

Ag Decision Maker

VOL. 26 NO. 3 / JANUARY 2022

A BUSINESS NEWSLETTER FOR AGRICULTURE

INSIDE . . .

PAGE 3

Sorting out hog production shocks

PAGE 7

Explore the essentials of a successful farm transition

PAGE 8

Farmers and cybersecurity

PAGE 10

Summarizing the 2021 crop year

PAGE 13

Black carbon – the power of soot

UPDATES

The following [Information Files](#) have been updated on extension. iastate.edu/agdm:

A1-20 Estimated Costs of Crop Production in Iowa – 2022

C1-40 Suggested Closing Inventory Prices For 2021 Records

C3-66 Benchmarking Family Living Expenses in Agriculture

The following [Videos and Decision Tool](#) have been updated on extension. iastate.edu/agdm:

A1-10 Chad Hart's Latest Ag Outlook

2022 Farm Bill Decisions: Program Sign-up with USDA FSA (webinar replay)

C3-66 Farm Family Living Benchmarking

The following [Profitability Tools](#) have been updated on extension. iastate.edu/agdm/outlook.html:

A1-85 Corn Profitability

A1-86 Soybean Profitability

A2-11 Iowa Cash Corn and Soybean Prices

A2-15 Season Average Price Calculator

D1-10 Ethanol Profitability

D1-15 Biodiesel Profitability



Cost management critical for a profitable crop season

By Alejandro Plastina, extension economist

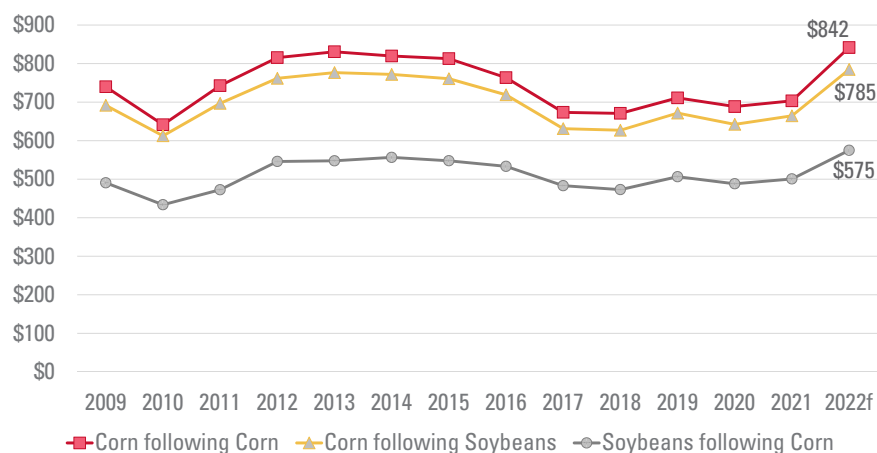
515-294-6160 | plastina@iastate.edu

Farmers have more control over costs than crop prices, and winter provides an opportunity to evaluate production records from last year, finalize marketing plans for the old crop, and advance plans for the new crop. At this stage, farmers might have already purchased some inputs for production, but most farmers should still be able to sharpen their pencils to devise or update a cost management strategy for their next crop year. The latest report "Estimated Costs of Crop Production" by Iowa State University Extension and Outreach provides guidelines to help farmers calculate their production costs and project average enterprise costs for Iowa farms in 2022.

Excluding land costs, all other costs to produce corn and soybean are expected to average \$568 and \$343 per acre in 2022, respectively. Those figures are \$115 and \$64 per acre higher than in 2021.

Total corn and soybean production costs (using last year's cash rent average to measure land costs and excluding storage) would average \$800 and \$575 per acre in 2022, respectively, showing 19 and 15% increases from 2021 levels (Figure 1). Fertilizer prices are driving the projected increase in costs, followed by machinery costs, seed prices, higher projected crop insurance premiums, labor costs, and financing costs (interest rates).

Figure 1. Estimated cost of crop production in Iowa, 2009-2022



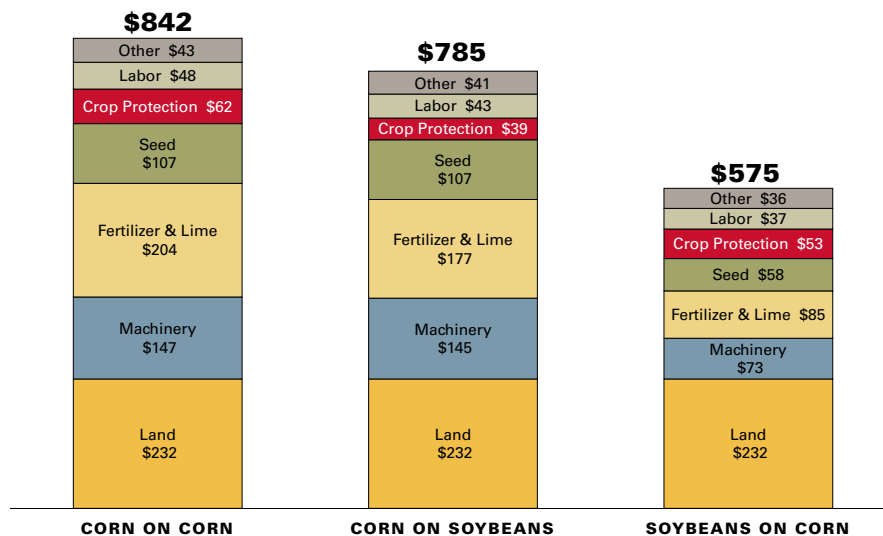
The estimated cost of production for continuous corn is \$4.68 per bushel for a target yield of 180 bushels per acre, while producing corn following soybeans would cost \$3.96 for a target yield of 198 bushels per acre. These projections assume substantial adjustments in the fertilization rates as a response to the more than doubling of nitrogen prices between the fall of 2020 and the fall of 2021. In particular, the maximum return to nitrogen (MRTN) rates used for the 2022 corn budgets are about 15% lower than the ones used for last year's budgets: 124 and 171 pounds of nitrogen per acre for corn following soybeans and continuous corn, respectively. Farmers should adjust their fertilization cost estimates to reflect their own fertilization needs when calculating break-even prices.

