IOWA STATE UNIVERSITY
Extension and Outreach

Ag Decision Maker

VOL. 29 NO. 2 / DECEMBER 2024 A BUSINESS NEWSLETTER FOR AGRICULTURE

INSIDE . . .

UPDATES

The following Information Files have been updated on extension.iastate.edu/agdm:

A1-82 Farm Revenues with Carbon Intensity Scoring

B1-15 Deductible Livestock Costs for Adjusting 2024 Income Tax Returns

B1-75 Estimated Costs for Livestock Fencing

C1-40 Suggested Closing Inventory Prices For 2024 Records

C2-70 2024 Iowa State University Farmland Value Survey

C2-72 Historical Iowa Farmland Value Survey by County

The following Video and Decision Tools have been updated on extension.iastate.edu/agdm:

A1-10 Chad Hart's Latest Ag Outlook

C2-72 Historical Iowa Farmland Value Survey by County

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

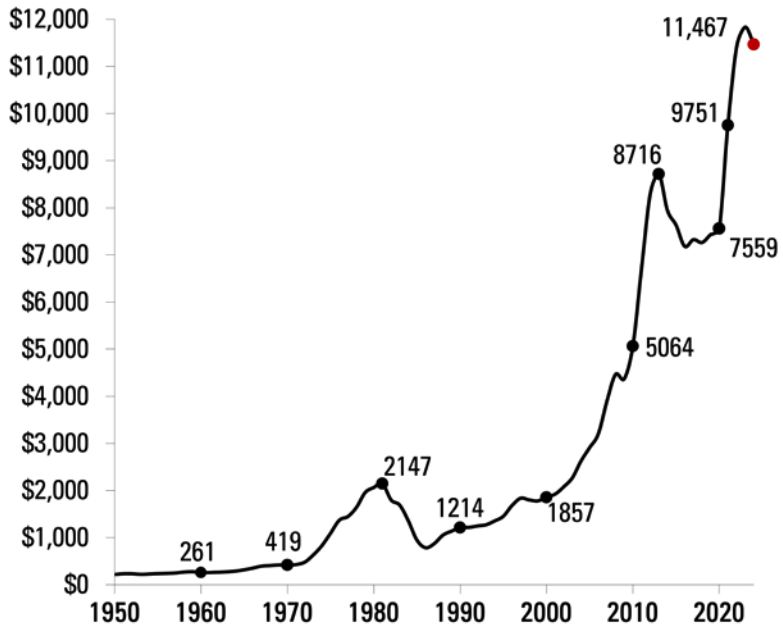
D1-15 Biodiesel Profitability

Outlook for land values in 2025 and beyond

By Rabail Chandio, extension economist, 515-294-6181 | rchandio@iastate.edu

After three consecutive years of record-high land values in Iowa, surpassing the peaks of 2013, the land values seen in the 2024 Iowa State University Land Value Survey reported a 3.1% decrease in average Iowa farmland values, bringing the statewide average to $11,467 per acre as of November 2024 (Figure 1). The drop in farmland values, while noteworthy, is not entirely unexpected. In November 2023, nearly half (48%) of respondents to the 2023 Iowa State University (ISU) survey anticipated a decline in land values for 2024, with 30% predicting decreases of less than 5%. The observed 3.1% decline aligns with these expectations. Additionally, nearly 70% of respondents believe land values remain higher than they should be, and 58% expect further declines in the coming year due to downward pressures from falling commodity prices, persistently high interest rates, and elevated input costs.

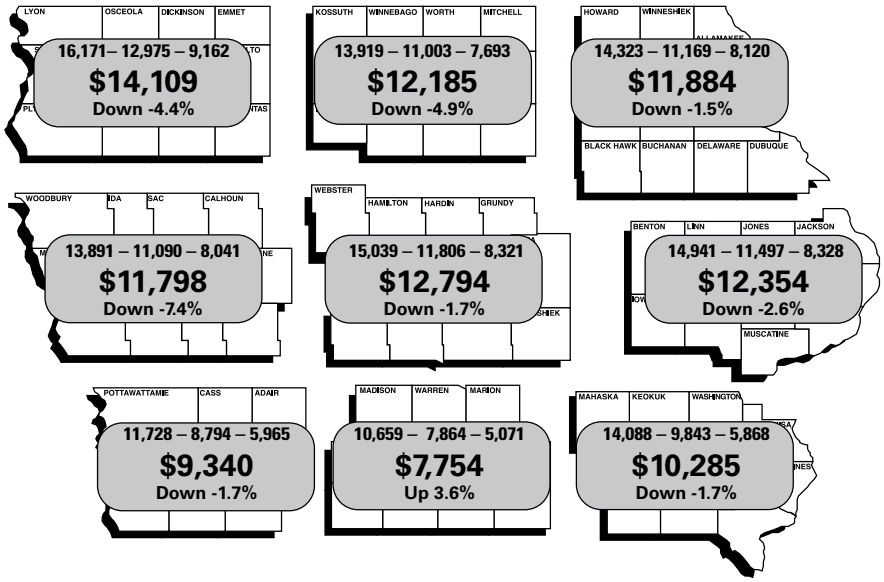
Figure 1. Average value per acre of Iowa farmland.
Source: Iowa State University Land Value Survey.



The statewide average for Iowa farmland is now estimated at $11,467 per acre—a 3.1% nominal decrease from November 2023. Following a 3.7% increase the previous year, this decline suggests that the farmland market, which began cooling in 2023, may have reached a tipping point. Adjusted for inflation, land values have decreased by 5.5%, with inflation-adjusted values dropping in 88 counties. However, despite these declines, most nominal and all inflation-adjusted values remain above 2021 levels, when land values first surged during the pandemic.

