

USDA FD-CIC WEB TOOL USER MANUAL

September 4, 2026



U.S. DEPARTMENT OF AGRICULTURE

Contents

Introduction	3
Instructions	3
Getting Started	3
Step 1: Enter Farm Information	3
Step 2: Enter Required Management Unit Information	4
Step 3: Enter Optional Management Unit Information	5
Step 4: Obtain resulting CI score	6
Results Table	6
Potential Errors and Warning Messages	7
Step 5: Download or Print FD-CIC Results.....	7
Reporting USDA FD-CIC Inputs and Outputs.....	9
Optional: Reset Management Unit Inputs	9
Appendix 1: Guidance on interpreting N content from manure testing.....	10
Appendix 2: Definitions of Low-Carbon Practices.....	12
Glossary	13
Description of Management Unit Operation and Management Practice Inputs.....	13
Description of Results Terms.....	15

Introduction

The U.S. Department of Agriculture’s (USDA) Office of the Chief Economist (OCE) issued a final rule titled, “Technical Guidelines for the Production of Regenerative Agricultural Biofuel Feedstocks.” The USDA Feedstock Carbon Intensity Calculator (USDA FD-CIC) tool is referenced in the final rule and allows users to estimate the carbon intensity (CI) in carbon dioxide equivalent (CO₂e) emissions per bushel of their corn, soybeans, sorghum, and spring canola based on user-supplied nutrient management data and user-supplied selections of specific regenerative and low-carbon agriculture practices, including no-till, reduced-till, and cover crops.

USDA FD-CIC estimates the carbon intensity of feedstock production. Components of carbon intensity estimates in USDA FD-CIC include soil organic carbon (SOC) sequestration and nitrous oxide (N₂O) emissions, which vary depending on farming practices employed. This user guide provides guidance on how to use the web tool to generate a CI score for the feedstocks produced using different sets of management practices. It includes step-by-step instructions for getting started with the calculator and entering operation-specific details.

Instructions

Getting Started

The FD-CIC web tool can be accessed via any web browser to create records of carbon intensities (CI) for management units (MU) within farms. The web tool is accessed at usda.gov/T-Disc/webtool and is designed to be used on a computer screen. The web tool may not function properly on mobile devices.

The process of completing the form is broken into 5 parts:

- **Step 1:** Enter farm information.
- **Step 2:** Enter required management unit information.
- **Step 3:** Enter optional management unit information.
- **Step 4:** Obtain resulting CI score.
- **Step 5:** Download or print a PDF document report of the form and CI results.

Step 1: Enter Farm Information

Provide farm information.

Farm Entries

Entry Name	Required?	Instructions
Farm Name	Required	Type farm name in box.

Date	Required	Select the date form is being completed. (Default is current date.)
Crop to Model	Required	Use the dropdown to select a crop to model. Only one crop can be selected per form.
# of MU to Model	Required	Use the slider or arrows to select the number of MUs to model. Up to 3 MUs can be modeled per form. For farms with more than 3 MUs, create and fill out another form.

Step 2: Enter Required Management Unit Information

Provide Management Unit and agricultural practices information. Once required inputs have been provided, carbon intensity (CI) results will be generated automatically as entries are completed. Clicking the light bulb icons attached to specific inputs provides more information about those inputs.

Required Management Unit Entries

	Entry Name	Required?	Unit	Instructions
	Management Unit Name	Required		This field is required. Default is fine for an input, but user has the option of renaming the management unit to something other than the default if desired by typing MU name or identifier into box.
	State	Required		Use dropdown to select the state where the MU is located. (Default is Alabama.)
	County	Required		Use dropdown to select the county where the MU is located. (Default is Autauga County.)
	Management Unit Size	Required	Acres	Type the size of the management unit in acres in the box. Input must contain only numbers and decimals.
	Actual average yield size per acre	Required	Bushels per acre	Type the actual crop yield for the management unit in bushels per acre in the box. Input must contain only numbers and decimals.
	Expected yield per acre	Required	Bushels per acre	Type the expected yield per acre for the MU in bushels per acre in the box. Input must contain only numbers and decimals. Click the lightbulb icon for more information about where expected yield values come from.
	Total synthetic N applied per acre	Required	lbs. per acre	Enter the total synthetic nitrogen (N) applied per acre. Input must contain only numbers and decimals.

Once these inputs have been completed and if no errors are present (see later section on Errors), the tool will generate a CI score for the management unit in the Results table (see later section on Results). However, if users have adopted additional regenerative practices on their management unit, they will need to enter that information into the optional green section to calculate a final score.

