Carbon Intensity Score calculator

By Alejandro Plastina, extension economist, 515-294-6160 | plastina@iastate.edu

The Inflation Reduction Act (IRA) of 2022 and the USDA Partnerships for Climate-Smart Commodities provide multiple pathways for farmers and ranchers to expand markets for America’s Climate-Smart Commodities, leverage the greenhouse gas (GHG) benefits of Climate-Smart commodity production, and provide direct benefits to production agriculture.

Direct pathways include participating in Voluntary Carbon Markets, by contracting with voluntary private carbon initiatives (VPCIs) to implement agricultural conservation practices that sequester carbon in the soil and avoid GHG emissions in exchange for monetary compensation. See AgDM File A1-76, How to Grow and Sell Carbon Credits in US Agriculture, go.iastate.edu/AGDMA176, for a side-by-side comparison of VPCIs; AgDM File A1-40, Carbon Farming: Stacking Payments from Private Initiatives and Federal Programs, go.iastate.edu/AGDMA140, to review the interaction of VPCIs and USDA cost-share programs; and AgDM File A1-78, Net Returns to Carbon Farming, go.iastate.edu/AGDMA178, to evaluate the financial impact of contracting with VPCIs for your own operation.

Indirect pathways for farmers and ranchers to participate in Climate-Smart programs include efforts to reduce the carbon intensity of feedstocks used in biofuels production. Over the past two decades, substantial reductions in GHG emissions from the electric power generation sector drove down total US GHG emissions. The next policy goal is to reduce emissions from the transportation sector. Tax credits to biofuel plants are among the chosen instruments to target this federal policy goal.

Federal Tax Credit 45Z (TC45Z), the “Clean Fuel Production Credit”, consolidates and replaces several fuel-related credits scheduled to expire at the end of 2024, including credits for the production of biodiesel, agri-biodiesel, renewable diesel, second-generation biofuel, sustainable aviation fuel, alternative fuels, and alternative...
fuels mixtures (Congressional Research Service, 2023). A major difference between TC45Z and the expiring provisions is that while the latter subsidize specific types of low-GHG emission fuels, the former is technology-neutral and is intended to subsidize the production of any transportation fuel with zero or low GHG emissions. TC45Z is expected to be available to biofuel refineries for qualifying transportation fuel produced after 2024 and sold on or before December 31, 2027. TC45Z has the potential to generate significant tax savings for US fuel production facilities able to produce “clean” fuel, defined as fuel produced with no more than 50 kilograms of carbon dioxide equivalent per 1 million British Thermal Units (50 kg CO2e / 1 mmBTU). The 2022 IRA defined the formula to calculate the credit values per ton of clean fuel sold as $0.20 \times [1 – (\text{kg of CO2e per mmBTU} / 50)]$, where the expression in square brackets is called the Emissions Factor (EF). The base payment rate is higher for sustainable aviation fuel (SAF) than for other fuels: $0.35$ instead of $0.20$. Finally, if certain wage and apprenticeship requirements are met by the refinery, the base payment rate increases from $0.20$ to $1.00$ for non-SAF and from $0.35$ to $1.75$ for SAF.

While federal agencies are still developing the rules and underlying life-cycle analysis (LCA) model for the operationalization of TC45Z, the CI-Score Calculator is based on the R&D version of GREET (Greenhouse gases, Regulated Emissions, and Energy use in Technologies): a full life-cycle model sponsored by the Argonne National Laboratory, U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy. The R&D version of GREET (Wang et al., 2023) fully evaluates the farm-to-fumes GHG emissions of advanced and new transportation fuels. The GREET model is specified in the IRA as the methodology to calculate the LCA for clean hydrogen production until a successor is approved by the Secretary of the Treasury.

Why the need for a CI-score calculator?