Several factors have contributed to the shifts in Iowa farmland values. On the supportive side, limited land availability, stronger-than-expected crop yields, ample cash and credit availability, and persistent demand from both local buyers and investors have prevented sharper declines. Despite challenging weather conditions, Iowa's corn and soybean yields reached 213 and 61 bushels per acre, respectively, demonstrating resilience and boosting the market. Additionally, investor interest, spurred by inflation concerns and a lack of alternative investment options, provided further stability. However, these positive influences were outweighed by negative factors, including declining commodity prices, higher input costs, and elevated interest rates. Farm income trends depict the challenges facing the farmland market.

Figure 2. 2024 Iowa land values by crop reporting district and quality of land.
Average by quality: High-quality, $13,930; Medium-quality, $10,740; Low-quality, $7,450
2024 statewide average: $11,467 (-3.1%).
Source: Iowa State University Land Value Survey, Center for Agricultural and Rural Development.



Land values declined in eight of Iowa's nine crop reporting districts, marking a reversal from last year's trends. The largest decreases occurred in the West Central and North Central districts, which reported declines of 7.4% and 4.9%, respectively. These districts, which experienced some of the largest surges during the pandemic, are now seeing the sharpest declines. Conversely, the southern districts, which had more moderate value increases last year, are seeing smaller declines, with Southwest and Southeast districts each reporting a 1.7% decrease. South Central Iowa was the only district to report an increase this year, likely driven by investor influence especially for recreational land, and lower land availability. Low-quality land saw the highest percentage increases in value, particularly in the northern and central districts, while medium- and high-quality land experienced declines across most districts, except South Central Iowa. **Previous research**, www.card.iastate.edu/products/publications/pdf/20wp612.pdf, shows that experts' estimates are less informative and noisier for low-quality land, suggesting that more trust should be put in the Iowa State University Land Value Survey for high-quality land values than for low-quality land values. It is also worth noting that low-quality farmland in the Iowa State survey also includes pasture, timber, and recreational tracts.

At the county level, 75 of Iowa's 99 counties reported declines in nominal land values, although only 28 counties experienced decreases of more than 5%. Inflation-adjusted values saw larger declines, with 54 counties

reporting reductions of over 5%. Harrison County experienced the largest nominal decrease at 9.7%, while Decatur County reported the largest increase at 10.5%. The Northwest, North Central, and East Central districts accounted for most of the counties with significant decreases, while the South Central district had four of the six counties reporting increases greater than 5%. Despite the declines, all nominal and 82 inflation-adjusted land values remain above 2021 levels. A comparison to 2021 is provided as that was the first year of a sharp surge in values following the COVID-19 pandemic, and provides a benchmark to measure the current offset in land values.

While short-term growth potential for farmland values has diminished, most respondents remain optimistic about future increases. Fifty-eight percent of survey participants predict a decline in their local land market over the next year, with 33% expecting drops of less than 5%. Looking five years ahead, however, 80% of respondents anticipate an increase in land values, with 36% predicting a rise of 10–20%. These projections align with expectations of stable or slightly rising corn and soybean cash prices. Concerns over inflation and farmland's credibility as an inflation hedge have attracted more investors to farmland as an asset class. Farmland has historically provided stable returns, particularly **compared with other investments such as stocks**, www.extension.iastate.edu/agdm/articles/zhang/ZhaJul22.html, due to its strong **positive correlation with inflation**, https://farmland.illinois.edu/wp-content/uploads/2020/10/Relationship-between-inflation-and-farmland-returns.pdf. In the 2024 survey, investors accounted for 23% of farmland sales, slightly down from 24% in 2023 and 27% in 2022, reflecting declining inflation rates. The South Central district saw the highest percentage of investor-driven sales at 34%, consistent with trends observed in 2023. As in prior years, the majority of farmland sales (70%) were to existing farmers, with 68% involving local farmers. This activity highlights the enduring competitiveness of farmers in the land market, supported by cash infusions from COVID-19-related assistance programs and a relatively strong agricultural economy over recent years. These factors have bolstered demand and mitigated steeper declines despite rising interest rates.

Survey respondents identified falling commodity prices as the most significant negative factor impacting 2024 farmland markets, with less than 10% citing high input costs as a concern. Producers have faced rising costs for inputs such as fertilizers, machinery, and fuel during 2022 and 2023, though some relief has emerged in 2024. Nevertheless, total costs remain elevated. For producers reliant on rented acres, 2024 marks the first time in five years that rents have not increased, though concerns about future rent levels still remain. Projections for crop prices and production costs suggest 2024 will not be a profitable crop year. This erosion of profitability has disrupted the upward momentum of farmland value increases.

Despite these challenges, several factors continue to support the high value of farmland. Farm income, while lower than last year, remains above the 20-year average. Additionally, the fact that at least 84% of Iowa farmland is fully paid for contributes to market stability. Farmland is increasingly viewed as a robust and stable investment option amid broader economic and geopolitical uncertainty. In the short term, farmland markets face pressures from declining commodity prices, high costs, and high interest rates. However, the long-term outlook remains positive, with the market expected to adapt and stabilize rather than experience a rapid collapse.

Complete details on the survey results can be found on the **CARD website**, farmland.card.iastate.edu/ and historical data can be downloaded in the AgDM Decision Tool **Historical Farmland Values Data**, go.iastate.edu/AGDMC270LV, or in AgDM File C2-72, **Historical Farmland Values**, go.iastate.edu/AGDMC272.

