

**Testimony of
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**Innovation in American Agriculture:
Leveraging Technology and Artificial Intelligence**

Good morning, Chairwoman Stabenow, Ranking Member Boozman, and members of the Committee. My name is Todd J. Janzen, I am the president and law partner with Janzen Schroeder Agricultural Law, LLC, a law firm based in Indianapolis, Indiana that serves the needs of America's farmers, ag technology providers, and agribusinesses. I also serve as the Administrator of the Ag Data Transparent project, which is an industry effort to build transparency, simplicity and trust into contracts between farmers and agricultural technology providers.

Farming in the United States has always been a story about technology. John Deere commercialized the steel plow over 175 years ago, which allowed for the Great Plains to be planted to food crops. Since then, we have seen many revolutions in agriculture—the internal combustion engine led to the tractor replacing the horse; the combine harvester replaced the threshing machine; commercial plant breeding led to consistently improved genetics and increased yields.

Today we are at the beginning of another large technological revolution in agriculture. I think of this transformation as the digitalization of farming. A modern farm generates enormous amounts of data: yield data, soil data, weather data, livestock data, financial data, etc. What has changed today is that farmers have various digital tools available to collect, manage, analyze, and share this agricultural data. While farmers once kept track of this information on paper notebooks and ledgers, today agricultural data has, for many farmers, moved to cloud-based data storage devices. With this technological change comes many possibilities for increased production from smaller environmental footprints. But there are also some concerns.

Today I will discuss: (1) how farmers use digital agricultural tools; (2) some of farmers' concerns about sharing their agricultural data with technology providers; and (3) how artificial intelligence (or "AI") is arriving on the farmstead.

1. How Farmers Use Digital Agricultural Tools

There are a number of different ways that modern farms collect, use and share agricultural data. The entrants in the market include both legacy agricultural companies that have added digital tools and new, start-up entities. Here are some examples of ways that farmers interact with digital platforms:

- A. FMIS Platforms.** There are many whole-farm management tools, commonly referred to as Farm Management Information Systems (FMIS). These are designed to help farmers manage all aspects of the farm, from making agronomic decisions to recording grain and livestock sales, to benchmarking farm production with similar operations.
- B. IoT Monitoring Platforms.** On the opposite end of the spectrum, there are many remote sensors used on farms that allow farmers to monitor specific tasks on the farm. These sensors are connected to the internet, commonly called Internet-of-Things or "IoT" platforms. An example would be an in-field irrigation sensor that links to an online platform that allows the farmer to monitor on his or her phone. Other examples include remote pest and soil sensors and connected livestock, such as a digital collar on a dairy cow that keeps track of the cow's eating, milking, and standing.
- C. Aerial Imagery.** Aerial imagery is more available to farmers today than at in any point in history. There are a number of digital platforms that allow collection of multi-spectral imagery from satellites, drones, and traditional fixed-wing aircraft. Farmers use these platforms to monitor crop and field conditions throughout the year.
- D. Robotics.** We are seeing the arrival of robotics on the farm in ways that seemed like science fiction twenty years ago. John Deere sells a fully-autonomous tractor that can be monitored by a farmer by his or her cell phone. Lely Corporation sells a robotic milking machine that can milk hundreds of cows per day without any human involvement.
- E. Crop Marketing and Trading Platforms.** There are online platforms available today that allow farmers to market, sell, and trade their crops and livestock products online. These platforms also allow traceability of commodities, which was nearly impossible in the old paper record days. Combyne is a good example of a platform that allows farmers to market and trade grain online.
- F. Connected Machines.** Nearly all modern agricultural equipment--tractors, combines, planters, etc.—either is remotely connected to the internet or has the ability to connect.

These machines generate a lot of data that is useful to the farmer, the equipment dealer, and the original equipment manufacturer (OEM).

