# GETTING THE NEXT GREEN REVOLUTION RIGHT

## Round Table Meeting January 2025

Farm Foundation®
Accelerating people & ideas

# CULTIVATOR BREAKFAST

## Round Table Meeting January 2025

Farm Foundation®
Accelerating people & ideas

# Tim Brennan

## Vice President Programs and Strategic Impact

## Farm Foundation

Farm Foundation®
Accelerating people & ideas

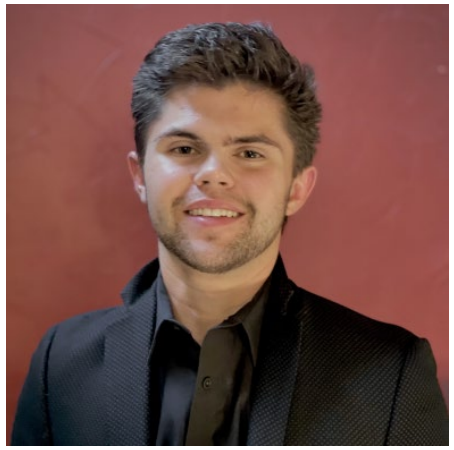
# Moderator
# Jenna Wicks

## Program Manager
## Farm Foundation

Farm Foundation®
Accelerating people & ideas

# JANUARY 2025 CULTIVATORS

**Cooper Cable**
**North Carolina State University**



**Ashton Dalton**
**Louisiana State University**

**Amanda Lay-Walters**
**University of Arkansas**

**Grace May**
**University of Illinois Urbana-Champaign**

**Yasmeen Saleem**
**University of Florida**

**Raymond Yan**
**Penn State University**

# Thank you to BNSF and the Round Table Fellows for your support of the Cultivators Program!

BNSF RAILWAY

Farm Foundation
Accelerating people & ideas

# Cooper Cable

## North Carolina State University

Farm Foundation®
Accelerating people & ideas

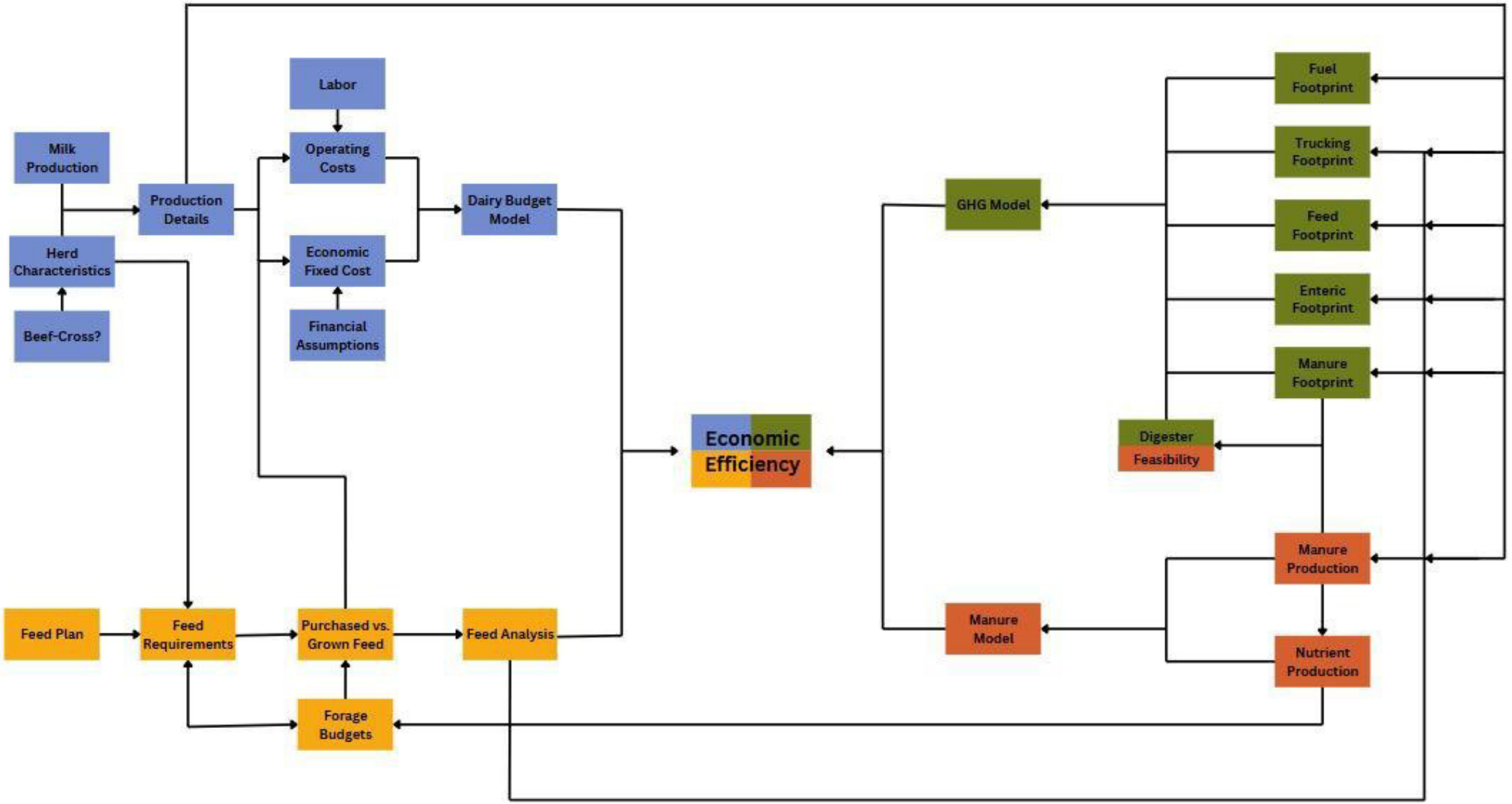
# A Comprehensive Dairy Model to Assess Carbon Footprint Reduction at Low Cost

