# Farmer Perspectives On Data

A roadmap for engaging with farmers to scale the collection and sharing of farm-level production data.

*Original research prepared by* Trust In Food, a Farm Journal Initiative
*In collaboration with* The Sustainability Consortium

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## Research Partners

Trust In Food is a purpose-driven division of Farm Journal dedicated to rebuilding consumer confidence in the U.S. agricultural value chain by partnering with farmers to accelerate conservation agriculture practice adoption and maintenance benefiting land, water, air and the financial health of farm businesses.

This is achieved through data science, social research and strategic communications deployed through the omnichannel Farm Journal platform in collaboration with our partners across conservation organizations, government agencies, agribusinesses, food companies and retailers and other food system stakeholders.

Learn more at trustinfood.com & farmjournal.com

The Sustainability Consortium (TSC) is a global organization transforming the consumer goods industry to deliver more sustainable consumer products. We are dedicated to improving the sustainability of consumer products. Our members and partners include manufacturers, retailers, suppliers, service providers, NGOs, civil society organizations, governmental agencies and academics. TSC convenes our diverse stakeholders to work collaboratively to build science-based decision tools and solutions that address sustainability issues that are materially important throughout a product's supply chain and lifecycle. TSC also offers a portfolio of services to help drive effective implementation.

Learn more at sustainabilityconsortium.org

# About this Report
## Improving Data Collection and Sharing

A lack of visibility presents a major challenge for efforts to increase supply chain transparency, sustainability and resiliency. Almost 49% of food companies and retailers using TSC's Food, Beverage, and Agriculture (FBA) toolkits to track their supply chain sustainability Key Performance Indicators (KPIs) _could not determine_ the upstream farm-level management practices for their agricultural inputs, according to research produced by The Sustainability Consortium (TSC). That research can be accessed here, and is referenced throughout this report.

To address this, TSC and Trust In Food, a Farm Journal initiative, partnered to undertake a survey of U.S. farmers to learn more about their perspectives on data collection and sharing with downstream organizations as well as their implementation of conservation agriculture.

**The purpose of this report is to equip organizations with an improved understanding of the realities farmers face related to data collection and sharing. In doing so, it will enable downstream food companies to more effectively engage with farmers around data.**

This is achieved through the following research objectives:
- **Document** baseline trends of farmer relations to farm-level data.
- **Identify** the barriers and motivators farmers experience related to collecting, sharing/ reporting and using farm-level data.
- **Promote** an improved understanding of farmer's relation to data collection, sharing/reporting and use through diagnostic analyses of the survey's response rates.
- **Establish** a set of actionable recommendations to enhance engagement with farmers around farm-level data collection, sharing/reporting and use.

_This report and the findings presented here represent those individual authors and do not reflect the views of the U.S. government, any federal or state agency, research institution, or any funding source or business partner of either Farm Journal or The Sustainability Consortium._

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# Foreword
## Sustainability Starts on the Farm

At The Sustainability Consortium (TSC) we recognize that the impact of our science-based, multi-stakeholder informed product sustainability performance assessment platform, called THESIS, hinges on the willingness of all parts of the supply chain to share data.

Farm data is pivotal to understanding the sustainability performance of food, beverage, and agriculture products. Yet, most farm sustainability activities are not currently reported from farm all the way through to a retailer.

Consumers are more curious that ever about how their food is made, what is in it, and if it was grown or raised sustainably. Brands and retailers struggle to tell this story as the data needed to understand sustainable or conservation agriculture practices never leaves the farm at scale.

This report is full of information direct from growers to shape how we engage them on sustainability. The results show that growers value the environment and they implement conservation agriculture practices on their farms, but the barriers to sharing their conservation successes through data are many.

Building trust, rewarding hard conservation work with dollars, and demonstrating the value of data sharing to the grower are just some of the challenges the sustainability community faces.

TSC is committed to working on these issues and barriers with our valued partners. Our goal is to ensure farmers receive the value they deserve for the work they do to protect natural resources, and that the sustainability story brands communicate to retailers and consumers is supported by farm data through TSC's THESIS Index.

*– Christy Melhart Slay, Ph.D.*
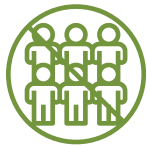*Director, Technical Alignment at The Sustainability Consortium*

Those who want our [farm's] data are making a profit off of it, but not sharing that profit back with us.
– Matt, Nebraska Farmer

# Key Findings
## Farmer Perspectives on Data Collection and Sharing

### Low Software Usage & Digitization

**62%** did not use farm-level data software in 2019; **46%** store and manage their data primarily on paper records

### Transparency is not a Right

**49%** said they do not believe their customer(s) has a right to know how they manage their farm

### Low Satisfaction Rates

**70%** of those who did use data software in 2019 are not having all of their needs met by the software

### Unequal Profit Distributions

Farmers identify unequal financial gain from data sharing, where downstream organizations profit from farm-level data sharing at higher levels than farmers

### Minimal Advocacy by Trusted Advisers

**71%** said their primary agronomic advisor or retailer has not recommended that they increase their data collection

### Trust Issues are Widespread and Nuanced

**More than half** said they do not trust the federal government or private companies with their data

# Key Findings
## Barriers and Incentives to Farm-Level Data Efforts

### Lack of Access Prevents Collection

Lack of access to the required capital, equipment and training scored highest as barriers to data collection

### Lack of Access Prevents Sharing

**63%** said their operation's data network connectivity and access is at least somewhat of a barrier to sharing data

### Clear Benefits to Collection

A lack of benefits to the farmer is the lowest scoring barrier to data collection

### Limited Benefits to Sharing

**18%** more respondents named a lack of benefits to the farmer as a barrier to data sharing compared to data collection

### Fear of Additional Regulatory Impact

The threat of potential new regulations being enacted scored as the primary barrier to data sharing

### Profitability Relaxes Trust Issues

A potential government incentive payment program scored high as an incentive to increase data collection and sharing

### Profitability Matters Most

Incentives which provide direct financial benefit scored the highest as potential incentives to increase farm-level data efforts

### Conservation is Important but Disconnected

Farmers show a high conservation ethic, yet this remains disconnected from data collection and sharing

# Call to Action
## Enabling Increased Data Collection and Sharing

### Improve Data Solutions and Remove Barriers

**Adapt and overhaul data solutions to provide equitable financial benefits and satisfy farmer information needs.**

> Provide farmers with direct financial benefit, equitable to what downstream actors receive as a result of increased data flows.