Cost of production estimates for herbicide tolerant soybeans amount to \$10.09 per bushel for a target yield of 57 bushels per acre.

Fertilizer and lime became the second largest budget line after land costs in 2022 for corn and soybeans, surpassing machinery costs (Figure 2).

The reported cost estimates intend to be representative of average costs for farms in Iowa. Very large or small farms may have lower or higher fixed costs per acre. The [full report](http://www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf), www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf, is available online through the Ag Decision Maker website. The publication also includes budgets for alfalfa hay establishment with an oat companion crop and by direct seeding. Annual production costs

Figure 2. Costs of crop production in Iowa – 2022 (\$ per acre)



for established alfalfa or alfalfa-grass hay as well as a budget for maintaining grass pastures are included. Actual costs can be entered in the column for "Your Estimates," or by using the electronic spreadsheet Decision Tools on the [Ag Decision Maker website](http://www.extension.iastate.edu/agdm/crops/html/a1-20.html), www.extension.iastate.edu/agdm/crops/html/a1-20.html.

Profitability prospects for 2022

There is substantial uncertainty regarding crop prices in the coming season. The most recent USDA projections for 2022/23, published in October 2021, put the national average farm prices for corn and soybeans at \$4.80 and \$10.50. Assuming that those prices could be received by Iowa farmers for their 2022 crop, production of soybeans would be profitable for all target yields considered in the report. Average net returns per acre would amount to \$24 for soybeans, \$22 for continuous corn, and \$166 for corn following soybeans. Not only would these projected net returns be about 90% smaller than last year's net returns for soybeans and continuous corn

and about 62% smaller for corn following soybeans, but changes in basis or relatively small changes in land or fertilizer costs can easily erase the projected profits. This is particularly concerning for tenant operators.

Using Dr. Chad Hart's most recent price projections based on futures markets for 2022-23 (\$5.47 for corn and \$12.53 for soybeans), crop profitability would be much stronger than under USDA projections. However, it is important to realize that futures prices are showing a declining trend over time, and farmers could benefit from pre-harvest marketing of some of the insured bushels to lock-in prices above cost of production.

Conclusions

Crop producers must have a strong grasp of their own production costs to make informed marketing decisions and generate profits. The annual report is intended to serve as a guideline for producers to help them estimate their own break-even prices, and as a benchmark to trigger relevant questions on how to better manage enterprise costs.



Sorting out hog production shocks

By Lee Schulz, extension livestock economist

515-294-3356 | lschulz@iastate.edu

USDA significantly revised previous estimates in its December 2021 quarterly Hogs and Pigs report. Going into a report, analysts and traders pit pre-report guesses against previously reported USDA estimates. When USDA revises its previous estimates, the baseline changes. Percent changes in pre-report guesses are compared to the old baseline. Percent changes in USDA's report are compared to the revised baseline. That complicates evaluating how much expansion or contraction is actually occurring.

One long-time analyst likens comparing pre-report guesses to USDA's revised estimates as moving the goal post three yards to the left just as the football leaves the place kicker's toe. The ball may still split the uprights, but not likely down the middle.

The trade generally expected a slowdown in production (Table 1). USDA's December 2021 report was largely in-line with expectations. However, clarifying how much pork producers are pulling back will take additional data.

Biology drives inventory relationships

USDA does not publish direct survey indications or other raw inputs they use to estimate hog and pig inventories. They do provide detailed information regarding the inputs and the methodology they use to incorporate all data sources. The goal is to find numbers that satisfy a set of biological and accounting constraints. These logical requirements relate current inventory to past inventory, relate current and past inventories to production data such as hog slaughter, and reflect the hog growth cycle.

