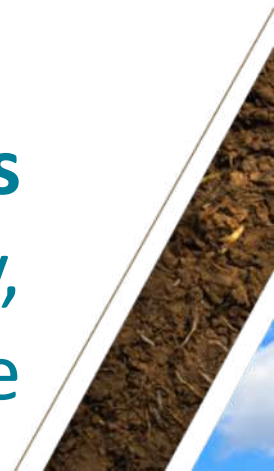
PHYTOBIOMES ALLIANCE

Webinar Series Introduction

22 October 2020

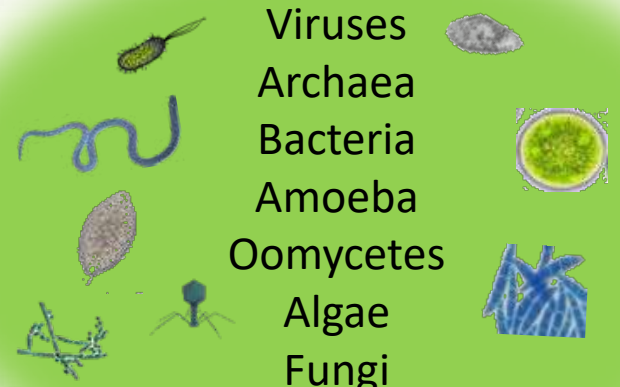
Sally Flis
Senior Director of Agronomy,
The Fertilizer Institute



Phytobiomes: Complex Systems of Plant-based Agriculture

Climate, Weather, Water

"Biomes": Site specific environments

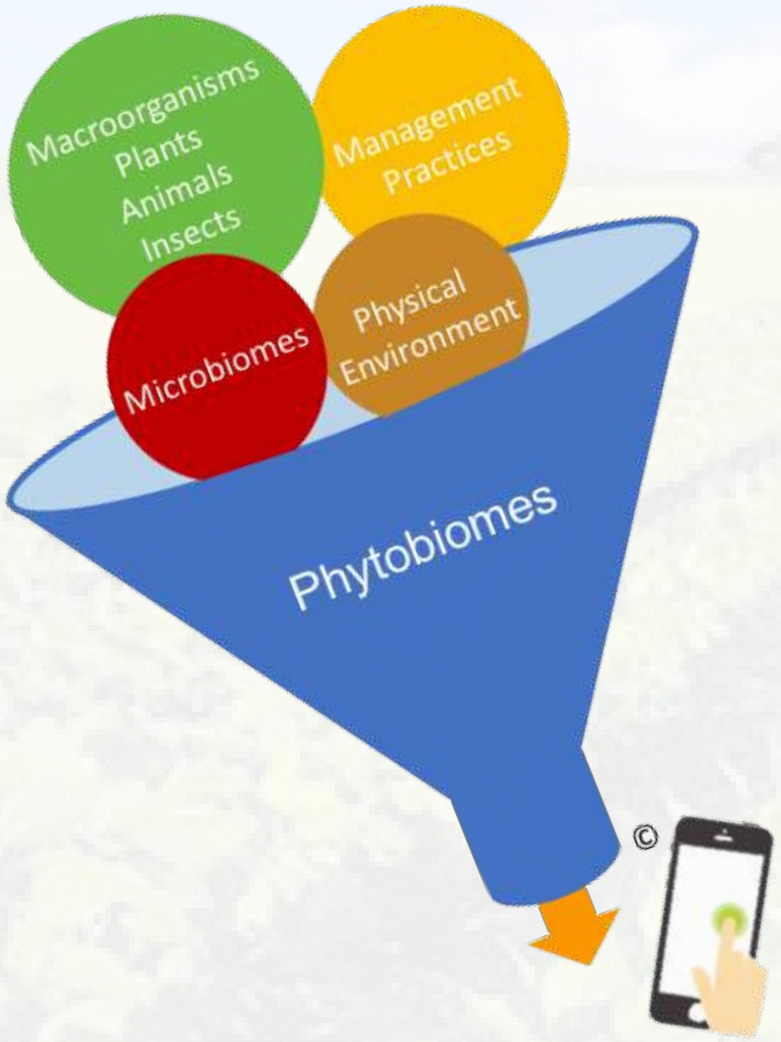


Microbiomes and Macroorganisms/Macrofauna

Arthropods, Other Animals and Plants

All influenced by Management Practices

Phytobiomes Alliance Vision



By 2050, all farmers have the ability to use predictive and prescriptive analytics based on geophysical and biological conditions for determining the best combination of crops, management practices, and inputs for a specific field in a given year.