Exports are improving, but continued growth is under threat

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

At the end of last year, we were looking at slowly improving exports as an avenue to more usage and better prices. This year, it's the same story, but corn has captured the surge, whereas soybeans have not. The December USDA World Ag Supply and Demand Estimates (WASDE) report is typically one where crop supplies are not adjusted, but crop usages are. For 2024, there were only two changes to corn use and no changes for soybean use, but the difference between those changes highlight the relative balance between the two crops. It was the two "E's" for corn that provided positive news. Corn use for **ethanol** increased by 50 million bushels, to 5.5 billion bushels. Corn **exports** increased 150 million bushels, to 2.475 billion bushels. The combination of changes lifted total corn usage to 15.19 billion bushels, a new record, and put total usage slightly higher than production. Thus, corn ending stocks for 2024-25 are expected to decrease slightly. However, the 2024-25 season-average price estimate for corn was held steady at $4.10 per bushel. With no changes to either soybean supplies or usage, the soybean balance sheet didn't change. But the 2024-25 season-average price estimate for soybeans dropped 60 cents, to $10.20 per bushel. This reduction reflects the lower market prices for soybeans since harvest. In fact, even with the lowering of the price estimate, market prices are still roughly 50 cents below the USDA estimate.

Figure 1. United States corn export sales pace. Source: USDA FAS.

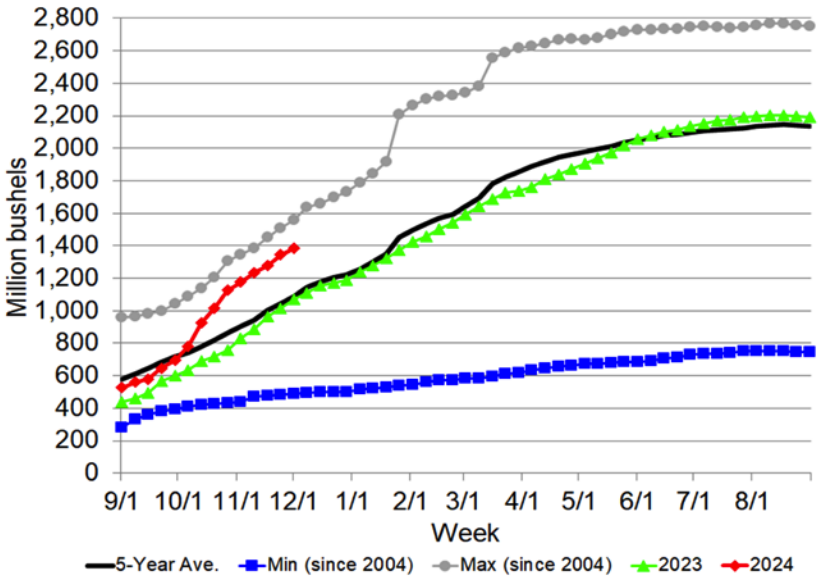
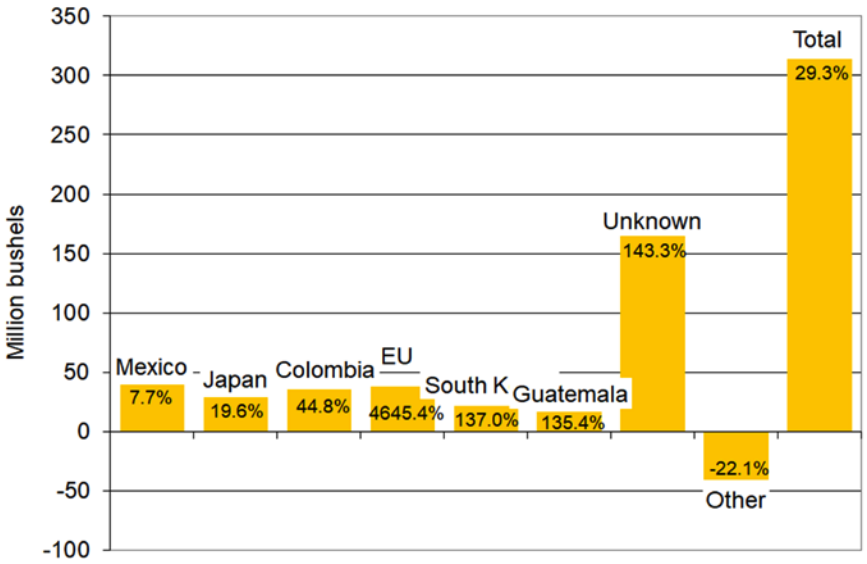


Figure 2. Year-over-year change in United States corn export sales by country. Source: USDA FAS.



The major driver for USDA's update has been the strong surge in corn exports over the past three months. Figure 1 shows the highs and lows of export sales for corn. International corn sales for the 2020-21

marketing year set the record for the most bushels shipped to international markets. The surge in sales was tied to the rebound in the global economy following the initial COVID wave and the implementation of the US-China Phase One trade deal. In fact, China, for a short while, became the top market for US corn exports. Since then, a combination of high US corn prices, a stronger US dollar, the relative increase in corn production outside the US, and the availability of other feed grains to balance out livestock rations around the globe lowered US corn exports significantly, bottoming out in 2022-23. The slide in exports translated into a slide in corn prices. And that slide in prices has allowed some recovery in corn exports. 2023-24 corn exports were roughly in-line with our five-year average levels. And the data, thus far, for 2024-25 show an export pace much closer to the record levels of 2020.

Thus far, during the 2024-25 marketing year, corn sales are up nearly 30% in comparison to last year and are within 180 million bushels of the 2020-21 record pace. Figure 2 details the year-over-year change in US corn export sales by country, specifically highlighting the current top six markets for US corn (listed in order from left to right across the graph). Across all of the top markets for corn, sales are up, and in some cases significantly. South Korea and Guatemala have doubled their

Figure 3. United States soybean export sales pace. Source: USDA FAS.

