



Statement of the American Farm Bureau Federation

TO THE HOUSE COMMITTEE ON AGRICULTURE
BIG DATA AND AGRICULTURE: INNOVATION AND IMPLICATIONS

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Chairman Conaway and Ranking Member Peterson, thank you for the opportunity to testify today on the fast-paced expansion of innovation in “big data,” its implications and its use in production agriculture. I would like to begin my testimony by sharing an article I wrote nearly two years ago on this topic.

Big data will make farming more environmentally responsible and easier to regulate, but will lessen the sense of place cherished by the local food movement.

Nothing is more important in agriculture than place. What is successful on one kind of soil in one kind of climate won't necessarily work in another place with a different soil or different weather patterns. Farmers have always gained the knowledge necessary to understand a place through hard-won and rarely transferable experience. What farmer Brown knows about his land might travel down the road a few miles, but it is less applicable on a similar farm in a different part of the country. This idea of place is what drives the local food movement. Wineries brag about the perfection of the marriage between their varieties and soil. On our farm, every acre that I've farmed for 35 years and that my father has farmed for 65 years has a story. We know which weeds grow where, when the wet spots will appear, and we all remember that time the combine caught on fire down by the hackberry tree. Farmers' personal relationship to place, one of the salient facts that distinguish agriculture, is about to change.

Most combines traveling across fields in the Midwest this fall had a GPS receiver located in the front of the cab. Although agriculture has been experimenting with this technology for a decade or so, only now is the industry starting to consider all the uses of this transformative technology. For several years, farmers have had the ability to map yields with global positioning data. Using that information, firms can design “prescriptions” for the farmer, who uses the “scripts” to apply seed and fertilizer in varying amounts across the field. Where the yield maps show soil with a lower yield potential, the prescription calls for fewer seeds and less fertilizer. This use of an individual farmer's data to design a different program for each square meter in a field spanning hundreds of acres could replace a farmer's decades of experience with satellites and algorithms. What we have gained in efficiency and by avoiding the overuse of scarce and potentially environmentally damaging inputs, we may be losing in the connections of the farm family to the ancestral place. Precision technology will allow managers to cover more acres more accurately and will likely lead to increasing size and consolidation of farms. While Michael Pollan, Mark Bittman, and Alice Waters continue to argue that we need to turn back the clock on technology in agriculture, much of the world is moving in a quite different direction.

Advice for individual fields is only the beginning of the uses for this technology. Agricultural equipment firms have run pilot programs where data is uploaded every several hours to the cloud, where it can be used... well, we don't really know all the ways it can be used. If 1,000 machines randomly spread across the Corn Belt were recording yield data on the second day of harvest, that information would be extremely valuable to traders dealing in agricultural futures. Traders have traditionally relied on private surveys and U.S. Department of Agriculture yield data. These yield estimates are neither timely nor necessarily accurate. But now, real-time yield data is available to whoever controls those databases. The company involved says it will never share the data. Farmers may want access to that data, however, and they may not be averse to

selling the information to the XYZ hedge fund either, if the price is right — but that's only possible if farmers retain ownership and control of the data.

One of the most important issues around “big data” goes directly to property rights. As Christopher Caldwell points out in the Claremont Review of Books, just because Facebook, MasterCard, or Google keeps track of what I searched for or where I buy lunch, it is not altogether clear why they should assume ownership of that data. For many of us, the convenience and enjoyment we receive for free from Facebook or Google may well be worth the loss of privacy.

The value relationship between farmers and the companies that collect their data is considerably different. The risks to privacy that the farmer endures, such as his pesticide or GMO usage that may be accepted practice but not politically popular, are considerably greater than the fact that Amazon knows I have a weakness for thrillers and murder mysteries. Not only that, but the individual farmer's data has considerably more value than the average consumer's data. Many farms are fairly large businesses, spending hundreds of thousands on fertilizer and seed and producing millions of dollars of crops. It's not difficult to imagine a smart phone ad arriving within seconds of a farmer encountering weed or insect damage while he's harvesting his crop. Farmers' information is valuable to the companies sponsoring ads, so farmers should be compensated when their data is sold. Farmers need to protect their data and make sure they bargain wisely as they share data with suppliers and companies who desire access to their information.