PHYTOBIOMES ALLIANCE

Phytobiomes Alliance Next Webinar: 5 November 2020

- **Circles H2020: Can natural microbiomes be exploited for more sustainable, safe, productive and nutritious food production?**
- Presenter: Senga Robertson-Albertyn, School of Life Sciences, University of Dundee, UK
- Registration: https://attendee.gotowebinar.com/register/5970242995046812688
- Time: 8am PDT, 11 am EDT, 5pm CET

Register to the mailing list to receive news about events organized by the Phytobiomes Alliance http://tiny.cc/ffw8rz

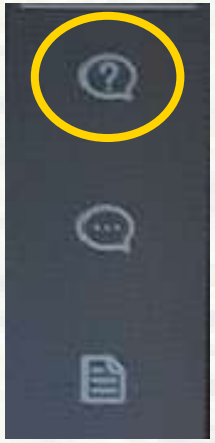
PHYTOBIOMES ALLIANCE

Phytobiomes Alliance Webinar dashboard

- The webinar is recorded and will be posted on the Phytobiomes Alliance YouTube channel in a few days https://www.youtube.com/channel/UCuysQnTAMbSGq7rpiB9Yc8g

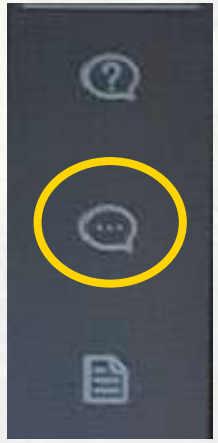
- The presentation section will be followed by a Q&A

Questions



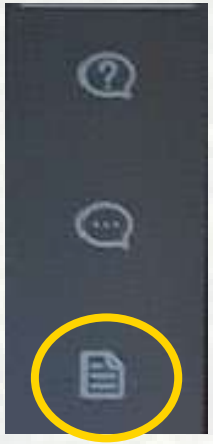
Submit your questions in the Q&A panel, do not use the chat

