



Farmer Perspectives on Data 2024:

Barriers and Opportunities to More Robust Feed Sustainability Data in U.S. Pork Supply Chains

*Original research prepared by Trust In Food™ at Farm Journal
in collaboration with The Sustainability Consortium*

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Research Partners



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Learn more at sustainabilityconsortium.org.

About This Report

The Present and Future of Feed Sustainability Data in U.S. Pork Supply Chains

Rising demand for animal proteins due to global economic growth, coupled with market volatility and heightened supply chain scrutiny, poses growing challenges and opportunities for the animal protein industry.

The U.S. pork supply chain sits at the intersection of these complex factors. To meet demand, strategies are needed that enhance the farm businesses of those raising pork and animal feed. Those strategies also must help develop science-based targets enabling the pork supply chain to capture the value of these sustainability investments and strengthen trust with consumers.

A lower-impact future for pork products requires a wide range of approaches. Collectively, they can help reduce emissions, land-use requirements and the water footprint of feed production. Feed production accounts for 50% of the carbon footprint and 90% or more of the water and land use impact of pork production in the U.S., life cycle assessment (LCA) studies estimate.¹

Scaling up the accurate collection of data to monitor, analyze and assess environmental impacts of agriculture is essential to quantify the industry's role as a climate solutions provider. It also would enable more farmers to be recognized and rewarded for on-farm management practices that improve the sustainability of their operations. Yet research has shown as of the 2020 growing season, only thirty-eight percent (38%) of U.S. row crop and specialty crop farmers stored and managed farm-level data related to production and management practices in one or more FMIS.

¹ Alessandra Nardina Trícia Rigo Monteiro, and Jean-Yves Dourmad. [Life cycle assessment of feed ingredients](#). SUMINAPP – Sustainable Usage of trace Minerals for Animal Production Programs (2018). DOI: 10.13140/RG.2.2.26695.75682.

About This Report

The Present and Future of Feed Sustainability Data in U.S. Pork Supply Chains

For row crop farmers and pork producers to invest more time and capital in data collection, they will need strong signals—largely absent today—from buyers and the marketplace at large. Against this context, this report focuses specifically on the experiences of producers raising pork, row crops or both. It reveals how they approach the collection and sharing of production-level data related, directly or indirectly, to animal feed organizations in upstream supply chains. The report also examines underlying reasons and context that might motivate farmers to share farm production data and management practices more widely.

About This Report

Methodology Notes

Trust In Food™ and its research partner, The Sustainability Consortium, asked questions to improve the agriculture industry's understanding of farmers' willingness to collect and share production-level data related to animal feed sustainability throughout pork supply chains. This research is not meant to be representative of all American agriculture; rather, it is a snapshot in time of pork and row crop farmers. Two hundred fifty-four farmers completed the survey; the (N)-value should always be considered to be 254 unless otherwise stated. Data points were collected in a survey conducted between September and October 2022. We provide descriptive statistics pertaining to survey responses as well as breakout comparisons between those answering in specific ways across multiple questions. All statistics presented throughout this report are rounded to their nearest whole number and a 5% margin of error should be considered. Questions were phrased to reference the 2022 growing season.

A full breakdown of the survey sample's demographic trends can be viewed in the Appendix at the end of this document.

About This Report

Terminology

This survey centers around digital farm management tools and farm-level production data. Although there are many different definitions and classifications across the sector, as well as much overlap in categories, for the purposes of this report:

- **Farm Management Information Systems (FMIS):** Systems that collect, store and analyze farmers' data and provide farmers with feedback on their management practices and performance.
- **Digital Sustainability/Conservation Tools:** Systems designed to help farmers collect, store, use and report data specifically related to conservation and sustainability.
- **Row crop farmers:** Throughout this report, the phrase "row crop farmers" refers to farmers who reported being either a row crop, hay and/or forage farmer. They do not have hogs.
- **Hog farmers:** Throughout this report, the phrase "hog farmers" refers to farmers who reported being either a hog farmer (growing-finishing) or both a hog farmer (growing-finishing) and a row crop, hay and/or forage farmer.

It is possible that, in this context, FMIS and Digital Sustainability/Conservation Tools might be the same software in certain cases and different software in other cases.

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.

Foreword

Recent sustainability investments and clear demand signals could pull more regenerative data into pork value chain.

International pressure for climate action is driving a new focus on sustainable practices in U.S. agriculture. Nevertheless, the importance of farmer perspectives on collecting and sharing data to achieve climate goals cannot be overlooked. With unprecedented investments in climate-smart commodities, keeping producer perspectives at the forefront is necessary to set the stage for successful outcomes from the adoption of practices that sequester carbon and protect soil health. Important barriers remain, however, to both the adoption of digital record keeping and ensuring producers are confident in the financial returns, market demands and data privacy associated with sharing information about farm practices.

U.S. row crop and hog farmers deliver products that have many domestic and international end destinations, such as inputs to value-added food and fiber products, animal feed, bio-based feedstocks for fuels and plastics and pork products. In this third collaborative report on farmer's perspectives, The Sustainability Consortium (TSC) and Trust In Food™ partner to take a deeper look into farmers' barriers and opportunities in the feed supply chain for pork. This report highlights crucial insights for growers and supply chain actors in the pork value chain. By addressing these insights, we can ensure that the large investments in climate-smart commodities create favorable conditions for farmers to adopt digital farm management solutions and succeed in advancing sustainable agriculture in the U.S.

Through this research, we make the case that there is a critical need for digital record keeping in the pork supply chain. Both row crop farmers and hog farmers have farm-level data, and are willing to share when concerns over data privacy, trust, fair compensation and other factors have been addressed. Yet pork brand and retail customers are not asking for it. Why? This perceived lack of demand is a key reason why farmers are not capturing additional data.

Coupled with low adoption of digital record keeping, this lack of demand may indicate that the pork value chain will greatly benefit from recent investments to support sustainable agriculture practices and digital, verified marketplaces. At TSC, we call for individuals and organizations working on row crop and pork supply chains to use the findings of this report to take farmer perspectives into account. We also highlight the important role of buyer requests for data in the pork supply chain to send a sustainability signal and drive data collection and sharing.



– *Christy Melhart Slay*
CEO, The Sustainability Consortium

1 Current State



PHOTO COURTESY NATIONAL PORK BOARD

Executive Summary

Feed Sustainability Data in Pork Supply Chains



Row Crop Farmers Primarily Collect Data That is Directly Linked to Their Financial and Production Needs.

Farmers were more likely to collect data related to revenue, lending, cost-share reporting and separately purchased inputs. Key data points collected by farmers include acreage, yield, crop selection, soil test data, herbicide and pesticide application data and precipitation data. The majority of farmers collect yield data (80%), herbicide and pesticide application data (79%) and precipitation data (74%).



Inconsistent Row Crop Records Leave Gaps in Sustainability Reporting.

Data in four categories—agronomy/production, land, machinery and weather—are essential to calculate sustainability metrics in pork's feed supply chain. Yet this research shows row crop farmers do not consistently collect data or related key performance indicators (KPIs) across any of the categories. Fewer than half (43%) have a nutrient management plan and just over a third (35%) collect conservation practice data.



