

Testimony of Justin Knopf
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Insurance, and Data Security
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Mr. Chairman, Ranking Member Blumenthal, and Members of the Subcommittee, thank you for the opportunity to address you today. My name is Justin Knopf and I am a fifth generation farmer from Gypsum, Kansas. I also serve as the Vice President of the Kansas Association of Wheat Growers. Working alongside my dad and my brother, we grow wheat, alfalfa, soybeans, grain sorghum, corn, and multi-species cover crops across our 4500 acre farm.

As my father has always said, we also grow people on our farm. For my brother and I, farming is a lifelong learning process. The local young people who find a summer job with us grow in responsibility, work ethic, and perspective. My wife Lindsey and I have three young children, two daughters and a son, and my brother also has two young sons. Our farm is not unlike most farms in the United States. According to the USDA, farming is still overwhelmingly comprised of family-owned businesses. 99% of U.S. farms are family farms, and they account for 89% of farm production.¹ The USDA also estimates that small farms make up 90% of the farm count and operate nearly half of America's farmland.²

We utilize a holistic approach to our farm management, rooted in values of faith and family, with a multi-generational view. Farmers understand the need for good stewardship and conservation. This is what we do every day. We depend on clean water and healthy soils to make a living and feed the world. This decision making process examines not only our economic returns, but also the returns to natural and human resources. For the past fifteen plus years, our dry land operation has utilized a cropping system focused on continuous no-till practices and crop rotations. This system protects the soil, allows soil biology to thrive, is more resilient to extreme weather, and increases Carbon content in soils by sequestering CO₂ from the atmosphere.

Although we have been blessed with some bountiful harvests in the last few years, the current economic reality on the farm is difficult and the coming years are shaping up to be some tough times. Farm income levels are at their lowest point since 1985. Net farm income dropped 95% from 2014 to 2015, and net farm debt levels have increased 25% over the last 3 years.³ This downturn has largely been caused by low commodity prices, which are due to record highs in both local and worldwide production over the past two years.⁴ These production levels have increased supply, while overall demand has waned, due to a strong U.S. dollar and decreasing exports.⁵ Another major factor is that while

¹ <https://www.ers.usda.gov/webdocs/publications/eib164/eib-164.pdf>

² <https://www.ers.usda.gov/webdocs/publications/eib164/eib-164.pdf>

³ <http://www.agmanager.info/kfma/state-summaries>

⁴ <https://www.wsj.com/articles/whats-behind-the-glut-in-agricultural-commodities-1476670020>

⁵ <https://www.wsj.com/articles/the-next-american-farm-bust-is-upon-us-1486572488>

revenues have only gone down, the cost of production and expenses have gone up. From 2009 to 2015 the cost of production has increased almost 50%.⁶ This rise in costs has forced farmers to look for ways to find efficiencies and minimize costs. Our ability to adapt to changes is what will keep us going when times get tough.

According to the United Nations there will be 9.1 billion people on the planet in the year 2050.⁷ One of the more significant long term challenges facing our world is how we feed a growing global population. Food security isn't just an agricultural issue; it is a national security issue. As farmers, we must find a way to produce more food, on less land, with less water, all while protecting our soils and natural resources. As stewards of the land it is our job to find ways to do more with less. It will take all available tools to meet these challenges. Agricultural innovations, like technological improvements, seed technology, and on farm efficiencies, are all important. Research within private entities and public institutions is critical. Perhaps most fundamental is collaboration with others, an eagerness to learn, and a willingness to adapt.

Never before has our society had the access to data and information that we have today. Data is all around us, and there is value in it all. While a record of Google searches and websites visited may be useless history to me, analysts and marketers see valuable information that allows them to adjust the content they create. The same, of course, is true in agriculture. While some may see a jargon-filled spreadsheet or just a bunch of various colors on a field map, I see ways to maximize efficiency in my operation, both for my pocketbook, as well as for the land that provides the livelihood of my family. Data collection, data processing, and the utilization of data for improved decision making has become a core competency for many, if not a majority of, farmers.

The obvious benefit of data is the ability to make improved management decisions. Data has become an important layer in our decision making process and a driver in our economical sustainability and environmental stewardship. The amount of knowledge per acre, and amount of knowledge *about* each acre, are significant drivers in the amount of profit per acre.

There are three main types of data we utilize on our farm. Microdata is data we collect and produce that is specific to our farm. Service provider data is data that is provided to us by service partners that is specific to our farm. And Macrodata, or big data, is data we provide to others and they, in return, give us an idea of what is happening in the industry on a larger scale.