Chat



Use the chat panel to talk with fellow attendees or the organizers

Handouts



Download handouts from the presentations in the handout panel

MANAGING NUTRIENTS AS A SYSTEM WITH 4R NUTRIENT STEWARDSHIP

Sally Flis, Ph.D., CCA – Senior Director of Agronomy, The Fertilizer Institute

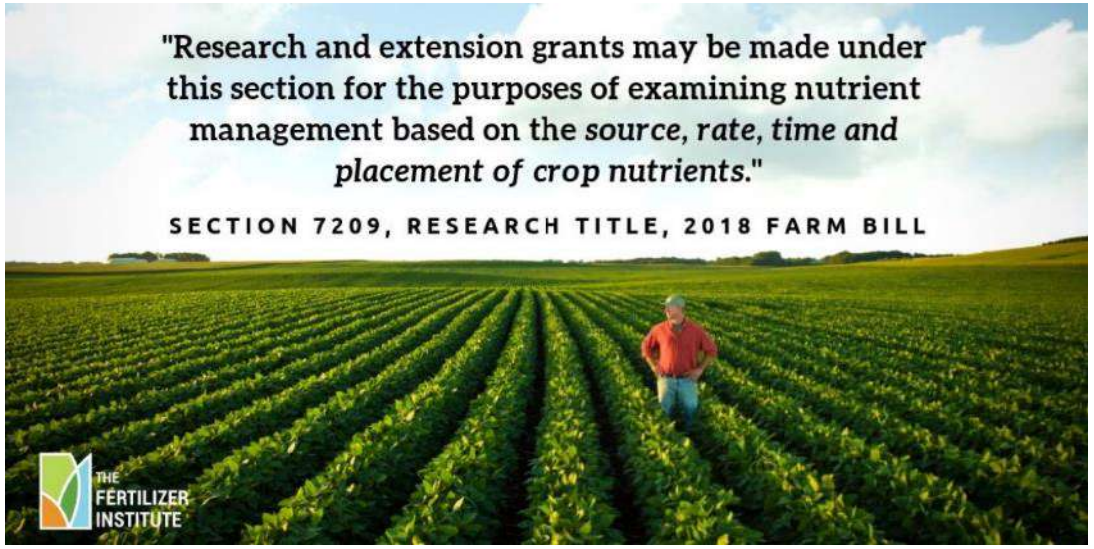
sflis@tfi.org

4R nutrient stewardship

THE FERTILIZER INSTITUTE

THE FERTILIZER INSTITUTE

TFI is the voice of the fertilizer industry, representing the public policy, communication, stewardship and sustainability and market intelligence needs of fertilizer producers, wholesalers and retailers as well as the businesses that support them with goods and services.



4 nutrient stewardship

RIGHT SOURCE
Matches fertilizer type to crop needs.

RIGHT RATE