Hog Farms Collect More Data Compared to Row Crop Farms.

Hog farmers, particularly the large swine operations, gather a broader range of data, particularly related to animal production. For instance, approximately 69% of hog farmers track feed usage. As with row crop farmers, hog farmers report they collect data that can help them minimize costs, maximize revenue and fulfill regulatory requirements.



Collection Practices Vary Among Hog Farms Based on Data Category.

Respondents do not consistently record the four key types of hog farm data—animal, operation, feed and manure—that downstream organizations need to calculate sustainability metrics and KPIs in the pork supply chain. For example, there is wide variability in how much detailed animal data hog farmers capture: 43% document animal welfare data while 71% record animal mortality. There is a narrower range of variability in manure data: over half (53%) document total gallons of manure while about two in three (64%) tabulate manure management practices.

Executive Summary

Inconsistent Records Hinder Comparability



Revenue, Cost Share and Inputs Data Rank High on Hog Farmers' Priorities.

The subcategories of farm-level data collected by hog farmers of all sizes indicate that data points associated with revenue and lending (e.g., mortality rate), cost-share reporting requirements or the need for specific, separately purchased inputs (e.g., antibiotic usage data, feed usage and feed ingredient data) are more likely to be collected by hog farmers. Similar to row crop farmers, hog farmers value data linked to financial return.



Regulatory Environment Could Prompt More Hog Farmers to Document Data.

More than half (56%) of hog farmer respondents had operations considered large swine operations at their largest point in a typical year. The finding that larger hog operations are most likely to collect more data is aligned with previous studies that found that the collection of farm-level data and the use of FMIS are strongly correlated with farm size.



Off-Farm Hog Feed Purchases Reduce Data Visibility.

For instance, three in four (75%) hog farmers who grow feed directly in their operations collected data on sustainable agriculture practices implemented. Meanwhile, only about a third (38%) of hog farmers who purchased their feed off-farm had access to the same data point.



Sourced Feed Brings Limited Data Breadcrumbs for Supply Chain Reporting.

Most hog farmers who purchase off-farm feed do not keep written records of seller information (51%) and product lot number or other identification (61%). The ways these transactions are captured must evolve in ease of use and incentives to expedite future access to data on crop production practices.

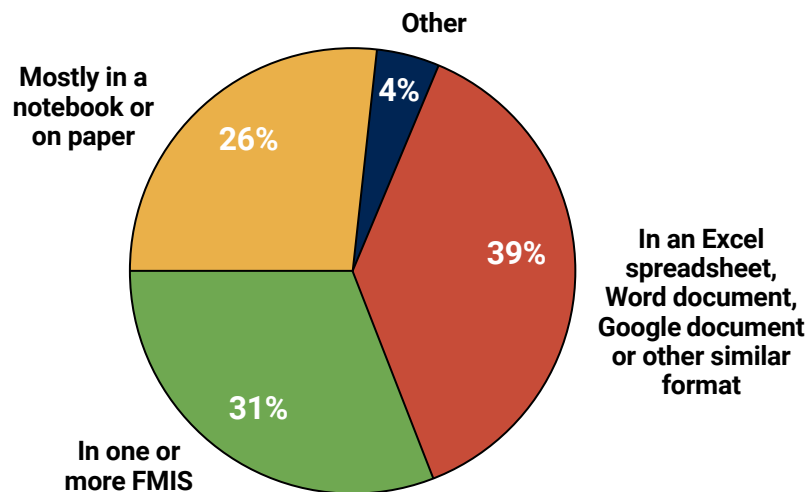
Key Findings

Data Digitization and Integration Limits Utility

How row crop and hog farmers collect data (N=254)

Figure 1. Primary way to store and manage data

What is the primary way you store and manage your operation's data related to production and management practices? *Please choose one.*



Others: Personal finance and money management software (e.g., QuickBooks)

The urgency to understand and address the lag in FMIS use within supply chains is growing. Effective strategies to bridge this gap will require greater examination of existing data collection methods, appropriate incentives and overlooked barriers to inform the current system of data collection.

Over two-thirds of respondents do not primarily rely on a digital FMIS solution to manage their farm-level production data related to animal feed (Figure 1). Both row crop farmers and hog farmers store and manage data primarily in Excel spreadsheet, Word document or similar system (21% and 19%, respectively). A greater number of hog farmers (18%) reported using FMIS as compared to row crop producers (13%) (Table 1).

Table 1. Primary way to store and manage data by operation type

What is the primary way you store and manage your operation's data related to production and management practices? *Please choose one.*

Data storage and management system	Row crop farmers	Hog farmers	Total
Excel spreadsheet, Word document or similar	21%	19%	39%
Farm Management Information Systems	13%	18%	31%
Notebook or on paper	13%	13%	26%
Other	2%	1%	3%

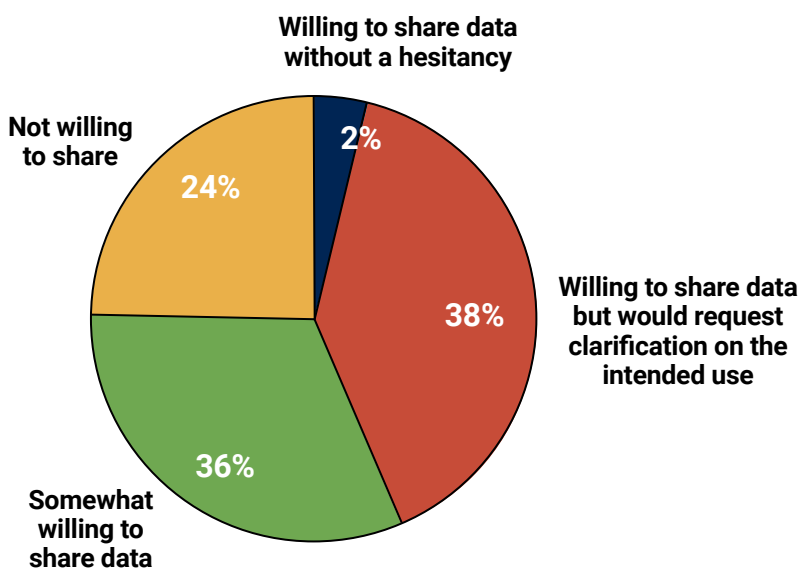
Key Findings

Producers Want to Understand How Their Data is Being Used

If you were contacted by your buyer(s) after the sale and delivery period to provide details on your farm's production and management practices, how would you respond? Choose the answer that best matches your feelings. Please choose one.