Farmers look forward to the ability to improve their yields and efficiency by comparing their results to neighboring producers. If my neighbor is receiving better results because of superior seed selection or because he times applications of inputs differently, then I'd really like to have that information. But this knowledge can have other results. If investors have data from all across the country, the access to better information could correct any market imperfections in the market for farmland. What has been a dispersed and unorganized market will likely be more accurate and rational with the advent of agricultural “big data.” Knowledge of soil types, weather patterns, and productivity has been limited to close neighbors, but now access to data maps will replace the value of local knowledge. Owners of the database will have a decided advantage when it comes to pricing agricultural inputs, whether seed or farmland.

Farmers are rightly concerned about data privacy. Even if an individual operator does everything to the best of his ability, following all the applicable rules, regulations, and best management practices, there is still concern that the EPA or one of the numerous environmental organizations that bedevil agriculture might gain access to individual farm data through subpoenas or an overall-clad Edward Snowden. This concern about privacy will likely slow the adoption of the technology. The data will be invaluable to regulators and to parties in future litigation and it may also help protect farmers from accusations of wrongdoing. Of course, some farmers will never be comfortable sharing any kind of farm information with strangers.

Amazon made headlines with the news that it is beginning to experiment with the use of drones for delivery of purchases to customers. We're a long ways from Amazon CEO Jeff Bezos's ideas about the delivery vehicle of the future, but it is fun to think about what it might mean for

agriculture. Nothing is more irritating to farmers than having to stop harvesting and travel dozens of miles for parts for their machines. With real-time monitoring of machine data and drone delivery, the local implement dealer may spot a bearing that is outside of the recommended temperature range, recognize an impending part failure, and dispatch a drone rescue mission before the actual operator of the machine realizes he is in trouble. That's unbelievably efficient, but more than a little spooky. Although delivery by buzzing FedEx drones may be a part of the distant future, drones will certainly be part of the data revolution in agriculture in the here and now. Though the industry complained loudly when they discovered that the EPA was using aerial surveillance to monitor livestock farms, the advantages of cheap and ubiquitous drones to monitor crop conditions and forecast yields will be too valuable to ignore.

Big data on farming will also likely affect the private-public partnership that brings us subsidized crop insurance. In the present system, insurance rates are set to maximize enrollment in the subsidized program, because encouraging participation by producers is seen as a public good. Insurance rates in marginal areas are lower than they would be if prices reflected only actuarial risk. But with access to the data about individual farms, insurance companies will be able to identify the least risky, most productive farms, which will likely buy less costly private insurance. This will end the ability of the present crop insurance programs to spread risk and will increase costs for farmers in more marginal areas, if the government doesn't increase subsidies further.

If a farmer can manage one machine guiding itself across a field by satellite, applying inputs and measuring outputs, reporting by-the-minute data on yields, soil temperature, and a gazillion other data points, what is to stop that same farmer from managing dozens of machines on farms the size of New Hampshire? Tyler Cowen argues that we're about to see an even wider disparity in incomes between the 10 to 15 percent of the population that can relate well to computers and the vast majority of us who will deliver services to the computer-savvy class. Farming may be one of the first industries to explore the validity of Cowen's thesis. All of us involved in agriculture will soon have to decide whether we want to occupy the nostalgic niche providing artisanal beets and heritage pork to Cowen's 10 percent, or whether we'll roll the dice on surviving the transition to a data-driven agriculture. Farming will be more efficient, more environmentally responsible, and easier to regulate and measure. But it won't be the same.

I wanted you to have this article before we begin to share what Farm Bureau and other farm and commodity groups have been working on the past couple of years because it encapsulates the opportunities and challenges we all face—not just farmers and ranchers, but the agriculture technology providers (ATP) and other segments of the agricultural production and marketing chain. It is extremely likely that the big data movement and the innovative technologies and analytics it yields will lead to at least as much change in agriculture as did the Green Revolution and the adoption of biotechnology. Farmers using the technology are reporting higher yields, fewer inputs, more efficiency and, importantly, higher profits.