Table 1. USDA quarterly hogs and pigs report summary, US totals

| | 2020 | 2021 | 2021 as % of 2020 | Pre-Report Range | Pre-Report Estimate | Actual - Estimate |
|---------------------------|--------|--------|-------------------|------------------|---------------------|-------------------|
| Dec 1 inventory * | | | | | | |
| All hogs and pigs | 77,312 | 74,201 | 96.0 | 96.2 - 99.1 | 97.2 | -1.2 |
| Kept for breeding | 6,176 | 6,180 | 100.1 | 99.6 - 100.5 | 100.1 | 0.0 |
| Market | 71,136 | 68,021 | 95.6 | 96.0 - 99.1 | 97.1 | -1.5 |
| Under 50 pounds | 21,989 | 21,174 | 96.3 | 94.2 - 100.0 | 97.1 | -0.8 |
| 50-119 pounds | 19,680 | 19,185 | 97.5 | 94.8 - 99.5 | 97.3 | 0.2 |
| 120-179 pounds | 15,791 | 14,809 | 93.8 | 94.0 - 98.1 | 96.2 | -2.4 |
| 180 pounds and over | 13,675 | 12,853 | 94.0 | 95.3 - 98.2 | 97.0 | -3.0 |
| Sows farrowing ** | | | | | | |
| Jun – Aug | 3,260 | 3,046 | 93.4 | | | |
| Sep – Nov | 3,165 | 3,012 | 95.2 | 95.8 - 99.0 | 96.9 | -1.7 |
| Dec – Feb ^{1,2} | 2,929 | 2,943 | 100.5 | 100.3 - 101.5 | 100.8 | -0.3 |
| Mar – May ³ | 3,034 | 3,010 | 99.2 | 98.3 - 102.2 | 100.2 | -1.0 |
| Sep – Nov pigs per litter | 11.05 | 11.19 | 101.3 | 100.0 - 100.9 | 100.5 | 0.8 |
| Sep – Nov pig crop * | 34,987 | 33,712 | 96.4 | 96.1 - 99.4 | 97.3 | -0.9 |

Data source: USDA-NASS. Pre-report estimates compiled and reported by Urner Barry.

* 1,000 head; **1,000 litters; ¹ December preceding year. ² Intentions for 2021-2022. ³ Intentions for 2022.

Under ordinary conditions, these relationships and outcomes are reasonably predictable.

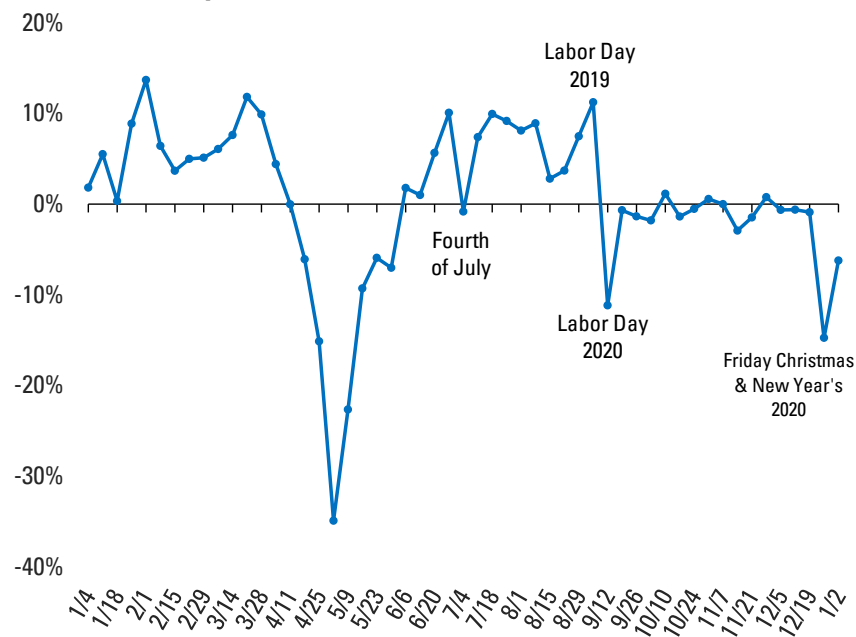
USDA uses a balance sheet to reflect the production constraints. For example, a pig takes about six months from birth to slaughter. That means it is not possible to slaughter more hogs than there were pigs six months earlier. The supply components of the live animal balance sheet are the beginning inventory, births, and imports. From this supply, USDA subtracts the disposition or use components. Those consist of commercial slaughter, farm slaughter, deaths, and exports. The result is the estimated inventory number on hand at a point in time.

Shocks can alter production patterns

Unpredictable deviations from equilibrium complicate estimating hog and pig inventories. Shocks, such as disease outbreaks, can greatly affect production. Other shocks include natural or other disasters, economic policies, rapid structural changes, new technologies, or other disturbances that cause sudden shifts in hog inventory, whether from the event itself or from producers' responses.

COVID-19 brought unparalleled slaughter disruptions in April and May 2020. The last time the industry saw such wide year-over-year swings in weekly slaughter was in 1975. During the 1970s, surges and dips in weekly slaughter of 20% and

Figure 1. Percent change (2020 vs. 2019) in FI Hog Slaughter, Weekly. Data source: USDA Actual Slaughter Under Federal Inspection report (SJ_LS711), compiled by LMIC.



30% from the same week a year earlier were not unusual. Firms that were "in" hog production when conditions were profitable and "out" when profits turned to losses drove those slaughter swings. Today, excluding shocks, large year-over-year swings in slaughter are in the single digits. Hog production is a highly controlled, measured process.

Nationally, 2020 slaughter did return to typical levels by June, roughly seven weeks after the processing disruptions began (Figure 1). Still, a major backlog of pigs existed. Producers implemented nutritional and other management strategies to relieve some pressure on pig flow. While those moves did not resolve all the issues, stepped-up summer 2020 slaughter helped work through the backlog by that Labor Day.