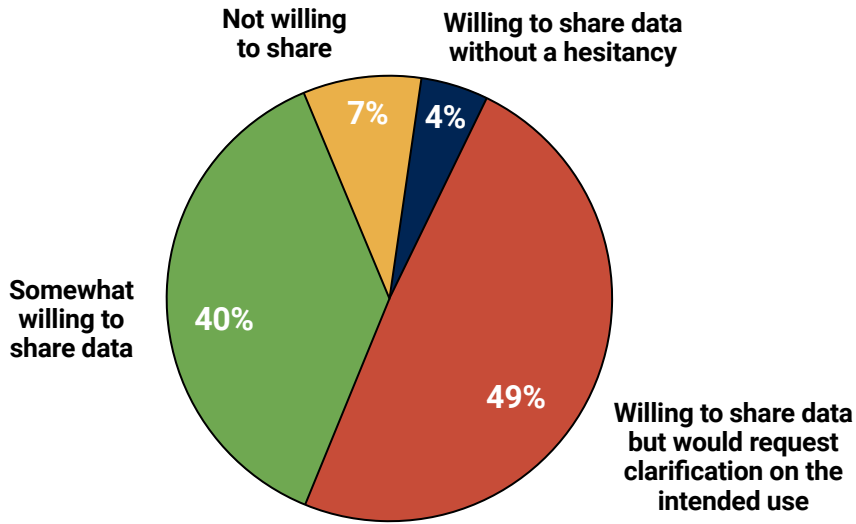
Interest in sharing data if contacted by a buyer post-sale (N=125)

Figure 2. Willingness of row crop farmers to share data if contacted by crop buyer after the sale



(N=102) for the hog farmers who answered this question

Figure 3. Willingness of hog farmers to share data if contacted by buyer/processor after the sale



It is worth noting that twenty-four percent (24%) of row crop respondents reported being unwilling to share any additional data after the sale and delivery period, which is more than three times the percentage of hog farmers unwilling to share additional data under the same circumstances (7%).

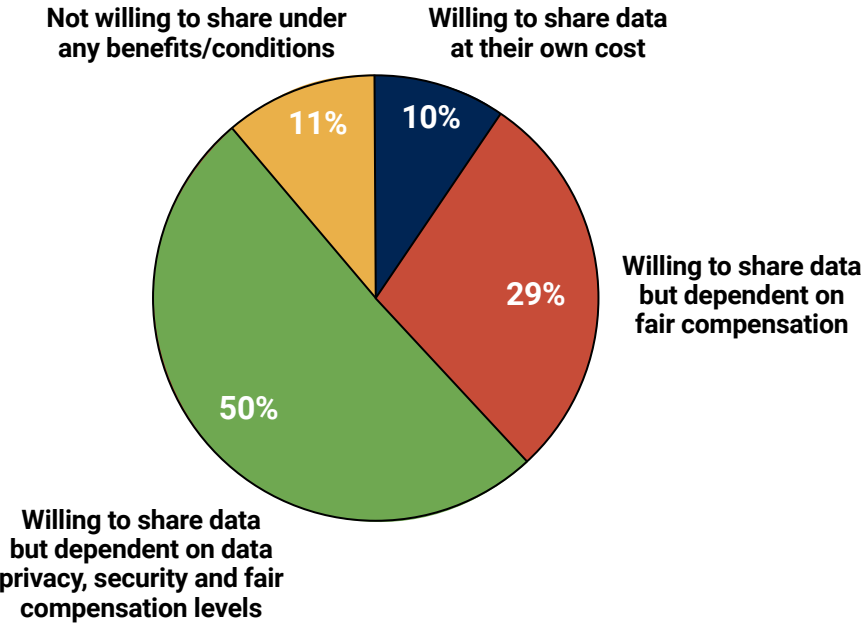
Key Findings

New Market Opportunities Encourage Producers to Open the Curtain

If you were provided new market benefits—such as new market access, price premiums or a pay-for-performance bonus—in return for providing additional data on your production practices and farm-level management techniques, how would you respond? *Choose the answer that best matches your feelings. Please choose one.*

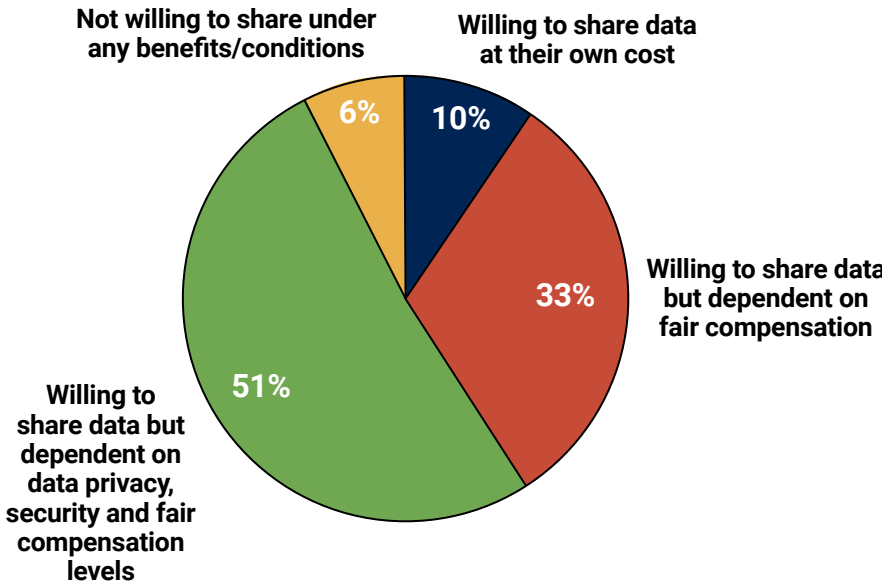
Interest in sharing data if given new market benefits (N=125)

Figure 4. Willingness to share data if provided with new market benefits, Row Crop Farmers



Hog Farmers (N=102)

Figure 5. Willingness to share data if provided new with market benefits, Hog Farmers



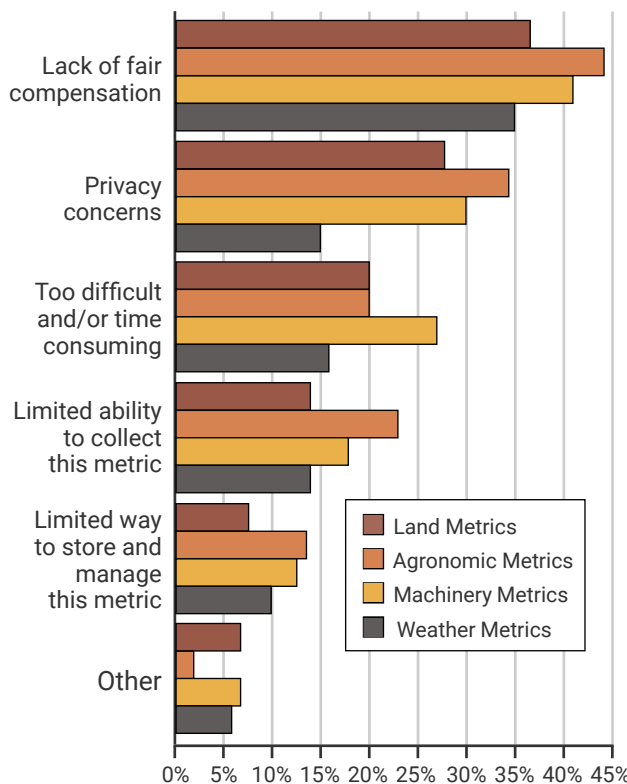
Similar willingness to share data between hog and crop farmers. Note that both hog and crop farmers have similar willingness to share data as long as they are fairly compensated and are assured data privacy and security. We continue to see that a greater percent of row crop farmers (11%) are not willing to share under any conditions than hog farmers (6%).