G. Precision Agriculture. The ability to collect a lot of data from farmers has allowed the increased use of precision technologies. There are many platforms today that use agricultural data to generate field “prescriptions” for precise application of fertilizer, seed, pesticide application, and irrigation.

H. Carbon Platforms. In the last few years, numerous companies have started offering farmers the opportunity to monetize soil carbon sequestration on their farms by verifying such activities using agricultural data. These companies then sell the sequestered carbon as offset credits to other industries.

2. Concerns with Agricultural Data Sharing

Many farmers have embraced digitalization by using agricultural data tools on the farm. However, polls taken of farmer attitudes about these ag data products shows a consistent reluctance and apprehension. Below are some of those concerns and how the industry is attempting to address them.

A. Farmers’ Concerns.

One of the more recent polls was by Trust in Food, a Farm Journal Initiative (“Trust in Food”), which surveyed 610 farmers for a 2021 report titled: “Farmer Perspectives on Data 2021”.¹ The survey highlights a few of farmers’ concerns with ag data collection and use by technology providers.

Lack of Trust

Trust is consistently ranked as farmers’ biggest concern with sharing agricultural data. 73% of farmers stated that they do not trust private companies with use of their ag data. 58% of farmers stated that they do not trust federal, state, or local government offices with use of their ag data.

Privacy Concerns and the Loss of Control

Ag data is representative of a farm’s livelihood. When asked about the greatest barriers to sharing ag data with technology providers, two areas in the Trust in Food survey jumped off the page. First, 69% of farmers surveyed stated that they feared sharing ag data would lead to

¹ <https://www.trustinfood.com/wp-content/uploads/2021/05/Farmer-Perspectives-on-Data-2021.pdf>

increased government regulation. Second, 69% of farmers surveyed also stated that privacy concerns were one of the largest barriers to adoption.

Interestingly, when asked whether ag data should be as tightly secured as “family health records,” 87% of farmers agreed.

These concerns arise from a fundamental legal truth about ag data—there are no laws that specifically protect farmers’ privacy and security concerns. Ag data is not typically “personally identifiable information,” such that it would be protected by state laws which prevent misuse of personal information like name, address, and phone number. Nor does ag data fit into a class of data that Congress has chosen to protect legally, such as medical information (HIPAA). Finally, ag data does not neatly fit into existing legal protections for intellectual property, such as patents, trademarks, or copyrights. Ag data ultimately may be deemed a trade secret under existing state and federal trade secret laws, but that will depend upon whether courts interpret existing statutes to include information such as agronomic data.

Overly Complex Technology Legal Agreements

When American Farm Bureau surveyed farmers in 2016, 59% percent of farmers indicated they were confused about whether current legal agreements allowed technology providers to use their ag data to market other services, equipment, or inputs back to them. Zippy Duvall, president of Farm Bureau, said at the time: “You should not have to hire an attorney before you are comfortable signing a contract with an ag technology provider.”

The more recent Trust in Food survey indicated that there is still a lot of room for improvement in simplifying legal agreements with technology providers. The third largest barrier to adoption (after fear of regulation and privacy concerns) was a “lack of training and understanding,” with 52% of respondents indicating this was a problem.

My experience as a lawyer working in this area confirms that this is a real problem for farmers. Contracts from the technology industry have been widely repurposed for use with farmers, such as end-user license agreements, privacy policies, and terms of service. A farmer seeking to compare two similar products today might find that they are governed by two very different sets of contracts.

This only adds to a farmer’s confusion. If we want to make technology easy to embrace and use—and we do—then we need to simplify the contracts farmers sign when implementing new ag data technology on the farm. Contracts that no one reads and understands set the stage for problems down the road.