Pork producers have wrestled with a new variant of porcine

reproductive and respiratory syndrome (PRRS) since late 2020. Disease outbreaks can reduce litter rates. They can also affect feeder pigs. Mortalities typically diminish once pigs reach a certain weight. In addition to pig losses, disease outbreaks can make hog weights more variable. Lower rates of gain slow movement of hogs through the stages of growth, which complicates tallying point-in-time inventories by weight group.

Truing up the baseline

Each December, USDA procedures allow for revisions to the previous eight quarters of hogs and pigs inventory estimates. Some numbers may have already been revised once or more. The largest changes in the official statistics usually occur during the process of the first revision. The change may, for example, reflect the impact of an event that had either a

larger or a smaller effect than thought at the time. In periods of disequilibrium, USDA may revise official statistics a second or third time.

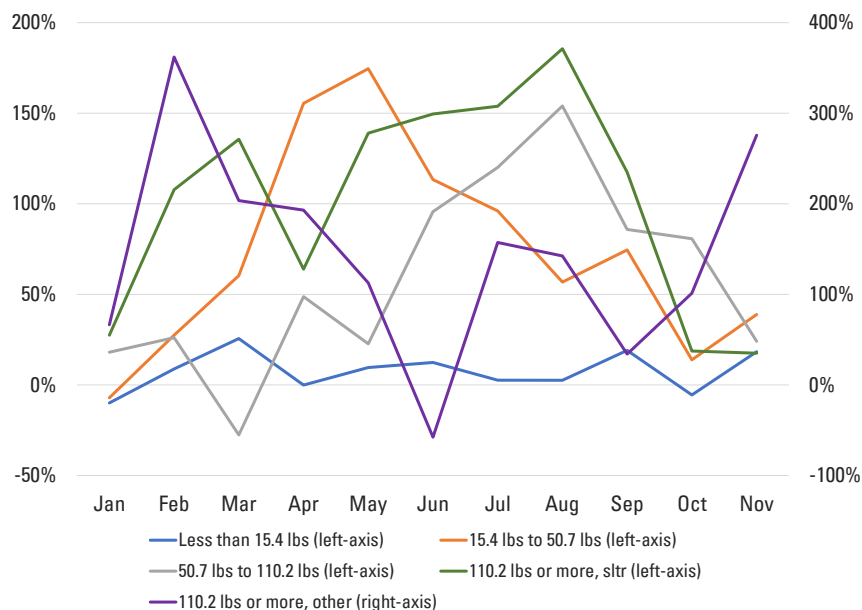
USDA made notable revisions from the report released on September 24, 2021 to the latest one on December 23, 2021. They trimmed the September-November 2019 pig crop by 5.2% or 1.86 million head. These pigs would have been expected to be slaughtered during the April-June 2020 period which was of course during the height of pandemic related slaughter disruptions.

USDA upped the June 1, 2020 market hog inventory by 0.3% with the 180 pounds and over category being decreased 2.0% and the 120-179 pound category being increased 3.2% reflecting slower growth rates. The September 1, 2020 market hog inventory weighing over 50 pounds was reduced 0.9% while the inventory under 50 pounds was increased 0.4% bringing inventory estimates better in-line with slaughter levels during the last four months of 2020.

Over the last quarter, USDA chose to raise the September-November 2020 pig crop by 1.1%, with the increase coming from 33,000 more sows farrowing. Producers logically upped the number of sows farrowing in response to the new PRRS variant to get enough pigs to fill facilities.

Another confounding factor for USDA in estimating inventories is that during times of increased

Figure 2. Percent change (2021 vs. 2020) in US Hog Imports from Canada, Monthly. Data Source: USDA-ERS calculations using data from US Department of Commerce, Bureau of the Census.



disease incidence producers typically find it profitable to feed hogs to heavier weights. Reasons include utilizing available on-farm capacity and capitalizing on favorable hog prices. Hog weights in 2021 were 0.3% behind the same period in 2020, but 1.6% above the 2015-2019 five-year average. This is despite 2021 having the highest production costs since 2013.

USDA made widespread revisions to the last four quarters of market hog inventory estimates. Some of these didn't net big changes in the total market hog inventory, while some did. For example, USDA upped the March 2021 total market hog inventory by just 0.2%, but cut the 180 pounds and over category by 4.1%, while boosting the 120-179 pound category by 4.1%. The June 2021 and September 2021 market hog inventories were trimmed 1.8% and 1.1%, respectively.

Feeder pig imports surged in 2021

Most of the US hog imports are Canadian feeder pigs for finishing. This used to be a bigger business in the mid-2000s. Recent years have been smaller but relatively stable. That changed last year. Limited feeder pig supplies and high prices in the United States encouraged higher shipments from Canada. Between January and November 2021, monthly shipments averaged 553,868 head, up 28.6% compared to the same period in 2020.

The weight mixture of Canadian pigs crossing the border also changed in 2021. Pigs weighing less than 15.4 pounds were up 7.0% through the first 11 months of 2021 compared to the same period in 2020 (Figure 2). Pigs in this weight category make up about 60% of the total US hog imports.

Hog imports weighing between 15.4 pounds and 50.7 pounds were up 58.3% in 2021 compared to 2020. Hog imports weighing 50.7 pounds to 110.2 pounds were up 51.1%. Hog imports weighing over 110.2 pounds or more for immediate slaughter surged 93.6%. A five-month labor strike at a large pork packing plant in Quebec was the salient factor that upped the number of Canadian market-ready barrows and gilts coming to the United States in 2021.