Key Findings

Compensation Only Opens the Door So Far; Producers Need Privacy Assurances, Technical Support

Table 2. Reasons provided by row crop farmers for their unwillingness to share data

Why would you take issue with providing data for at least one operation metric to a buyer? Please select all that apply.

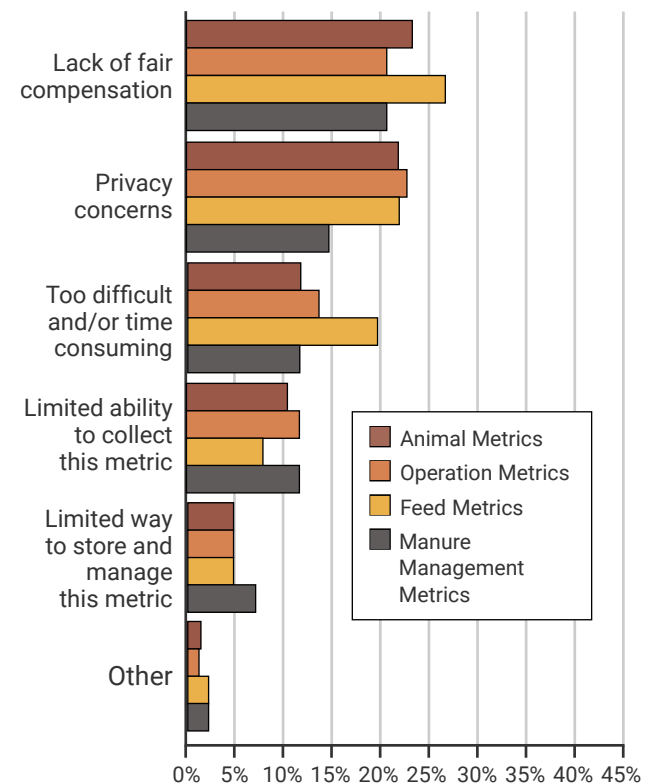


86% of row crop farmers believe they should be compensated for sharing their farm's data (agronomic/production, land, machinery and weather)

Both row crop farmers and hog farmers reported "lack of fair compensation" and "privacy concerns" as the main barriers for sharing data. The ability to collect and store data was also indicated as a barrier but to a lesser extent.

Table 3. Reasons provided by hog farmers for their unwillingness to share data

Why would you take issue with providing data for at least one animal metric to a buyer or processor of your animals? Please select all that apply.



Seventy-four percent (74%) of hog farmers believe they should be compensated for sharing their operations' data.

The survey asked identical questions but exchanged the phrase "animal metrics" for "operation metrics," "feed metrics" and "manure management metrics."

1 Key Findings

Producers Struggle to Understand How Production Metrics Open New Markets, Incentives and Premiums

Figure 6. Unwillingness to share data—other reasons, Row Crop Farmers

Why would you take issue with providing data for at least one feed metrics to a buyer or processor of your animals?
Please select all that apply. Other - Please specify

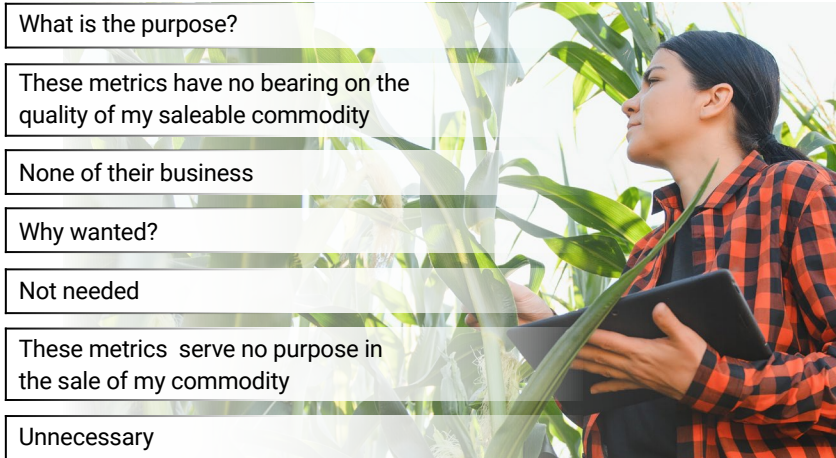
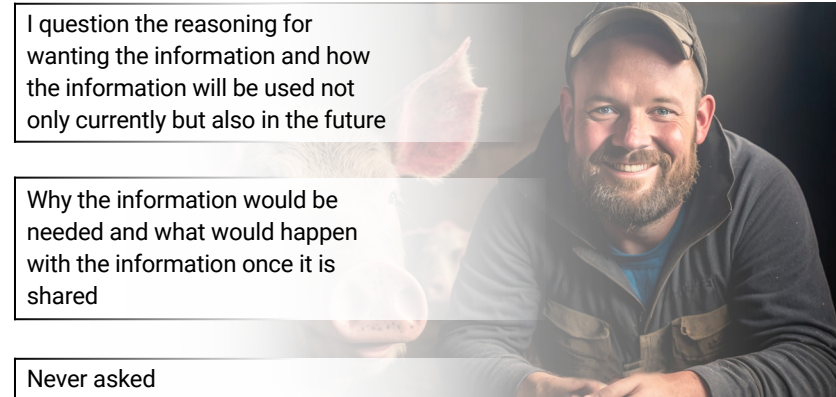


Figure 7. Unwillingness to share data—other reasons, Hog Producers

Why would you take issue with providing data for at least one feed metrics to a buyer or processor of your animals?



2

Actionable Insights

Expanding Feed Sustainability Data in Pork Supply Chains



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Actionable Insights

Context, Security and Incentives to Drive Adoption, but FMIS is Needed

This study shows that row crop and hog farmers may be collecting valuable data, but before they are willing to share it, they must be seen as critical partners in a trusting relationship. Behavior change campaigns that treat them as market players simply looking to be incented or as farmers in need of being educated will undermine progress towards capturing real value in return for their collection efforts.

Groundwork should begin with validating the concerns expressed by a majority of producers who demand to know the context, security and incentives associated with their data's use. It is also critical to promote the adoption of data collection and sharing platforms in a form that immediately rewards farmers for their willingness to try these data tools while assuring them buyers are present on the same platform.

Hog farmers generally indicated higher levels of trust in existing partners compared to row crop farmers.

Insight

Hog farmers trust private companies with the security and fair use of operation data almost three times as much as row crop farmers do. Sixty-six percent (66%) of hog farmers reported trusting private companies with the security and fair use of their operation's data, while only twenty-three percent (23%) of row crop farmers reported trusting private companies. Thirty-eight percent (38%) of hog farmers also reported trusting federal, state and county level government offices with the security and fair use of their operation's data, while twenty-eight percent (28%) of row crop respondents reported the same.

Proposed Action

Tailor messaging about FMIS adoption and deliver it through trusted messengers. Information might be relayed based on a farmer audience's operational and demographic characteristics, via a specific sales strategy (i.e., membership in marketing groups) or even using behavioral data that indicates farmers' openness to using more digital tools.