> Ensure all data solutions provide farmers with actionable information outputs they can use to make improved operating decisions; use farmer's strong connection to family legacy to motivate digitization of records.

> Prioritize privacy, address farmer' fears and trust issues, and establish demonstrable control measures that limit their real and perceived exposures to risk.

**Remove, reduce or otherwise provide solutions to the various access barriers farmers face to collecting/sharing data.**

> Build robust rural data networks and increase farm connectivity levels.

> Improve access to the equipment farmers need; provide free training and technical support.

> Develop cost-sharing, loan or other financial programs that enable access to the capital needed to begin or scale data collection and sharing.

### Build a Farmer Culture Focused on Data

**Cultivate a business and normative culture among farmers that understands, values and trusts the critical role data collection and sharing play in both their operation's success and that of U.S. agriculture as a whole.**

> Better connect the farmer to the value created and provided by the relationship between conservation agriculture practices, data collection and data sharing.

> Use the important role of data to farm operation profitability, stewardship, and legacy as a foundation to build understanding and buy-in from farmers about the necessary and beneficial role of data.

> Equip farm operation staff with the tech and data literacy as well as the knowledge, skills and abilities needed to utilize emerging farm-level data solutions and continuously improve their operation's data efforts.

> Minimize fear and build trust with farmers regarding data sharing by clearly and openly communicating with them; provide transparency into how the data is used, what profits are generated through the data and who has access to the data.

# Considerations
## Re-Prioritize Resources and Efforts

**Farmers have identified that many current data solutions do not meet their needs and are perceived to be business risks.**

**For many farmers, increased data collection and sharing does not make business sense and the risks are too high.**

> Farmers do not recognize a significant, direct, tangible benefit from farm-level data collection and sharing – and so they are unwilling to consider it
> Farmers fear that their data will be used against them and do not trust downstream organizations to equitably share profits generated from increased data flows – and so they are unwilling to consider it

In situations where it might make sense to the farmer, and they are ready to begin or scale their data collection and sharing, several logistical barriers prevent them from doing so.

Behavior change and adoption of innovation research is clear that it is important to address these innovation issues *__before__* attempting to drive farmers to adopt or scale.

If promotion of data collection and sharing persists without addressing these issues, organizations risk creating a culture of antipathy among farmers around data.

Resources and efforts may be better prioritized to addressing the farmer-identified shortcomings and challenges of data solutions, then to their promotion.

We are very careful about the data we share, because it puts our business in jeopardy of being picked apart by the neighboring operations and having our livelihood stolen out from under us.
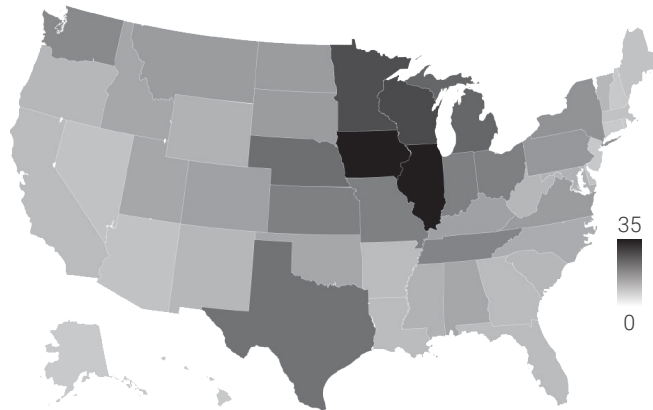
*– Nancy,*
*Illinois Farmer*

# **Survey Respondent** Demographics

## Regional Representation of Respondents

In total, 393 farmers from across 44 states completed the survey.



## Annual Farm Income



Income Level
- $0−25,000
- $25,001−50,000
- $50,001−75,000
- $75,001−100,000
- $100,000−200,000
- $200,001−500,000
- $500,001 or more
- Prefer not to answer

Percent of respondents
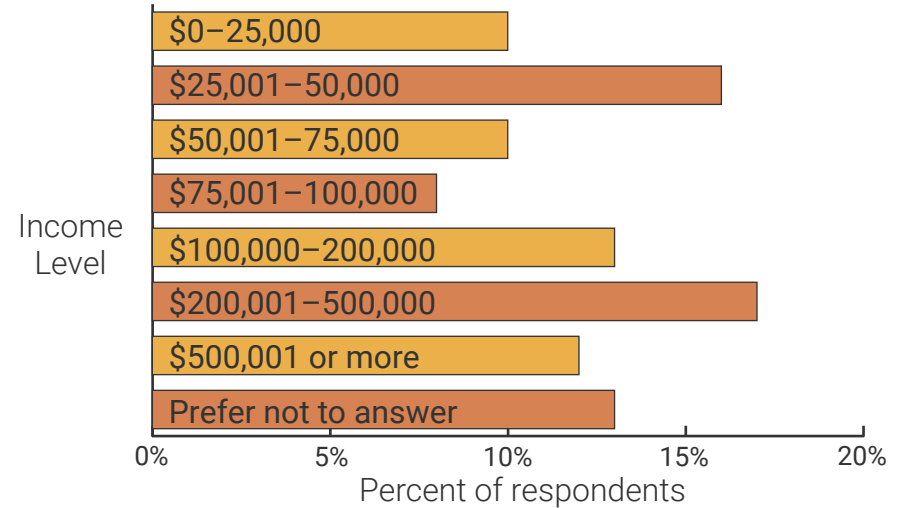
## Education Level of Respondents



Education Level
- Home schooled
- Some high school but no degree
- High school degree
- 2-year college degree
- 4-year undergraduate degree
- Masters or Ph.D.
- Technical or trade school