Matches amount of fertilizer to crop needs.

RIGHT TIME
Makes nutrients available when crops need them.

RIGHT PLACE
Keeps nutrients where crops can use them.

4 nutrient stewardship Is More…

- **Soil characteristics**
- **Site-specific**
  - Slope
  - Distance to water
  - Conservation Practices
- **Crop yield and quality goals**
- **Weather**
- **Cost**

Environmental Metrics

- **Farm Level**
  - Nitrogen Balance
  - Nitrogen Use Efficiency
  - CO2e emissions
  - P-Index per field
  - Cost per acre
- **Program Level**
  - Total acres covered
  - Number of acres with individual practices
  - Economic impact of programs
  - Changes in total nutrient use

2013 Meta-analyses – 4 Papers

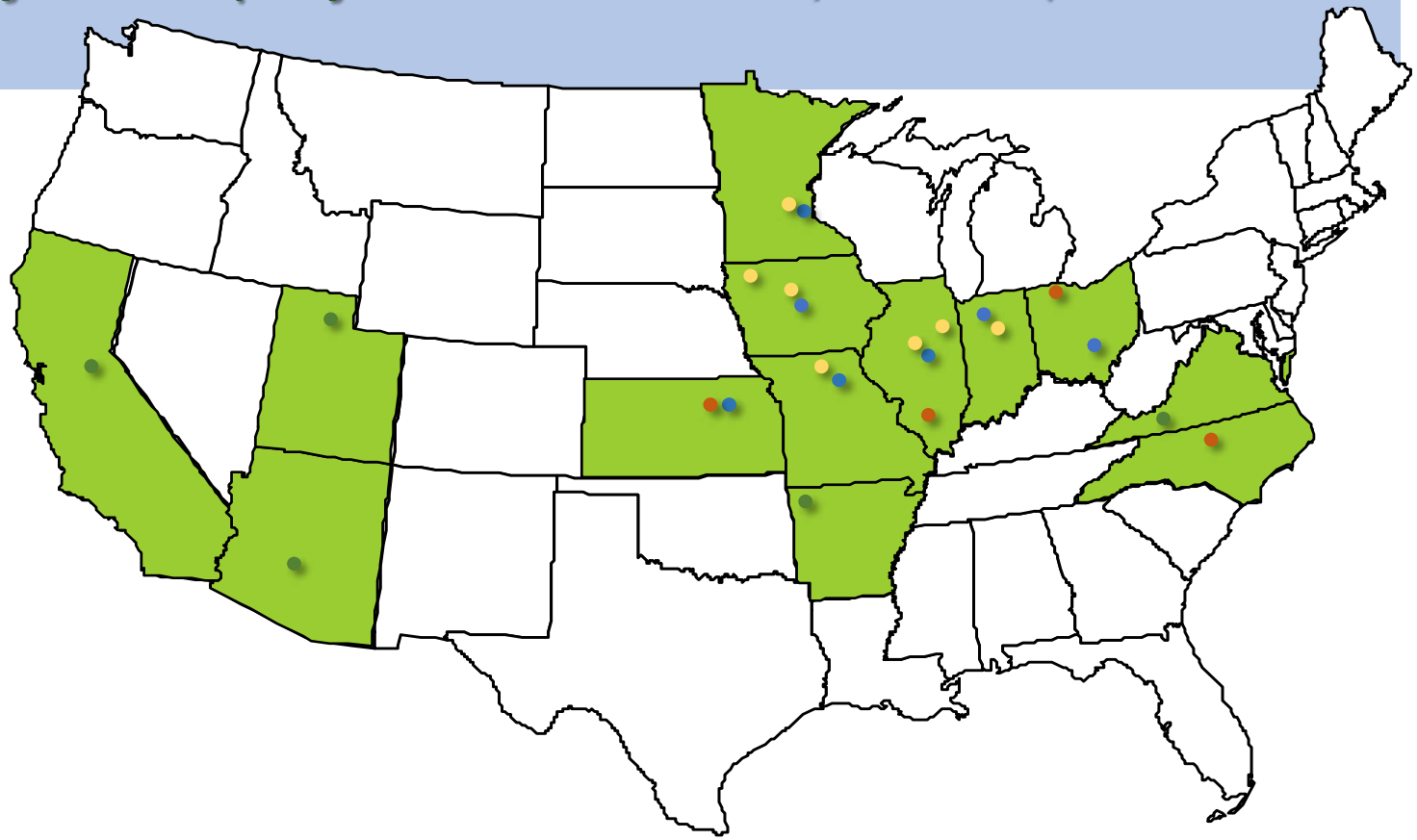
2013 4R Research and Demonstration – 7 projects in Corn and Soybean Rotations