Actionable Insights

Older Producers Less Likely to Consider FMIS

The comprehensive use of FMIS and farm-level data is central to tracking and communicating performance in terms of sustainability and resilience, both on farm and downstream in the supply chain. But barriers exist that prevent farmers from incorporating data and FMIS into their operations at the rate and scale needed to meet emerging challenges. The survey identified key barriers and provided recommendations to empower farmers in adopting a greater level of FMIS on their farms.

Operational and demographic differences are a factor in—but do not define—data collection and sharing sentiment.

Insight

Among the 61% of respondents who have considered transitioning to digital FMIS under the right conditions, younger respondents entering the field are more willing than ever to consider new forms of data collection:

There is a statistically significant relationship between farmer's age range and their willingness to transition to a data management software.

Table 4.

What is your age range?	Have you ever considered transitioning to data management software?	
	Yes	No
18-35	18%	4%
36-54	35%	27%
55-65	33%	33%
66+	14%	36%

Actionable Insights

FMIS Use Lowers the Barrier to Sharing Data

Age did not significantly impact respondents' ability to provide more data in the absence of incentives. Nor did it affect their responses about new market benefits from sharing data. While age was a visible factor, it did not have a major influence on current data collection, FMIS usage and attitudes towards data sharing.

Other observations include:

- Larger row crop farmers were slightly more likely or willing to capture certain data, especially around irrigation, avoid a pen-and-paper approach to data collection or see equipment as a significant barrier or incentive.
- Mid-sized to larger swine farmers stated more familiarity and willingness to collect the commonly recorded data among their operational group but mentioned more challenges with collecting and storing data at scale.

Interesting directional patterns emerged when comparing respondents who had considered implementing data management software on their operations in the past to those who had not. Those who had considered the transition were

more likely to track multiple sustainability metrics. Furthermore, when asked about their hesitation to provide selected metrics to buyers, the group that had considered data management software implementation was slightly less likely (among hog farmers) to find it challenging or time-consuming to share individual metrics. Conversely, among row crop farmers, they were more likely to cite that they were not being fairly compensated for those metrics, resulting in their hesitance with sharing at the moment.

Proposed Action

Recognize that openness to FMIS use might be linked to other attitudes and behaviors. These could include a farmer's relative willingness and capability to collect and share data. Farmers with different production types might express these perspectives differently from one another.

Actionable Insights

Technical Support Needed for Greater Data Capture and Reporting

To adopt new data collection and data sharing practices, farmers must see its value for their operations and feel capable of implementing the tools and processes needed for the job. Past data reports from Trust In Food™ and The Sustainability Consortium have shown top logistical barriers to greater farmer uptake include costs, lack of time and equipment challenges.

Neither row crop nor hog farmers feel confident in their ability to engage in more data transactions in the next several years.

Insight

In the current study, both row crop farmers and hog farmers were asked “...if you were required to provide additional data on your production practices and farm-level management techniques to market your crops as you normally do, with no added premiums provided in return, would you be able to do so?” Results were similar between the two groups with about one in five (18% row crop, 19% hog) feeling capable of providing additional data within the next five years.

Proposed Action

Commodity buyers need to request sustainability data from farmers as they are unlikely to pursue further data collection strategies without demand for production-level data in their commodity transactions. Sustainability professionals can make inroads working with farmers by understanding barriers to data sharing more deeply. Greater uptake of data collection could support future demand for data from commodity buyers.

Actionable Insights

Co-ops and Marketing Groups Encourage Data Reporting and Sharing

Co-operatives, or farmer-owned marketing groups, were the most used method reported by row crop farmers to market their crops (48%), followed by ethanol or biofuel companies (24%) and commodity marketing or aggregation companies (12%).

In addition to helping farmers market and process their crops and livestock, farmer-owned co-operatives can provide an opportunity to increase transparency in supply chains.

The co-operative business model is highly flexible and can potentially address the need for a trusted platform to increase transparency and visibility into farm-level data, including production and sustainability data related to the crops required to produce animal feed.

Marketing strategy provides potential avenues for uptake, especially the most-used method: Co-ops.

Insight

Eighty-five percent (85%) of row crop farmers who market their crops through co-ops reported collecting farm-level production and sustainability data. Yet only thirty-two percent (32%) of them share that data with their buyers as part of the transaction.

Proposed Action

Consider opportunities to close the gap between data collected and data shared. The relationship of row crop farmers who mostly market their crop directly to food, beverage or fiber companies is worth modeling: In these direct-marketing relationships, farmers reported the same percentage of farm-level production and sustainability data collected and shared with their buyers as part of the transaction (67%). By contrast, gaps between row crop farmers and other types of buyers are substantial. For example:

Ethanol, biofuels or similar companies: Ninety percent (90%) of farmers reported collecting farm-level production and sustainability data, but only thirty-eight percent (38%) share at least one of those data with their buyers as part of the transaction.

Actionable Insights

Data is Being Collected but Shared to a Lesser Degree

Commodity marketing or aggregation company: One hundred percent (100%) of farmers reported collecting farm-level production and sustainability data, but only sixty percent (60%) share at least one of those data with their buyers as part of the transaction.

Animal feeding operation: One hundred percent (100%) of farmers reported collecting farm-level production and sustainability data, but only thirty-three percent (33%) share at least one of those data with their buyers as part of the transaction.

Dedicated animal feed and nutrition company: One hundred percent (100%) of farmers reported collecting farm-level production and sustainability data, but only thirty-three percent (33%) share at least one of those data with their buyers as part of the transaction.

Actionable Insights

Aligning Market Opportunity With Messaging

This and past Perspectives on Data reports have suggested common themes. Farmers who are open to collecting and sharing more data from their operations require compensation for both their effort and the value of the data collected. Trust is essential, and farmers need assurance data use will preserve their privacy and market advantage. Farmers need additional technical support, knowledge or both to make the transition. Farmers seek data demand signals from the market to justify the investment of time, energy and capital to meet the market's data needs.

Develop data tools and outreach customized to meet the unique needs of individual farming systems and commodity types.

Insight

Outreach to farmers from both a sales implementation and an operational and personal readiness standpoint might serve as a building block to data collection and sharing.

Proposed Action

Communications leaders at FMIS organizations (and others that support more data-driven decision-making in agriculture) should consider retooling their messages. Consider framing data opportunities with marketing and production examples relevant to specific farmer groups. This study illustrates how hog farmers and row crop farmers collect and share data differently based on their unique production systems, for example. Recognize and acknowledge these unique data focus areas in communications with farmers. Invite those who already are interested in data collection to build stronger partnerships and earn more value.

3

Trends in Feed Sustainability Data Collection, Management and Use



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Row Crop Farmers Question Demand for Data

While the farmers in this study say requests for farm-level data is low, responses show hog farmers report a slightly higher demand for their data compared to their row crop counterparts. In addition, there is low confidence that they will be able to meet potential increases in data demand without significant changes to data collection and sharing processes. Until farmers perceive a significant increase in buyer demand for farm-level data, it seems unlikely that they will invest in making these changes.

Row crop farmer data collection greatly outpaces reported requests for data from their buyers.