Percent of respondents

## Age of Respondents



Age Range
- 18-34
- 35-64
- 65+
- Prefer not to answer
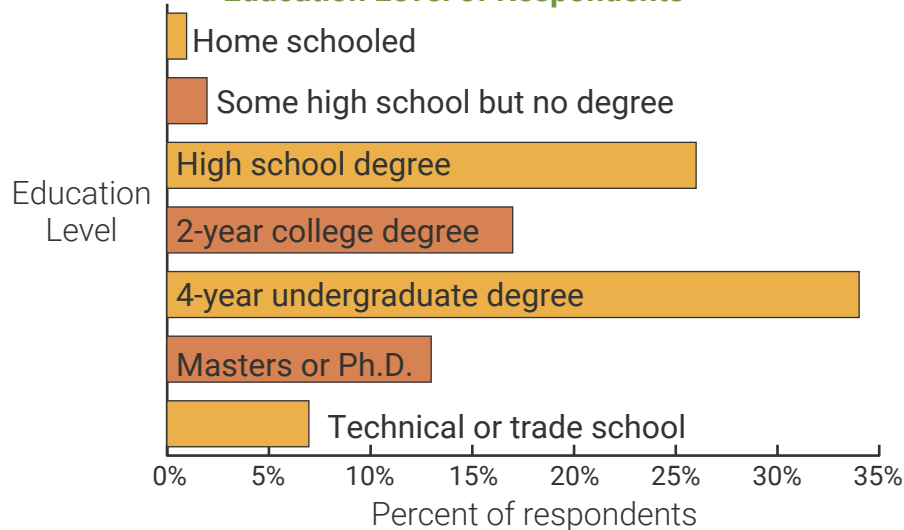
Percent of respondents
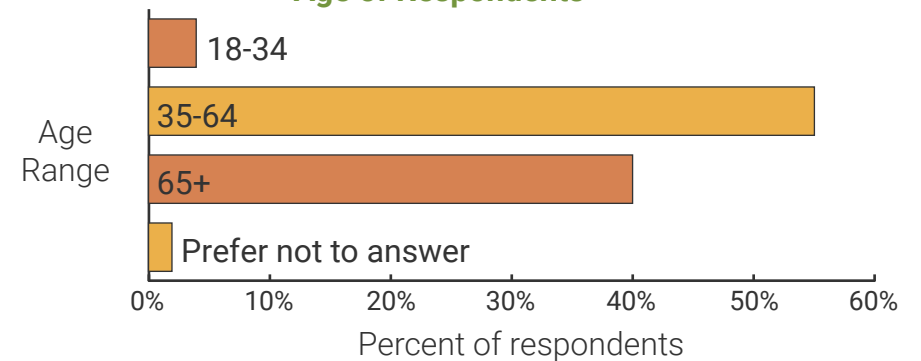
# **Survey Respondent** Demographics

## Land Usage

Land Usage

| Category | Percent of respondents |
|---|---|
| Sugar beets | ~1% |
| Nuts | ~2% |
| Potatoes | ~2% |
| Canola | ~3% |
| Fruits | ~4% |
| Sorghum | ~7% |
| Vegetables | ~7% |
| Other | ~10% |
| Barley, oats | ~15% |
| Wheat | ~32% |
| Livestock | ~52% |
| Soybeans | ~55% |
| Hay, haylage | ~59% |
| Corn | ~67% |

Percent of respondents
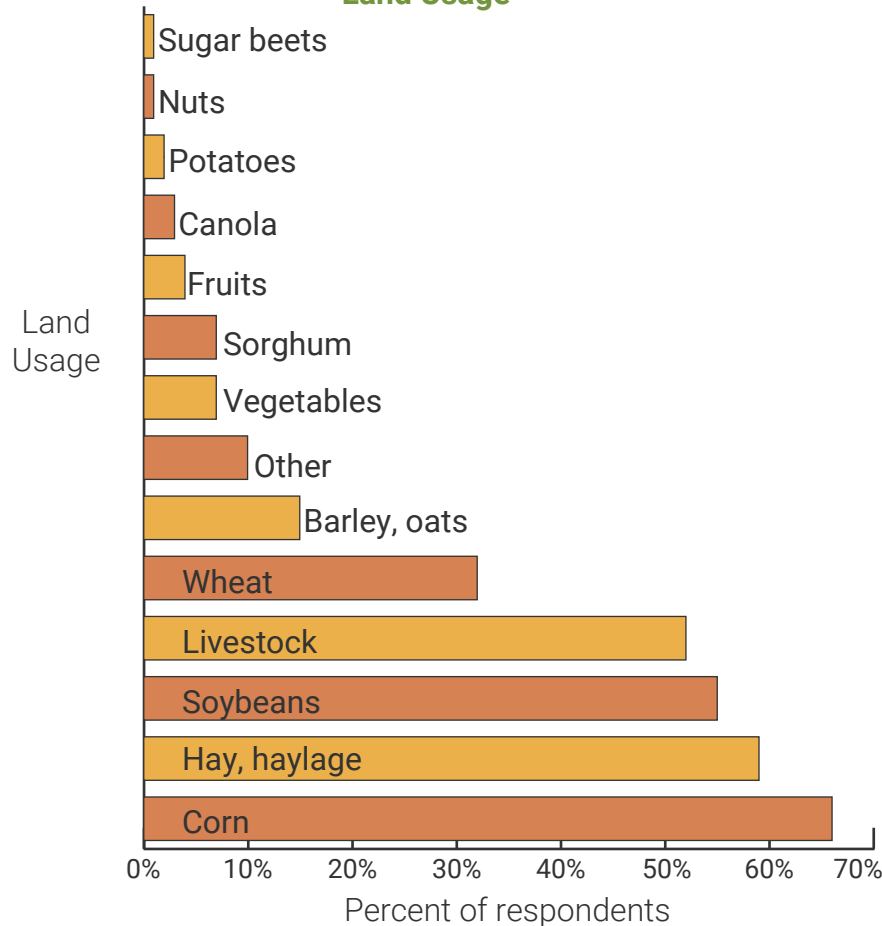
*Totals may equal more than 100% in cases where a farmer reported more than one crop*

## Total Farmland Acres

Acreage Range

| Range | Percent |
|---|---|
| 1–49 | ~3% |
| 50–179 | ~13% |
| 180–499 | ~24% |
| 500–999 | ~25% |
| 1,000+ | ~35% |