2017 NutriNet collaboration – 5 states and 1 Ontario Site

2019 4R Research Awarded Projects- 5 projects in Almonds, Cotton, Tree Crops, Alfalfa, Vegetable Crops

FAR

FOUNDATION FOR AGRONOMIC RESEARCH



2020 4R Advocates

4R Nutrient Stewardship Certification Program

- Provides a science-based framework for plant nutrition management
- Considers specific individual farms' needs
- Started in Western Lake Erie Basin, the program has expanded internationally, adopted by states in the U.S. and Canadian provinces.

- NY – 700,000 ac
- Canada – 443,160 ac
- TOTAL = 4,043,130 ac

The Question of Cost

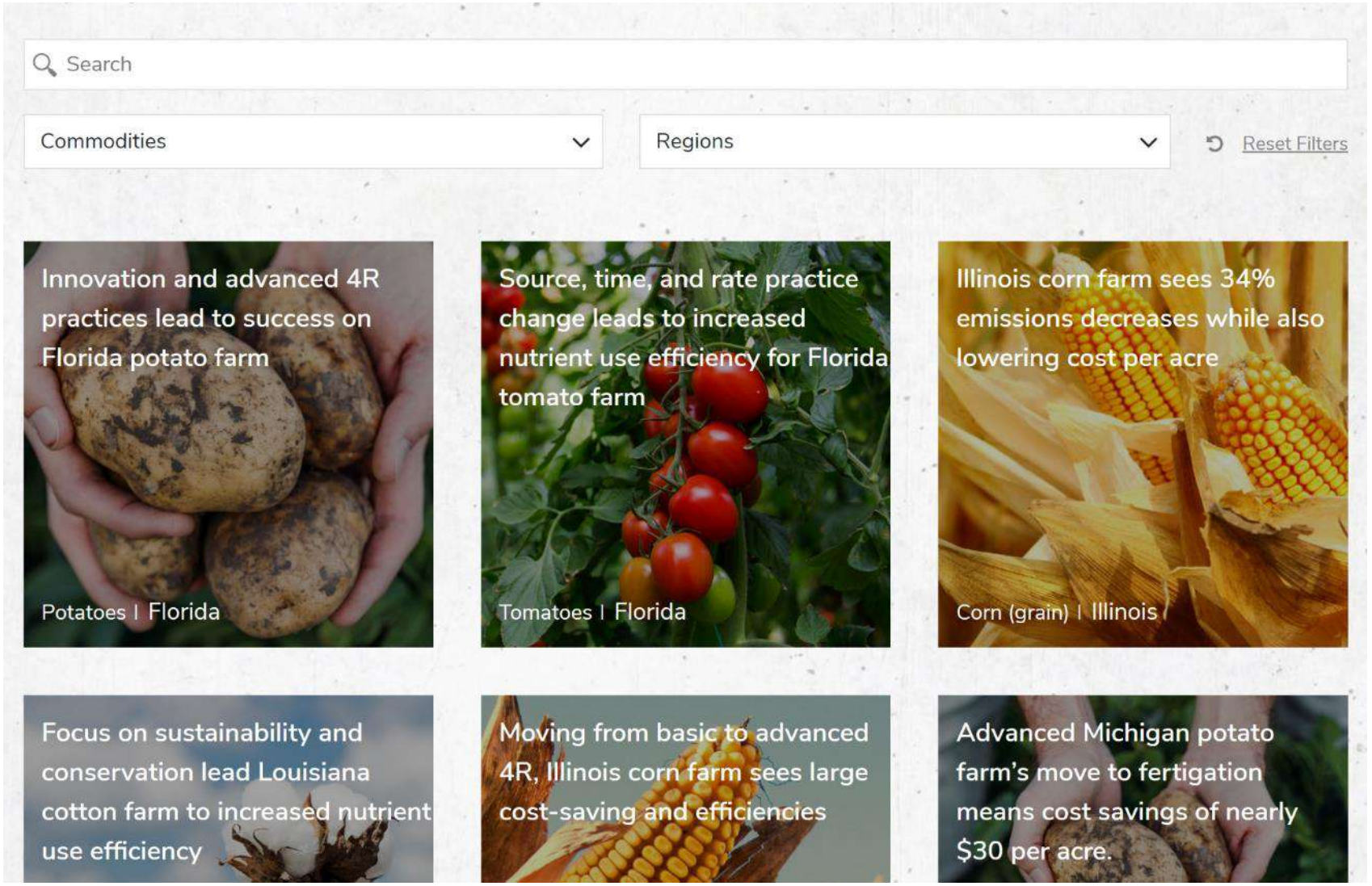
"I really like to see if a certain farming practice is really cost effective by the way it works before I invest money into it. I like new farming practices to improve my business."