Cooper Cable

# The Research Question?

- The North Carolina Dairy Foundation
- Develop a way to examine the whole system efficiency and carbon footprint related to forage and grain production.
- Capture the effects the diet has on emissions and manure production with attention to how to economically deal with manure management and carbon reductions.
- Show the efficiencies that can be gained from a fully integrated dairy, forage, and grain system.

# Our Approach!



# Progress and Contact Information

- Excel Model is almost complete, will have farmers and industry experts evaluating it.
- Moving beyond the traditional extension model to a cloud-based platform.
- Please stop by my poster with any questions or reach out to me via another method!
- Email: cmcable@ncsu.edu
- LinkedIn: https://www.linkedin.com/in/cooper-cable


Farm
Foundation®
Accelerating people & ideas

# Ashton Dalton

## Louisiana State University

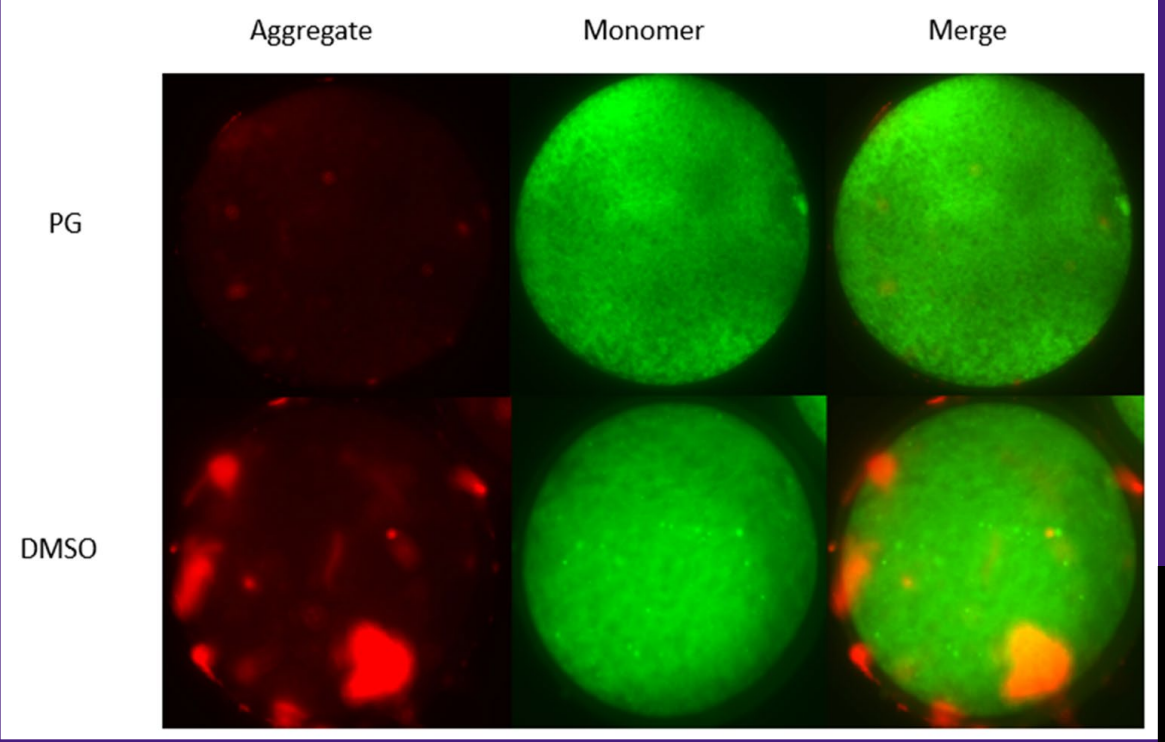
Farm Foundation®
Accelerating people & ideas