Percent of respondents

## Acreage Rental Rates

Percent of Total Acres that are Rented

| Category | Percent |
|---|---|
| 0–25% of my acres are rented | ~50% |
| 26–50% of my acres are rented | ~18% |
| 51–75% of my acres are rented | ~18% |
| 76–100% of my acres are rented | ~14% |
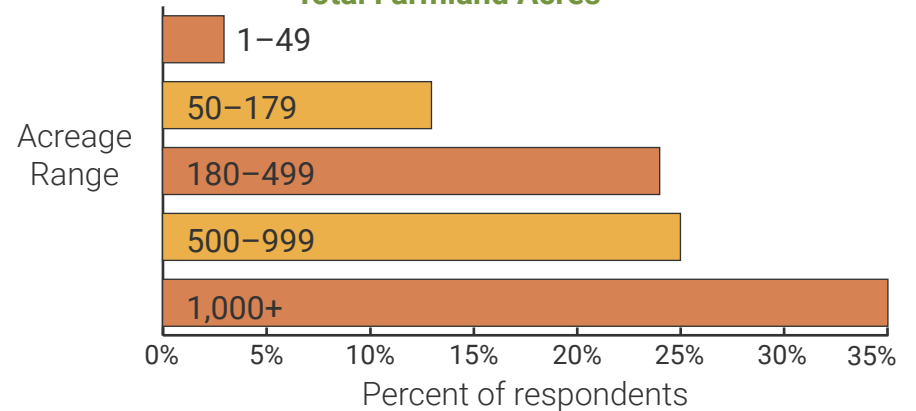
Percent of respondents
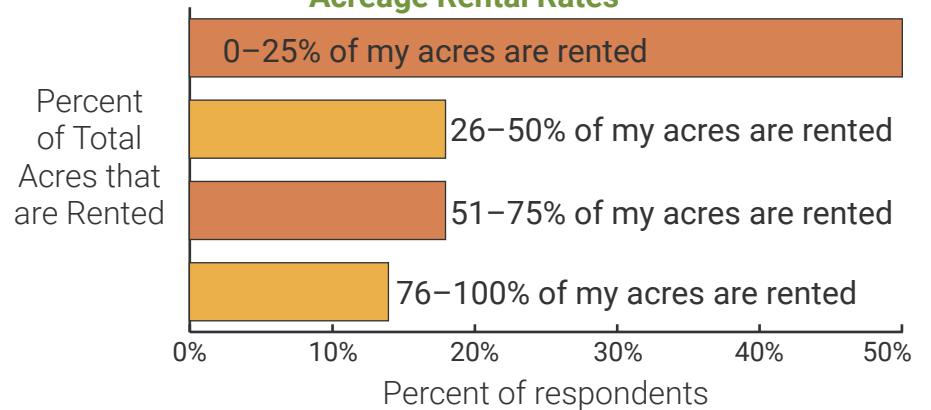
# Data Collection, Management and Use



*Photo by the United Soybean Board*

# Data Collection, Management and Use Trends

## How much data does your operation collect related to your production and management practices?

> **38%** Collect data on most of the big things but not everything
> **37%** Only collect data on a select few things
> **18%** Collect data on absolutely everything we do
> **5%** Do not collect any data
> **2%** I am unsure

## What method(s) do you use to collect most data related to your farm's production and management?

> **56%** Mix of both technology solutions and by hand on paper in a notebook
> **27%** Mostly by hand in a notebook or on paper
> **13%** Mostly technology solutions
> **3%** I am unsure

## How often do you collect data on your farm operation?

> **57%** Collect data most of the time but not always
> **24%** Collect data constantly
> **16%** Rarely collect data but do every now and then
> **2%** Never collect data
> **2%** I am unsure

## Which of the following best describes how your farm's data is stored and managed?

> **38%** Mix of digital and paper, but mostly digital
> **30%** Mix of digital and paper, but mostly paper
> **16%** Primarily through paper records in filing cabinets accessed by hand
> **12%** Primarily through digital solutions accessed through a computer program
> **2%** I am unsure
> **2%** Other

## Which of the following best describes the way you use the data you collect?

> **60%** Use data to inform a lot of decisions, but not all of them
> **30%** Only use data to make a select few decisions
> **5%** Use the data to inform every single decision
> **3%** Do not use the data to make our decisions
> **2%** I am unsure

# Data Collection, Management and Use Trends
## Analysis

### Bell-Curve Baselines

Across the board, the majority of farmer-respondents tend to be in the response groups representing median levels of data collection and sharing. This is in-line with diffusion of innovations theory, setting up a "routine" population distribution curve of early adopters, majority and laggards.

### Downstream Constraints Shape On-Farm Data Collection Practices

When reviewing these findings, it is critical to reference what TSC identified in their 2019 Data Landscape Mapping Report *(page 17)*. Manual data entry was one of the most common approaches for data entry across major farm management software platforms (even being the only method for many).

Without a cloud/automated linkage between sensor and software platform, farmers are forced to record and store data using hand/paper methods to then enter later. With such constraints present, data collection and storage methods and rates are unlikely to significantly change – until/unless the platforms change first, to enable this.

### Predicting Based on Demographics is Difficult

Data collected here indicate that farmer acreage, income and formal education levels are not strong indicators of data collection frequency, quantity, management and use.

Based on farmer responses, higher formal education, acreage and/or income are not necessarily indicators of a farmer's likeliness to collect more data with more frequency or use and store it with more sophistication. Farmers who self-reported the categories of high, medium and low data use levels ranged in reported income, number of acres and level of education obtained. No meaningful correlation identifying demographics as a major influencing or predicting factor to a farmer's provided data use level was found.

This reinforces what TSC identified in their 2019 Data Landscape Mapping Report *(page 17)* – that five of six farm management software companies report users of all sizes.

With diverse farm demographics across the adoption segments, communicators should be wary of one-size-fits-all marketing and communications programs. Communication and marketing programs which assume farms operate in a certain way related to data collection and storage based on their demographic factors, might be flawed and should be avoided.

