

Navigating Carbon Markets: Opportunities and Strategies for Farmers



Precision Conservation Management



College of Agricultural,
Consumer &
Environmental Sciences

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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Carbon markets?

- Already using
- Been approached by a carbon market
- Have not been approached by a carbon market
- Not interested
- I'm not eligible (not a farmer)

Why Carbon?

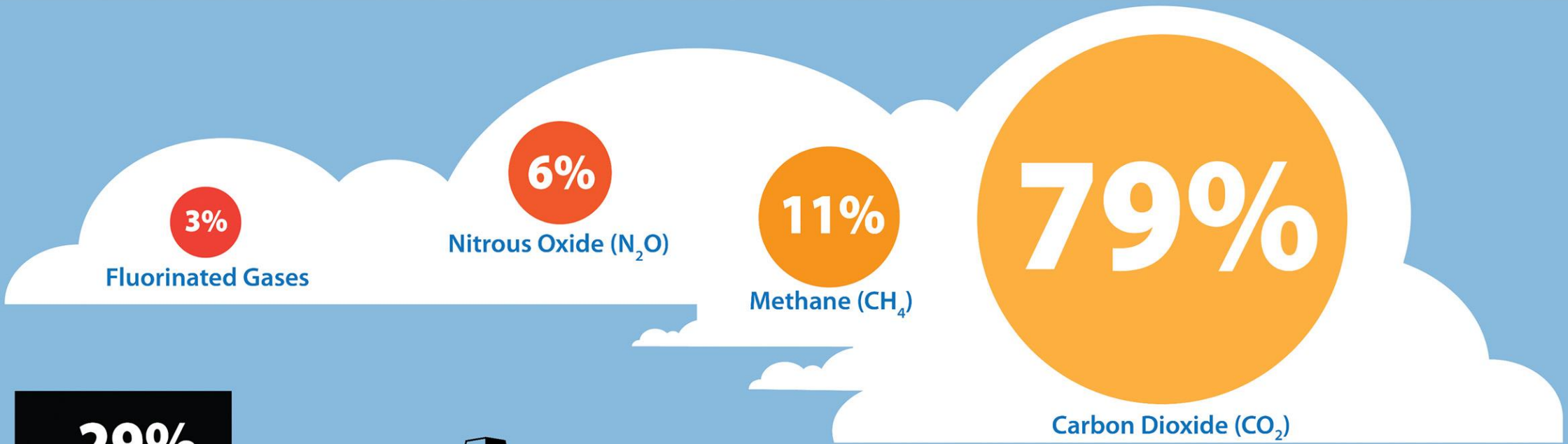
Many companies and countries have committed to **carbon neutrality** and even **carbon negativity** within the next decades.

Pepsico – committed to reducing Scope 3 emissions by 2030 by 40%.