# The influence of different cryoprotectants on mitochondrial function in vitrified bovine oocytes

• • •

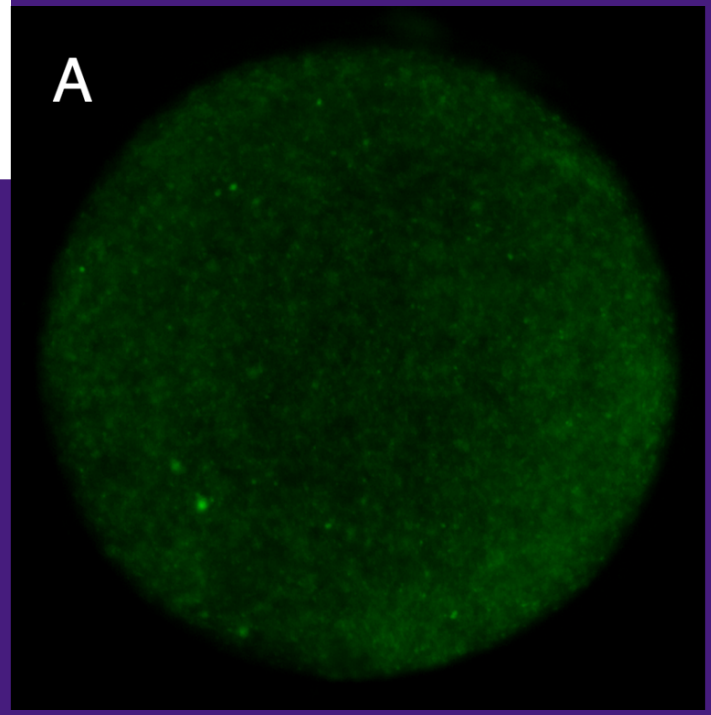
A. Dalton, E. Girka, A. Brewer, K. Bondioli