"What would be the cost to implement this program and is it cost effective on smaller acreage fields?"

#1 - Improve farm operation profit

- **Barriers to adoption**
  - New equipment needs
  - Labor or time changes
  - Expertise
- **Top 2 Sources of information on fertilizer**
  - Agronomist
  - Fertilizer dealer

4RFarming.org

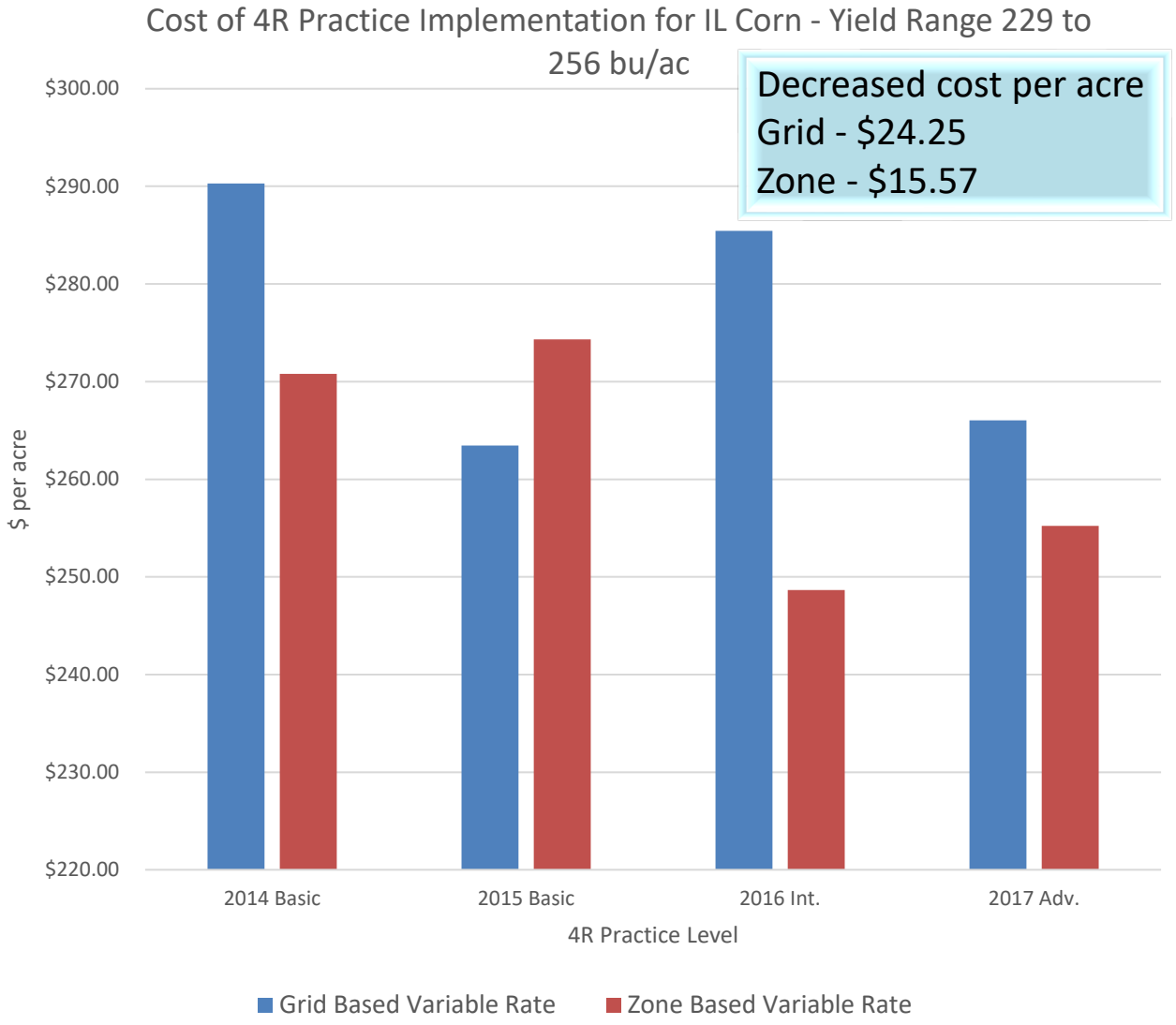


Economics of 4R stewardship