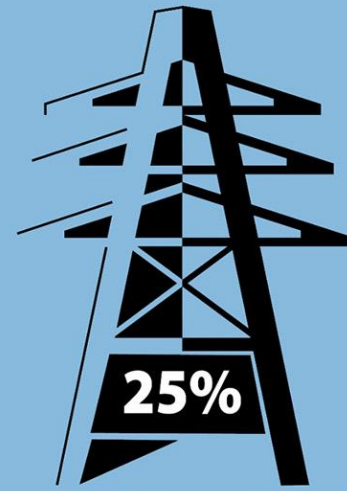


U.S. Greenhouse Gas Emissions in 2021*

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2021*



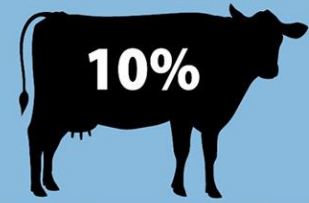
Transportation



Electric Power Industry



Industry



Agriculture



Commercial

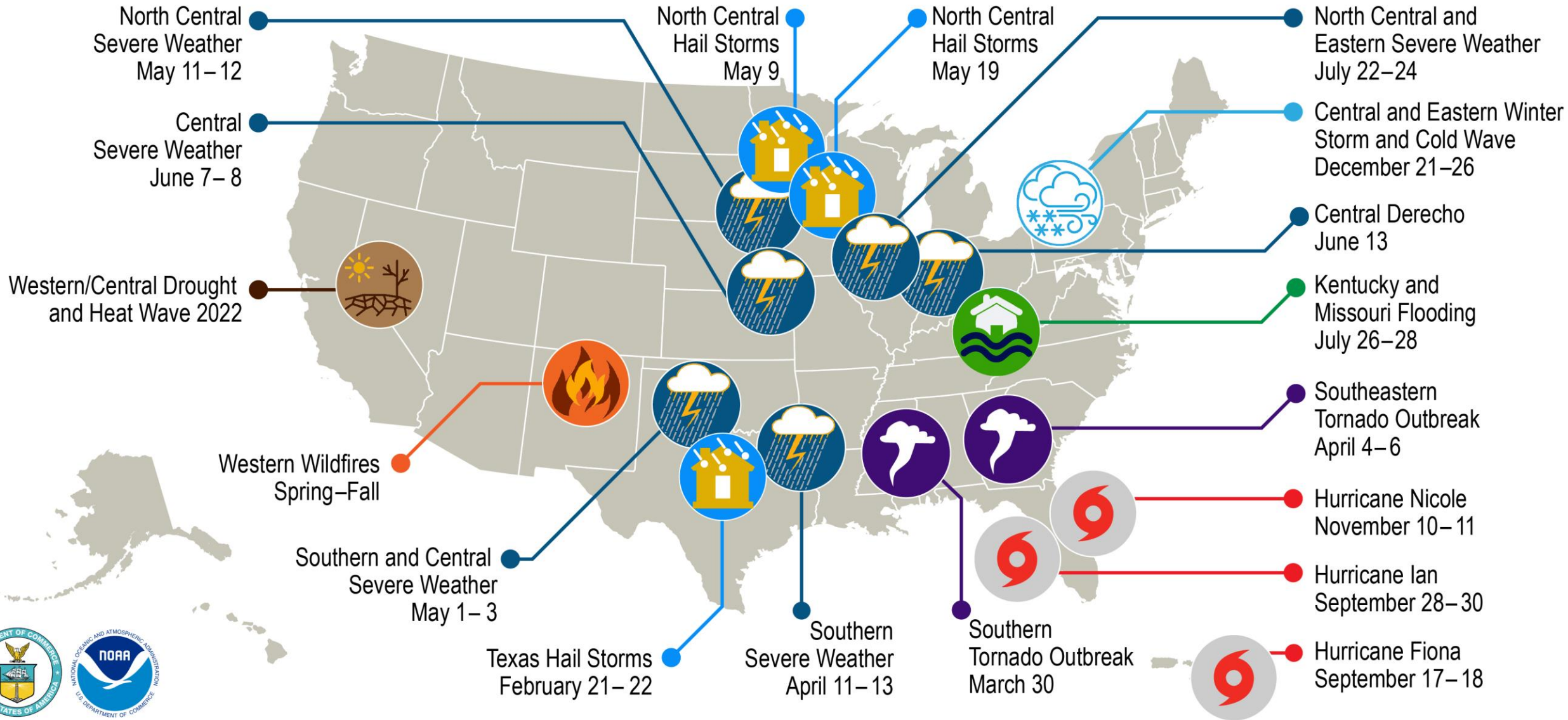


Residential

*Percentages may not add to 100% due to independent rounding and the way the inventory quantifies U.S. territories (not shown) as a separate sector. Percentages are based on gross total emissions excluding emissions and removals from the land use, land use change and forestry sector.

Source: <https://cfpub.epa.gov/ghgdata/inventoryexplorer/>

U.S. 2022 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 18 separate billion-dollar weather and climate disasters that impacted the United States in 2022.

No-Till & Cover Cropping

Your **crops** are tools to that put carbon dioxide in the ground

Your **soil** is responsible for keeping the carbon dioxide out of the atmosphere



Cover crops allow the soil to continually receive CO₂ from the atmosphere

No-till prevents carbon dioxide from leaving the soil

Cover cropping and no-tilling can sequester an additional ~1.5 tonnes CO₂/ acre



SETTING THE STAGE: HOW MUCH CARBON CAN MY FARM STORE?

Table 1. Annual GHG emission reduction potential of converting to no-till (NT) and planting cover crops (CC) as estimated per individual practice at the national and state levels via COMET-Planner¹. All values are reported in metric tonnes of carbon dioxide equivalents per acre per year (CO₂e/ac-yr) with averages in parentheses.

PRACTICE	NATIONAL RANGE (AVG.)	ILLINOIS RANGE (AVG.)	
		Intensive till to NT 0.57 – 0.80 (0.72)	Reduced till to NT 0.46 – 0.64 (0.57)
No-till (NT)	0.03 – 1.07 (0.49)		
Cover Crops (CC)	-0.03 – 1.50 (0.37)	Legume cover crop 0.23 – 1.26 (0.68)	Non-legume cover crop 0.16 – 0.90 (0.50)

¹Swan et al., 2019, available at http://comet-planner.nrel.colostate.edu/COMET-Planner_Report_Final.pdf and <http://comet-planner.com/>, ranges provided for general reference and should not be considered additive or field-specific.