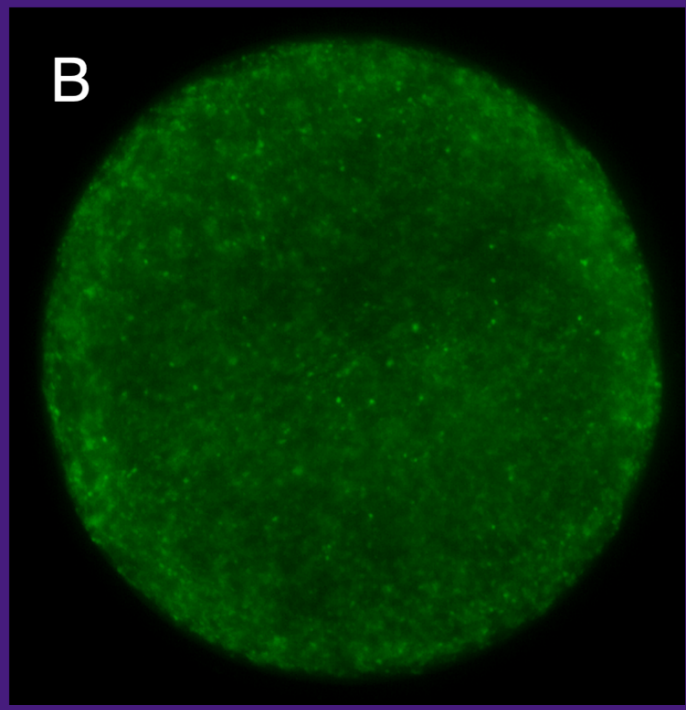
LSU
College of Agriculture




# ROS Testing: higher quantity of green pigmentation indicates increased levels of ROS

# JC-1 Testing: higher ratio of red to green indicates a healthy membrane potential and permeability




DMSO

PG

LSU College of Agriculture

# Conclusion

- The findings align with existing studies, demonstrating that the DMSO + EG combination is less detrimental to oocyte mitochondria.
- This combination exhibits reduced ROS production, facilitating enhanced calcium regulation and minimizing interference with the ETC. Additionally, oocytes vitrified with DMSO + EG show an augmented mitochondrial membrane potential compared to those vitrified with PG + EG.
- Subsequent research should explore the potential benefits of incorporating antioxidants, such as melatonin, to further diminish ROS and regulate mitochondrial functions.

LSU
College of Agriculture


Farm
Foundation®
Accelerating people & ideas

# Amanda Lay-Walters

## University of Arkansas

Farm Foundation®
Accelerating people & ideas

DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

# Nitrogen Fertilizer Rate Effect on ‘Ouachita’ Blackberry

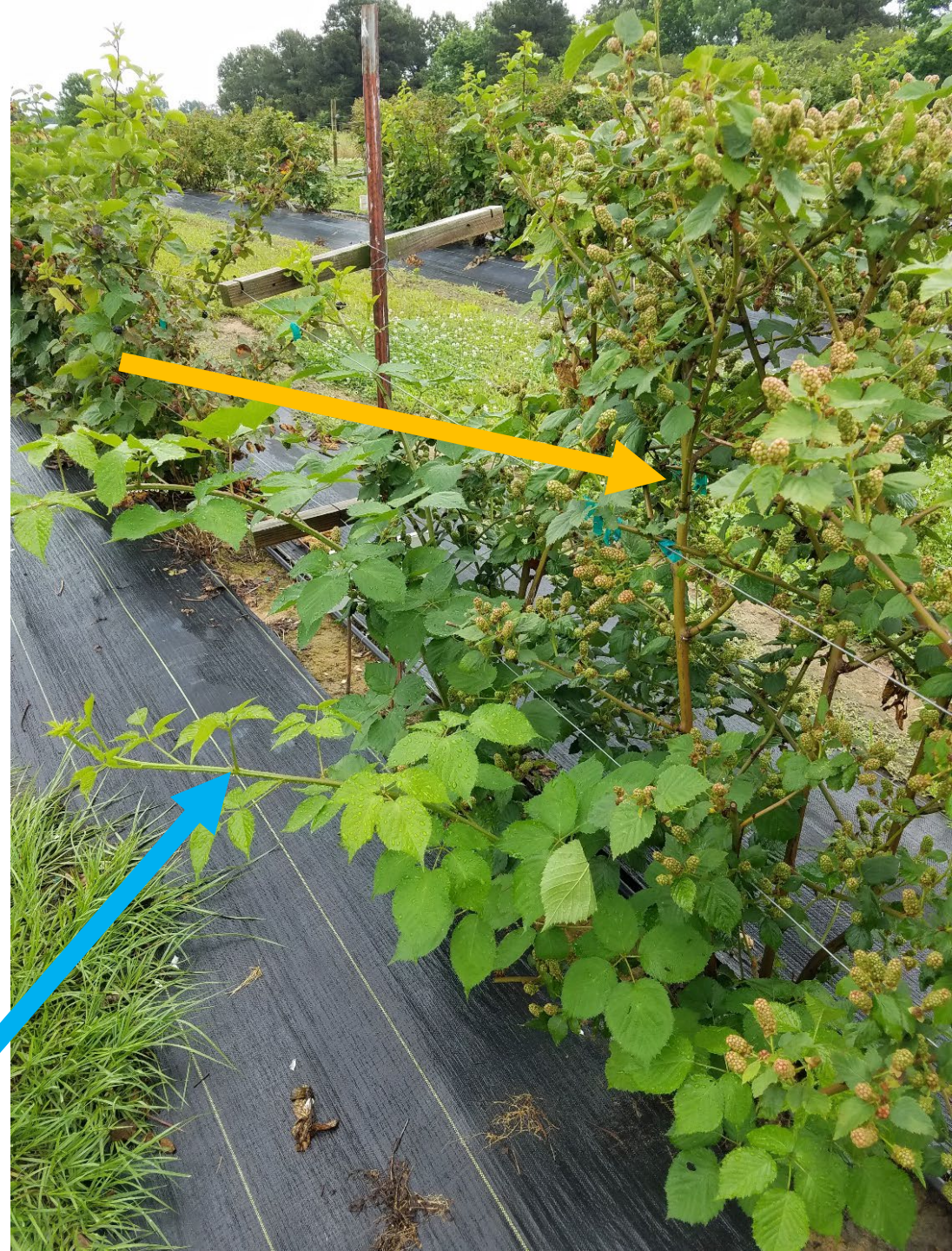
Amanda Lay-Walters, PhD Candidate - University of Arkansas Horticulture Department