- Basic: spring pre-plant anhydrous ammonia w/ inhibitor, liquid starter w/ seed, early post-plant w/ herbicide, liquid N side-dress with Y-drop

- Intermediate: Liquid starter w/ seed, early post-plant w/ herbicide, side-dress anhydrous ammonia with inhibitor

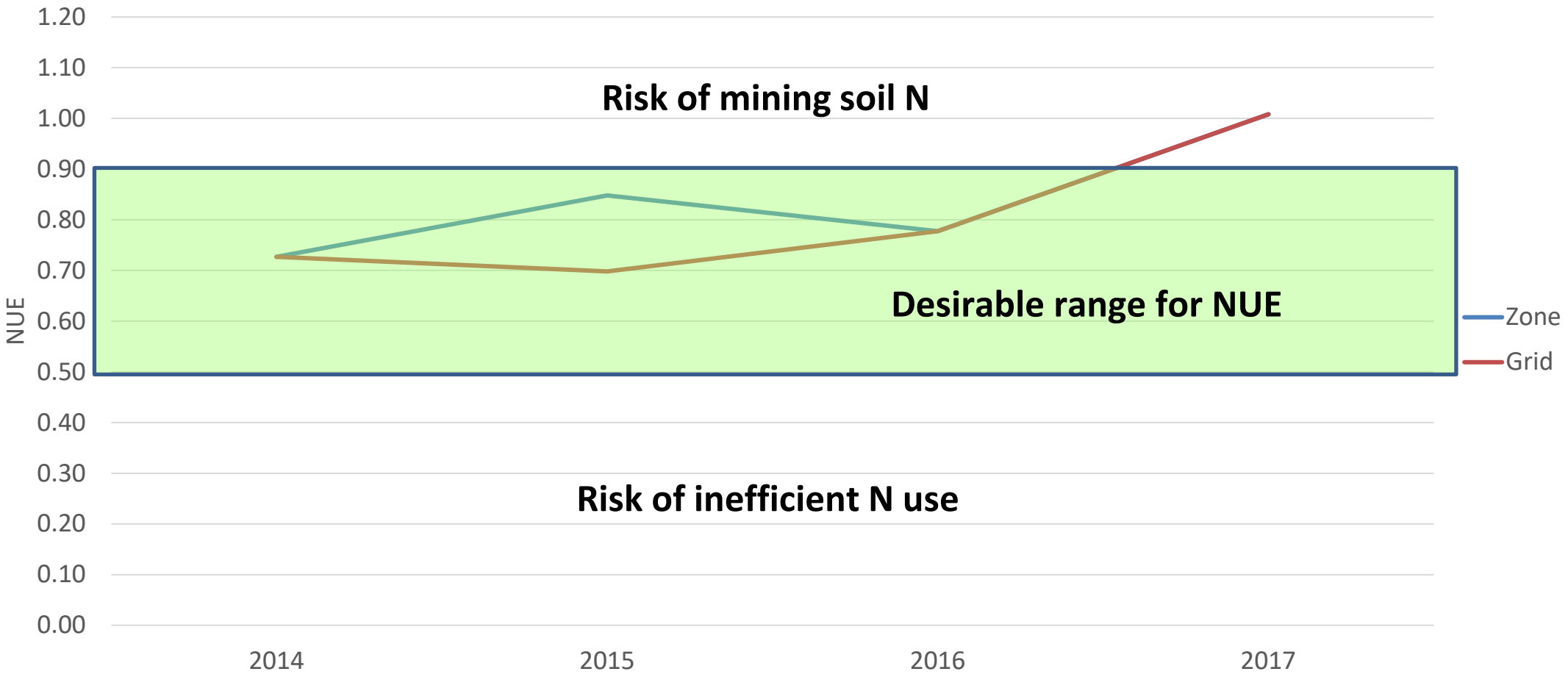
- Advanced: Liquid starter w/ seed, early post-plant w/ herbicide, side-dress anhydrous ammonia w/ inhibitor, liquid side-dress w/ Y-drop (V10)