Source: <https://ilsustainableag.org/wp-content/uploads/2020/09/ISAP-Fact-Sheet-Carbon-9.4-FINAL.pdf>

Common Practices for Market Enrollment

Fertilizer	Cover Crops	Tillage	Rotation
Application Timing	Grass	Change in type	Added crops
Reduced Rate	Legume	Change in frequency	Reduced fallow periods
Use of inhibitors	Interseed	No-Till	Added perennials
Use of organic fertilizer or compost	Perennial		
	Cover crop termination (planting green, burn down, mechanical)		

Disclaimer: Neither table contains the complete list of recommended practices for carbon sequestration or N – P runoff reduction. Please refer to specific programs for a complete list of requirements.

Benefits of Soil Health

1. Soil Temperature and Moisture Regulation
2. Reduced Soil Loss from Wind & Water
3. Winter Annual & Early Season Weed Suppression
4. Improved Soil Structure
5. Increased Diversity of Soil Biological Communities
6. Nutrient Capture & Availability



Farmer learns about program and is willing to implement a conservation practice that **reduces the production of GHG or sequesters carbon in the soil**



The farmer then...

- Completes enrollment forms
- Signs a contract
- Begins implementing the practice(s)



OFFSET MARKET

Buyer is outside of Ag industry

Examples: transportation & manufacturing companies



Farmer works with **Project Manager** to compile data used to estimate GHG reductions



Project Manager combines GHG reductions from multiple farms and sells credits to a third party that uses the credits to offset their (Scope 1) emissions



Farmer provides data used to estimate GHG reductions (which may require delivery of grain to the buyer)



Ag corporation combines reductions for all participating farms within its supply chain and claims reductions in their Scope 3 emissions

INSET MARKET

Buyer is inside of Ag industry

Examples: input suppliers & grain buyers



Verification process includes additional reporting to confirm practice change and GHG reduction.



per credit sold



Farmer gets paid



per credit sold or a premium per unit of grain sold



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SUSTAINABLE
AG PARTNERSHIP

Offsetting



**Reducing carbon emitted outside
the agricultural supply chain.**



Why is the contract so long?

Permanence

Aggregators ensure that carbon will be sequestered for ~100 years between all the farms in their program.

Carbon aggregators put many (entire countries worth) of farms in one project to ensure permanence.

Carbon Offset Registries

- Set standards for many types of carbon offset markets – ag, forestry, landfills, etc.
- Set standards for offset protocols that ensure permanence and additionality
- Set standards for verification
- Approve models used to estimate carbon sequestration