B. Existing Industry Efforts to Address Farmers' Concerns

The Privacy and Security Principles for Farm Data

American Farm Bureau, National Farmer's Union, and national commodity organizations for corn, soybeans, wheat, and sorghum, led an effort in 2014 to establish fundamental principles for companies working in the ag data space. These organizations held a series of meetings where roundtable discussions occurred among industry stakeholders, such as John Deere, CNH Industrial, AGCO, Bayer Crop Science (at the time, Monsanto), Corteva (DuPont Pioneer and Dow AgroSciences), Beck's Hybrids, and many others. The culmination of these efforts was the drafting of the "Privacy and Security Principles for Farm Data," also known today as ag data's "Core Principles."

The Core Principles address thirteen key elements related to ag data. These include:

- **Education**
- **Ownership**
- **Collection, Access and Control**
- **Notice**
- **Transparency and Consistency**
- **Choice**
- **Portability**
- **Terms and Definitions**
- **Disclosure, Use, and Sale Limitation**
- **Data Retention and Availability**
- **Contract Termination**
- **Unlawful or Anti-Competitive Activities**
- **Liability & Security Safeguards**

The Core Principles have been widely embraced by the U.S. agricultural industry and have even served as a model for many other countries trying to create guidelines for proper agricultural data collection, use and sharing.

Ag Data Transparent² Certification

Having the Core Principles in place was a great starting point for the ag data industry to address farmers' concerns with ag data privacy, use, and control. However, the Core Principles are only guidelines, and only valuable if companies incorporate the Core Principles into their contracts with farmers. Therefore, following the release of the Core Principles, several farm groups and industry stakeholders worked together to create an independent verification tool that could help farmers determine if ag tech providers are abiding by the Core Principles. The verification is called the Ag Data Transparent certification, which entails a simple three-step process:



- Participating companies must answer 11 questions about how they store, use, and transfer ag data.
- The 11-question answer form is reviewed by an independent third party (Janzen Schroeder Ag Law) for transparency and completeness.
- If the evaluation is acceptable, the company is awarded the “Ag Data Transparent” seal of approval for use on its future marketing materials.

Companies that undergo evaluation and are approved as “Ag Data Transparent” may then use the seal of approval on their websites and in marketing materials. To date, over 40 companies have completed the evaluation and been approved as “Ag Data Transparent.” The list of companies that are currently certified include those on this chart:

² www.agdatatransparent.com



Ag Data Transparent Certified Companies, November 2023.

Source: www.AgDataTransparent.com

The Ag Data Transparent process addresses farmers’ three main concerns with ag data. First, the process instills trust. No company submits its contracts to a voluntary evaluation unless the company is willing to revise its contracts, as necessary, to bring them into compliance with the Core Principles. Second, loss of control is addressed by requiring tech providers to obtain farmer consent before transferring data to third parties. Finally, farmers’ complexity frustration is addressed by condensing all of a tech provider’s contracts into a 11-question form that answers the questions farmers want to know. The Ag Data Transparent process makes contracts better.

The Ag Data Transparent effort is governed by a non-profit corporation, the Ag Data Transparency Evaluator Inc. The corporate bylaws create three classes of directors: (1) Farm organizations that are made up of farmer-member organizations. The farm organizations are American Farm Bureau Federation, American Soybean Association, National Corn Growers Association, National Farmers Union, National Sorghum Producers, National Association of Wheat Growers and National Potato Council. (2) Ag technology providers that participate in the Ag Data Transparent certification are the second class of directors. (3) The organization also allows for organizations who align with the Ag Data Transparent’s mission to be supporting

members. To date, these include McCain Foods, EMILI Canada, AGree Coalition (Meridian Institute), NASA Acres, Farm Credit Canada, and the National Ag Producers Data Cooperative.

Janzen Schroeder Agricultural Law LLC serves as the administrator of the program and conducts the evaluation reviews.

Creation of a Model Ag Data Use Policy

Our law firm, together with a committee from the Ag Data Transparent organization, has also developed a model Ag Data Use Agreement that we provide to companies looking for the best practices to manage farmers' ag data.