While the volume of Canadian hogs being imported into the United States remains relatively small, about 5% of total US hog slaughter, recent dynamics have added more variability to that component of the hog production balance sheet. Furthermore, hog import data by weight group is published

monthly but there is a significant time lag in reporting, making accounting for these pigs in inventory estimates more difficult, especially when patterns are changing.

USDA is dedicated to continual process improvement

Some may argue that revisions change nothing in terms of future outlook. However, revisions do change our confidence in historical numbers and should also improve our confidence in future estimates.

Assumed biological and accounting constraints are static, but USDA continually discusses them as it tries to improve models. Large shocks can result in large initial errors in inventory estimates requiring sizable revisions. Knowing causes, magnitudes, and

durations of shocks can improve precision going forward.

USDA uses diagnostics to make informed hog and pig inventory estimates. No single number, or indication, drives final estimates. The process is carefully balanced and controlled to incorporate a plethora of information.

Commercial slaughter and price forecasts

Table 2 contains the Iowa State University price forecasts for the next four quarters. Prices are for the Iowa-Minnesota producer sold weighted average carcass base price for all purchase types. Basis forecasts along with lean hog futures prices are used to make cash price projections. The table also contains the projected year-over-year changes in commercial hog slaughter.

Table 2. Commercial hog slaughter projections and price forecasts, 2022

| | Year-over-Year Change In Commercial Hog Slaughter (percent) | ISU Model Price Forecast, IA-MN Base Price, All Purchase Types (\$/cwt) | CME Futures (12/28/21) Adjusted for IA-MN Producer Sold Weighted Average Carcass Base Price for All Purchase Types Historical Basis (\$/cwt) |
|--------------|---|---|--|
| Jan-Mar 2022 | -4.87 | 80-84 | 82.56 |
| Apr-Jun 2022 | -2.96 | 92-96 | 93.81 |
| Jul-Sep 2022 | 0.85 | 90-94 | 91.72 |
| Oct-Dec 2022 | 1.04 | 77-81 | 78.96 |



Explore the essentials of a successful farm transition

By Kitt Tovar Jensen, Beginning Farmer Center Coordinator
 515-294-5608 | kwtovar@iastate.edu

In person or online, don't miss this important event

Whether beginning farming, looking to transition your farm business to the next generation, or are a producer somewhere in between, plan to attend the upcoming farm transitions conference being offered by Iowa State University Extension and Outreach. Learn from more than 20 experts about opportunities, pitfalls to avoid, and tools required for a successful farm transition. On the first day, you will hear from industry experts on current farm markets and opportunities. Are there opportunities for entry or expansion that you haven't considered? What are the risks you must weigh? How might these opportunities impact retirement? On the second

day, we will dive into the nuts and bolts of farm business transitions. We will explore financial considerations for beginning or expanding a farm business, including business planning essentials. We will also review relevant tax, business, and estate law considerations and explain important planning tools and strategies.

Although we are not offering continuing education credit for this two-day event, professionals working with farmers may benefit from this event as well. Those attending in person will have opportunities for networking, and all attendees (in person or online) may interact with speakers and ask questions throughout both days. All attendees will receive a Farm Transitions manual.

Questions? Reach out to Kitt Tovar Jensen, Beginning Farmer Center coordinator, kwtovar@iastate.edu.

When: February 10-11, 8:30 a.m. to 4:30 p.m.

Where: In person at the Gateway Hotel, Ames or virtually via live webinar

Cost:

- \$175 in person, includes lunch both days and Farm Transitions workbook
- \$150 online live webinar, includes Farm Transitions workbook in PDF form
- \$100 for college students, online or in person

Find the full agenda and registration link on the [Center for Agricultural Law and Taxation webpage](http://calt.iastate.edu/seminar/2022-02-10/farm-transitions-entering-expanding-or-exiting-business), calt.iastate.edu/seminar/2022-02-10/farm-transitions-entering-expanding-or-exiting-business.

Farm Transitions: Entering, Expanding, or Exiting the Business

Whether you want to begin farming, you are looking to transition your farm business to the next generation, or you are a producer somewhere in between, this event is for you. Come learn about opportunities, pitfalls to avoid, and tools required for a successful farm transition.

IOWA STATE UNIVERSITY
Extension and Outreach



Beginning
Farmer Center

February 10, 2022 - February 11, 2022 | Ames, IA
 See full agenda: www.calt.iastate.edu/seminar/2022-02-10/farm-transitions-entering-expanding-or-exiting-business



Farmers and cybersecurity

By Doug Jacobson, University Professor, Electrical and Computer Engineering, 515-294-8307 | dougj@iastate.edu

Ally Frickel, Program Specialist, Electrical and Computer Engineering
515-294-0659 | africkel@iastate.edu

Cyber attacks are in the news everyday, and it only seems to get worse.

Attacks like botnets, malware, ransomware, phishing, and sniffing are against pipelines, hospitals, and water plants. Now, there are attacks against meat processors and cooperatives.

Security experts advise several mitigation tactics, while throwing information everywhere. All of the hype and waves of endless information tend to confuse and overwhelm people about what is safe and what they should do to protect themselves.

A farmer is likely sitting in rural America wondering what cybersecurity has to do with them and what, if anything, they can do to protect themselves.