Step 3: Enter Optional Management Unit Information

Additional regenerative practices available within the tool include cover crops, cover crops with grazing, conservation tillage (no till or reduced till), use of nitrification inhibitors, and application of manure. The practices are specified in the following fields:

Optional Management Unit Entries

#	Entry Name	Required?	Unit	Instructions
1	Cover Crop	Optional		Use the dropdown to select the cover crop practice used on the MU, if applicable.
2	Tillage Practice	Optional		Use the dropdown to select the tillage practice used on the MU, if applicable.
3	Percent of synthetic N receiving Nitrification Inhibitors	Optional	Percent	Type the percentage (0% to 100%) of nitrification inhibitors applied to synthetic nitrogen fertilizers. Input must contain only numbers and decimals.
4	Applied Manure			
4.1-4.3	Manure Applied, Type 1-3	Optional		Use the dropdown to select the type of manure applied to the MU, if applicable. Up to 3 types of manure can be applied per MU.
	Amount of type 1 manure applied	Optional	ton per acre (solid) or 1,000 gal per acre (liquid)	Type the amount of manure applied for each manure type selected, if applicable. Input must contain only numbers and decimals.
	N content of type 1 manure	Optional	lbs per ton (solid) or lbs per 1,000 gal (liquid)	Type the N content of manure applied for each manure type selected, if applicable. Input must contain only numbers and decimals.

USDA FD-CIC users who select a conservation tillage practice as an input must use an additional tool—Tillage Disturbance Index for Soil Carbon (T-DISC)—to demonstrate that their field practices are eligible for that designation. T-DISC is available at usda.gov/t-disc as either an Excel tool or a web tool.

Step 4: Locate Resulting CI Score

Results Table

The results table provides the feedstock CI scores, in the unit of grams CO₂ equivalent (CO₂e) per bushel. A set of Estimated National Average CI scores are also displayed for reference. USDA FD-CIC further generates the percentage (%) and absolute changes in total CI score (per bushel) for each management unit compared to the Estimated National Average CI score for the feedstock.

The components of the Feedstock Carbon Intensity Score are shown in the box below the Total Score and comprise the following elements:

Emissions from manufacture and transportation of N fertilizer	GHG emissions associated with the upstream production and transportation of synthetic nitrogen fertilizers.
Soil carbon emissions/removals	Changes in soil organic carbon (SOC) stocks resulting from adoption of low-carbon agricultural practices (e.g., cover crops, reduced till, no-till).
Direct N₂O Emissions	Nitrous oxide (N ₂ O) emissions directly released from soils as a result of nitrogen inputs (synthetic fertilizer, manure, crop residues) and management practices.
Indirect N₂O Emissions	N ₂ O emissions resulting from nitrogen that is lost from the field via volatilization or leaching and subsequently converted to N ₂ O elsewhere in the environment.
Emissions from on-farm energy consumption	GHG emissions resulting from the use of diesel, gasoline, and other energy sources for field operations (e.g., tillage, planting, fertilizer/pesticide application, harvesting).
Emissions from manufacture and transportation of other chemicals	GHG emissions associated with the upstream production and transportation of other farming chemicals (e.g., pesticides, herbicides).
CO₂ emissions from urea/lime	CO ₂ emissions resulting from the application of urea fertilizer and agricultural lime to soils.

For more information on how each element of the carbon intensity score is calculated, see the technical methodology document for USDA FD-CIC located on the USDA FD-CIC website at usda.gov/usda-fdcic.

Potential Errors and Warning Messages

Warning messages will cover the results if certain conditions are not met:

1. One or more required fields are missing an input or have an invalid input (shown in Figure 5).
2. The combination of crop, state, and county does not have sufficient data to compute a CI score (shown in Figure 6). In such cases, USDA FD-CIC is unable to generate a CI score for that feedstock produced in that state/county.
3. The value input for Nitrification Inhibitors (3) lies outside the 0% to 100% range (shown in Figure 7).

Figure 5: Warning example for required fields.

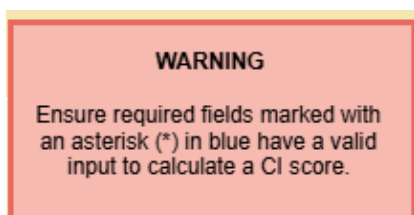


Figure 6: Warning example for insufficient data.

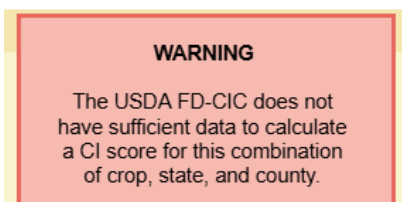


Figure 7: Nitrification Inhibitors warning.