CLIMATE
ACTION
RESERVE
— 2001 • 2021 —



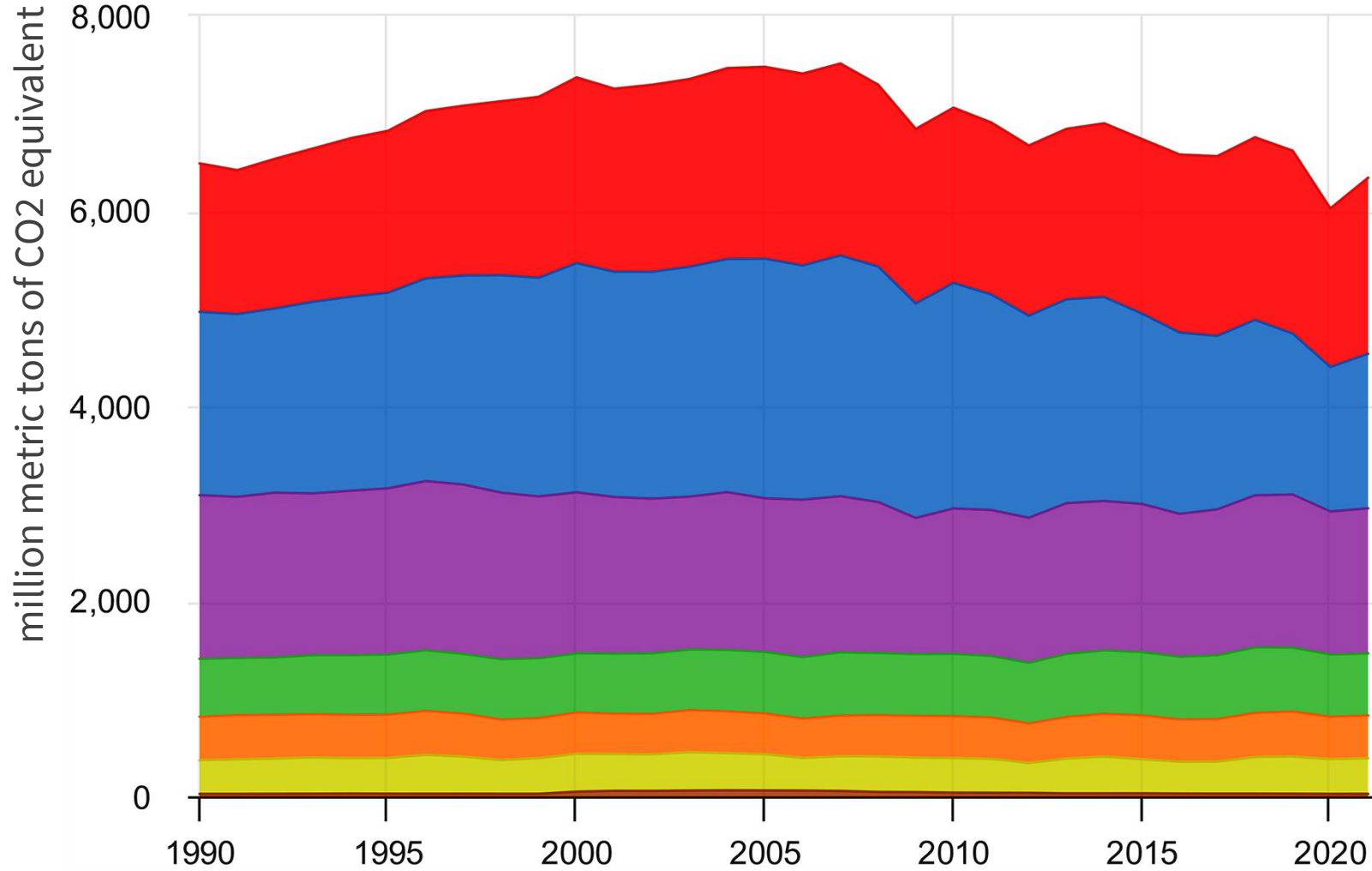
Verified Carbon
Standard
A VERRA STANDARD

Insetting

The reduction of
carbon emissions
within a value chain



U.S. Greenhouse Gas Emissions by Economic Sector in million metric tons of CO₂ equivalent from 1990 to 2021



Percent change:

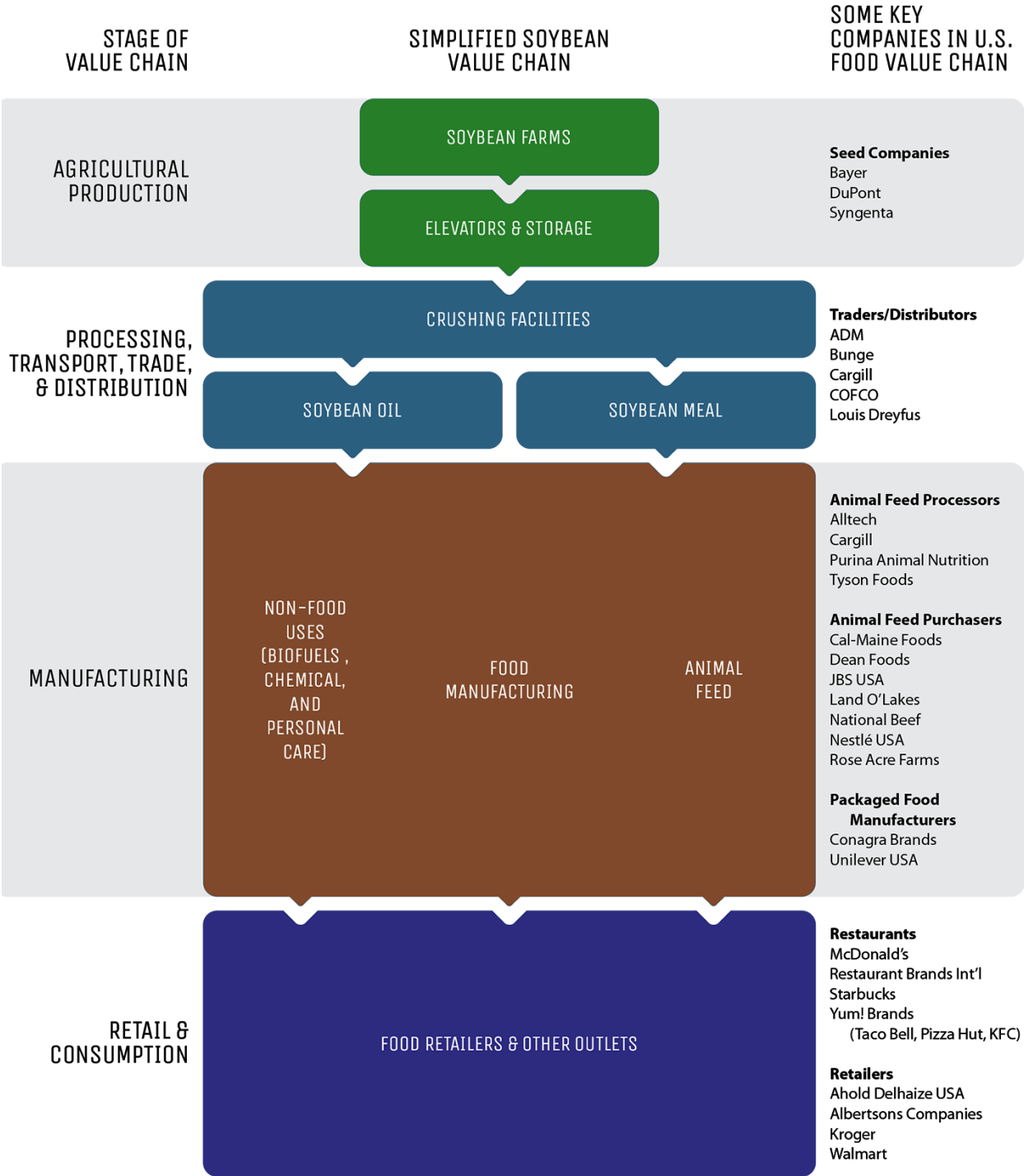
- ▲ 18.6%
- ▼ 15.7%
- ▼ 11.3%
- ▲ 7.2%
- ▼ 1.8%
- ▲ 5.8%
- ▲ 2.8%

Gross total: ▼ 2.3%

Transportation
 Electric power industry
 Industry
 Agriculture
 Commercial
 Residential
 U.S. territories

Source: U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021.
<https://www.epa.gov/ghgemissions/inventoryus-greenhouse-gas-emissions-and-sinks>

Row crops are ingredients sold by small businesses to publicly traded companies



Proposed SEC Ruling

- Requires publicly traded companies to report on carbon emissions
- Establishes a common language and measurement system for making sustainability claims
- Example – Pepsico will have to account for emissions associated with all ingredients in their supply chain (corn syrup)

Illinois Insetting Programs



Precision Conservation Management



2023 PAYMENT STRUCTURE

COVER CROPS	NO-TILL/STRIP-TILL	MRTN/10% NITROGEN REDUCTION
\$15, 1st/2nd year	\$10, 1st/2nd year	\$10, 1st year
\$10, 3+ year OLD	\$5, 3+ year OLD	–
	\$25, 1st/2nd year NEW	\$15, 3+ year OLD
\$20, 1st/2nd year	\$15, 3+ year OLD	–
		\$15, 1st/2nd year



Ecosystem Service Market

Ecosystem Service Market

- Uses the same practices to address areas of pollution
- Often carbon + water quality (N+P runoff reductions)
- Often lead to higher payments

Credit Buyers

- Carbon: Companies looking for offsets or insets
- Water Quality: Often governmental funding
(either local through water treatment districts or national through USDA)
- Pay attention to who is buying the water quality offsets
because you cannot be paid twice with federal dollars