# Software Platforms



*Photo by the United Soybean Board*

# Management Software Use

### Please select all farm management software your operation used in 2019

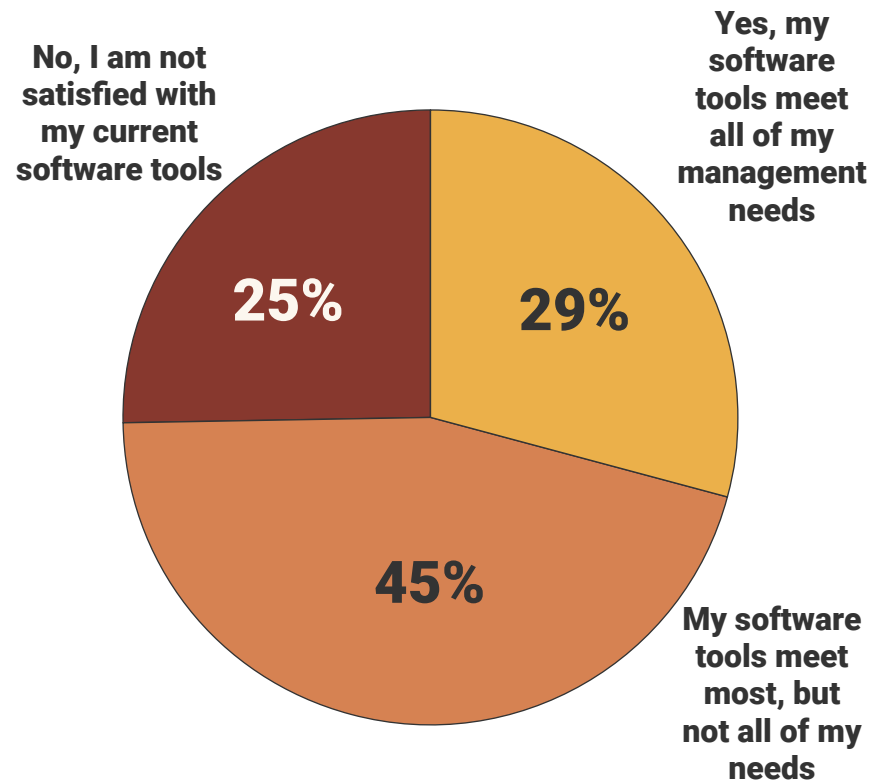| Select all that apply | Response Percent | Response Total |
|---|---|---|
| None | 62% | 243 |
| Other | 14% | 56 |
| I am unsure | 7% | 28 |
| John Deere Operations Center | 6% | 25 |
| SMS | 4% | 15 |
| Trimble | 4% | 15 |
| Farm Works | 3% | 13 |
| Case Advance Farming Systems Connect | 2% | 9 |
| FarmLogs | 2% | 9 |
| Agrible | 0.75% | 3 |
| AgriWebb | 0.5% | 2 |
| Conservis | 0.5% | 2 |
| FarmConnect | 0.5% | 2 |
| Granular | 0.5% | 2 |
| Land O'Lakes SUSTAIN/Truterra | 0.5% | 2 |
| My Farm | 0.5% | 2 |
| AgDNA | 0.25% | 1 |
| AgOS Crop Planning | 0.25% | 1 |
| AgriEdge Excelsior | 0.25% | 1 |
| Croptracker | 0.25% | 1 |
| Dairy One Crop Management | 0.25% | 1 |
| MapShots | 0.25% | 1 |
| Agrinavia, Agrivi, Agvance Grain, AgroSense, FarmERP, GreenIQ, Hydrawise, Rachio, Sentera, Spruce | 0% | 0 |

# Sustainability Software Use

**Please select all software-based sustainability/conservation tools your operation used in 2019**

| N = 393 | Response Percent | Response Total |
|---|---|---|
| No | 84% | 330 |
| I am unsure | 9% | 36 |
| Other | 2% | 9 |
| NRCS Resource Stewardship Evaluation Tool (RSET) | 2% | 7 |
| Pesticide Risk Tool | 1% | 5 |
| Agrible | 1% | 4 |
| AgriEdge | 0.5% | 2 |
| Land O'Lakes SUSTAIN/Truterra | 0.5% | 2 |
| BASF AgBalance | 0.25% | 1 |
| COMET-Farm | 0.25% | 1 |
| Field to Market | 0.25% | 1 |
| Potato Sustainability Initiative | 0.25% | 1 |
| Sustainable Agriculture Initiative (SAI) Platform | 0.25% | 1 |
| Stewardship Index for Specialty Crops | 0.25% | 1 |
| Bunge Centerfield, EDF N Balance, Protected Harvest, SureHarvest Sustainability MIS | 0% | 0 |

# Farm Data Software Solutions
## Satisfaction

**Are you satisfied with the current systems and data analytics you receive from your software?**

**No, I am not satisfied with my current software tools**

**Yes, my software tools meet all of my management needs**

**25%**

**29%**

**45%**

**My software tools meet most, but not all of my needs**

# Software Platforms
## Analysis

### Software Satisfaction

Of those farmers who responded that they used software in 2019, only about 30% of farmers said they are entirely satisfied and their software solution meets all their needs. Remaining respondents expressed dissatisfaction at a variety of levels, with around 25% expressing complete dissatisfaction.

Throughout the open-ended response sections of the survey, farmers expressed frustration with many software design and functionality components. These largely align with interview insights from the TSC Data Landscape Mapping Report.

Addressing common frustrations could provide immediate benefits to software adoption/satisfaction rates:
> Lack of compatibility or interoperability between multiple platforms.
> Lack of relevance of software to certain farming systems/ crop mixes.
> Outputs that are unclear or not easily usable by the farmer for operational efficiency changes.
> Lack of time, training, hardware and trusted staff needed to fully utilize software.

### Strong Potential for User Error

Additionally, user error may play a role in the dissatisfaction trends. Farmers might not be satisfied with their software due to an inability to realize the full potential of their platform(s). Close to 70% of farmers responded that a lack of training was at least a minimal barrier preventing them from collecting and sharing more data than they already do.

