

## **Presentation Overview**

- GHG Reductions with Climate Smart Practices (CSA): Illinois
  Case Study
- Sustainability Certification of CSA and Monetization via Book&Claim protocols

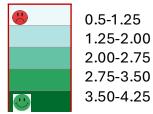


# GHG Reductions with Climate Smart Practices (CSA): Illinois Case Study



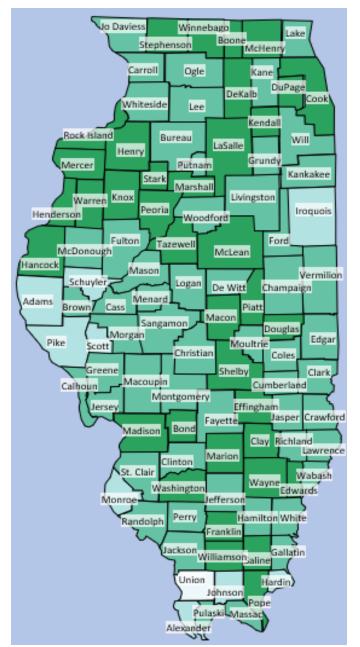
### Spatial Variation in 2000-2023 Yield Gain in Illinois –National average of 1.82 bu/ac/yr

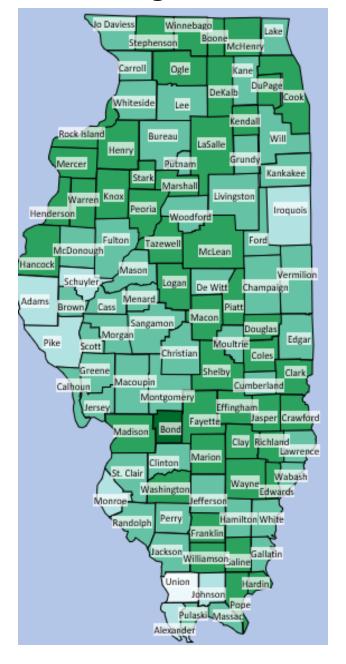
### **2023** Yield (bu/ac)



State Avg - NASS Incl. 2012 - 2.57 bu/ac/yr NASS Excl. 2012 - 2.64 bu/ac/yr







#### Jo Daviess Winnebago Stephenson McHenry Carroll Ogle DuPage DeKalb Whiteside Rock-Island Bureau Will LaSalle Henry Grundy Mercer Putnam Kankakee Marshall Warren Knox Livingston Iroquois Henderson Woodford Fulton Tazewell McLean McDonough Hancock Vermillion Schuyler De Witt Champaign Adams Macon Morgan Edgar Pike Christian Greene Clark Cumberland Montgomery Effingham Jasper Crawford Lawrence Marion St. Clai Wabash Washington Jefferson Fertilizer N Rate Hamilton White Franklin (lb/ac) 140-150 150-160 160-170 170-180 180-197

# IL County Average Fertilizer N Rates (lb/ac)

State Average = 167 lb/ac National Average = 166 lb/ac



# **Carbon Intensity** 23.5 Score Compared to National Average 23,9 Based on USDA **NASS Yield** Data 23.7 234 G CO2e/MJ of grain production 24.1 24.1 100 200 mi

# IL County CI Score: Yield and N Inputs

- State Average CI score is 5% lower than national average.
- Average CI score within 35 miles of ethanol plants is 16% lower than national average.

\*Based on NASS 2022 County level Yield Estimates



### CI Assessment: Around Ethanol Plants

Differential Yield Increase and N fertilizer productivity in counties within a 35-mile radius of ethanol plants and those not within that radius from 2000-2022 for USDA-NASS and USDA-RMA data sources.

	Counties within 35 miles of Ethanol Plant	Counties NOT within 35 miles of Ethanol Plant	% Difference
Total Number of Counties	56	44	
Avg NASS Yield Increase (bu/ac/yr)	2.5	2.3	8.6%
Avg RMA Yield Increase (bu/ac/yr)	2.8	2.2	27.3%
Avg NASS Fertilizer Productivity (lb N/bu)	0.82	0.90	8.9%
Avg RMA Fertilizer Productivity (lb N/bu)	0.75	0.85	11.8%