1. calculate the average carbon intensity score (CI-Score) of their corn production under current farming practices,
2. calculate the expected change in CI-Score under alternative farming practices,
3. project the dollar amount of the Federal Tax Credit 45Z that ethanol plants would obtain from using the corn supplied by the farmer as feedstock under (1) and (2), and
4. project the extra-revenue that a farmer could receive from the ethanol plant, depending on the share of Tax Credit passed-through.

Caveats

The federal government is finalizing the rules and models that will be used in the implementation of the TC45Z, and the final model could differ substantially from the one used in this CI-Score Calculator. The value of this tool is purely educational and does not imply any warranties on the potential payments from the TC45Z program. See Information File A1-80, Carbon Intensity Score Calculator for additional information on how to use the Decision Tool, interpret the results, and additional sources of information.
Flood damaged crops, crop insurance payments, and lease contracts
By Ann M. Johanns, extension program specialist, 515-337-2766 | aholste@iastate.edu; William Edwards, retired economist

Some Iowa corn and soybean producers are facing substantial, if not complete crop losses, due to flooding and other natural disasters in 2024. Fortunately, in recent years, well over 90% of Iowa’s corn and soybean acres are protected by multiple peril crop insurance. USDA RMA data from 2023 reported 95% of corn and soybean acres in the state were protected by Multiple Peril Crop Insurance (MPCI), and 15% of these acres also had additional companion program coverage, such as Supplemental Coverage Option (SCO), Enhanced Coverage Option (ECO), or Margin Protection (MP).

Crop insurance
Most Iowa producers purchase crop insurance policies with a 75% or 80% level of coverage. This means that if crops are a total loss, the producer must withstand the first 20-25% of the loss. In 2023, 96% of the crop acres insured in Iowa were covered under MPCI Revenue Protection policies that offer an increasing guarantee if prices increase between February and October. So far, this has not shown to be a factor for 2024 crops, with current November/December Futures trading below the spring projected price guarantees of $4.66 per bushel for corn and $11.55 per bushel for soybeans. Producers with crops that have been totally destroyed by flooding will not have to incur the variable costs of harvesting. This could save around $40 per acre for soybeans and perhaps $75 per acre for corn, depending on potential yields and drying costs. Nevertheless, even producers who carried insurance at an 80% coverage level could be looking at net revenues of at least $100 per acre below those obtained from normal yields this year.

Potential losses
For example, assume an insured tract has an expected corn yield of 200 bushels per acre and an insurance proven yield of 185 bushels per acre. A normal crop marketed at $4.40 per bushel would bring $880 per acre. The insurance indemnity payment for an 80% RP guarantee, zero yield, and spring guarantee of $4.66 would equal 185 bu. × $4.66 × 80% = $690. Saving $75 in harvest costs would bring the equivalent of $765 per acre, or $115 below the value of a normal crop. Ag Decision Maker Information Files A1-48, Current Crop Insurance Policies, www.extension.iastate.edu/agdm/crops/html/a1-48.html, and A1-57, Delayed and Prevented Planting Provisions for Multiple Peril Crop Insurance, www.extension.iastate.edu/agdm/crops/html/a1-57.html, provide more information on crop insurance coverage in Iowa.

In many cases, flooded acres will make up only a portion of the insured unit, so production from non-flooded acres will be averaged in with the zero yields from the flooded acres. The next question is how much will it cost to clean up fields and bring them back into production next year? The full extent of damage is yet to be determined and many Iowa farmers have not had prior experience with fields being under water for extended periods of time, so effects are difficult to estimate. Problems will range from physically removing debris to leveling eroded areas to restoring fertility.

Rental contracts
What do these questions imply for rental contracts? A great deal of uncertainty, for one thing. Lease agreements in Iowa
continue in effect for another year under the same terms if they are not terminated, in writing, on or before September 1. Either an owner or a tenant can terminate a lease. Operators who rented flood or weather impacted land this year may want to think seriously about whether they want to rent those acres next year, especially at the same level of cash rent. Leases can be terminated by delivering a notice in person to the other party, sending it by certified mail, or (rarely) publishing it.