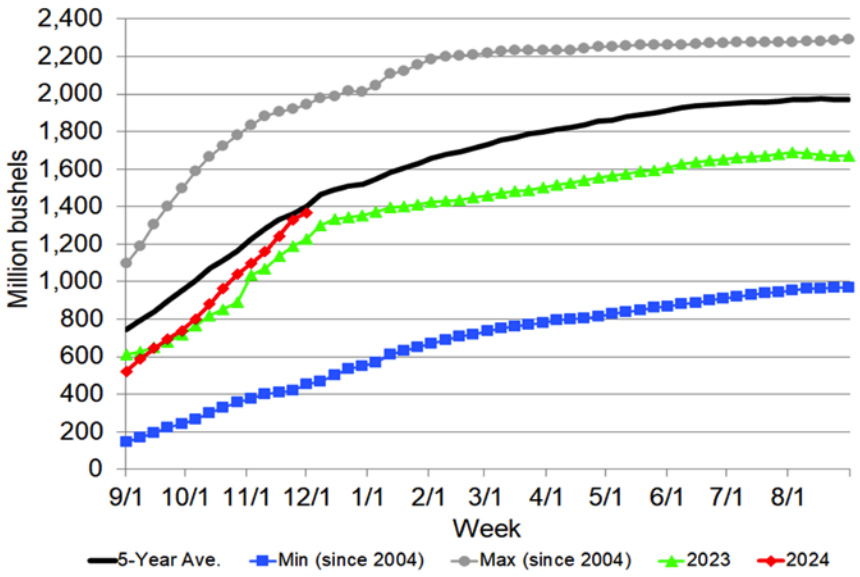
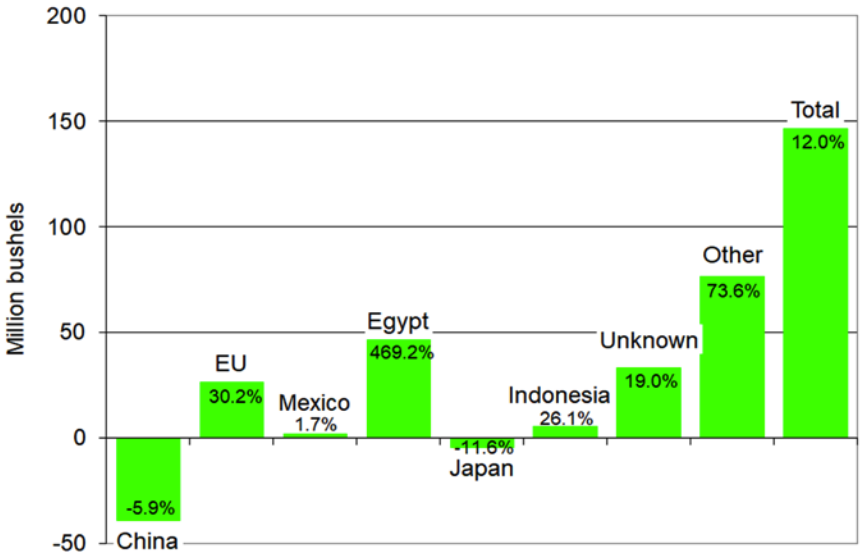


Figure 4. Year-over-year change in United States soybean export sales by country. Source: USDA FAS.



purchases. Meanwhile, the European Union has far exceeded sales from last year, increasing by over 4,000%. The only market that remained sizably down is China. Over the past four years, US corn exports to China have fallen by 87%. China was our biggest market for corn in 2020. China is now our 24th largest market. But the losses from China are being offset by gains in other parts of the world. This year, the growth outside of China has been more than enough to cover the Chinese losses, not only for this year, but also covering a good portion of the losses from previous years.

While the corn market has rocketed past the 5-year average for exports, the soybean market has just got back to that level. So soybeans are also gaining on the export front, but the progress is

much slower. The general trade story for soybeans over the past few years is similar to that of corn. The 2020-21 marketing year was one for the record books, with China leading the purchases. Soybean exports fell in the years since, as record global supplies and strong export competition reduced our market share. And while corn exports began their recovery with the 2023 crop, soybean exports continued to fall. But the early data for this year show some signs for recovery. Within the last couple of weeks, soybean's export sales pace has crawled back up to the five-year average.

In fact, soybean sales are up 12% compared to last year. As Figure 4 shows, in total, US soybean export sales are 150 million bushels higher currently than they were a year ago. The gains are coming from a variety of countries. Like with corn, Europe has opened up. We are seeing a large surge in demand from Egypt. But much of the growth is distributed across smaller markets, showing up in the "Other" category, which captured the combined sales to countries outside the top six export markets. But the largest challenge remains China. Over the past four years, our soybean sales to China have fallen by 31%. Currently, they are down another 6% for the year. As we saw with corn, the export sales outside of China are now growing enough to offset the current losses from China. The issue for soybeans is that the gains are not enough to fill in a significant portion of the previous years' losses, where corn has been able to cover most of those losses.

So the export picture is currently looking more promising than over the past few years. But this optimism may be short-lived. With the change in Presidential administrations, President-elect Trump has outlined several plans to implement tariffs for both trade adjustment and as a negotiation tool for other international issues. The scale and scope of those tariffs will have a definite impact on the future of corn and soybean export sales. US agriculture is a likely target for any retaliatory tariffs other countries would place on the US in response to the President-elect's tariff changes. For Iowa, the two key markets to watch are Mexico and China. They are the two largest export markets for Iowa's agricultural products and they are also the two most likely targets for President-elect Trump's tariffs.

The latest **Market Outlook video**, https://youtu.be/Iz4IH-Vm60Q, is also provided for further insight on outlook for this month.

SAVE THE DATE!

2025 Beginning Farmer Center Farm Transitions Conference
www.regcytes.extension.iastate.edu/farmtransitions/.

Diversify your farm portfolio with conservation

By Catherine DeLong, water quality program manager, 515-294-5963 | crdelong@iastate.edu

Too much of a good thing, is a bad thing?