So, where do we go from here? Here are a few tips to help prepare for a cyber attack.

Email

Email is a huge opportunity for attackers to trick victims into downloading malware. This tactic is called phishing. In emails, senders will disguise themselves to sound like someone important to the victim. In regard to farmers, attackers may pretend to be a cooperative, supplier, implement dealer—anyone who is critical to farmers' jobs.

The goal of phishing is to get the email recipient to download and install malware onto the recipient's computer. Attackers will either attach or link to the malware in the email.

How do we identify phishing emails?

Trust your instincts. If the email looks fishy, it probably is. Do not trust unfamiliar email addresses. If you suspect an email is a phishing email, do not click on any link or attachment. Delete the email.

Malware

Attackers have several things they must do to infect a computer with malware.

First, they must get the malware downloaded onto the computer. Then, they must trick victims into installing, opening and running the malware. Finally, they need to collect the bounty: data, money, passwords, etc., from the malware.

A common way to trick people into downloading malware is through a phishing email. Attackers attach a link to a website with malware to an email, or they tell victims in an email to visit a website where the malware is stored. Sometimes, attackers will capture login information of victims if they design a website that tricks people into thinking

they have an account with.

Next, the computer would install the malware by opening the attachment or running the program, prompted by the website.

When installing any program onto a computer, a message pops up asking if it's okay to install the program. The pop-up should mention what company created the software. If the publisher is unknown, that is a red flag for malware. Computers will ask questions like "do you want to run this program" in pop-up windows to protect users from common mistakes.

In the event that malware is downloaded, delete the email and attachment, or delete the file downloaded from the web. If malware is installed, contact a computer expert.

Authentication (passwords)

Attackers try to learn about victims and guess their passwords based on what they've learned. For example, they might try your pet's name, favorite sport team, etc. as a password if they see your pet on your social media. With social media and internet searches, it is easy to gather information.

Many people focus on password strength, which is creating a password that no one can guess. One trick to create a

strong password is to use the first letter of a phrase coupled with numbers, such as “I like to watch science fiction with my wife 16,” which gives me a password of: *iltwsfwmw16*.

Password secrecy is not sharing your password with others. While this may seem obvious, it is still worth thinking about. For example, we tell people to not write your PIN on your ATM card, your password shouldn't be written on a sticky note on the screen or in a document on your computer.

Password diversity refers to using different passwords for different logins. Use different passwords for sensitive information—email, bank, medical, and investments—where the loss of your identity is costly.

This may mean creating possibly dozens of different and hard-to-remember passwords. It's understandable to be a bit overwhelmed. One suggestion is to write the passwords down

in small notebook and keep it in a safe place. Do not create a document on your computer with account information and passwords. Otherwise, download a password keeper program, like 1Password or Keepass. These programs manage your passwords and keep them locked using a single, strong password, so you only need to remember one password.

Backups

Backups are like insurance for your data. It is something you need but hope you never have to use.

We all have data—often photos—which would be devastating to lose. To prevent losing this data, perform a periodic archive to secure storage. The point to backing data up to a secure storage—the cloud—is to be able to recover the data later.

Another type of backup is the ongoing backup of data on your computer. This can be done via cloud storage or

via a USB device, like a small hard drive. Most operating systems come with backup software and will start backing up when the removable drive is connected. Both cloud backup and USB drive backup are good options. The cloud provides off-site backup, so in the event that things in your home are destroyed or unattainable, you will still have the data that was backed up to the cloud.

Key takeaways

- No legitimate organization will ever ask for your bank information, social security number or password.
- Use multifactor authentication.
- Consider using cloud-based backup to protect from cyber attacks and natural disasters.
- If you need the help of a tech person, there are many qualified people who can help.

This article originally appeared in the November 2021 Acreage Living Newsletter from ISU Extension and Outreach Small Farm Sustainability.



Summarizing the 2021 crop year

By Chad Hart, extension crop market economist
 515-294-9911 | chart@iastate.edu

The first big USDA reports of the calendar year always summarize the previous growing season and outline the demand picture for the rest of the marketing year. That summary for 2021 confirmed the large crops harvested this past fall, despite the weather challenges. The usage projections show some weakness in international sales, but strength in domestic utilization. Prices remain on course to provide the best returns corn and soybeans have captured since 2013. Overall, from the crop perspective, 2021 turned out to be a great year.

While the ongoing drought raised concerns this summer, crop yields were outstanding. For corn, the national average yield was 177 bushels per acre, a record and roughly a 5.5 bushel jump from 2020. Several states also registered record corn yields, especially in the eastern Corn Belt (Figure 1). Iowa corn yielded a record 205 bushels per acre. Drought impacts did show up in the corn yields from the Dakotas and Minnesota, but those losses did little to temper national corn production.

The pattern for soybean yields was similar (Figure 2). Although the national average yield was not a record, it was still a strong production year for soybeans. For every state east of the

Figure 1. Corn yields. Source: USDA-NASS.