Yet, many are also expressing concerns about privacy, security, portability and transparency in how their data is used and who, exactly, has access. While the questions about the new technology are numerous, they can be grouped into the following categories:

TRANSPARENCY

- What information is being collected?
- Will the ATP notify me (the farmer) if its policies and/or procedures change?
- With whom does the ATP share the information?
- Who else can obtain my data?

CONTROL

- What control does the farmer have over the information that is collected?
- Can I delete my data from an ATP's database?
- Can I easily switch among providers (and take my data with me)?

SECURITY

- Am I the gatekeeper to data access?
- Who is liable if there is a data breach?

VALUE

- What is the value of this data to the farm?
- Can I get paid for my data?

PRINCIPLES OF DATA PRIVACY AND SECURITY

In early 2014, the American Farm Bureau Federation (AFBF) initiated a working group by inviting six farm and commodity groups and six ATPs to discuss these issues and see if we could coalesce around some concepts and solutions to our members' challenges and concerns. The participants included:

- American Farm Bureau Federation;
- American Soybean Association;
- Beck's Hybrid Seed;
- Dow AgroScience;
- Dupont Pioneer;
- John Deere;
- Monsanto;
- National Association of Wheat Growers;
- National Corn Growers Association;
- National Cotton Council;
- National Farmers Union;
- Raven; and
- USA Rice.

This group worked several months to develop 13 principles on privacy and security. I served as one of AFBF's four representatives on that group. We had significant discussion and frank debate on the issues. But more importantly, we had several "learning moments" that occurred simply from spending time with each other as the ATPs learned more about farmers' concerns

and we gained insight into the ATPs' ability or inability to address each and all of those concerns. I would emphasize a critical point: farmers prefer this teamwork, "business-to-business" approach over a regulatory or legislative "fix" because we believe the market will provide the process to address problems if farmers have an equal footing with agribusinesses. If we rely on the government to make changes, the undue overhead might irreversibly deter innovation.

However, while we are not advocating for government involvement in regulating big data, our farmers are extremely interested in having the government be a data-driven partner so that they can more easily use electronic technologies to access and utilize USDA programs, such as having a one-stop sign-up for programs across multiple agencies rather than having to report to their crop insurance agent, the Farm Service Agency, Natural Resources Conservation Service, etc. Through technology, the government can enable progress and efficiency. USDA needs better data technologies and the authority and resources to use them to drive value for farmers' data. If we can accomplish that, we will jointly drive innovation, reduce economic burden on farmers, reduce administrative costs for USDA agencies and improve services. Everyone wins.

You will note that we started this process with 12 participants. As we had intended from the beginning, when we completed our work on the principles document, it was shared with other groups to gauge their interest and see if they wanted to sign on indicating their support as well. Today, 35 groups have endorsed the principles. The latest document is attached for your further review.

This was an extremely valuable process that allowed various segments to better understand the "other side's views," work through differences and reach a workable conclusion. Beyond the principles document, the 35 groups have committed to ongoing engagement and dialogue regarding this rapidly developing technology.

TRANSPARENCY EVALUATOR (TE)

One of the first things that several of the participants agreed would be useful was a way to help farmers understand the formal agreements and/or contracts they sign to engage ATPs and/or ag service providers—and to do so without a legal background or hiring a lawyer to understand the details. This group made the decision to develop a Transparency Evaluator. In its simplest form, I would describe it as a combination of a Consumer Reports review and a Good Housekeeping Seal of Approval.

This was a priority because many farmers are interested in using some form of data collection and storage, but virtually all are unaware of how their data is used after it leaves their farm—their immediate control, if you will.

Farmers often sign a terms and conditions contract with companies that collect their data, a contract that typically exceeds 30 pages in length; some are even longer. It is virtually impossible to find the specific provision you may be interested in, such as "will the ATP share my data" in such a lengthy document and even more difficult if a farmer is trying to compare policies between companies or service providers.