Specifically on our farm, we collect and utilize this data in a number of different ways. As on many farms, our seeding, spraying, and harvesting equipment all has hardware and software that measures and records spatially what is being done or happening in the field. Performing on-farm research with sound scientific and statistical principles is one way we use this technology. For example, we were able to quantify the impacts of cover crops on

⁶ <http://www.agmanager.info/kfma/state-summaries/2015-state-summary-detailed-cost-summary>

⁷ http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf

subsequent crop yields, which has led to a broader adoption of cover crop practices. We utilize satellite imagery as a way to help us identify management zones within a field and predict yield variability. These management zones allow us to modify our seeding rates based on the productivity of the land, which lowers our seed cost on acres that are less productive. We use zone soil sampling to quantify soil fertility levels in differing areas of the field, which allows us to fertilize based off specific soil conditions and fertility levels. It allows us to focus inputs on the areas that need them and to avoid applications on areas that don't. We enter data into ADM's sustainable wheat program, and in return we receive sustainability metrics based off the field to market calculator. Through this program we are able to use key sustainability outcomes and metrics and benchmark our farm's performance to others in the program.

I also share economic, cost, and revenue data with the Kansas State University (K-State) Farm Management program and receive informational data back on my farm's profitability in relation to other like-sized no-till farms. This program allows me the ability to know how my business is doing in relation to others in the industry, what business strategies I should implement to become more profitable, or what investments I should make in my business.

The quality and the quantity of data in agriculture, and its importance, is driving the improvement of farming practices and its value will only continue to grow. It is vital that our stakeholders and collaborators work alongside our public research institutions, such as K-State, to continue to develop the tools farmers need to be successful. Private industry is rapidly expanding in this space and the technology is changing by the day. Competition for the "digital acre" is increasing and it is rapidly driving innovation.

For example, we can now use crop sensors mounted to sprayers that utilize algorithms, developed by K-State and other land-grant institutions, that tell us in real time how much nitrogen each plant needs, while giving credit to biological nitrogen that already exists in the plant. As the sprayer travels through the field the sensors will tell us in real time how much nitrogen the plants in that spot need. This technology allows us to put the right amount of nitrogen in the right place which saves money and increases environmental stewardship.

There are also proprietary tools from companies such as Pioneer and Monsanto that utilize soil and weather data to predict a crop's nitrogen needs and the amount of available nitrogen in the soil. This data helps farmers tune the timing and quantity of fertilizer applications to increase efficiencies.

A researcher from Kansas State has been utilizing land on our farm and others to test and develop a sensor that can quickly and efficiently quantify soil water-holding capacity differences across a field. As water is typically one of our most limiting factors for crop production on many farms in the Great Plains, efficient access to this information would be very valuable in developing management zones and insight in how to best manage each area within the field.

Data is also important to those off the farm as well. Consumers have an ever growing interest in their food. They want to know more about how their food is produced, how it is processed, and if it is being grown in a way that aligns with their values. Our use of data allows us to tell our story to the consumer and enables us to do so with transparency like never before.

However, as we begin to find new ways to collect and utilize this valuable data we need to make sure we protect the ownership interests and rights of farmers. We need to make sure that government and regulatory agencies do not try and access proprietary data that is critical to a farmer's business. We need to make sure third party dealers and vendors do not try and take ownership of data that was generated and collected by the farmer. Finally, we need to ensure that the privacy rights and ownership interests of the farmer are respected by all those who may want to access this data. The last thing we need is for those who are not aligned with our farm interests to twist and misconstrue what we do on the farm.

The agricultural economy is at a crossroads right now. Depressed prices, increased costs, and rising debt levels are creating economic angst. The average age of farmers continues to increase while the number of us continues to decrease. There is this great challenge intensifying our farming system, but doing so in a way that is sustainable if not restorative to our natural resources. Consumers are increasingly removed from the farm and wary of technological innovations in farming. However, the minds and spirits engaged in agriculture and farming are as bright as ever. There will a record percentage of farms transitioning to the next generation in the coming decade. This transition represents a great opportunity for change and innovation, not only in improved productivity, but also in environmental stewardship. It is critical that we collaborate, learn, and adapt in order that we may have continual improvement. I appreciate the opportunity to share the value of data with you today, and I appreciate that congress is listening to the people who may be impacted by future legislation. There is an immense amount of technology, both here and on the horizon, that will allow American farmers to continue to meet these challenges. This drive for continual improvement and understanding of the complex biological ecosystem we farm with is what will allow my children, and their children after them, to continue feeding the world and protecting the natural resources long after I am gone. I urge you to continue to listen as your shape future legislation.