As I drive across the Iowa countryside in late fall, I see massive piles of corn waiting to be moved or sold. It has been a bumper year for corn and soybean production in our state. However, as Chad Hart, Extension grain markets economist, notes, this can have negative implications for farm incomes. In a recent article on Ag Decision Maker, www.extension.iastate.edu/agdm/articles/hart/HarOct24.html, he said, "The incredibly strong, and for some crops record, production is great for filling bins, bragging about yields, and building up next year's insurance yield; but it is also the weight that has driven down prices for a vast majority of this calendar year." In short, when production exceeds usage, it is reflected in lower prices and farm incomes.

Is it time to consider controlling production? To ensure that farmers are getting the best possible prices, is it time to consider what land should (and should not) be in corn and soybean production?

Don't put all your eggs in one basket

A key principle of sound financial management is diversification. Diversifying your portfolio (your assets) ensures that investments are spread across different asset classes, industries, and geographies. This diversification, in turn, spreads out your risk so that when one investment (or commodity) under-performs it doesn't lead to the whole portfolio collapsing.

Now, of course, we need to acknowledge that commodities like corn and soybeans are protected by crop insurance and therefore less financially susceptible to shocks such as extreme weather. However, we have seen the price of commodities fluctuate in the last 30 years; corn between $2 and almost $7, and soybeans between $5 and $14.

Can conservation diversify your portfolio, offer a steady and reliable source of income, and help to control production? The Conservation Reserve Program (CRP) was introduced in 1985 to do just that. It has two primary goals, reducing erosion on highly erodible land and curbing the production of surplus commodities.

Financially, CRP is similar to investing in bonds, rather than the stock market; it won't make you record profits, but it is a steady and reliable payment. The annual rental rate for CRP has steadily increased from around $70 in 1986 to $234 in 2022.

Are ALL your acres profitable?

A 2018 study (Brandes et al., 2018) led by the Agronomy Department at Iowa State completed a profitability analysis of corn and soybean acres in Iowa. It considered crop production costs, cash rents, yields, and grain prices between 2012 and 2015. The study found that, on average, 23% of Iowa corn and soybean acres annually lost greater than $100 per hectare, or greater than $40 per acre (Figure 1). The most highly unprofitable land was found in west and central Iowa.

Every farmer knows of at least a few parts of their land that are consistently a hassle to farm; they're too wet, oddly shaped, or highly eroded. These areas are opportunity zones to transition out of corn and soybeans and into something different.

A study at Iowa State tested this approach, www.youtube.com/watch?v=PGUFVDtrySo. Researchers did a profitability analysis of a 10,386-acre watershed in Boone County in central Iowa and found that there were 1,101 acres that were likely unprofitable due to wet, poorly drained soils. Working with local farmers, they transitioned 398 of those acres out of corn and soybeans and into perennials.

Parcels that were transitioned ranged in size from 6.3 to 108 acres. The researchers found that profitability of the fields improved when those acres received a CRP payment, and even when they did not.

The wet areas that were taken out of corn and soybean production had been dragging the field's yield down. Participants found that when they took out these low yielding acres, the overall yield average and profitability of the parcel improved.

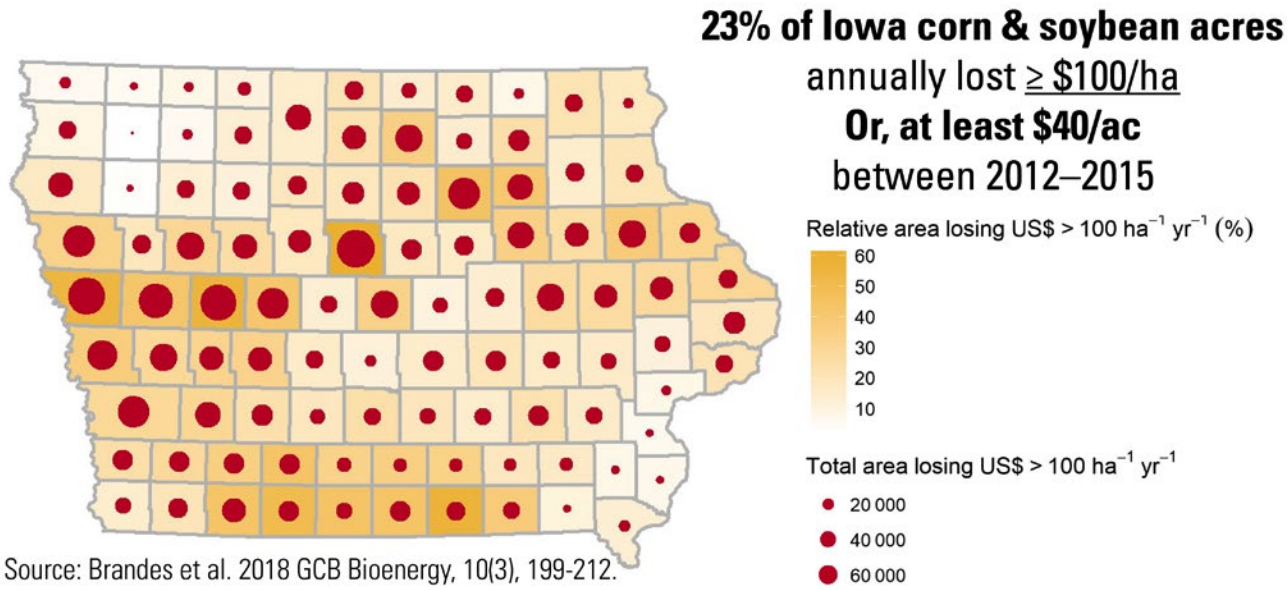
If you're interested in improving the profitability (and ease of operation) of your land, then consider reaching out to your local **Pheasants Forever Farm Bill Biologist**, www.pheasantsforever.org/Habitat/findBiologist.aspx. Pheasants Forever is currently offering a precision conservation analysis that will identify consistently unprofitable acres and help you consider management changes. You can even earn a one-time incentive payment on the acres that **remain** in production when you make a conservation management change.