Nearly 39% of respondents stated access to free training and technical support would be likely to incentivize them to collect and share more data than they already are. Nearly 31% said they were undecided on this matter. When asked if they knew someone they could call to answer a question about farm-level data collection methods, technology, sharing or privacy, nearly 56% of respondents said no or were unsure.

This points to a significant trend of potential under-use, improper use or dissatisfaction related to technical or user error issues by farmer-users.

Addressing this issue through capacity building efforts with farmers could improve satisfaction and, by extension, adoption rates.

# Barriers to Collecting and Sharing Data



*Photo by the United Soybean Board*

# **Collecting Data** Barriers

Farmers were asked to rank the severity of barriers that prevent them from sharing more data than they already are today.

| | |
|---|---|
| **COST – The cost associated with collecting it is a problem.** | **Major Reason:** 38%<br>**Minor Reason:** 42%<br>**Not a Reason:** 20% |

| | |
|---|---|
| **TIME – It is too time consuming.** | **Major Reason:** 22%<br>**Minor Reason:** 53%<br>**Not a Reason:** 25% |

| | |
|---|---|
| **EQUIPMENT – My operation does not own or have access to the right equipment.** | **Major Reason:** 33%<br>**Minor Reason:** 40%<br>**Not a Reason:** 27% |

| | |
|---|---|
| **DEMAND – There is no/low demand by anyone for more data; it is an unnecessary burden.** | **Major Reason:** 19%<br>**Minor Reason:** 46%<br>**Not a Reason:** 36% |

| | |
|---|---|
| **TRAINING – My operation lacks the training or understanding necessary.** | **Major Reason:** 25%<br>**Minor Reason:** 45%<br>**Not a Reason:** 30% |

| | |
|---|---|
| **NO BENEFIT – My operation believes there would be no/limited benefits.** | **Major Reason:** 13%<br>**Minor Reason:** 33%<br>**Not a Reason:** 54% |

| | |
|---|---|
| **DATA NETWORK – My operation's connectivity to data networks (broadband, cellular) limits it.** | **Major Reason:** 24%<br>**Minor Reason:** 39%<br>**Not a Reason:** 37% |

# **Sharing Data** Barriers

Farmers were asked to rank the severity of barriers that prevent them from sharing more data than they already are today.

**REGULATION – I feel that farm data will be used to enact more stringent government regulations.**
Major Reason: 42%
Minor Reason: 33%
Not a Reason: 25%

**TIME – It is too time consuming.**
Major Reason: 26%
Minor Reason: 46%
Not a Reason: 28%

**EQUIPMENT – My operation does not own or have access to the right equipment.**
Major Reason: 34%
Minor Reason: 40%
Not a Reason: 26%

**DEMAND – There is no/low demand by anyone for more data; it is an unnecessary burden.**
Major Reason: 23%
Minor Reason: 49%
Not a Reason: 28%

**PRIVACY – I am afraid that by sharing data I might make myself a target for malicious activity.**
Major Reason: 36%
Minor Reason: 46%
Not a Reason: 27%

**NO BENEFIT – My operation believes there would be no/limited benefits.**
Major Reason: 27%
Minor Reason: 37%
Not a Reason: 35%

**COST – The cost associated with collecting it is a problem.**
Major Reason: 30%
Minor Reason: 45%
Not a Reason: 25%

**DATA NETWORK – My operation's connectivity to data networks (broadband, cellular) limits it.**
Major Reason: 26%
Minor Reason: 38%
Not a Reason: 36%

**TRAINING – My operation lacks the training or understanding necessary.**
Major Reason: 27%
Minor Reason: 45%
Not a Reason: 28%

**PENALTY – I am afraid my bank, landowner or other will use my data to penalize my operation in some way.**
Major Reason: 21%
Minor Reason: 29%
Not a Reason: 50%

# Collecting and Sharing Data
## Trust and Privacy Barriers

**Do you trust the following entities with the security and use of your farm's data?**

> **Your lenders and bankers**
> Agree: 39%   Disagree: 40%   Unsure: 21%

> **Federal, state and county level government offices**
> Agree: 17%   Disagree: 60%   Unsure: 23%

> **Private companies**
> Agree: 12%   Disagree: 59%   Unsure: 29%

**Data about my farm's production and management practices should be as tightly secured as my family's health records.**
Agree: 68%   Disagree: 24%   Unsure: 11%

**I believe that my customers have a right to know how I manage my farm.**
Agree: 27%   Disagree: 49%   Unsure: 24%

**No one needs to know what I am doing [on my farm]! It could give others too much control over my farm.**

*– George,*
*Iowa Farmer*

# Collecting and Sharing Data
## Analysis of Barriers

**Benefits to Sharing**

Regarding data collection, the lowest scoring barrier is "no perceived benefit," yet as a barrier to data sharing it scores almost 20% more likely to be a barrier. This points to a farmer population that perceives a benefit from collecting data, but not as much from sharing it. Open-ended questions support this, with multiple references to the asymmetrical nature of financial benefits related to data sharing.

When asked if they believed collecting and sharing data on their farm's operation would help their operation become more financially successful in the future, 47% agreed, 32% disagreed and 21% were unsure.

*Call to Action*
> Develop data sharing programs that more directly benefit farmers in tangible financial terms.
> Ensure farmers are aware of and understand the tangible benefits to them of data sharing.
> In situations where downstream entities benefit from farmers sharing their data (i.e. charging a premium for goods produced in a certain way), ensure farmers are fully compensated for enabling this premium to exist.

**Access Barriers**

Equipment, training, time, data network and demand barriers were similarly ranked by farmer respondents across both sharing and collecting.

In terms of sensors and equipment, collecting data is likely to incur more cost to the farmer than sharing. Many organizations farmers share their data with have focused on streamlining the data sharing pipeline by making sharing easy to do from a smartphone app or computer, therefore requiring farmers to purchase little, if any, new equipment. The same however is not true for data collection, in general it almost always requires the purchase of equipment to facilitate collection.

*Call to Action*
> Develop cost-share programs that enable farmers to overcome cost barriers to data collection.
> Create more opportunities for farmers to increase their income through data collection and sharing to justify their investment in collection infrastructure, equipment and software.
> Provide farmers with access to data collection tools and equipment at reduced rates or gratis, to facilitate increased collection.