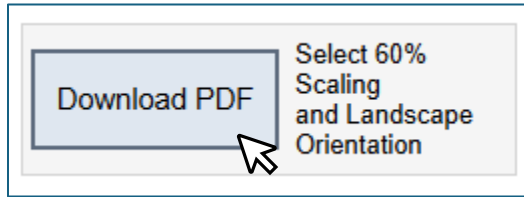
3) Nitrification Inhibitors (percent N receiving NI, 0-100%)	1,000 %
4) Applied manure	WARNING Fraction of synthetic N receiving Nitrification Inhibitors must be between 0 and 100%.
4.1) Manure applied, type 1 Amount applied	

Step 5: Download or Print FD-CIC Results

Users can save their results by downloading or printing a PDF of the form. Note: Example screenshots are using Microsoft Edge browser.

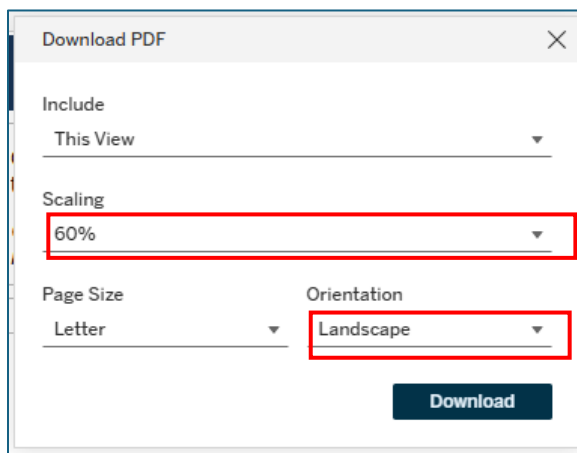
1. Once all entries are complete, click the “Download PDF” button to create a PDF document of the entries (shown in Figure 8).

Figure 8: Download PDF button.



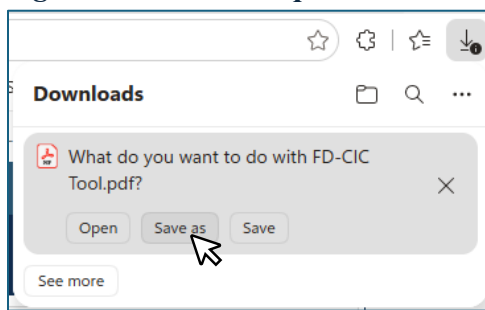
2. Ensure the document has 60% Scaling and is in Landscape Orientation (shown in Figure 9).

Figure 9: Settings for PDF download.



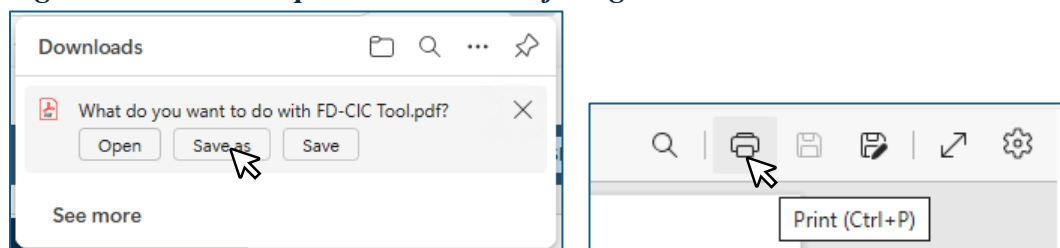
3. **To save as a PDF:** Click ‘Save as’ in the Downloads pop-up in your web browser to select a folder location to save the PDF to your computer (shown in Microsoft Edge in Figure 10).

Figure 10: Download process in Microsoft Edge.



4. **To print a copy:** Click ‘Open’ in the Downloads pop-up in your web browser to view the PDF. Then click the print button in the PDF viewer (shown in Figure 11).

Figure 11: Download process in Microsoft Edge continued.



Reporting USDA FD-CIC Inputs and Outputs

If adhering to the voluntary guidelines established in 7 C.F.R. Part 2100 “Technical Guidelines for Agriculture Crops Used as Low-carbon Biofuel Feedstocks”, farm producers must keep records (as defined in 7 CFR Part 2100.031) that include USDA FD-CIC inputs and outputs. To provide documentation of the USDA FD-CIC calculation for each field or management unit and the farm-level crop-specific reduced-CI, users may take a screenshot, print out, or save a PDF showing all USDA FD-CIC inputs and results.