#### Jo Daviess Winnebago Lake Boone Stephenson McHenry Carroll Ogle Kane DuPage DeKalb Cook Whiteside Lee Rendall Rock Island Bureau will LaSalle Henry Grundý Mercer Putnam Kankakee Stark Marshall Warren Knox Livingston Peoria Iroquois Henderson Woodford Fulton Ford Tazewell McDonough McLean Hancock Mason Schuyler Logan De Witt Champaign Menard Adams Cass Piatt Brown Macon Sangamon Douglas Morgan Edgar Pike Moultrie Christian Coles Greene Clark Macoupin Calhoun Cumberland Montgomery Effingham Jersey Jasper Crawford Fayette Bond Madison Clay Richland Lawrence Marion Clinton St. Clair Wabash Wayne Washington Edwards Jefferson Cover Crop/Corn Perry HamiltonWhite -Soy-Wheat Acres Franklin Jackson 0-2% Gallatin Williamson; aline 2-4% Hardin) 4-6% Johnson 6-8% Pulaski Massac 8+% Alexander

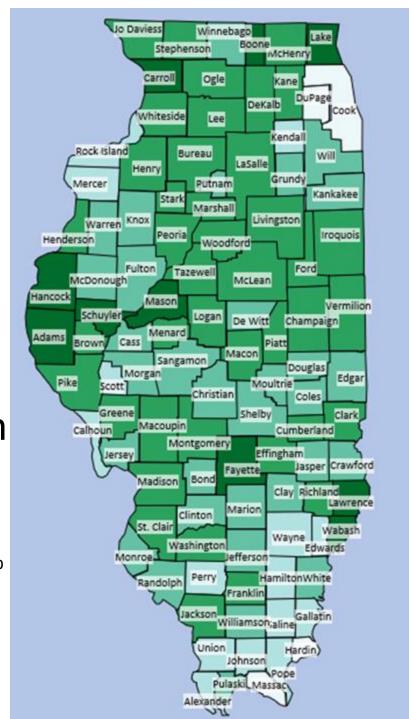
### Other CSA Practices

# IL County Cover Crop %

State Average = 5% National Average = 8%

# IL % of acres in reduced-till

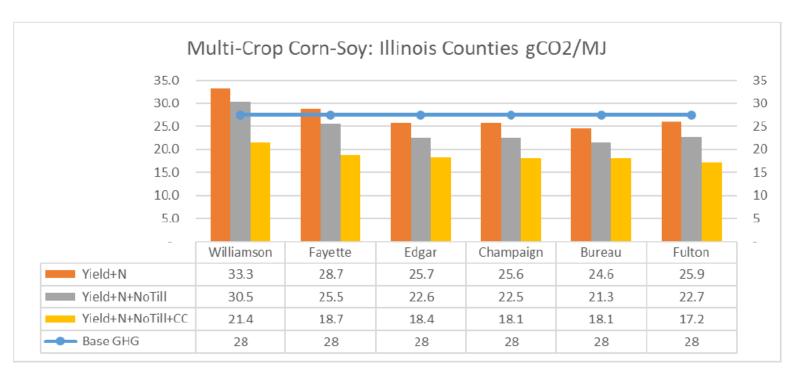
State Average = 37% National Average = 35%



## Spatial CI Assessment:

# Additional CSA Practices

- Carbon Intensity (g CO2e/MJ) of corn production in a corn/soy rotation across 6 counties along a South-NOrth transect in Illinois.
- Lower CI from Higher yields, better Nutrient Use Efficiency in North but Soil Carbon Models show larger CI Benefits from Cover Crop in South
- Benefits from CSA depend on Geography but Opportunities in All Regions









# Sustainability Certification of CSA and Monetization via Book&Claim protocols

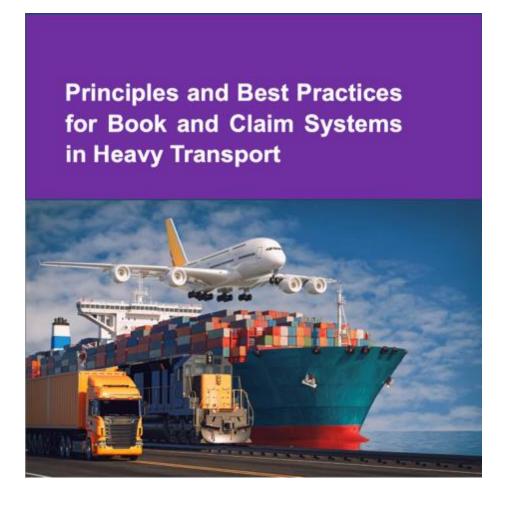
# From Start to Finish: Certification Ensures Full Supply Chain Traceability