Landowners will have to bear the burden of mitigating damages—that goes with owning property. But, a better solution may be for renters and owners to work together to repair the damage and bring the land back into production. Farm operators may have access to machinery that can help accomplish the job that owners do not. In return, tenants should be compensated for their efforts, either directly, through a significant discount on the 2025 rent, or with a long-term lease. Guidance on addressing the agronomic impacts, crops.extension.iastate.edu/blog/angie-rieck-hinz-gentry-sorenson-leah-ten-napel/management-considerations-flooded-soils, for flooded soils to restore field conditions or to plant a suitable cover crop is available for Iowa landowners and tenants.

Next year
In some cases, there may be doubt as to whether land flooded this year can even be planted next year. Risk Management Agency rules state that land must be physically available for planting to be insurable. Land that cannot be planted due to weather events that occurred before the sales closing date (March 15 in Iowa) is not eligible for prevented planting payments. When operators report their 2024 production, they can request that their 2024 yield histories reflect a value equal to 60% of the county “T-yield” rather than a zero or very low yield (with a yield adjustment exception of 80% for Beginning Farmers and Ranchers).

Close communication and cooperation between owners, crop insurance agents, and renters can be a “win-win” strategy in the long run, but recovery will likely take several years. Flooding and other unexpected impacts due to weather outside our control create stressful situations for everyone involved. Recognize and take action to mitigate personal, family, and business stress. If the capacity to address weather related impacts becomes overwhelming and unmanageable, seek professional help from a mental health agency, church pastor, private counselor, or crisis hotline. Iowans can contact ISU Extension and Outreach Iowa Concern, www.extension.iastate.edu/iowaconcern/; 1-800-447-1985, for help and referrals for dealing with stress. Additional information about managing flood damaged cropland as the waters recede and the situation is assessed is available from Iowa State University Extension and Outreach, www.extension.iastate.edu/disasterrecovery/.
What data frequency to hog inventory reports is ideal?
Lee Schulz, extension livestock economist, 515-294-3356 | lschulz@iastate.edu

Data in USDA’s June Quarterly Hogs and Pigs report, downloads.usda.library.cornell.edu/usda-esmis/files/rj430453j/np1951284/rr173m98z/hpgg0624.pdf, show the number of sows farrowing in the United States is down 1.3%, up 0.1%, or up 0.7% from 2023. All three estimates are correct. USDA published all three in the report.

How can this be?
During December 2023-May 2024 producers farrowed 5.819 million sows, down 1.3% from the 5.893 million sows farrowed in December 2022-May 2023. During March-May 2024 producers farrowed 2.944 million sows, up 0.1% from the 2.941 million sows farrowed during March-May 2023 (Table 1). In May 2024, producers farrowed 976,000 sows, up 0.7% from the 969,000 sows farrowed in May 2023.

Similarly, pigs per litter are up 3.1%, up 1.8%, or up 1.6%. The pig crop is up 1.8%, up 1.8%, or up 2.4%.

Interpretations can differ depending on time period used
USDA publishes monthly, quarterly and semiannual sows farrowing, pigs per litter and pig crop data in each Quarterly Hogs and Pigs report. Monthly data can provide detailed insights into short-term fluctuations. But individual months can be outliers, so large changes in monthly data can be misleading.

Semiannual data can provide a broader perspective on longer-term trends and changes. But looking at half a year at a time can miss or delay identifying shifts in some numbers.

The best time period may be somewhere in the middle, or quarterly, which can give precise enough estimates, but not too precise to call something...