From my standpoint, the Ag Data Transparent effort has helped drive more technology providers into creating data use policies. Thus, the effort has paid dividends even for some companies that have not participated in evaluations because it has caused them to rethink how they are contracting with farmers.

3. The Arrival of AI in Agriculture Data Platforms

The agricultural retailer Farmers Business Network (FBN) recently unveiled “Norm³,” an artificial intelligence (AI) advisor for FBN farmer-members. Norm is built off of OpenAI’s ChatGPT language model and trained using agronomic data. Norm will allow FBN’s farmer-members to use its query tool to obtain agronomic advice. Norm is likely the first dedicated artificial intelligence platform designed specifically for farmers, but it will not be the last. AI is on the rise in agriculture as it is elsewhere. Before AI technology becomes widespread, we should take some time to consider what AI is, how AI platforms might benefit agriculture and other industries, and consider what might go wrong to avert potential problems.

A. What is AI technology as it relates to farming?

First, some basics. AI stands for “artificial intelligence.” According to Dr. Anastasia Lauterbach, contributor to *The Law of Artificial Intelligence and Smart Machines*, AI should be thought of as “narrow” AI or “general” AI. Narrow AI is focused on solving a particular task. When we talk about “machine learning” (ML) that is generally what we are talking about. ML involves a

³ <https://www.fbn.com/norm>

computer using vast amounts of data to make a decision—but not just any decision but to continue to make better and better decisions. ML allows the computer to learn from its past decisions.

General AI is what we have been talking about more recently. According to Dr. Lauterbach, general AI is similar but seeks to mirror the behavior and capabilities of a human to solve problems. What we are seeing now with ChatGPT and other technologies is “generative” AI, which is a type of general AI that can generate new content that never existed. Generative AI like ChatGPT uses information from vast amounts of data that is publicly available, creating original content in response to inquiries from users.

B. How farmers can use AI tools.

Much of farming involves analyzing vast amounts of data to make informed and better decisions for future crop years and, in the case of livestock producers, using that information to increase milk production on dairies, egg production on poultry farms, and meat production. It is easy to envision how AI might be helpful in increasing plant and animal production.

For example, when a farmer asks *what variety of corn should I plant this year?* The market is saturated with seed companies and brands, each featuring dozens of unique varieties of No. 2 yellow corn (the most common feed corn). No human agronomist could reasonably analyze every possible variety and determine which might be best for a specific field, given the soil profile, weather predictions, pest predictions, anticipated weed pressure, the availability of irrigation, etc. AI, on the other hand, when equipped with the right training data, could do that. AI would also be free from the inherent biases that humans bring. No seed salesman is going to recommend seed from a competitor.

The same could apply to a modern dairy farm when the producer asks *which cows should I breed this year with which bulls?* Modern dairy farms often have hundreds or thousands of milking cows. Not surprisingly, there are many companies that offer their bulls for breeding and promise great results. And it may surprise many that not all dairy cows are the same. Some live productive lives longer, are more resistant to illness, and better suited to different climates (dairies exist everywhere from sunny, hot Florida to northern Wisconsin). AI could be trained on all of this data and make breeding recommendations for the dairy farmer.

In some areas, we are already seeing narrow AI used successfully on the farm. John Deere has introduced “See & Spray”⁴ technology for its commercial sprayers. For those unfamiliar, modern sprayers are tractors with large liquid storage tanks used to hold fertilizer or pesticides. With spray booms up to 120 feet wide, these machines can cover hundreds of acres in a day. See & Spray is revolutionary, however, as it uses sensors to spot weeds and differentiate those weeds from desirable crops. The spray nozzles are then turned on only when a weed is sensed under the nozzle. Spray applicators only use pesticides on the weed and do not have to broadcast over an entire field. This sort of technology is only possible with machine learning, as the equipment must be trained with vast amounts of data to distinguish good plants from bad.