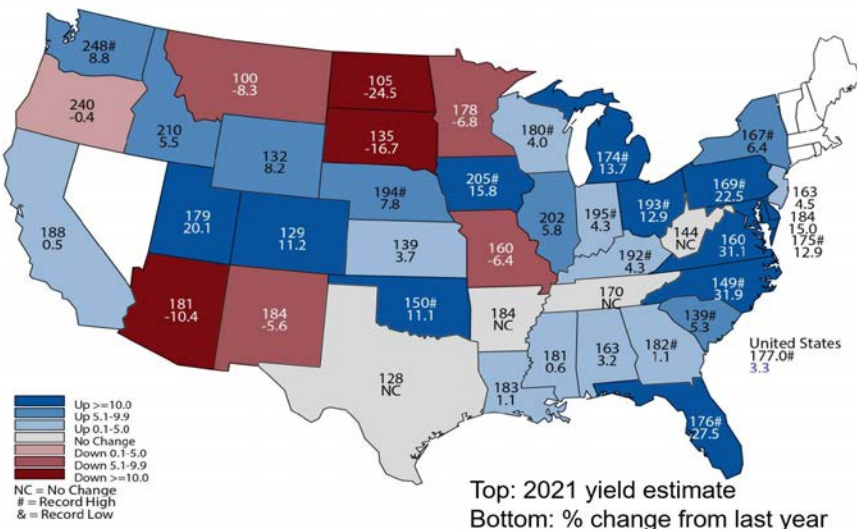
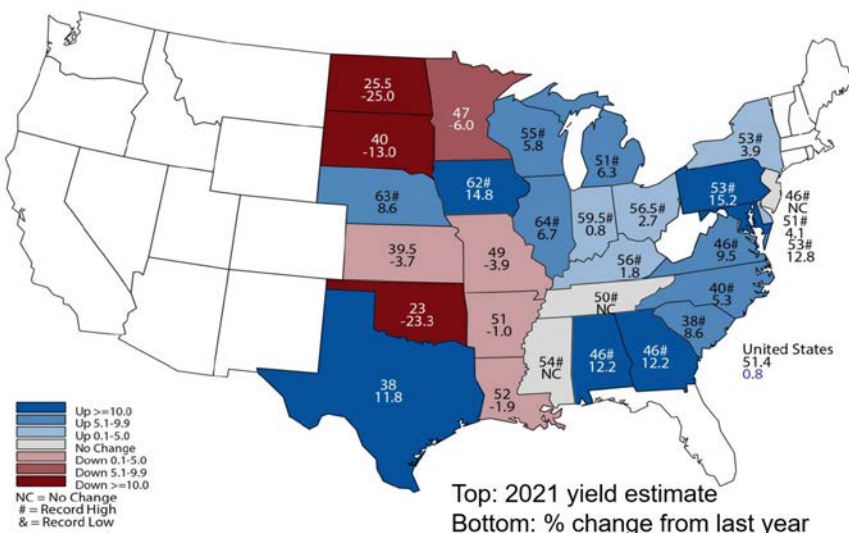


Figure 2. Soybean yields. Source: USDA-NASS.



Mississippi that USDA tracks for soybeans, the state average yield was a record. Iowa and Nebraska also joined the record list, with Iowa's soybean crop averaging 62 bushels per acre. But as with corn, the drought significantly limited soybean yields in the Dakotas and Minnesota.

For the 2020 marketing year, corn usage exceeded production, leading to increasing prices. For 2021, production jumped by roughly a billion bushels, while usage only grew by 14 million bushels. However, corn prices continued to improve. Based

on the final field surveys this fall, USDA increased corn plantings by 100,000 acres. Combined with the yield data in Figure 1, that led to a 53 million bushel increase in estimated production, compared to last month's estimate. So corn supplies continued to grow. Estimated corn usage also got a boost, but it was much smaller. Corn usage for ethanol was increased by 75 million bushels, as ethanol is competitively priced versus gasoline. Food, seed, and other industrial usage of corn was bumped up by 5 million bushels as the corn sweetener market has strengthened recently. However, corn export projections were reduced by 75 million bushels. As of early January, corn export sales are down approximately 9% compared to last year at this time. Most of the loss in

sales is coming from sales to smaller markets and unknown destinations. Partially offsetting those losses are increased sales to Canada and Mexico, as the drought extended into those countries and diminished their feed crop production. Looking across the corn balance sheet, the January adjustments were relatively small. Thus, USDA maintained its 2021-22 season-average price estimate at \$5.45 per bushel.

The soybean data again tells a similar story to corn. For the 2020 marketing year, usage exceeded production and prices rose. For 2021, production grew, usage slipped, but prices remained robust. The 0.2 bushel per acre increase in yield added 10 million bushels in production, raising the total to 4.435 billion bushels. The market once again had plenty of soybeans with which

to work. The usage adjustments for the 2021 projections are small, changing by only a million bushels. Domestic crush was held steady at 2.19 billion bushels, roughly 50 million bushels above the number from 2020. The export projection was also unchanged, at 2.05 billion bushels, down 215 million bushels from 2020. The decline in the projection is based on the current pace of export sales. Compared to last year, soybean sales are off 23.5%. China has pulled back the most, but there are double digit cuts for Mexico, Taiwan, and several other countries. Despite the drop-off in export sales, soybean prices have held, being supported by concerns about crop losses in South America. Based on the price strength, USDA raised its 2021-22 season-average price estimate by 50 cents, to \$12.60 per bushel.