Table 1. USDA quarterly hogs and pigs report summary. Data source: USDA NASS

<table>
<thead>
<tr>
<th>Jun 1 inventory *</th>
<th>2023</th>
<th>2024</th>
<th>2024 as % of '23</th>
<th>2023</th>
<th>2024</th>
<th>2024 as % of '23</th>
</tr>
</thead>
<tbody>
<tr>
<td>All hogs and pigs</td>
<td>73,551</td>
<td>74,486</td>
<td>101.3</td>
<td>23,900</td>
<td>24,600</td>
<td>102.9</td>
</tr>
<tr>
<td>Kept for breeding</td>
<td>6,206</td>
<td>6,008</td>
<td>96.8</td>
<td>910</td>
<td>820</td>
<td>90.1</td>
</tr>
<tr>
<td>Market</td>
<td>67,345</td>
<td>68,479</td>
<td>101.7</td>
<td>22,990</td>
<td>23,780</td>
<td>104.3</td>
</tr>
<tr>
<td>Under 50 pounds</td>
<td>21,284</td>
<td>21,589</td>
<td>101.4</td>
<td>6,150</td>
<td>6,250</td>
<td>101.6</td>
</tr>
<tr>
<td>50–119 pounds</td>
<td>18,982</td>
<td>19,208</td>
<td>101.2</td>
<td>7,130</td>
<td>7,420</td>
<td>104.1</td>
</tr>
<tr>
<td>120–179 pounds</td>
<td>14,344</td>
<td>14,630</td>
<td>102.0</td>
<td>5,300</td>
<td>5,480</td>
<td>103.4</td>
</tr>
<tr>
<td>180 pounds and over</td>
<td>12,735</td>
<td>13,052</td>
<td>102.5</td>
<td>4,410</td>
<td>4,630</td>
<td>105.0</td>
</tr>
</tbody>
</table>

Sows farrowing **

<table>
<thead>
<tr>
<th></th>
<th>Dec–Feb 1</th>
<th>Mar–May</th>
<th>Jun–Aug 2</th>
<th>Sep–Nov 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2,952</td>
<td>2,941</td>
<td>3,040</td>
<td>2,962</td>
</tr>
<tr>
<td></td>
<td>2,875</td>
<td>2,944</td>
<td>2,963</td>
<td>2,945</td>
</tr>
<tr>
<td></td>
<td>97.4</td>
<td>100.1</td>
<td>97.5</td>
<td>99.4</td>
</tr>
</tbody>
</table>

Mar–May pigs per litter | 11.36 | 11.56 | 101.8 |
Mar–May pig crop *  | 33,414 | 34,021 | 101.8 |
Mar–May pig crop  | 5,523 | 5,198 | 94.1 |

* 1,000 head; **1,000 litters; 1 December preceding year; 2 Intentions for 2024.

Would gathering monthly intentions data be better?

Most estimates in Quarterly Hogs and Pigs reports reflect the current state of producers’ inventories. One exception is the number of sows and gilts expected to farrow in each of the next two quarters. In December 2023, US hog producers said they intended to farrow 2,907,200 sows during March-May 2024 (Figure 1). When producers updated their March-May 2024 farrowing intentions in March 2024 they said they expected to farrow 2,915,400 sows—up 8,200 sows from what they said in December. In June 2024, producers indicated 2,943,600 sows farrowed during the March-May 2024 quarter. This was 28,200 more sows than what they said in December and 36,400 more sows than stated six months earlier.

The sows farrowed survey questions collect producer responses for each month. The sows and gilts expected to farrow questions collect responses for each quarter. Even if USDA wanted to report farrowing intentions by month, they couldn’t, because data is collected by quarter.

Presumably collecting and publishing farrowing intentions by month would be more accurate than farrowing intentions by quarter. Pork producers already keep detailed daily and weekly production records.

The gestation period for sows is three months, three weeks and three days. That means sows to farrow in the current quarter are already bred. Producers will have decided a farrowing level by the time they report the second intentions for a quarter, or the individual months of the quarter.

We’ve been down this road before

As part of the fall-out from hog prices plummeting in 1998, some analysts, traders and producers asked USDA to conduct monthly inventory surveys and publish monthly estimates. USDA complied.

In December 2000, USDA began including a new U.S. table with monthly estimates of sow and gilt inventory, the number of sows and gilts bred, plus monthly farrowing and pig crop estimates in each Quarterly Hogs and Pigs report. In January 2001, USDA also launched a new Monthly Hogs and Pigs report.