C. What might go wrong with AI?

Putting aside the Hollywood doomsday predictions of AI becoming so intelligent it decides to destroy humanity for the good of the planet, there are other more immediate and realistic concerns with AI in agriculture. AI is only as good as the data that trains it. If the training data is corrupt or skewed by a company to increase shareholder value, such decisions could create problems. Imagine a seed company figures out what data an AI tool like ChatGPT is using to make farming decisions and that company starts flooding the internet with false reports about its seed—data that we (as humans) never find through search engines, but AI zeros-in on the data. That seed company could skew the AI results to favor its products. Just as companies today use various tactics to game search engine optimization (SEO)—making sure they appear on page 1 of Google searches—we could see corporate marketing departments try to game AI systems to skew product recommendations in their favor.

Remember, too, that AI has to make mistakes in order to learn what is correct. This means mistakes will be made, on the farm and elsewhere, on the road to the future. Will AI platforms also retain liability for these failures? This seems doubtful.

D. What are some of the legal implications for AI?

Companies that are wanting to use general AI to expand services to farmers should do so with cautious oversight. Privacy has long been a big concern for farmers when it comes to their

⁴ Learn more about See & Spray at: <https://www.deere.com/en/sprayers/see-spray-ultimate/>

agricultural data, as evidenced by the interest in the Ag Data Transparent organization. AI tools have the ability to violate the privacy walls that companies establish for their human users. Any company creating an AI tool should ask: does the platform have the right to access confidential information and, if so, are the safeguards to prevent release of confidential information? A farmer may provide confidential agricultural data to an AI platform and not realize that information will not only be used for recommendations for his farm but for others too.

Companies using AI tools should clearly license the ag data used to train models. A clear license not only addresses the farmers' concern with transparency but also protects the AI developer from claims later on that training data was not obtained lawfully.

On a broader sense, companies should also make sure that AI platforms respect the rights of ownership of data, copyrights, and other forms of intellectual property (IP). Currently, only humans or companies can legally create or own intellectual property. What happens when AI uses proprietary information to create new, derivative content? Who will own the resulting IP? And even more concerning, is the AI platform owner liable for violations of IP laws?

Companies trying to maximize the benefits of AI tools should also consider the ethical complications. Is it ethical—or worse, fraudulent—for companies to attempt to fool AI platforms into making decisions that may not be based upon accurate data but instead based upon false data published to skew AI results in the company's favor? Can a marketing department flood the internet with exaggerated claims about the company's products in order to trick AI platforms into believing the (false) hype. I don't know of any laws that address this scenario of intentionally misleading AI to generate inaccurate results.

Conclusion and Policy Considerations

Ag technology, ag data, and AI are all very broad subjects with a host of issues for farmers. For policymakers, I offer a few considerations to help with policy development.

When it comes to new technologies on the farm, **policy should focus on leveling the playing field and not stifling innovation.** The Ag Data Transparent project is a good example of this principle. The Ag Data Transparent certification does not recognize the right or wrong way to

collect and use data, but instead recognizes companies for being *transparent* about how they use data.

Transparency should always be the focus of any data collection platform, regardless of whether the collector is a private company or government regulator. Transparency does not mean such information should be publicly available, but that farmers should know what information is being collected from them and how it will be used. This is also important with AI tools. Farmers should know whether their data is being used for AI training when signing up.

There is room for improvement of data collection at USDA. The Agriculture Innovation Act (S.98)⁵ is an example of a bill that seeks to modernize USDA’s collection and use of data. USDA data has long history of collecting farm data for various programs, but much of that data is siloed within these agencies and therefore not valuable to policymakers and researchers. The Act envisions an update to USDA data collection, creating a secure data center that would allow stakeholders and researchers access to anonymized data collected by USDA.

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⁵ Learn more about the Agriculture Innovation Act at: <https://foodandagpolicy.org/wp-content/uploads/sites/17/2022/05/Agriculture-Innovation-Act-One-Pager.pdf>