More Data is Being Collected Than is Shared in the Sales Process

Please review a list of farm-level metrics and select whether you collected that metric in the last year. *Please select all that apply.*

Which of these metrics does the buyer(s) of your crop normally collect from you as part of the transaction? *Please select all that apply.*

Which of the following metrics would you be willing to share with a buyer of your crop?

Highlights From This Chart

- Only 10% of row crop farmers report sharing agronomic/production data with buyers as part of their typical sales transaction. Seven percent share land data, 6% share machinery data and 9% share weather data.
- Although 71% of row crop farmers report collecting soil test data—a key indicator of soil health—only 10% share that data with their crop buyers.

Table 5. Farm-level data—row crop farmers

	Farm-level data	Data collected by farmer	Data reportedly collected by buyer	Willingness to share with a buyer
AGRONOMIC/PRODUCTION	Biodiversity management plan	6%	1%	32.5%
	Conservation practices implemented	35%	6%	60%
	Crop selection	73%	18%	68%
	Herbicide and pesticide application	79%	22%	69%
	Irrigation water applied	5%	3%	33%
	Nutrient management plan	43%	8%	50%
	Soil test data	71%	10%	53%
	Yield	80%	10%	54%
	Acreage	76%	17%	56%
	Field-level GPS coordinates	42%	6%	36%
LAND	Number of years in production	29%	3%	45%
	Slope	14%	2%	39%
	Soil type	52%	8%	51%
	State and county	41%	8%	72%
MACHINERY	Topography	16%	2%	43%
	Electricity usage	21%	2%	23%
	Fuel usage	58%	10%	27%
WEATHER	Irrigation system	8%	5%	24%
	Growing degree days (GDD)	40%	9%	45%
	Precipitation	74%	13%	53%
	Temperature	48%	6%	46%

Hog Farmers Collect More Than Animal Data

The percentage of hog farmers that reported collecting animal, operation, feed and manure data consistently outpaced the need reported by their buyers or animal processors. Most of the data currently being collected by buyers or processors of hog farmers' animals are related to animal data, such as herd size and mortality rate. Nonetheless, there remains an important discrepancy between the percentage of hog farmers who collect different categories of production-level data and the reported percentage of buyers who request it.

Hog farmers report slightly higher demand for their farm-level data compared to row crop farmers—and they'd willingly share more if buyers asked for it.

More Than 6 in 10 Hog Farmers Are Willing to Share Animal Data

Highlights From This Chart

- Sixty-nine percent (69%) and sixty-two percent (62%) of hog farmers report collecting total live weight marketed and antibiotic usage data, respectively.
- By comparison, only 36% of hog farmers report total live weight marketed to their buyer. Meanwhile, just over one in four (26%) of hog farmers report antibiotic usage data as part of the transaction.
- An even smaller percentage of buyers or animal processors collect manure management, feed and operation management data. For example, just 16% of buyers or animal processors reportedly collect data about total gallons of manure, despite 53% of hog farmers having that data point available and being willing to share it.

Table 6. Farm-level data—hog farmers

Please review a list of farm-level data points related to your hog production operation and farm inputs and select whether you collected that data point in the last year. *Please select all that apply.*

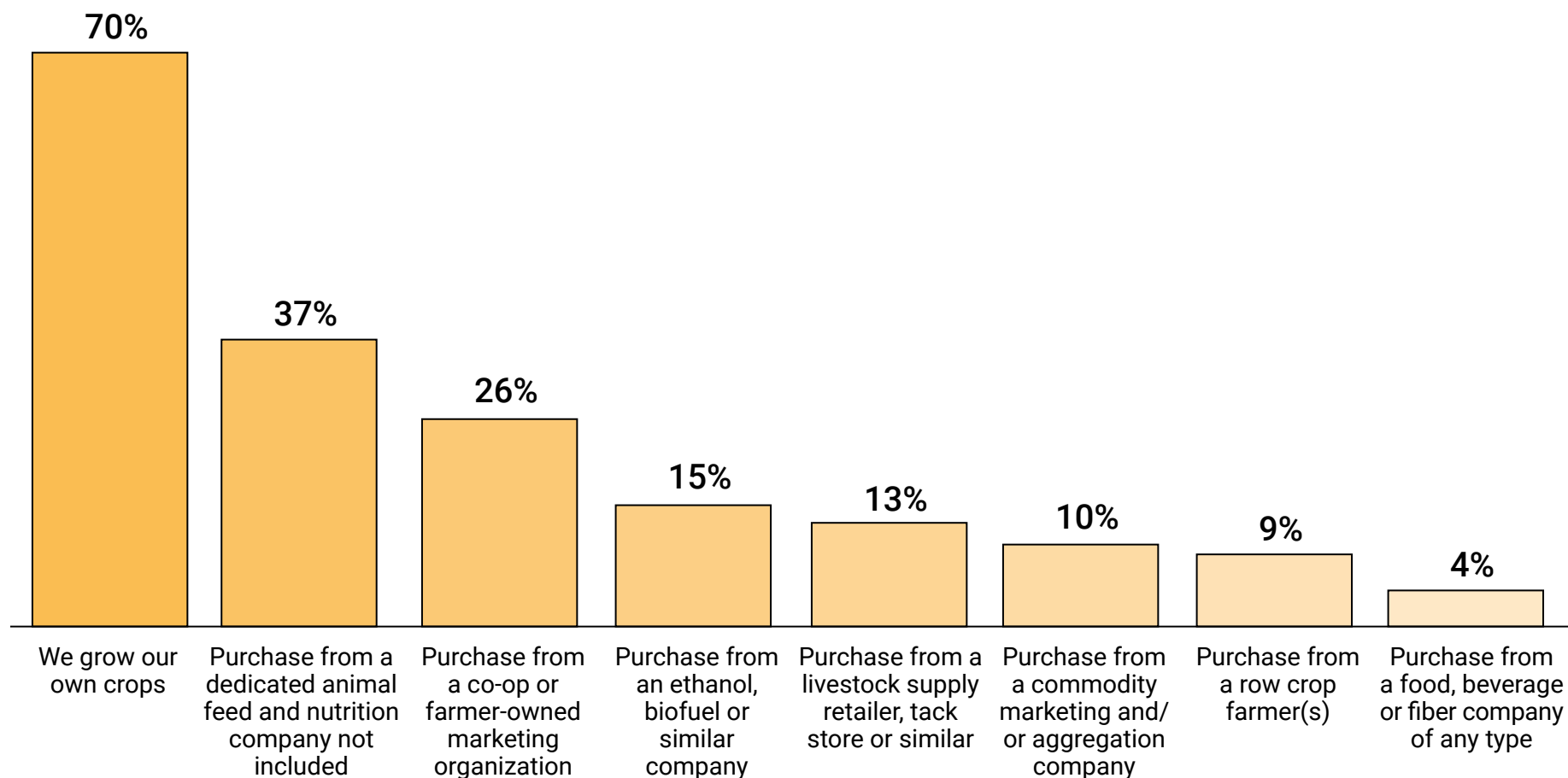
Which of these metrics does the buyer(s) of your crop normally collect from you as part of the transaction? *Please select all that apply.*