Gathering the extra data required more questions in questionnaires and more frequent surveying.

Monthly farrowing and pig crop estimates were preliminary and were subject to revision in Quarterly reports.

Because USDA did often revise monthly data once quarterly data was released, users heavily criticized the Monthly reports. This also fueled inquiries as to the reliability and accuracy of the quarterly data. Survey
response rates fell. USDA was asked to go back to just publishing Quarterly reports. Again, USDA complied. August 2003 was the last Monthly Hogs and Pigs report. Still, it took several years to turn response rates around.

More recently, response rates to Quarterly Hogs and Pigs surveys have fallen from the upper 70% level in 2012 to the low 50% level in 2023. Getting quality data to analyze requires a high level of producer participation to surveys. Nonrespondents can be accounted for through the statistical methodology of estimating inventories. Still, the best way to get reliable information is to get data directly from producers.

**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>
<thead>
<tr>
<th>Year-over-Year Change In Commercial Hog Slaughter (%)</th>
<th>ISU Model Price Forecast, IA-MN Base Price, All Purchase Types ($/cwt)</th>
<th>CME Futures (6/28/24) Adjusted for IA-MN Producer Sold Weighted Average Carcass Base Price for All Purchase Types Historical Basis ($/cwt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul–Sep 2024</td>
<td>1.96</td>
<td>83.18</td>
</tr>
<tr>
<td>Oct–Dec 2024</td>
<td>1.50</td>
<td>71.05</td>
</tr>
<tr>
<td>Jan–Mar 2025</td>
<td>0.10</td>
<td>74.00</td>
</tr>
<tr>
<td>Apr–Jun 2025</td>
<td>0.28</td>
<td>83.48</td>
</tr>
</tbody>
</table>
Farmland leasing and management workshops planned
By Ann M. Johanns, extension program specialist, 515-337-2766 | aholste@iastate.edu

Topics will include land values and cash rent trends, cost of production, fair rental rates and more

Iowa State University Extension and Outreach will host numerous farmland leasing and management workshops across the state in July and August, beginning July 29 in Waterloo and continuing through Aug. 28 in Keokuk County.

The annual meeting series is offered to address questions that landowners, tenants or other interested individuals have about leasing farmland. The average per-acre rent reported in the 2024 cash rental survey for Iowa is $279 for corn and soybeans and is the first time rates have not increased in five years.

Harvesting silage. Topics will include land values and cash rent trends, cost of production, methods for determining a fair rental rate, legislative updates regarding leases, including conservation in farmland lease arrangements, and communicating with tenants or landlords.

More than half of Iowa’s farmland is rented, and strong landowner/tenant relationships are important for the long-term viability of Iowa’s valuable farmland. While the trend in rental rates is fairly steady, individual agreements vary. There are many aspects to farmland management beyond lease rates. Attending a workshop is a great way to learn more or ask questions on specific aspects of farm ownership and lease arrangements.

Each workshop is designed to assist landowners, farm tenants and other agribusiness professionals with current issues related to farmland ownership, management and leasing arrangements. Attendees will gain a better understanding of current cash rental rate surveys and factors driving next year’s rents such as market trends and input costs.

Each registrant will receive a 100-page workbook with resources regarding land leasing agreements such as surveys, sample written lease agreements and termination forms, along with many other publications. The workbook may be included in the registration fee in some county meetings and available for purchase in others.

Attend a local meeting
The registration fee varies slightly based on county, but is not more than $20-25 per person, and includes materials. Preregistration is encouraged and an additional $5 fee may be added if registering less than two calendar days before the meeting date. To register contact the ISU Extension and Outreach county office where the meeting is being held.

Virtual option
One live, virtual option will be offered Aug. 26, from 9-11:30 a.m., featuring three farm management field specialists. This is an opportunity for those who are unable to attend an in-person event, especially out-of-state landowners. The webinar, https://go.iastate.edu/DMNFA0, registration fee is $20, and includes access to download an electronic (PDF) version of the handbook. Hard copies are only available through the in-person events.