Ecosystem Service Market



ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

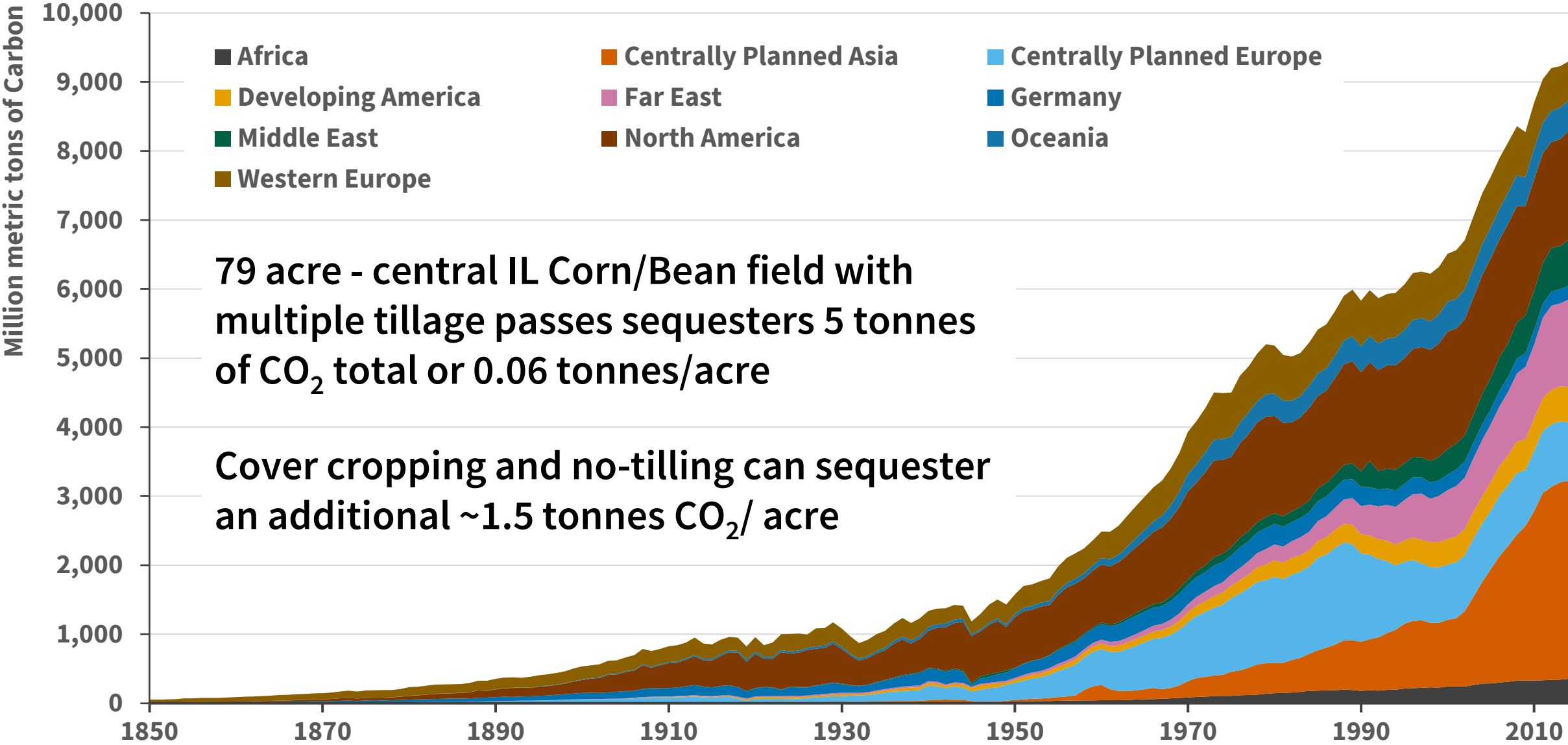
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Reduced Rate	Legume	Change in frequency	Reduced fallow periods
Use of inhibitors	Interseed	No-Till	Added perennials
Use of organic fertilizer or compost	Perennial		
	Cover crop termination (planting green, burn down, mechanical)		

Recommended in-field strategies for achieving NLRs goals

Fertilizer	Cover Crops	Tillage
Application Timing	Grass	Change in type
Reduced Rate	Perennial	Change in frequency
		No-Till

Disclaimer: Neither table contains the complete list of recommended practices for carbon sequestration or N – P runoff reduction. Please refer to specific programs for a complete list of requirements.

Global Carbon Emissions from Fossil Fuels, 1850 to 2014



https://data.ess-dive.lbl.gov/view/doi:10.3334/CDIAC/00001_V2017

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Foundational Carbon Market Principal

Additionality:

Greenhouse gas (GHG) reductions are additional if they would not have occurred in absence of a market for offset credits. If the reductions would have happened anyway – without any opportunity for farmers to sell carbon offset credits – then they are not additional.

Credit buyers are paying for a ton of sequestered carbon that would not have been sequestered if they had not paid for it.