One of the driving motivations for the AFBF Board regarding the decision to engage in big data discussions was that use of this technology, in all its iterations, is a choice that belongs to each individual farmer. With that in mind, we determined our best course would be to encourage farmers, before signing a big data contract, to make sure they understand what will become of the data collected from their operations, including such important issues as:

- Who controls their data;
- Who can access it;
- Whether the aggregated or individual data can be shared or sold;
- The ways a company intends to use the farmer's data;
- Whether it will be kept in a place that could make it accessible to others via a Freedom of Information Act request;
- Whether farmers can get his data out of the system;
- Whether it is accessible to government agencies such as the Environmental Protection Agency;
- Whether or not it could be used by ATPs to speculate in the commodities market; and
- What happens to the data if the company is sold, acquired, or dissolves.

In short, farmers need to be able to determine whether the benefits outweigh the privacy and security risks associated with usage. By providing a tool to answer these questions, Farm Bureau can help farmers make informed decisions.

Twenty farm and commodity organizations, ag service providers and ATPs have joined forces and provided financing to collaborate in the development of a TE. The TE will provide farmers with an easy-to-use mechanism to allow them to compare and contrast specific issues within the contracts presented to them by ATPs. The groups are:

- AGCO;
- AgConnections;
- American Farm Bureau Federation;
- American Soybean Association;
- CNH (Case New Holland);
- CropIMS;
- Dow AgroSciences;
- Dupont Pioneer;
- Farm Dog;
- Farmobile;
- Granular;
- GISC (Grower Information Services Cooperative);
- Growmark;
- Independent Data Management;
- John Deere;
- Monsanto;

- National Association of Wheat Growers;
- National Corn Growers Association;
- National Farmers Union; and
- National Sorghum Producers.

While we are still in the development phase, the TE group has coalesced around a TE tool that will be simple and easy for farmers and ATPs to use. A key component in the development is, to the extent possible, match the questions/information available in the TE with the provisions endorsed in the Privacy and Security Principles.

Farmers need a method to quickly understand the often-complicated privacy policies, terms and conditions and other documents that come with signing up for new precision agricultural services. Likewise, ATPs and ag service providers need an easily recognizable way to demonstrate to farmers that they mean what they say – that their marketing and promotional materials are consistent with the legal terms of the contract. The TE is being developed around a simple scorecard format to allow, for example, a farmer whose primary focus may be transparency concerns, to easily review that area of the TE and, if desired, click on a link to obtain more information from a particular ATP.

The TE will provide answers to 10 questions that provide the farmer with basic information about ownership, control and use of the data generated on his or her farm. These would be “yes” or “no” questions, with a link to the specific language in the actual contract to back up the answer if the farmer wishes to look at the specific contract language. While we have not yet finalized the questions, it is likely to include wording such as, “Will the ATP obtain my consent before selling my data to persons or companies not parties to the agreement?” and, “Can I delete my data upon contract termination?” Other questions could be about ownership, contract termination or portability.

Products that have been through the transparency scorecard analysis and approved by the TE administrator would be eligible to use an annual TE seal, denoting compliance with the process. This is something that could be used on the ATP’s product websites or in marketing materials, giving a farmer a quick method to determine how the privacy policy and other contract documents for the product relate to the data principles.

While the original purpose of the TE was simple transparency of contracts, the members of the TE have discussed whether there should be a requirement for some level of adherence to the Privacy and Security Principles for Farm Data in exchange for awarding the seal of approval.

The current process calls for the ATPs to be responsible for the initial completion of the transparency scorecard. ATPs would complete the transparency scorecard by answering the questions and providing hotlinks to their privacy policies and other contracts containing the answers to each of the 10 questions. The ATPs would submit the forms upon completion via electronic means to the TE administrator, who would then undertake a legal review of the responses to verify their accuracy.