Optional: Reset Management Unit Inputs

User inputs may be reset to the original FD-CIC defaults for a single management unit by clicking the “Reset” button at the top of each MU column. To return to the default of the entire form, click the web page refresh button on your web browser. If the user refreshes the page through the web browser, all input values, including farm information, will be reset to default.

Appendix 1: Guidance on interpreting N content from manure testing

- **Type of N reported:** If the manure nutrient report provides Total N, that value should be used directly in USDA FD-CIC. If the manure nutrient report provides separate values for Total Kjeldahl N, nitrite N, and nitrate N, the Total N must be calculated from those values using the following equation:

$$\text{Total N} = \text{Total Kjeldahl N} + \text{Nitrite N} + \text{Nitrate N}$$

If the manure test provides only Total Kjeldahl N (TKN), or Total Kjeldahl N broken out by Organic N and ammonium, Total Kjeldahl N (the sum of Organic N and ammonium N) may be entered into the Total N input cell.

- **As-sampled versus dry weight results:** Most agricultural labs report manure testing results on an as-sampled basis that can be entered directly into USDA FD CIC. If the results are reported on a dry-weight basis the analyses will have to be converted back to as-sampled to be entered into USDA FD-CIC. (If it is unclear from the laboratory report if the results are reported on an as-sampled basis, contact the laboratory for clarification.) To convert nutrient content from a dry-weight basis back to an as-sampled basis, use the following equation:

$$\text{Nutrient content (as-applied basis)} = \text{nutrient content (dry basis)} \times [1 - (\text{moisture content (\%)} \div 100)]$$

- **Conversion of units for N content:** Units for N content of manure should be entered as lbs N/ton for solid manures and lbs N/1000 gals for liquid manures. It may be necessary to convert units appearing on the manure nutrient test. Some relevant conversions appear in the table below:

Manure Type	Starting unit	Multiply By	To get (desired unit)
Solid manure	%	20	lbs/ton
	ppm	0.002	lbs/ton
Liquid manure	%	83.4	lbs/1000 gallons
	ppm	0.00834	lbs/1000 gallons

- **Sample calculations:**
 - (a) lbs/1000 gallons (a) If analysis results are % dry weight (dwt) and need to be converted to lbs N/ton as sampled for a solid manure:

$$\text{lb N/ton (as sampled)} = ((1 - \% \text{ Moisture}) / 100) \times (\% \text{ N in dwt} / 100) \times 2000$$
lb/ton

- (b) If analysis results are % dry weight (dwt) and need to be converted to lbs N/1000 gallon as sampled for a liquid manure:
- $$12 \text{ lb N/1000 gal (as sampled)} = ((1 - \% \text{ Moisture})/100) \times (\% \text{ N in dwt}/100) \times (8.34 \text{ lb/gal} \times 1000)$$
- (c) If analysis results are ppm dry weight (dwt) and need to be converted to lbs N/ton as sampled for a solid manure:
- $$\text{lb N/ton (as sampled)} = ((1 - \% \text{ Moisture})/100) \times (\text{ppm N in dwt}/1000000) \times 2000 \text{ lb/ton}$$
- (d) If analysis results are ppm dry weight (dwt) and need to be converted to lbs N/1000 gallon as sampled for a liquid manure:
- $$\text{lb N/1000 gal (as sampled)} = ((1 - \% \text{ Moisture})/100) \times (\text{ppm N in dwt}/1000000) \times (8.34 \text{ lb/gal} \times 1000)$$

Appendix 2: Definitions of Low-Carbon Practices

If adhering the voluntary guidelines established in 7 C.F.R. Part 2100 “Technical Guidelines for Agriculture Crops Used as Low-carbon Biofuel Feedstocks”, farm producers meet all of the applicable practice standards as follows:

- For reduced till or no-till, 7 C.F.R. § 2100.051 Tillage management.
- For cover crops, 7 C.F.R. § 2100.052 Cover crop management.
- For synthetic N applied, 7 C.F.R. § 2100.060 General nutrient management
- For nitrification inhibitors, 7 C.F.R. § 2100.061 Nitrification inhibitor standards.
- For applied manure, 7 C.F.R § 2100.062 Manure application standards.