Visualizing the Path of Certification Across the Supply Chain (Example)

**Exemplary** supply chain **Agricultural** crops and crops residues First gathering Farm / point **Plantation** Bio-**Trader Production** Waste, residue **Downstream** Airline/ refinerv plant Blend point or by-products trader road Point of Collecting transport Origin point **Blending** and Refinement and Feedstock production distribution **Production** 

- Virtually all elements in alternative/renewable fuel supply chains can be covered and made "certifiable" by the supply chain scopes depicted above
- For each certification scope, clear and publicly available certification requirements have been defined – the compliance with which are checked during regular audits

# Book and Claim Enables Participation of All Growers, Regions, and CSA Practices



#### Contributing

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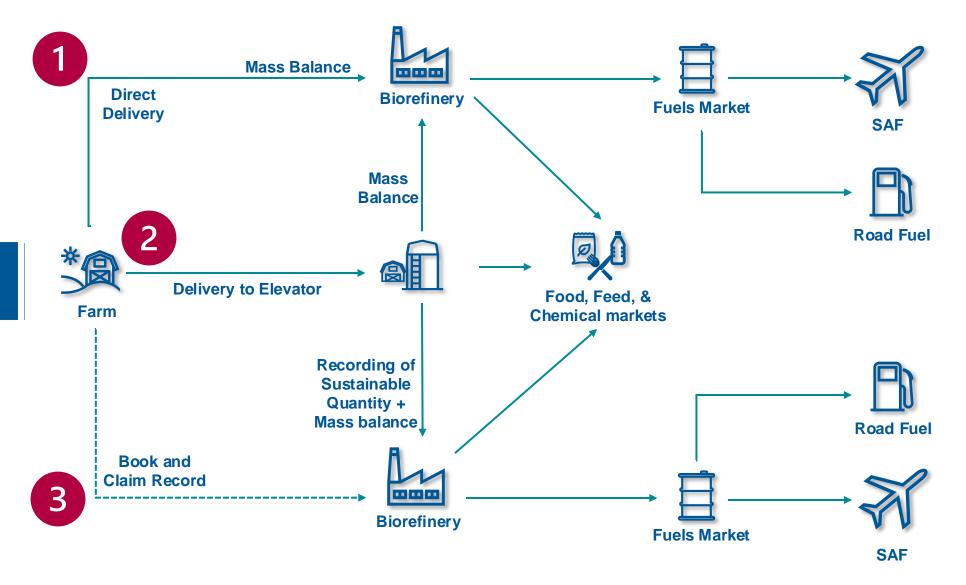
William Boatwright, NORDEN

### 3 US Grower Options to Participate in the Biofuels Market

Scenarios Under CORSIA, RED II, Japan Biofuels Policy

> Agricultural Crop Producers (i.e., corn, soy)

Scenarios Under 45Z & Voluntary Markets



## **Book and Claim Considerations**

- Book and Claim Needs to Integrate with Existing Biofuels Policies that Promote Current and Future Grain and Ethanol Exports.
  - Seamlessly integrate with existing biofuels policies where US corn is exported to international markets such as, for example, the Japan Biofuels Policy and the EU Renewable Energy Directive as well as CORSIA.
  - The book and claim system can be designed to audit for both book and claim and mass-balance at once via combination audits. This reduces the auditing burden on the growers.
- Growers retain flexibility of their book and claim certificates.
  - Book and claim certificates are issued to the growers.
  - Grower then has the flexibility to monetize the environmental attribute of corn represented by the certificate not only in the fuels markets but also in any corn/feed/biochemicals market.
  - This includes tax incentive markets (e.g 45Z), voluntary carbon markets, or feed/food producers with product or corporate GHG reduction goals.
- Create opportunities for growers traditionally not delivering to ethanol plants.
  - The book and claim system needs to be designed to enable participation by growers that are currently not delivering to an ethanol plant (e.g. growers in Southern Illinois).
  - Auditing capabilities must be scalable to provide geographic coverage across all corn growing regions from day one of the system



# **Summary Thoughts**

- IL Case Study shows that GREET FD-CIC tool can be easily adapted to emphasize regionalized CSA benefits.
- In complement, Book and Claim Enables Participation of All Growers, Regions, and CSA Practices
  - Book and Claim Needs to Integrate with Existing Biofuels Policies that Promote Current and Future Grain and Ethanol Exports
  - Growers retain flexibility of their book and claim certificates.



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