This type of ATP self-certification at the beginning of the process has two advantages: it requires the ATP to engage in the process and, in the long term, we hope the scorecard will shape the privacy policies and other legal documents the ATPs attempt to certify.

After submittal, the TE administrator's review would determine the completeness and accuracy of the transparency scorecard responses. Assuming that all answers are correct and links are functional, the TE administrator would notify the ATP that certification is appropriate and the seal is granted. If problems arise during the review of the ATP's scorecard responses, there will be opportunities for resubmission and an appeals process.

Our goal is to have the TE operational next spring.

AG DATA REPOSITORIES

Another big data issue on which Farm Bureau is focusing is the development of an ag data repository. Today, most experts believe that 80 percent of a farmer's data is not removed from devices on the tractor or other machinery and that it is deleted before being transferred to storage in a database, effectively rendering it inaccessible and not usable.

A data repository akin to a bank should be developed where an individual is free to deposit or withdraw funds at will. Farmers could use such a repository to store their data for later use, and also provide a means to share their data with a trusted service provider, an ATP, a university for research purposes, business partners or any others if they want. The repository should be able to aggregate, secure, store, clean and distribute production data with whomever the producer requests it be shared.

While AFBF has not endorsed any particular ag data repository at this time, we are working with those who are developing them to share our thoughts on what type of system would work best so that producers have an opportunity to store their data in a secure, controlled and easily accessible location. To this end, it is also our hope to ensure one or more data repositories are developed and operated in a manner that, like the TE, adheres to the principles contained in the Data Privacy and Security document to the greatest extent possible.

Some businesses already operate successful databases, but a generous portion of our members have expressed skepticism about allowing their data to be stored in those databases. The following are some of their biggest concerns:

- 1) Concerns about data security and privacy.
- 2) Providing agribusiness companies with their data gives those companies another reason to target market to a producer and potentially increase their cost of doing business.
- 3) A belief that farmer data has value, and that by simply offering it to a data service, they forgo opportunities to realize this value. (At this time, very few companies have offered to share any of the value they derive from a farmer's data with the farmer.)
- 4) If data is stored in an individual company database, it is often difficult, if not impossible, to move—transport—producer data from that “data silo” to another repository if a farmer decides to change equipment dealers, seed dealers, etc.

Obviously, if historical data cannot be easily moved, the farmer is disadvantaged and innovation suffers.

We are encouraging all ag data repositories in place or being developed to:

- 1) store and protect agricultural production data;
- 2) allow farmers to control their data and be responsible for granting data access to others;
- 3) per farmer agreement, to aggregate data in order for it to be useful to outside parties interested in analytics;
- 4) standardize and transfer aggregated data to agri-businesses to create value;
- 5) provide farmers with unrestricted access to their data;
- 6) ensure and improve the participation of farmers in the creation and pricing of new products and services;
- 7) increase the value of agricultural data at the farm level and improve the livelihood of farmers by capitalizing on this new asset—much as farmers capitalize on other key assets such as land, water, fertilizer and seed; and
- 8) clean and certify the data to ensure a level of data quality so that actionable information is available and poor decisions are not made due to poor data—either now or in future years.

If these ideas are incorporated in a data repository, farmers will have more leverage with agribusinesses desiring to use their data than they do on their own. In addition, it will allow farmers to focus on farming—and ATPs, ag service providers, universities, etc., to focus on their core businesses while lowering costs to support their data-related needs, products and services.

If data repositories are properly developed, they will give farmers the ability to better manage and control their data, convert it into new products and services, increase their buying and selling power and capture more of their data's overall value. In short, it should enable farmers and their business partners to significantly expand their return on investments by unlocking the power of ag data.

In summary, the increasingly important role of precision agriculture and big data offers significant opportunities for farmers and ranchers to increase productivity and efficiencies. However, we must do everything we can to ensure that producers own and control their data, can transparently and easily ascertain what happens to their data, and have the ability to store the data in a safe and secure location so it can best be used to improve efficiency and productivity.

Attachments:

Principles document

Blake Hurst disclosure form and bio