Conserving your pocketbook (and your legacy)

In conversations with farmers, landowners and colleagues, I often hear them say that they want to conserve their land, but financially, it isn't an option. I hope this article has given you at least one example of where profitability and conservation are in line. Shifting unprofitable corn and soybean acres to perennials has benefits for your pocketbook, but let's not forget the benefits to water quality, decreased greenhouse gas emissions, habitat, and the long-term sustainability of the land.

The replay of the Women Managing Farmland webinar on **adding diversity to the Iowa landscape**, vimeo.com/1030149057, from November is available for more insight on this topic. Additional information on this webinar series can be found on the **Ag Decision Maker website**, go.iastate.edu/AGDMEVENTS.

Figure 1. Profitability analysis on corn and soybean acres.
Red circles show the absolute amount of land; gold shades indicate the relative area per county. Source: Brandes et al., 2018.



Current replacement heifer prices seem reasonable

Lee Schulz, Chief Economist, Ever.Ag Livestock Division; ISU extension livestock economist (on leave) | lschulz@iastate.edu

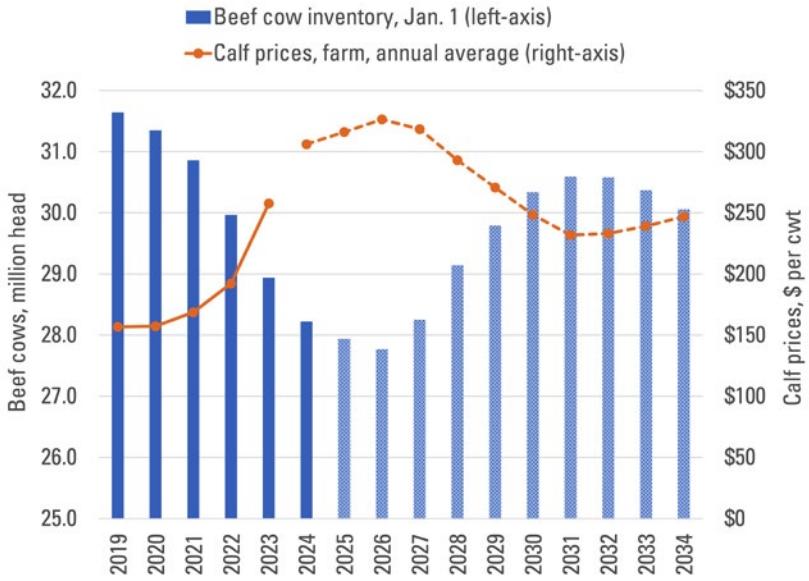
Profits and losses drive cyclical expansion and contraction in cattle production. The most recent beef cow herd cyclical build-up began January 1, 2014. It peaked January 1, 2019. Over those five years the herd grew by 2.68 million head or 9.3%.

By January 1, 2024 the beef cow herd had retreated 3.42 million head or 10.8% from five years earlier. Smaller beef cow numbers will continue to help propel profits for cow-calf producers in 2025 and 2026.

USDA expects calf prices to peak in 2026. Costs are expected to moderate in the coming years. USDA's sense is resulting profits will fuel industry-wide expansion in 2026 bringing an anticipated January 1, 2027 year-over-year beef cow herd increase (Figure 1). If that occurs, it will be the first year-over-year expansion since January 1, 2019.

Those projections come from the early-release tables from the USDA Agricultural Projections to 2034 report, www.usda.gov/oce/commodity-markets/baseline, made available on November 7. Projections use the October 11, 2024 World Agricultural Supply and Demand Estimates, downloads.usda.library.cornell.edu/usda-esmis/files/3t945q76s/cv43qp248/t148hb32b/wasde1024.pdf, as the starting point and macroeconomic forecasts developed in August 2024.

Figure 1. USDA beef cow inventory and calf price long-term projections.
Data source: USDA Agricultural Projections to 2034.



USDA's projections assume that current laws affecting federal spending and revenues will remain in place through 2034. USDA does not attempt to predict global policy or political outcomes, abnormal weather events or other external shocks that could affect market outcomes. Instead, projections reflect how markets would evolve under current conditions, existing laws and normal weather patterns. Do not view the USDA baseline as a prediction of the future. Instead, use it as a benchmark.

Recognize future legislation could affect tax policy, federal spending or immigration. External developments could occur. Such developments would cause agricultural markets to deviate from USDA's long-term projections.

Valuable replacements will become even more valuable

When herd expansion begins, whether it's in 2025 like some analysts believe, in 2026 like USDA projects or even later like others have opined, beef replacement females will become increasingly pricey. Bred heifer prices are higher than a year ago. They're already about double the price they were in 2019. For instance, the Show-Me-Select replacement heifer sale on November 15 at Joplin Regional Stockyards in Carthage, Missouri, mymarketnews.ams.usda.gov/filerepo/sites/default/files/1790/2024-11-15/885816/ams_1790_00012_01.pdf, had

79 medium and large frame, 1-2 muscle score, bred heifers that are due to calve from early February to late April. The top lot consisted of four head and sold for $4,500 per head. The low end of the range was $2,500 per head. The average price was $3,309 per head, which was $583 higher than November 2023's sale and $1,699 higher than in November 2019 (Figure 2).

Factors to consider when contemplating buying replacements

Suppose you are contemplating buying a replacement female. This could be a heifer or cow. You will have to pay for her now. You will incur other expenses along the way. You will get income from the calves she weans over her time in your herd.