# Collecting and Sharing Data
## Analysis of Barriers

### Trust Issues are Nuanced

The potential threat of additional regulation was rated as the highest barrier to data sharing. Yet, penalty from a landowner or bank was seen as the lowest barrier to data sharing. Supplementing this, there was a high number of open-ended responses that referenced distrust of the government, trade boards and other public groups.

This dichotomy between barrier ranking levels is perplexing, given the two barriers are, functionally, very similar. Compounding this, nearly 40% of farmers said they do not trust their banks or lenders with their data.

#### *Call to Action*

> Develop privacy policies which keep farmer identities anonymous, so they are assured there can be no regulation or other negative repercussions based on their data.
> Work with government and financial institutions to put in place policy safeguards that protect farmers from negative repercussions of sharing their data
> Further explore this issue to better understand why farmers do and do not trust certain entities in certain situations.

### Lack of Widespread Advocacy

Almost three-quarters of respondents said their primary ag consultant or input retailer has not suggested to them they should increase the amount of data collected on their production practices. Ag consultants and retailers are among the advisers farmers rely on most frequently and trust the deepest. According to research by Trust In Food and Environmental Defense Fund, ag retailers have a tremendous opportunity to increase their company or co-op profitability through scaling their sale of data-related services and products. As such, motivating and empowering retailers and consultants to promote data collection and sharing should be an immediate focus to drive on-farm adoption rates.

#### *Call to Action*

> Create programs to educate and enable farm consultants, such as ag retailers and input dealers, to effectively promote data collection and sharing.
> Incentivize retailers and consultants to promote data collection and adoption.

Not sure what else I could collect or how it would benefit, I'm open to the concept but there has to be a reason and a benefit.

*– Brian, Kansas Farmer*

Cotton planted into corn residue, Texas. Photo by USDA NRCS Texas

# Incentives to Collecting and Sharing Data

Photo by USDA NRCS South Dakota

# Collecting and Sharing Data
## Incentives

Farmers were asked to score potential incentives to increasing data collection and sharing.

**Tools to make your operation more profitable using data.**
Likely: 53%
Not Likely: 21%
Undecided: 25%

**Lower rates and/or longer terms on loans from financial institutions.**
Likely: 37%
Not Likely: 38%
Undecided: 25%

**Additional cost and/or premium benefits provided through crop insurance.**
Likely: 41%
Not Likely: 37%
Undecided: 22%

**Free training and technical support provided by industry experts.**
Likely: 39%
Not Likely: 31%
Undecided: 31%

**A direct payment made to the farmer by a company or group (non-federal).**
Likely: 40%
Not Likely: 33%
Undecided: 27%

**Access to longer lease terms on rented land.**
Likely: 35%
Not Likely: 44%
Undecided: 21%

**Government support such as tax incentives or payment programs.**
Likely: 38%
Not Likely: 39%
Undecided: 23%

**Access to a peer-to-peer learning group with other farmers in your region who are collecting and sharing data.**
Likely: 29%
Not Likely: 38%
Undecided: 33%

# Collecting and Sharing Data
## Analysis of Incentives

**Profitability**

The top-ranking potential incentives are all centered around increasing farmer profitability/income. The lowest scoring incentives are those farthest removed from direct financial benefit to the farmer. This is supported by the large number of open-ended question responses referencing the asymmetrical financial benefit for farmers who share their data.

*Call to Action*

> Create direct financial incentive programs for farmers to share their data.
> Communicate to farmers clearly to ensure they understand exactly how their operation will financially benefit from sharing data.
> Do not create programs that do not directly or indirectly pay farmers for their data while downstream links in the supply chain receive financial benefit; in cases where this already exists, begin compensating farmers for enabling the downstream benefit.

**Nuanced Trust Issues**

Support for government incentive/support payments ranks high, which contrasts with the high ranking of government regulation and fear of government access to data. Given the nuanced complexities here, farmers likely scored this incentive high as it is a direct path to financial gain for them, something frequently cited as a primary goal. Similarly, it is likely farmers are already involved or very familiar with various government incentive programs.

*Call to Action*

> Streamline the application process for government incentive programs and clearly identify any ways a farmer's data could be used and, if the farmer does not want their data used for the benefit of any entity outside of their farm operation, make clear that is their choice.
> Weave data collection and sharing into existing government programs and provide an additional premium for doing so.
> Create new policy initiatives to ensure farmers feel safe providing their data to the government.
> Further explore this issue to understand why farmers do not trust government agencies with their data at higher levels but are highly willing to participate in payment programs.

# Conservation Agriculture Trends

Photo by the United Soybean Board

# Conservation Agriculture
## Connecting the Benefits

Farm-level data collection and sharing has the potential to strengthen environmental impact and add transparency into the food value chain.

Many farmers use a variety of conservation practices and have a strong conservation ethic rooted in environmental stewardship, family legacy, resiliency and profitability, according to the data captured in this study. Farm-level data can effectively communicate these positive stories about farmers' environmental stewardship and help unlock additional capital for conservation efforts.

Yet those conservation actions and values often remain invisible – to other farmers, to actors in the supply chain, and to the public. Many industry initiatives capture parts and pieces of the conservation adoption equation, and they should be applauded. Yet as this report attests, farm-level data records are collected and kept in diverse ways and to varying levels of detail that often prevents the necessary analysis.

This limits the industry's ability to properly credit farmers for the conservation systems they utilize. It also presents challenges for those seeking to advance our understanding of conservation agronomy and biology.

This report builds the case for the need to link on-farm conservation practices, data about those practices and the downstream supply chain organizations.

By identifying and addressing areas where change is needed, supply chain actors can strengthen the relationship between themselves and farmers, capture more meaningful data and offer greater transparency to the public.

In turn, this could lead to improved public perception of agriculture's ability to solve some of our world's most pressing environmental challenges.

