding of how crops are impacted by certain factors such as weather events, management decisions, soil types, etc. Obviously some of these factors are outside of the farmer's control, but access to improved live-time monitoring of crops and measurement of surrounding conditions can help farmers be more proactive in predicting crop response to these factors or events and lead to more timely and improved decision making. One quick example, this past summer we had a summer hail storm that significantly reduced soybean stands in its path. We utilized satellite images of the impacted fields that were available several days after the

storm to fine tune our scouting and decision making about where to replant and where we could salvage the stand of soybeans.

*Question 3.* Your testimony divides the data that your farm specifically uses into three categories: microdata, service provider data, and macrodata. Will you please describe how farmers and their operations benefit from each category of data?

Microdata- this is data a farmer collects from his own operation and is specific to his operation. This likely helps better characterize specific aspects or management factors unique to his farm, leading to improved decision making.

Service provider data- this is data that is produced by a service provider outside of the farm. Likely, there will be data from the farm shared with or collected by the service provider, but then the service provider will utilize data from that farm and perhaps integrate it with data from other farms and/or a proprietary algorithm or internal data set to provide analyzed data back to the farm in order to help with improved decision making by the farmer.

Macrodata- this is "big data" collected from many farms likely across a broad geography. The farmer may or may not have contributed data from his farm, however, there are insights gained from the sheer volume of data that may not be possible if the data set was not so large. The insights may be more universal in nature yet still applied by many farmers to improve decision making.

*Question 4.* In a 2016 poll conducted by the American Farm Bureau Federation, regarding the loss of control over downstream uses of data, sixty-six percent of the farmers polled expressed concern about not being compensated for the potential benefits from the use of their data beyond the direct value they may realize on their farm. Meanwhile, sixty-one percent of the farmers were concerned that agricultural technology providers (ATPs) could use their data to influence market decisions. Which of the two concerns do you believe is the greatest threat to farmer profitability and well-being, and what should be done to alleviate these concerns?

I don't know which of these two concerns is the greatest threat to the farmer. As the statistics indicate, both are of significant concern to many farmers. Farmers are accustomed to dealing with concrete things we can put our hands on- tractors, soil, grain. Data is very abstract and therefore more difficult for farmers to quantify the value of, although most of us certainly recognize it does have value. As was mentioned in the hearing, I believe one of the most important steps to reducing the threat of non-compensation is transparency and understandable communication up front before data transactions and agreements take place. It is important the farmer can quickly and easily understand what is happening with his data and the parameters of any data agreement he is considering. I also believe it's important to recognize that farmers may be compensated for their data in forms other than money. Compensation may be access to insights gleaned from the larger data set they are contributing to, or access to a proprietary decision making tool.
I believe most would agree that there is power in data and recognize the consolidation in agricultural companies, which is likely why farmers feel concern about their data being used to influence market decisions. Consolidation and concentration of data is perhaps something that should be monitored.

*Question 5.* With connectivity being crucial to the successful implementation of the technology we have discussed today and almost 30% of farms not receiving adequate broadband connection according to the USDA's Farm Computer Usage and Ownership August 2017 report, what role can this Committee play in closing the gap to make sure all of our farms are able to benefit from broadband and innovative technologies? Do you see a role for advanced wireless networks in achieving that goal?

Our farm is one of the 30% not receiving adequate broadband connection. We do have a broadband connection, but to date it is slow, not very reliable, and with only one provider choice, there is no competition to drive improvement. Nearly all data management software has now become web based so as the amount of data on the farm needed to be uploaded and downloaded exponentially increases, effective utilization of data and implementation of technology becomes impossible without reliable and high speed data transfer technology. My time as a farmer is very limited as it is, especially during the growing season, so I cannot afford to sit and wait on a slow data connection. There have been numerous times I've had to abandon a project because of slow data transfer. However, I am hopeful as a local communications company has undertaken the project of running new fiber optics to rural residences and farms in our community. This will help with effective data transfer from our farm office, but it will take advanced wireless networks to achieve this goal in the field from mobile devices. It is my hope this committee would have a renewed commitment to learning where these gaps still exist and assisting small local companies, such as Home Communications, Inc in Galva, Kansas, along with wireless network providers in closing those access gaps to fast and reliable data networks.