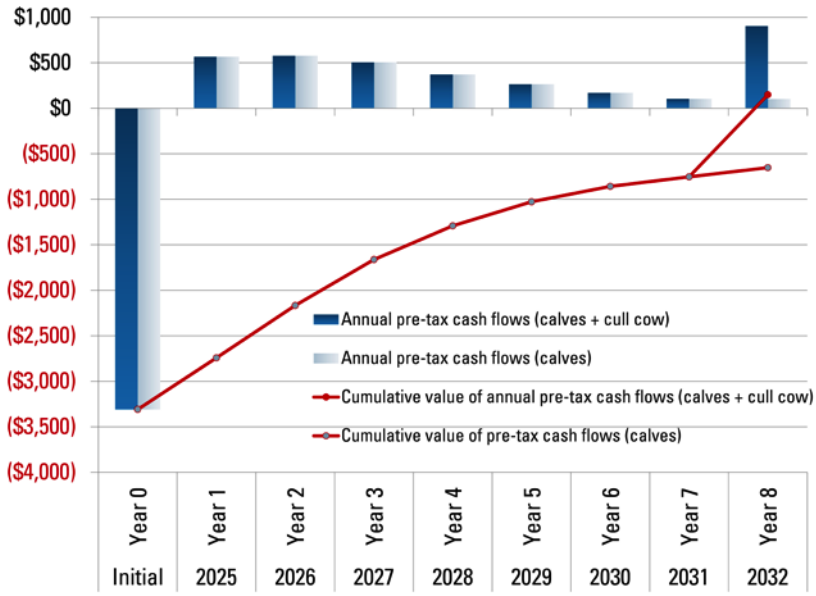
Further suppose the income her calves bring over her time in the herd plus her cull value equal the total of her expenses over her time in the herd. That is still a losing proposition because you have to pay expenses sooner, but you won't get income until later.

One way to analyze the buying replacement female investment decision is to calculate the net present value of the cost stream and the net present value of the income stream over the life of the replacement in your cow herd. This approach accounts for the time value of money. Think of the calculation as compound interest in reverse.

If the net present value of the replacement's income stream exceeds the net present value of her cost stream, buying the replacement could be a paying proposition.

Figure 2. Bred heifer prices, medium and large 1-2, Show-Me-Select Special - Carthage, MO. Data source: USDA-AMS.

Figure 3. Discounted cash flows of purchasing replacement heifer analysis.



What factor should you use to adjust (discount) those streams to account for the time value of money? One choice is the interest rate you are paying on debt. Another choice is the interest rate you could earn investing elsewhere.

Many factors impact those cash flow streams and therefore their net present value. Some are:

- Purchase price of replacement female
- Number of calving opportunities
- Number of marketable calves, weaning weights, and sale price of calves

- Annual cow costs
- Weight and sale price of cow when culled

Iowa State University Extension and Outreach has a decision tool spreadsheet, available on Ag Decision Maker, to aid in calculating the **Net Present Value of Beef Replacement Females**, www.extension.iastate.edu/agdm/livestock/html/b1-74.html. In addition to calculating the net present value of the cash flows, the spreadsheet also calculates the payback period and maximum bid price.

The payback period estimates the number of years required for a replacement female to pay for herself. The payback period is calculated by finding the year in which the accumulated net cash flows, calves plus cull cow less expenses, equals the initial investment in the replacement female. A replacement with a shorter payback period would be a better buy.

The maximum bid price calculates the initial investment value that equates the net present value to zero given the required rate of return (discount rate) or opportunity cost of capital. The maximum bid price provides a benchmark to compare to current beef replacement female prices. If the current market price is below the calculated maximum bid price, then purchasing a replacement looks attractive. If the current market price is above the calculated maximum bid price, buying may not be attractive.

Running the numbers

Let's see why some producers may be eagerly interested in expanding their cow herds whereas others may not be. We'll use a bred heifer price of $3,309 per head as a starting point and the following plausible assumptions. The replacement heifer will produce a marketable calf every year for eight years starting in 2025. Weaning weights are 540 pounds for steers and 500 pounds for heifers. USDA's long-term projections for calf prices are used for steer calves and heifer calf prices are $15 per cwt less. The cull cow price is $95 per cwt in 2032 and the cull cow weight is 1,450 pounds. Annual cow costs are $1,000 per cow. A discount factor (risk rate) of 7% is conservatively used. This is lower than the 8.12% for operating loans and the 7.19% for farm real estate loans at the end of September according to the **November 2024 AgLetter**, www.chicagofed.org/publications/agletter/2020-2024/november-2024, published by the Federal Reserve Bank of Chicago.

In this scenario, the net present value of the inflows exceeds the net present value of the outflows by $149 (Figure 3). The payback period is eight years. Accordingly, under these assumptions, the maximum price you could pay for the replacement bred heifer and breakeven is $3,458 per head.

Analyze alternative scenarios and assumptions

Producers analyzing the economic value of a replacement entering the herd should start with the most likely assumptions. In addition to the initial analysis, producers should run several "what if" scenarios. Changing variables in the model to the best case, and worst case, are examples. This sensitivity analysis positions producers to evaluate the results in relation to the risks associated with not being able to precisely predict the future.

In our example, if calf prices fall 10% below USDA's projections and every other input remains unchanged, the net present value would drop to a negative $714 and the maximum price that should be paid for the replacement bred heifer would skid to $2,595 per head. Alternatively, if annual cow costs drop by 10%, from $1,000 per cow to $900 per cow, and everything else remains unchanged, the net present value would be $746 in the black and boost the maximum bid price to $4,055 per replacement bred heifer. A combination of bullish changes from the initial analysis could get the maximum bid price to $4,500 per head, which aligns with the top end of the range at some recent replacement heifer sales.

Replacement heifers appear to be reasonably priced for now. That might not be the case in a year or two when industry-wide expansion begins.


Farm revenues with carbon intensity scoring

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With changing market demand, consumer expectations, and environmental regulations, farmers may look for ways to increase profitability while reducing their environmental impact. Carbon Intensity (CI) scoring is a tool that may help. CI scoring measures carbon emissions associated with the production of a good, in this case, crops. It can open doors to market opportunities, align with sustainability goals, qualify fuel producers for tax credits enabling profit sharing, or potentially open the farmer to other carbon programs. This report covers the basics of CI scoring, how to calculate it, and illustrates the revenue implications of lower CI scores for selected practices.