# Conservation Agriculture Use

**Please select all farming practices related to conservation and sustainability that your operation utilized in 2019.**

| N = 393 | Response Percent | Response Total |
|---|---|---|
| Soil sampling | 80% | 315 |
| No-till | 61% | 241 |
| Grassed waterways | 50% | 197 |
| Reduced-till | 50% | 195 |
| Cover crops | 43% | 170 |
| Precision agriculture (autosteer, GPS, LiDAR, drones, GIS, etc.) | 40% | 156 |
| Conservation crop rotations | 36% | 143 |
| Advanced nutrient management practices (split application, nutrient modeling/yield monitoring, nitrification inhibitors, variable rates, etc.) | 32% | 128 |
| Integrated pest management | 23% | 93 |
| Contour farming | 19% | 76 |
| Tissue sampling | 18% | 72 |
| Natural wetlands kept intact | 17% | 69 |
| Forested riparian buffers | 8% | 34 |
| Strip-till | 6% | 25 |
| Other | 3% | 13 |
| Prairie strips | 2% | 11 |
| None | 1% | 7 |
| Saturated buffers | 1% | 6 |
| Constructed wetlands | 1% | 6 |
| Bioreactors | 1% | 4 |

# Conservation Agriculture
## Motivations for Use

Farmers were asked to self-identify their reasons for implementing the conservation agriculture practices they do.

**Stewardship – it is the right thing to do for the land and the environment**
Major Reason: 74%
Minor Reason: 20%
Not a Reason: 6%

**Improvements in overall farm profitability**
Major Reason: 73%
Minor Reason: 22%
Not a Reason: 5%

**To protect my operation from extreme weather events, pests, or natural disasters**
Major Reason: 69%
Minor Reason: 23%
Not a Reason: 7%

**Increases in yield**
Major Reason: 68%
Minor Reason: 25%
Not a Reason: 6%

**Decreases in input costs**
Major Reason: 62%
Minor Reason: 30%
Not a Reason: 7%

**Legacy – it helps ensure I pass on a profitable and viable operation to the next generation**
Major Reason: 61%
Minor Reason: 30%
Not a Reason: 9%

**It is required for participation in government payment programs**
Major Reason: 22%
Minor Reason: 40%
Not a Reason: 38%

**Access to valuable marketing opportunities otherwise closed to me**
Major Reason: 19%
Minor Reason: 44%
Not a Reason: 37%

**My landowner requires it**
Major Reason: 6%
Minor Reason: 18%
Not a Reason: 76%

# Conservation Agriculture
## Analysis of Motivations

### Emotional Drivers

The highest scoring driver for implementing conservation practices is stewardship. Legacy ranked high as well with nearly 91% of farmers identifying it as a driving factor of conservation practice implementation. Neither of these two drivers are directly profit-focused, rather they speak to higher emotional, social and cultural needs.

*Call to Action*

> Outreach and engagement campaigns for data collection and sharing efforts should build on this, making links between stewardship efficacy and data collection, ensuring farmers fully understand the stewardship implications of collecting and sharing data.

> Likewise, outreach campaigns, which clearly link data collection, data sharing and legacy benefits, could be an effective motivator that illustrates the benefits of access to historical farm data to future generations of farm operators.

### Profitability

Profitability ranks second highest as a driver for conservation, in line with the high focus on profitability shown throughout the report.

*Call to Action*

> Linking conservation practice profit gains to data collection and sharing profit gains could serve as a way to motivate farmers into action.

> Identifying ways data collection and sharing lead to increased farm profitability could illustrate the business impact of conservation practice implementation.

### Risk Mitigation

Risk mitigation ranks second highest in drivers for conservation. There are many synergies between data collection and risk mitigation.

*Call to Action*

> Build engagement programs that clearly link risk mitigation with data collection and storage.

# Conservation Agriculture
## Analysis of Motivations

### Landowners

Landowners requiring conservation practices, as well as government programs requiring conservation practices, both ranked extremely low as drivers. These are both potential influence points.

*Call to Action*

> Engage with landowners to require farmers to implement conservation practices on their land and empower them to support farmers in this.
> Increase the opportunity for farmers to receive financial assistance from government programs for the initiation, management or scaling of conservation practices.

### Market Access

Access to markets ranks relatively low, but this could provide the financial benefit needed to spur farmers to begin collecting and sharing more data. Further research should be conducted to understand why farmers perceive there to be little or no access to new markets for conservation practices, or if this is a functional reality.

*Call to Action*

> Create new market benefits for farmers who implement conservation practices and ensure those that currently exist are clearly communicated to farmers.
> Conduct research to determine whether it is a perception of no access or actual lack of access.

I feel that too much data is being used where it was not intended to be.
– *John,*
*Texas Farmer*

*Photo by United Soybean Board*

# Conclusion
## Challenges Persist, but Solutions are Clear

Farm management data is key to recognizing the impact of practice change on a farm operation. It helps farmers test new practices and gauge the validity of the change based on its effect on yields, productivity, profitability, field entry dates, emissions, crop location, nutrient use, seed selection and more. Each year a farmer collects data that helps compound the value of the data they collected the year before. That data can then be used to inform their decisions, increase the precision and efficiency they manage their farm with, improve conservation outcomes and satisfy consumers' desire for increased transparency.

However, data is a very personal thing. It is a specific farmer's web of decisions made and the results of those decisions. To begin or increase their data collection methods, frequency and sophistication, there must be a perceived, and real, benefit to the farmer. There also must be trust between the farmer and the data software they use.

This research asked farmers about how they collect, share, use and feel about data. The results from the analysis show there is enormous potential for increased data collection and sharing.

However, farmer perceptions need to be taken into consideration by data management platform development companies to recognize this potential. Many farmers recognize there is a benefit to them to collect data, but fewer see a benefit in sharing that data. Farmer concerns related to trust, privacy and satisfaction need to be adequately addressed to scale the frequency and sophistication of farm data collection. Connecting data collection to stewardship and legacy can play a critical role in documenting and reporting a farm operation's sustainability.

A farmer's data can help tell their stewardship story in an indisputable way. By ensuring farmers' needs are met and concerns are addressed, data collection and sharing can be rapidly scaled and the positive impact of data-informed decisions on U.S. farm acres can be expanded.

# Farmer Perspectives On Data

A roadmap for engaging with farmers to scale the collection and sharing of farm-level production data.

*Photo by the USDA NRCS Montana*

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