You can typically make a small change and still enroll

Carbon vs.
Ecosystem

Inset
vs.
offset

Aggregator
Risk
Mitigation

	Category	Indigo	Bayer	Soil and Water Outcomes Fund
	Market Type	Carbon Offset	Carbon Inset	Ecosystem Service Carbon Inset + Federal Funding for Runoff Prevention
	Price	\$30.00/acre/ton	\$3.00 – No-Till \$6.00 – Cover Cropping \$9.00 – Combined	\$25.00 - \$40.00 Avg. \$35.00 / acre
	Contract Length	5-year contract	1-year contract	1 – year contract
	Payment Terms	50% year 1 20% year 2 10% year 3,4,5	Annually Fall 2021/Spring 2022 practices paid in Q4 2022	Annually 50% at enrollment 50% post verification
	Buyers	Buyers: Outside the ag value chain	Bayer offsetting its own carbon emissions	SWOF aggregates carbon and sells outcomes to buyers within the ag supply chain and water quality credits to municipalities or the USDA

An Overview of Voluntary Carbon Markets for Illinois Farmers

Illinois Sustainable Ag Partnership (June 2023)

- 15 Ecosystem Service Markets are available in Illinois

- Market Types

- Inset - 6
- Offset – 7
- Combination - 2



- Payment Types

- Pay for Practice
- Pay for outcomes (per Tonnes of CO₂e)
- Pay for outcomes (per bushel)
- Combinations of pay for practice + Pay for Outcome

- Confirmed 760,979 acres enrolled (2.8% of IL Farmland)

- Average price of CO₂e = \$19.27 per tonne CO₂e



Partnerships for Climate-Smart Commodities

\$3.1 billion in funding nationwide

24 projects available in Illinois

- Row crop, specialty crop, forestry, and livestock projects
- All multi-state projects
- \$45,855,218.55 in federal estimated in Illinois
 - Private match funding will also be available

Federal Funding Opportunities

Federal USDA –NRCS Cost Share Programs

- EQIP
- CSP
- RCPP
- Contact your local NRCS office



United States
Department of
Agriculture

Inflation Reduction Act

\$8.45 billion for EQIP

\$3.25 billion for CSP

\$4.95 billion for RCPP

\$1.4 million for ACEP

\$1 billion for Technical Assistance

This is all pending the 2023 Farm Bill



United States
Department of
Agriculture



Illinois Sustainable Ag Partnership's Cover Crop Incentive Stacking Matrix


ISAP's Cover Crop Incentive "Stacking Matrix" is designed to demonstrate opportunities for farmers to stack payments from multiple incentive programs. Programs that are claiming a farmer's carbon asset will be marked with an asterisk (*).

These programs and the relationships shown on this matrix are acre-specific, meaning the same acres enrolled in EQIP on your farm are in-eligible to receive payments from other federally funded programs. However, you can enroll separate tracts on your farm in different federally funded programs and receive payments that way. For federal programs, acreage is only eligible for financial assistance if there is an unaddressed resource concern that may be mitigated by using cover crops.

<https://ilsustainableag.org/resource/isaps-cover-crop-incentives-directory/>

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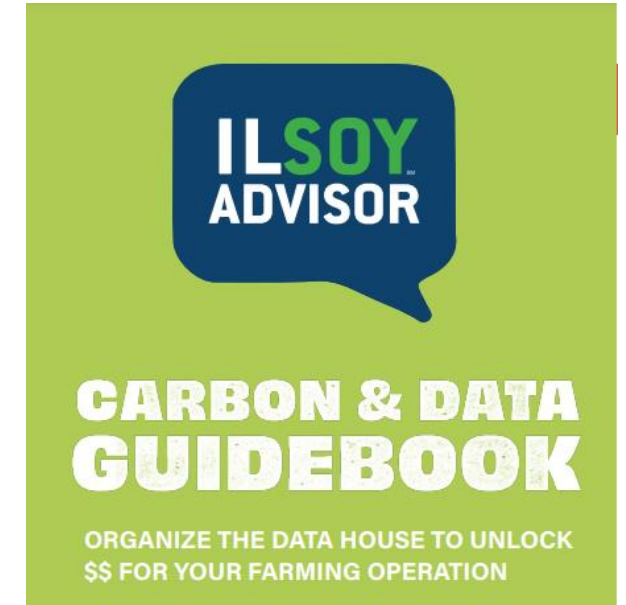
Illinois Sustainable Ag Partnership's Cover Crop Incentive Stacking Matrix