The meetings are facilitated by farm management specialists with ISU Extension and Outreach. For the full list of locations, visit the Ag Decision Maker events page, https://go.iastate.edu/AGDMEVENTS.

The Ag Decision Maker website, www.extension.iastate.edu/agdm/wdleasing.html, also provides useful materials for negotiating leases, information on various types of leases, lease forms and newly updated Decision Tools.
Adopt a blackjack strategy to feeding cattle

Lee Schulz, extension livestock economist, 515-294-3356 | lschulz@iastate.edu

Splitting pairs and doubling down are both strategies in blackjack. If used correctly they can hike your chances of winning.

When you are dealt a pair of low-value cards (2s, 3s, 6s, 7s, 8s), especially if the dealer’s upcard is weak (2 through 6), you should split them into two separate hands. You must place an additional bet equal to your original wager to split. Each of the split cards then becomes the first card of a new hand, and you play each hand independently.

Doubling down is typically used when you have a strong starting hand, such as a total of 9, 10, or 11, and the dealer’s upcard is weak. Doubling down allows you to increase your bet and potentially win double the amount if you win the hand. It’s risky because if you get dealt a low card, you can’t hit again, and could risk losing twice as many chips.

Many novice blackjack players like to play it safe by keeping bets low. But sometimes, playing it safe can convert a favorable hand into a wasted opportunity.

Marketing corn, marketing cattle and marketing corn through cattle have some of these same attributes. It’s about getting the balance right between playing it safe and taking risk and identifying where the advantages exist.

No clear choice exists this year

USDA currently projects the 2024-25 season-average corn price at $4.40 per bushel. Futures prices, adjusted for a historical Iowa basis, project a more pessimistic $4.10 per bushel. Both are below estimated corn production costs.

Iowa State University’s finishing yearling steers costs and returns data, indicates cattle feeding margins have been volatile so far this year. In 2024’s first four months, cattle feeding margins ran from a loss $307 per head in January to a profit of $362 per head in June. Summer margins should be positive. But futures markets suggest losses returning this fall. Overall, 2024 margins may average near breakeven. Next year, margins look worse. But, rarely can producers lock in a profit at or before placement.

Cattle feeding carries risk

Factors that impact cattle feeding profitability include feeder and fed cattle prices, feed prices, feeding costs, feed conversion and average daily gain and death losses. In a survey, Iowa feedlot operators listed ability to grow their own corn as the most important factor for improving cost of production.

Corn farmers marketing corn through cattle potentially delays income and may require additional financing. The effects of higher interest rates on operating costs are significant in the current environment.

In June 2021, the interest cost for an 800-pound feeder steer ran about $28 per head. By June 2024, the interest expense had ballooned to about $95 per head if working solely from borrowed capital. The interest expense more than tripled because interest rates nearly doubled (Figure 1) and cattle prices climbed about 80% (Figure 2). This increase narrows margins quickly and hikes risk because of a higher investment cost.
total interest expense attributed to a feeder animal includes capital to buy the animal and money for inputs to finish it. If you are not borrowing money and using equity, your interest cost is opportunity cost. That’s the return you could earn investing your equity somewhere else.

Suppose your alternative is marketing corn. Is the return you could get selling corn for cash more or less than corn could earn fed through cattle?

**Two hands may be better than one**

Just as splitting pairs in blackjack can open up new avenues for success, so too can marketing corn through cattle. Splitting pairs can help in two types of situations. The defensive play is breaking up a pair with a bad total value (a pair of 8s for example) into two cards with better scoring potential. The attacking play is splitting a pair in order to get more money on the table against a weak dealer hand (a pair of 4s versus a dealer’s 6). Right now, both the corn and cattle feeding markets may be more on the defensive side but a producer needs to be in the game to be able to go on offense. After splitting cards, a blackjack player may also have the option to double down on one or both of the split hands. So too may the corn farmer and cattle feeder.