	Farm-level data	Data collected by farmer	Data reportedly collected by buyer	Willingness to share with a buyer
ANIMAL	Animal welfare data	43%	19%	63.5%
	Antibiotic usage data	62%	26%	65%
	Herd size	61%	21%	60%
	Mortality rate	71%	15.5%	55%
	Pig genetics data	43%	19%	65%
	Total live weight marketed	69%	36%	64%
FEED	Daily or weekly raw ingredients mix	39%	4%	53%
	Distance from farm to the feed mill	22%	7%	60%
	Feed ingredients	62%	19%	61%
	Feed usage	69%	19%	57%
	Source of raw ingredients	27%	5%	54%
MANURE MANAGEMENT	Total feed consumption	57%	12%	56%
	Manure management practices	64%	16%	58%
	Manure nutrient (N, P, K) content	63%	14%	54%
	Total gallons of manure	53%	16%	53%
OPERATION	Energy usage	50%	11%	48%
	Fuel usage	54%	10%	48%
	Water usage	49%	15%	49%

Most Hog Farmers Grow Their Own Animal Feed

Table 7. Most used animal feed procurement method

Please rate all the ways your operation procures its animal feed and nutrition products in a typical year:



On-Farm Feed Production Provides Deeper Sustainability Data and Greater Opportunity for Program Engagement

Please review a list of farm-level data points related to all feed directly produced in your operation and select whether or not you collected that data point in the last year.

Does your operation have access to any of the following data points on the crop production practices for the feed ingredients that you did not directly produce in your operation?

Highlights From This Chart

- Hog farmer access to data points about feed varies substantially depending on whether the feed is grown on-farm or sourced from off-farm. For example, 80% of hog farmers who grow at least some of their own feed have acreage data whereas just 42% of hog farmers sourcing feed off-farm have access to this information. There are exceptions: For example, at least one in five hog farmers has access to irrigation data, whether feed is sourced on- or off-farm.

Table 8. Farm-level data on feed produced and feed purchased

Farm-level data		Data on feed produced— % of hog farmers	Data on feed purchased— % of hog farmers
AGRONOMIC/PRODUCTION	Biodiversity management plan	34%	24%
	Conservation practices implemented	75%	38%
	Crop selection	84%	42%
	Herbicide and pesticide application	82%	46%
	Irrigation water applied	27%	26%
	Nutrient management plan	63%	37%
	Soil test data	70%	34%
LAND	Yield	86%	42%
	Acreage	80%	42%
	Field-level GPS coordinates	48%	31%
	Number of years in production	52%	28%
	Slope	24%	25%
	Soil type	59%	32%
	State and county	73%	42%
WEATHER	Topography	29%	21%
	Electricity usage	46%	28%
	Fuel usage	61%	31%
	Irrigation system	25%	20%
MACHINERY	Growing degree days (GDD)	42%	30%
	Precipitation	68%	39%
	Temperature	50%	37%

Written Records Provide an Opportunity to Digitize for Traceability

Table 9. Written record of animal feed and nutrition product/ingredient purchases

Do you keep detailed written records of animal feed and nutrition product/ingredient purchases?

Written records kept by hog farmers	% of hog farmers
Feed data	
Quantity of product	66%
Date of delivery	60%
Price paid	60%
Seller	49%
Product lot number or other identification	39%

Highlights From This Chart

- A majority of hog farmers keep basic written records about key aspects of their feed and nutrition product purchases. More than half document the quantity of feed plus delivery date and price paid.

Conclusion

Our surprising conclusion: the ag value chain itself is driving demand for more farm-level data – farmer to farmer

For three years, Trust In Food™ has partnered with The Sustainability Consortium to dive deeper on a core question: What can be done to help more U.S. farmers unlock the market potential of data—especially the data about production practices that more food companies and consumers seek? Together, we have leveraged the information and reach of Trust In Food™ parent company, Farm Journal Inc. We've asked a range of questions of row crop farmers. We've explored how they use data, what barriers they face and what potential they see from this resource.

Several patterns have emerged: Producers aren't widely seeing value in collecting data. They also have concerns about data would be used if shared with the value chain. Barriers exist in implementing FMIS, especially time and know-how.

In this latest edition, we turned our attention to a related and similarly understudied topic: The complexities of getting better production practice data about the row crop feed used in pork supply chains, which are under increased pressure for animal well-being and

environmental impacts. What emerged was a nuanced picture that hints at a role animal protein producers may be able to play in the shift towards more data collection and sharing.

On one hand, hog farmers mirrored the themes we heard from earlier work with row crop producers. They take care when using data. They have concerns about data privacy. They focus on keeping data tied to finances and production.

And yet, this work demonstrated that hog farmers collect data at a greater rate than row crop producers. Ensuring compliance with regulation came across as one clear driver, but so did efficiency and productivity, including tracking feed consumption. Tellingly, hog producers also reported far more willingness to share that data.

When thinking about increasing the utility of data collection across US agriculture, hog producers emerge a unique place. They need to have access to data on both their feed supply chain as well as their own production to meet marketplace demands. Could we work towards a future in which different parts of the agriculture supply

chain are able to share information in ways that are producer-friendly, even before being asked by downstream food companies?

This study underscores the need for continued attention to on-farm data. More importantly, it shows the need for action to equip more farmers for success and measurable ROI with data. Those who serve U.S. farmers must strive to deeply understand how farmers see value in data collection, and the wide array of barriers that they consider to be in their way. Only by meeting producers where they are will food companies and retailers be able to reimagine tools, strengthen engagement and refine processes to meet the needs of the marketplace.



I'd love to hear what stood out to you about this report—and where you think we should go from here. Email me at acole@farmjournal.com.

Yours in regenerative ag,
Amy Skoczlas Cole
President, Trust In Food™

Appendix

By Operation Type

Overall sample

A total of 254 surveys were completed by hog farmers (growing-finishing), row crop, hay and forage farmers in the U.S. between September and October of 2022 through Farm Journal's platform. The survey was comprised of two main parts. First, all respondents were directed to screening questions to select only those who are: 1) row crop, hay and forage farmers, or 2) row crop, hay and forage farmers and/or hog (growing-finishing) farmers. Farmers identified as the

former were directed to the row crop farmer path of the survey, while farmers identified as the latter were directed to the animal feed path of the survey.

Forty-nine percent (49%) of respondents were only row crop, hay and/or forage farmers, eight percent (8%) were only hog farmers (growing-finishing), and forty-three percent (43%) were both row crop, hay and/or forage farmers and hog (growing-finishing) farmers (Table 10).

Table 10. Summary statistics by operation type for the survey respondent sample

Please select which of the following best describes your operation. *Please choose one.*

Variable	Category	N	Sample
Operation type	Row crop production	115	45%
	Hay and/or forage production	10	4%
	Hog production	19	8%
	Both row crop, hay and/or forage production and hog production	110	43%

Appendix

By Geography and Age

The demographic characteristics of the respondents for the overall sample are summarized in Table 11, in which we compare the survey data to national statistics for general reference. In the overall sample, the average age of respondents was between 36-54 years old, which is slightly below the average age of U.S. farm farmers (57.5 years).¹ Thus, our sample is not representative of the population.