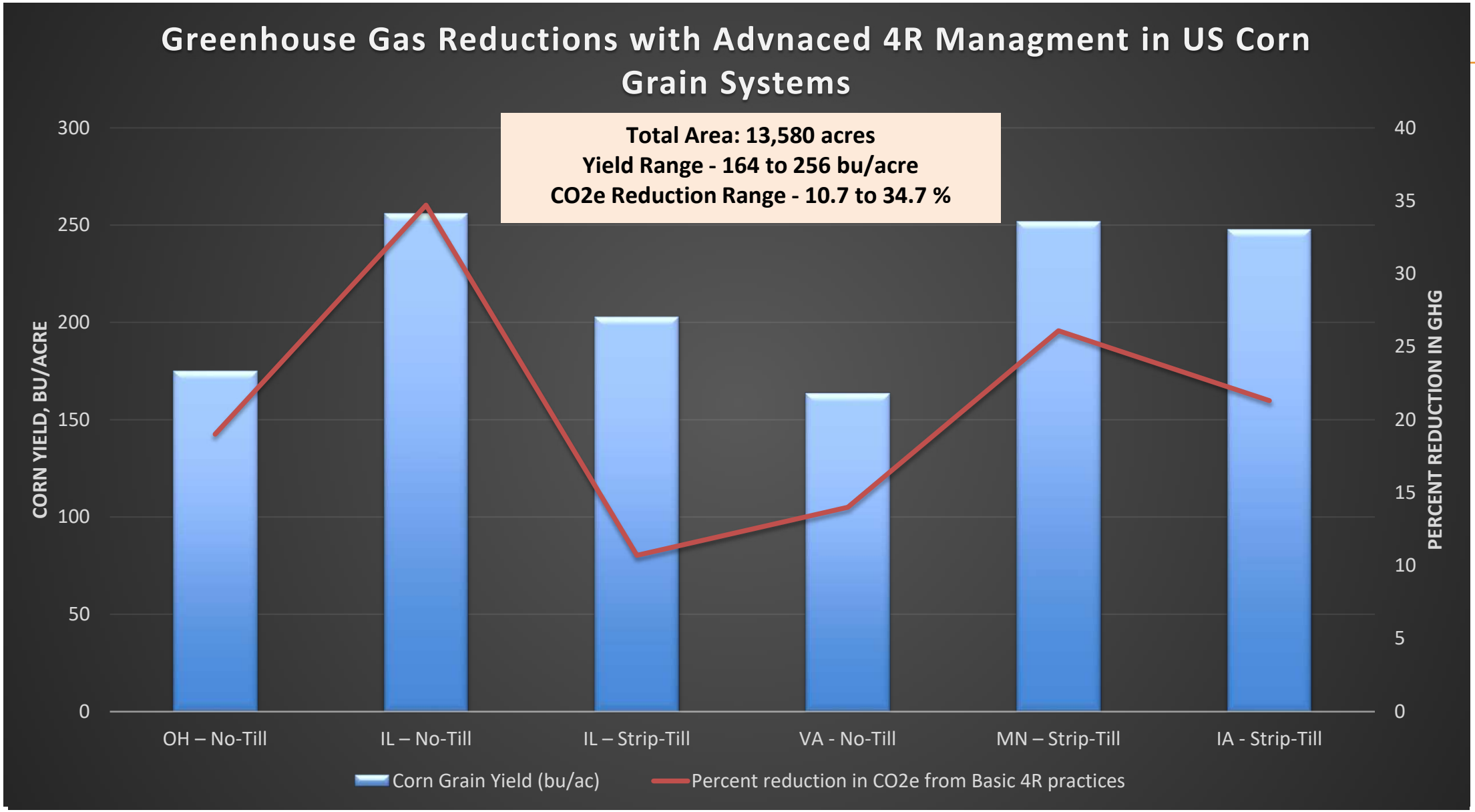
Environmental Metrics– IL Corn

	2014	2015	2016	2017
4R Practice Level	Basic	Basic	Intermediate	Advanced
Corn Grain Yield (bu/ac)	229	220	246	256
N Application Rate (lbs/ac)	253	208	253	204
Nitrogen Use Efficiency (lb N applied/bu corn grain)	1.11	0.95	1.03	0.80
N Balance (lb N applied – lb N harvested)	69.5	31.9	56.6	-1.14
CO2e Emissions per bu	9.4	8.43	8.17	6.14
Percent reduction	-	10.3	13.1	34.7

NUE (N harvested/N applied)



International Nitrogen Expert Panel Recommendations


Greenhouse Gas Reductions with Advnaced 4R Managment in US Corn Grain Systems
Total Area: 13,580 acres
Yield Range - 164 to 256 bu/acre
CO2e Reduction Range - 10.7 to 34.7 %
CORN YIELD, BU/ACRE
PERCENT REDUCTION IN GHG
300
250
200
150
100
50
0
40
35
30
25
20
15
10
5
0
OH – No-Till
IL – No-Till
IL – Strip-Till
VA - No-Till
MN – Strip-Till
IA - Strip-Till
Corn Grain Yield (bu/ac)
Percent reduction in CO2e from Basic 4R practices

Other Crops on 4RFarming.org

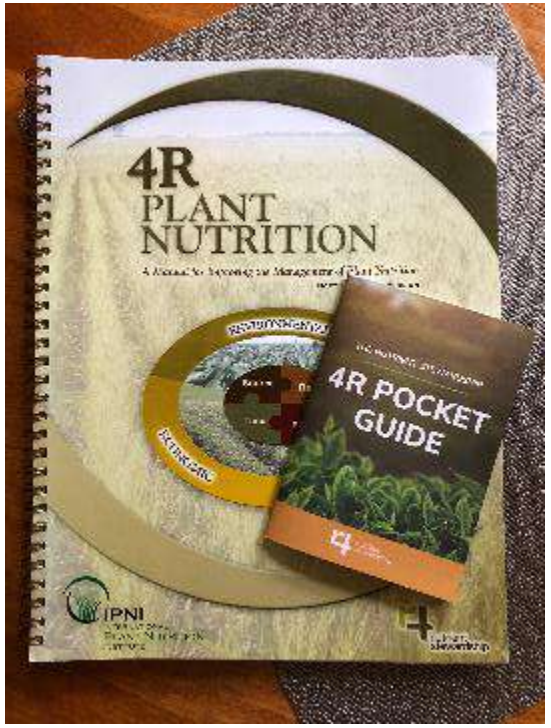
- **Strawberries**
- **Chip potatoes**
- **Cotton**
- **Corn Grain**
  - IL, MN, VA, OH, IA
- **Coming Soon - WI**
  - Corn silage
  - Diverse crop rotations
  - Manure nutrients

Resources

nutrientstewardship.org
4RFarming.org

@4Rnutrients

4R Nutrient Stewardship



https://www.youtube.com/user/1fertilizer/videos