Table 1. Corn supply and use. Source: USDA-OCE.

| Marketing Year (2021 = 9/1/21 to 8/31/22) | | 2020 | 2021 | 2021 change from previous estimate |
|---|-------------------|--------|--------|------------------------------------|
| Area Planted | (million acres) | 90.7 | 93.4 | 0.1 |
| Yield | (bushels/acre) | 171.4 | 177.0 | 0 |
| Production | (million bushels) | 14,111 | 15,115 | 53 |
| Beginning Stocks | (million bushels) | 1,919 | 1,235 | -2 |
| Imports | (million bushels) | 24 | 25 | 0 |
| Total Supply | (million bushels) | 16,055 | 16,375 | 51 |
| Feed and Residual | (million bushels) | 5,602 | 5,650 | 0 |
| Ethanol | (million bushels) | 5,028 | 5,325 | 75 |
| Food, Seed, and Other | (million bushels) | 1,438 | 1,435 | 5 |
| Exports | (million bushels) | 2,753 | 2,425 | -75 |
| Total Use | (million bushels) | 14,821 | 14,835 | 5 |
| Ending Stocks | (million bushels) | 1,235 | 1,540 | 46 |
| Season-Average Price | (\$/bushels) | 4.53 | 5.45 | 0.00 |

Table 2. Soybean supply and use. Source: USDA-OCE.

| Marketing Year (2021 = 9/1/21 to 8/31/22) | | 2020 | 2021 | 2021 change from previous estimate |
|---|-------------------|-------|-------|------------------------------------|
| Area Planted | (million acres) | 83.4 | 87.2 | 0 |
| Yield | (bushels/acre) | 51.0 | 51.4 | 0.2 |
| Production | (million bushels) | 4,216 | 4,435 | 10 |
| Beginning Stocks | (million bushels) | 525 | 257 | 1 |
| Imports | (million bushels) | 20 | 15 | 0 |
| Total Supply | (million bushels) | 4,761 | 4,707 | 11 |
| Crush | (million bushels) | 2,141 | 2,190 | 0 |
| Seed and Residual | (million bushels) | 97 | 118 | 1 |
| Exports | (million bushels) | 2,265 | 2,050 | 0 |
| Total Use | (million bushels) | 4,504 | 4,357 | 1 |
| Ending Stocks | (million bushels) | 257 | 350 | 10 |
| Season-Average Price | (\$/bushels) | 10.80 | 12.60 | 0.50 |

In total, the January reports didn't change the balance sheets much. But they mainly confirmed the earlier estimates from the fall. Supplies are ample. Domestic usage, especially related to biofuels, continues to grow. But international sales are now lagging under the weight of our higher prices and increased competition from the rest of the

world. This set-up bodes well for farmers during the early part of 2022, but it also highlights concerns for the second half of the year. If the export slide continues to deepen, crop prices will likely follow, especially if weather conditions cooperate during planting. The prospect of another year where production

exceeds usage will eventually erode price support. Profitability is here right now, but remember it is fleeting. With current futures prices for the 2022 crop holding above \$5.50 per bushel for corn and \$12.75 per bushel for soybeans, there are good opportunities to lock in good prices.



Black carbon – the power of soot

By Don Hofstrand, retired extension value-added agriculture specialist

Reviewed by Eugene Takle, retired professor emeritus, Iowa State University

This article is the eleventh in a series focused on the causes and consequences of a warming planet.

Have you ever experienced a cloud of black soot coming out of the exhaust of the diesel truck in front of you when the stoplight turns green? A major component of this soot is “black carbon.” It is the material formed by the incomplete combustion of fossil fuels. Black carbon is emitted from gas and diesel engines and coal-fired power plants, including other sources that burn fossil fuels. It also comes from the burning of biomass (including wildfires).

Black carbon has negative implications for both human health and our climate. The inhaling of black carbon is associated with several health problems such as respiratory and cardiovascular diseases, cancer, and birth defects. But that is another story. We are concerned about the global warming impacts of black carbon.

Black carbon is not included as a greenhouse gas like carbon dioxide because it is not a gas but a solid. But its warming impact is significant. The bad news is that it is approximately 360,000 times more powerful at absorbing heat than carbon dioxide, according to the EPA. The good news is that black carbon only stays in the atmosphere for about a week.

Because of its short lifetime in the atmosphere, black carbon needs to be constantly replenished in the atmosphere to maintain its warming impact. This provides an opportunity to quickly negate its warming impact by reducing black carbon emissions. Emissions in the US may decline substantially due mostly to controls on new diesel engines. Reductions are also expected in most other developed countries.



In the Arctic, black carbon falls out of the atmosphere and lands on snow. This darkens the surface of the snow and reduces the ability of the snow to reflect sunlight. So more sunlight is absorbed, creating heat that melts the snow.

See the [Ag Decision Maker website](http://www.extension.iastate.edu/agdm/energy.html#climate), www.extension.iastate.edu/agdm/energy.html#climate, for more from this series.

Ag Decision Maker is written by extension ag economists and compiled by Ann Johanns, extension program specialist, aholste@iastate.edu.

PERMISSION TO COPY

Permission is given to reprint ISU Extension and Outreach materials contained in this publication via copy machine or other copy technology, so long as the source (Ag Decision Maker Iowa State University Extension and Outreach) is clearly identifiable and the appropriate author is properly credited.

This institution is an equal opportunity provider. For the full non-discrimination statement or accommodation inquiries, go to www.extension.iastate.edu/diversity/ext.