Table 11. Summary statistics for demographic variables for the survey respondent sample

What is your age range?

In which state is your operation primarily located? *Type the first few letters to find your state faster.*

Variable	Category	N	Sample	Population
Age	18-35	34	13%	8%
	36-65	165	65%	58%
	66+	55	22%	34%
Region	West	14	6%	16%
	Plains	61	24%	24%
	Midwest	161	63%	29%
	South	2	1%	12%
	Atlantic	16	6%	19%

¹United States Department of Agriculture - National Agricultural Statistics Service ACH17-2 (April 2019). 2017 Census of Agriculture Highlights: Farm Producers. Retrieved from https://www.nass.usda.gov/Publications/Highlights/2019/2017Census_Farm_Producers.pdf

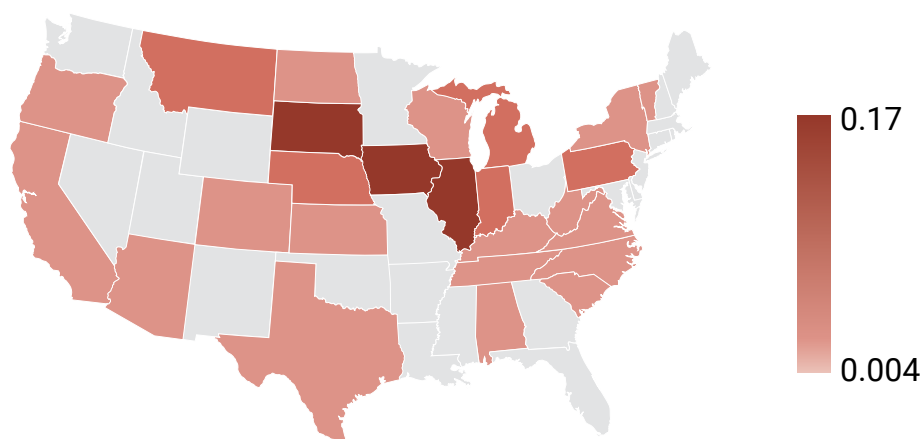
Appendix

By Geography

Responses came from 29 of the 50 U.S. states. States in which respondents' operations are primarily located were categorized into five regions based on the U.S. Department of Agriculture (USDA) National Agricultural Statistics Service (NASS) farm production regions²: West,³ Plains,⁴ Midwest,⁵

Atlantic⁶ and South.⁷ Most of the operations were located in the Midwest farm production region, also known as Corn Belt (63%). Within the Midwest region, most operations were located in Iowa (17%), Illinois (16%), Ohio (6%), and Indiana (4%) (Figure 8).

Figure 8. Primary location of operations by U.S. state



²https://www.nass.usda.gov/Charts_and_Maps/Farm_Production_Expenditures/reg_map_c.php

³Includes the states of Arizona, California, Colorado, Idaho, Nevada, New Mexico, Montana, Oregon, Utah, Washington, Wyoming.

⁴Includes the states of Kansas, Nebraska, North Dakota, Oklahoma, South Dakota, Texas.

⁵Includes the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin.

⁶Includes the states of Connecticut, Delaware, Kentucky, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, West Virginia.

⁷Includes the states of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, South Carolina.

Appendix

By Operation Size

Row Crop Farmers

Most row crop, hay and/or forage farmer respondents reported having farm operations with more than 1,000 acres in the last growing season, which is larger than the average farm size of 445 acres in the U.S. in 2021.⁸

Table 12. Farm operation size

How many acres did you actively farm in the last growing season? *Please choose one.*

Operation size	% of farmers
1-249	8%
250-499	5%
500-999	33%
1,000+	54%
TOTAL	100%

⁸USDA – NASS. Farms and Land in Farms 2021 Summary. Retrieved from https://www.nass.usda.gov/Publications/Todays_Reports/reports/fnlo0222.pdf

Appendix

By Crop Production

Row crop farmer respondents reported growing a variety of animal feed ingredients. The vast majority reported producing grains, including soybeans (96%) and corn (94%). Some also reported producing small grains, such as wheat (30%) and oats (10%), and hay and forage crops, such as alfalfa (29%), perennial grasses (14%), clover (9%) and annual grasses (8%).

Table 13. Crops grown by row crop, hay and forage farmers

Please select all the crops you have produced over the last 5 years. *Please select all that apply.*

Crops produced	% of farmers
Soybeans	96%
Corn (grain)	94%
Wheat	30%
Alfalfa	29%
Corn (silage)	21%
Perennial grasses	14%
Oats	10%
Annual grasses	8%
Clover (any)	9%
Sorghum / Milo	4%
Specialty crops or permanent crops	4%

Appendix

By Operation Size

Hog Farmers

Fifty-six percent (56%) of hog farmer respondents had operations considered large swine operations at their largest point in a typical year (Table 14). An animal feeding operation is considered a large swine operation if it raises 25,000 or more hogs weighing more than 55 pounds, according to the U.S. Environmental Protection Agency (EPA).⁹

Table 14. Animal operation size

How many animals comprise your operation at its largest point in a typical year? *Please choose one.*

Animal operation size	% of animal operations
15,000+	20%
10,001-15,000	11%
5,001-10,000	13%
2,500-5,000	12%
2,000-2,499	7%
1,000-1,999	12%
250-999	12%
Up to 249	13%
TOTAL	100%

⁹Environmental Protection Agency (EPA). Regulatory Definitions of Large CAFOs, Medium CAFO and Small CAFOs. Retrieved from https://www3.epa.gov/npdes/pubs/sector_table.pdf

Appendix

By Feed Categories

Respondents with both a row crop, hay and/or forage operation and a hog operation reported growing a variety of animal feed ingredients. Most of them reported producing grains (88%), such as corn and soybeans, and hay, haylage and other supplemental forage (63%).

Table 15. Animal feed ingredients grown by hog farmers

Which of the following animal feed/hay/silage/etc. ingredients do you grow?
Please choose all that apply.

Animal feed ingredient	% of hog farmers
Grain	88%
Hay, haylage or other supplemental forage	63%
Silage	34%
Others	15%

Other feed ingredients reported by hog farmers include edible beans, peas, beets, carrots and other vegetables.

Appendix

By Feed Ingredients

Most hog farmer respondents reported using a custom mixed ration, mixed in-house (79%). Among the most commonly used feed ingredients by hog farmers were corn (91%), corn-soybean meal (70.5%), feed additives (60%) and vitamin and mineral premixes (57%) (Table 16).

Table 16. Feed ingredients and nutrition products used by hog farmers

What types of animal feed and nutrition products does your operation utilize? *Please choose all that apply.*

Types of animal feed and nutrition products used	% of animal farm operations
Corn	91%
Corn-soybean meal	71%
Feed additives	60%
Vitamin and mineral premixes	57%
Hay (any type)	56%
Distillers' grains with solubles (DDGS)	55%
Soybeans	48%
Silage	35%
Small grains	33%
Other	21%
Haylage	20%
Pellets	16%
Brewer's grains	6%
Canola meal	3%

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