	EQIP	CSP	RCPP	PFC	FCSS	PCCP	Champaign County Cover Crop Incentive	STAR Pfp	*ICCI	*PepsiCo Cover Crop Incentive Program	*PCM Soil Health Incentive	*SWOF
EQIP		X	X	X	X	✓	X	✓	✓	✓	✓	X
CSP	X		X	X	X	✓	X	✓	✓	✓	✓	X
RCPP	X	X		X	X	✓	X	✓	✓	✓	✓	X
PFC	X	X	X		X	✓	X	X	X	X	X	X
FCSS	X	X	X	X		✓	X	✓	✓	✓	✓	✓
PCCP	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Champaign County Cover Crop Incentive	X	X	X	X	X	✓		X	✓	✓	✓	X
STAR Pfp	✓	✓	✓	X	✓	✓	X		X	X	X	X
*ICCI	✓	✓	✓	X	✓	✓	✓	X		X	X	X
*PepsiCo Cover Crop Incentive Program	✓	✓	✓	X	✓	✓	✓	X	X		X	X
*PCM Soil Health Initiative	✓	✓	✓	X	✓	✓	✓	X	X	X		X
*SWOF	X	X	X	X	✓	✓	X	X	X	X	X	

*Programs that are claiming a farmer's carbon asset

How to prepare for market enrollment?

- 1) Understand your conservation goals – carbon markets may not be the best financial mechanism to help you achieve your goal
- 2) Its probably too early to enroll the whole farm – start with a few fields at a time
- 3) Be prepared with good conservation agronomy – find a conservation agronomist to help you with your transition into conservation agriculture
- 4) Get your data ready - records and data are the key to receiving the highest dollar for your work - visit <https://www.ilsoyadvisor.com/carbon-data-guidebook/>
- 5) Review your options – review the different market options- visit <https://ilsustainableag.org/programs/ecomarkets/>



Pay attention to:

Contract length v land rental agreements

Will you be farming that field for the length of your contract?

Funding type:

Inset, offset, ecosystem service, federal conservation program

Contract fine print

Understand the full terms of your agreement

Data usage

How will the carbon market use your data?

Pay attention to:

Verification methods

Receipt audits, field visits, modeling, satellites all common

Program Exclusion:

Whether enrollment excludes the grower from participating in other markets or government programs

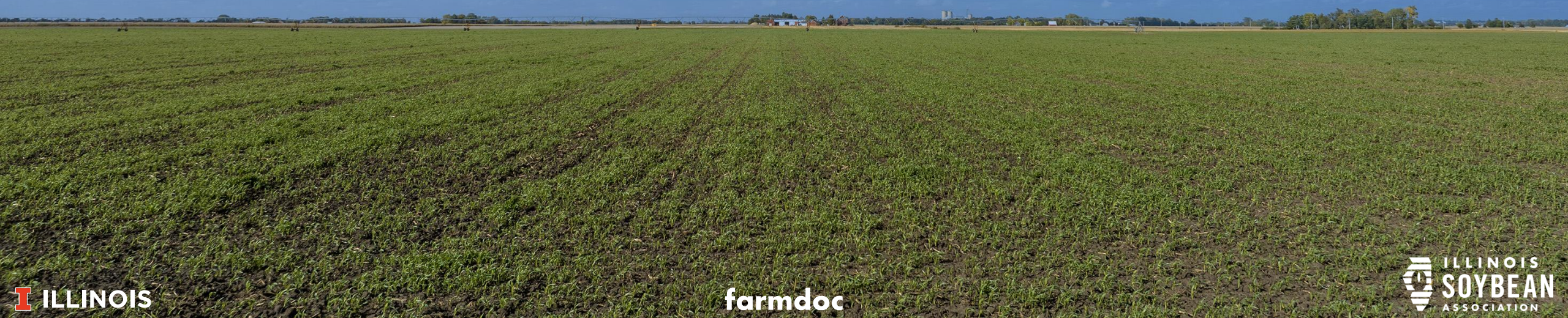
Cost-share programs

Many non-governmental cost share programs are now associated with a carbon asset

Pay attention to:

Practice standards

If enrolling in a federally funded program (e.g. Climate-Smart or EQIP) don't assume they all have the same planting standards and program requirements



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Eco Markets & Carbon Dynamics Field Day



November 7 at 9 AM to 1 PM

The carbon market is an emerging entity and buzzword in the agriculture industry. Every day, different programs are being presented to farmers, landowners, and researchers, creating many questions around carbon and farm operations. Clear the air and confusion at the Eco Markets and Carbon Dynamics Field Day.

Event Location

University of Illinois ACES Energy Farm
4110 S Race St, Urbana, IL 61802

Cost: Free and lunch provided to those registered by Nov. 3



go.illinois.edu/CarbonFieldDay

The Arrival of Spotted Lanternfly

Tips for Illinois Farmers Webinar

Thursday, October 26, 2023 from 11:00 am to 12:00 pm CT

Register at <https://go.illinois.edu/SLF2023>



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Eco Markets & Carbon Dynamics Field Day



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