Glossary

Description of Management Unit Operation and Management Practice Inputs

#	Term	Description	Reference
	Management Unit Size	Management unit is defined as a field, group of fields, or other land units of the same land use and having the same management.	§ 2100.002 "Management Unit"
	Actual average yield size per acre	The actual crop yield for the management unit.	-
	Expected yield per acre	Expected yield per acre is defined as either: (i) For farm producers holding a crop insurance policy covering the reduced-CI crop for the current crop interval, farm producers must provide the yield used to establish coverage on their crop insurance policy; or (ii) For farm producers that do not hold a crop insurance policy, a farm producer may utilize the transitional yield or Agriculture Risk Coverage (ARC) County Benchmark yield for their county published by the USDA Risk Management Agency (RMA) or Farm Service Agency (FSA).	§ 2100.020(a)(5)
	Total synthetic N applied per acre	Industrially manufactured nitrogen fertilizer applied to soils to support crop growth.	
3	Nitrification Inhibitors	A nitrification inhibitor (NI) is a chemical compound that slows down the conversion of ammonia to nitrate in soil, a process called nitrification. Nitrification inhibitors can be added to fertilizers and can help reduce N losses and N ₂ O emissions.	§ 2100.061 & Association of American Plant Food Control Officers (AAPFCO)

	Manure	Feces, urine, other excrement, and bedding produced by livestock including dairy, swine, beef and poultry that may have been collected and stored but has not been actively managed as compost.	§ 2100.002 "Manure" § 2100.062
1	Cover crop		
	Cover crop	Seasonal vegetative cover (grasses, legumes, forbs) not intended for harvest, planted between production crops.	§ 2100.002 "Cover crop" § 2100.052
	Cover crop with grazing	A cover crop that is grazed by livestock during its growth period.	§ 2100.052(a)(8)
	No cover crop	No vegetative cover was planted between production crops.	-
2	Tillage Practice		
	Reduced till	The STIR value for the crop interval must be no greater than 80. Tillage methods where the entire soil surface is disturbed by tillage operations such as chisel plowing, field cultivating, tandem disking, vertical tillage, or ridge tillage are permitted, but primary inversion tools like moldboard plows are prohibited. Residue must not be burned but may be removed from planting rows.	§ 2100.002 "Reduced till" § 2100.051(a)
	No till	The STIR value for the crop interval must be no greater than 20 and full-width soil disturbance is prohibited throughout the crop interval. Strip tillage and fertilizer injection are allowed. Residue must not be burned and may be removed only from the immediate planting area.	§ 2100.002 "No-till" § 2100.051(b)
	None of the above	The tillage method used does not meet the criteria for reduced till or no till.	-
4.1-4.3	Applied Manure		
	Manure Applied	Manure that is applied to the management unit. Applied manure options in the tool include the following: Beef Cattle Manure (solid or liquid), Dairy Cattle Manure (solid or liquid), Swine Manure (solid or liquid), and Poultry Manure (solid or liquid).	§ 2100.002 "Manure" § 2100.062

	Amount of Manure Applied	Farm producers applying solid or liquid manure may not exceed application rates stated in their nutrient budget and also must get a manure test for each type of manure applied. The manure test must be collected during the current crop interval and provide information on nitrogen and phosphorus content of the manure.	§ 2100.062
	N Content of Manure Applied	Farmers should reference the results of their manure test for the correct N content of applied manure to their management unit.	§ 2100.062

Description of Results Terms

Term	Description	Reference
Carbon intensity (CI)	A measure of greenhouse gas (GHG) performance reflecting the estimated quantity of GHG emissions associated with one unit of production. For biofuel feedstock crops, carbon intensity is expressed as grams of carbon dioxide equivalent (CO ₂ e) per bushel of produced crop (g CO ₂ e/bushel).	§ 2100.002 "Carbon intensity"
Emissions from manufacture and transportation of N fertilizer	GHG emissions associated with the upstream production and transportation of synthetic nitrogen fertilizers.	inferred from our methodology
Soil carbon emissions/removals	Changes in soil organic carbon (SOC) stocks resulting from adoption of low-carbon agricultural practices (e.g., cover crops, reduced till, no-till).	inferred from our methodology
Direct N₂O Emissions	Nitrous oxide (N ₂ O) emissions directly released from soils as a result of nitrogen inputs (synthetic fertilizer, manure, crop residues) and management practices.	inferred from our methodology
Indirect N₂O Emissions	N ₂ O emissions resulting from nitrogen that is lost from the field via volatilization or leaching and subsequently converted to N ₂ O elsewhere in the environment.	inferred from our methodology
Emissions from on-farm energy consumption	GHG emissions resulting from the use of diesel, gasoline, and other energy sources for field operations (e.g., tillage, planting, fertilizer/pesticide application, harvesting).	inferred from our methodology

Emissions from manufacture and transportation of other chemicals	GHG emissions associated with the upstream production and transportation of other farming chemicals (e.g., pesticides, herbicides).	inferred from our methodology
CO₂ emissions from urea/lime	CO ₂ emissions resulting from the application of urea fertilizer and agricultural lime to soils.	inferred from our methodology