Why carbon intensity matters

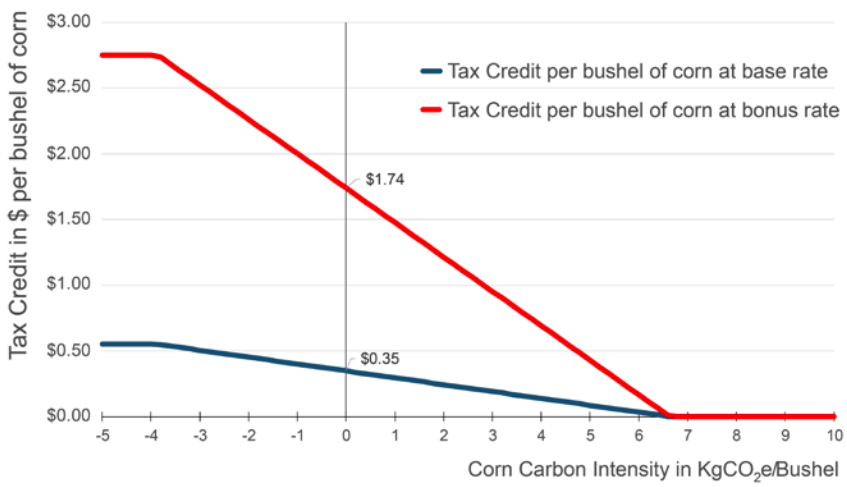
Starting in 2025, CI scoring could impact sales of corn and soybean being used for renewable fuel production. Such changes may also impact livestock feed markets as livestock processing companies strive for carbon neutrality in future years. Lower CI scores make crops more appealing to buyers with sustainability commitments as they lower the carbon footprint of the value chains that use them as inputs, like those of biofuels. Currently, the US 45Z tax credit for clean fuel production offers fuel refineries a potential revenue source, though much remains unknown.

Understanding the 45Z clean fuel production credit

The 45Z tax credit, part of the Inflation Reduction Act (IRA), will be available to biofuel refineries producing low-carbon fuel from 2025 to 2027. This credit benefits facilities that produce fuel with emissions below 50 kg of carbon dioxide (CO_2) per million British Thermal Unit (mmBTU). Specifically, the tax credit offers \$0.20 × [1 – (Fuel kg of CO2 per mmBTU / 50 kg of CO2 per mmBTU)] per gallon produced. Additionally, if certain wage and apprenticeship requirements are met, the credit could go from a base of \$0.20 to a bonus of \$1.00. Finally, if the fuel qualifies as sustainable aviation fuel (SAF), the base SAF credit is \$0.35 and the bonus SAF credit is \$1.75.

Figure 1 illustrates the potential premium per bushel of low-CI corn for the non-SAF base and bonus credit rates assuming 100% pass through, conversion rates of 2.75 gallons of ethanol per bushel of corn and 233.85 mmBTU per bushel of corn, and that the refinery adds 18.4 kg of CO_2 per mmBTU during the refining process of each gallon of ethanol. Depending on multiple factors, the potential price premiums might be substantial, and farmers might benefit from speaking with local biofuel producers about future opportunities and consulting with agronomists on cost-effective ways to lower their CI scores if such markets were to develop.

Figure 1. Price premium per bushel of corn raised at different carbon intensities from the 45Z tax credit assuming 100% pass through of funds and that non-SAF processing adds 18.4 KgCO2e/mmBTU per gallon.



The rules and regulations governing the measuring, monitoring, reporting and verification (MMRV) system around the farm-to-fuel process, as well as the accounting and legal aspects of the 45Z Clean Fuel Production Credit are currently under development by the Federal Government. However, the IRA makes it clear that the tax credit will be provided to the fuel refiner. As such, farmers may earn a price premium for low-CI corn or soybeans if biofuel producers pursue these credits and use the CI score of the grain processed to qualify.

Ag Decision Maker Information File A1-82, **Farm Revenues with Carbon Intensity Scoring**, www.extension.iastate.edu/agdm/crops/html/a1-82.html goes into more details on calculating carbon intensity scores using the GREET model, as well as current unknown aspects of the tax credit.

Getting started with carbon farming

Potential steps you can take are:

- Run a free CI Assessment: Use the GREET calculator or the **Iowa State University Carbon Intensity Score calculator**, www.extension.iastate.edu/agdm/crops/html/a1-80.html, to gauge your current CI score and identify potential areas for improvement.
- Explore Programs and Incentives: Consider credits like 45Z with local fuel producers, private carbon markets, and the potential for contracts for low-CI crops.
- Consult with Advisors: Agronomists and extension specialists can help you tailor practices to achieve meaningful CI reductions.
- Stay Updated: The CI scoring, incentives, and technology landscape changes quickly with evolving policy. Use ISU as a resource to help you follow evolving market development.

Conclusion

CI scoring might offer corn and soybean producers a way to enhance sustainability while driving profitability. Adopting practices that lower CI and finding markets to monetize scores may enable farmers to unlock new revenue streams. Get started today by assessing your CI score, implementing practical changes, and exploring the potential benefits of carbon farming.

Resources

Congressional Research Service. 2023. "**In Focus: The Section 45Z Clean Fuel Production Credit**". https://crsreports.congress.gov/product/ pdf/IF/IF12502.

Ag Decision Maker Carbon Market Information, go.iastate.edu/AGDMCARBON.

Unpacking the Section 45Z Clean Fuel Production Credit, www.calt.iastate.edu/blogpost/unpacking-section-45z-clean-fuel-production-credit.

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