# Experiment

- **Objective**: Evaluate the effects of N fertilizer rate and sampling date on ‘Ouachita’ blackberry tissue N concentration

- 6 rates of fertilizer applied weekly
  - 0 – 150 lb N/ac

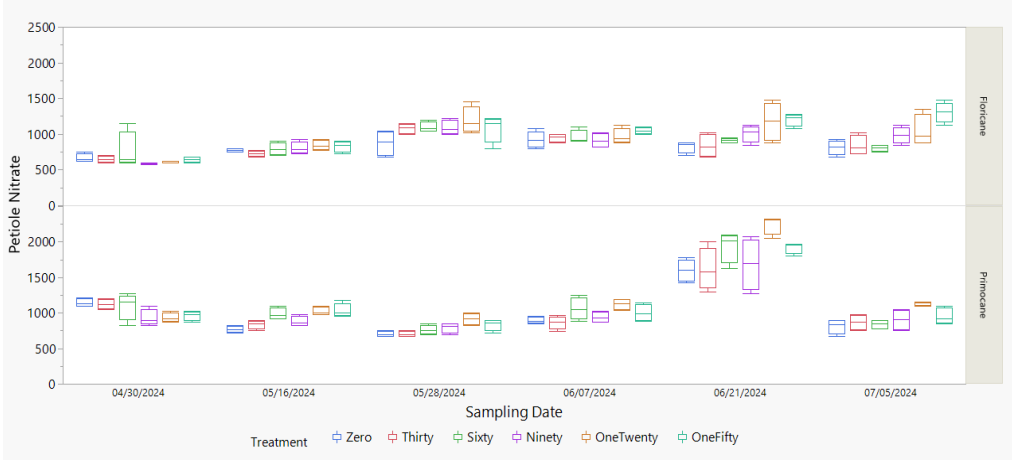
- Leaf sampled from primocanes and floricanes every other week



DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

# Conclusion

- My **poster** will show the results of 2023 & 2024 leaf tissue nitrogen data




- Thank you to the Farm Foundation, University of Arkansas Fruit Research Station team, and Dr. Amanda McWhirt and her lab

Farm Foundation
Accelerating people & ideas

UofA
DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Dr. Jackie Lee
Director of Fruit Station

Amanda Lay Walters
PhD Student

MJ Exner
Undergrad Intern

Lizzy Herrera
Program Associate

Dr. Amanda McWhirt
Horticulture Specialist

Keilah Barney
Program Technician

Taunya Ernst
Research Program Associate


Farm
Foundation®
Accelerating people & ideas

# Grace May

## University of Illinois Urbana-Champaign

Farm Foundation®
Accelerating people & ideas

ILLINOIS

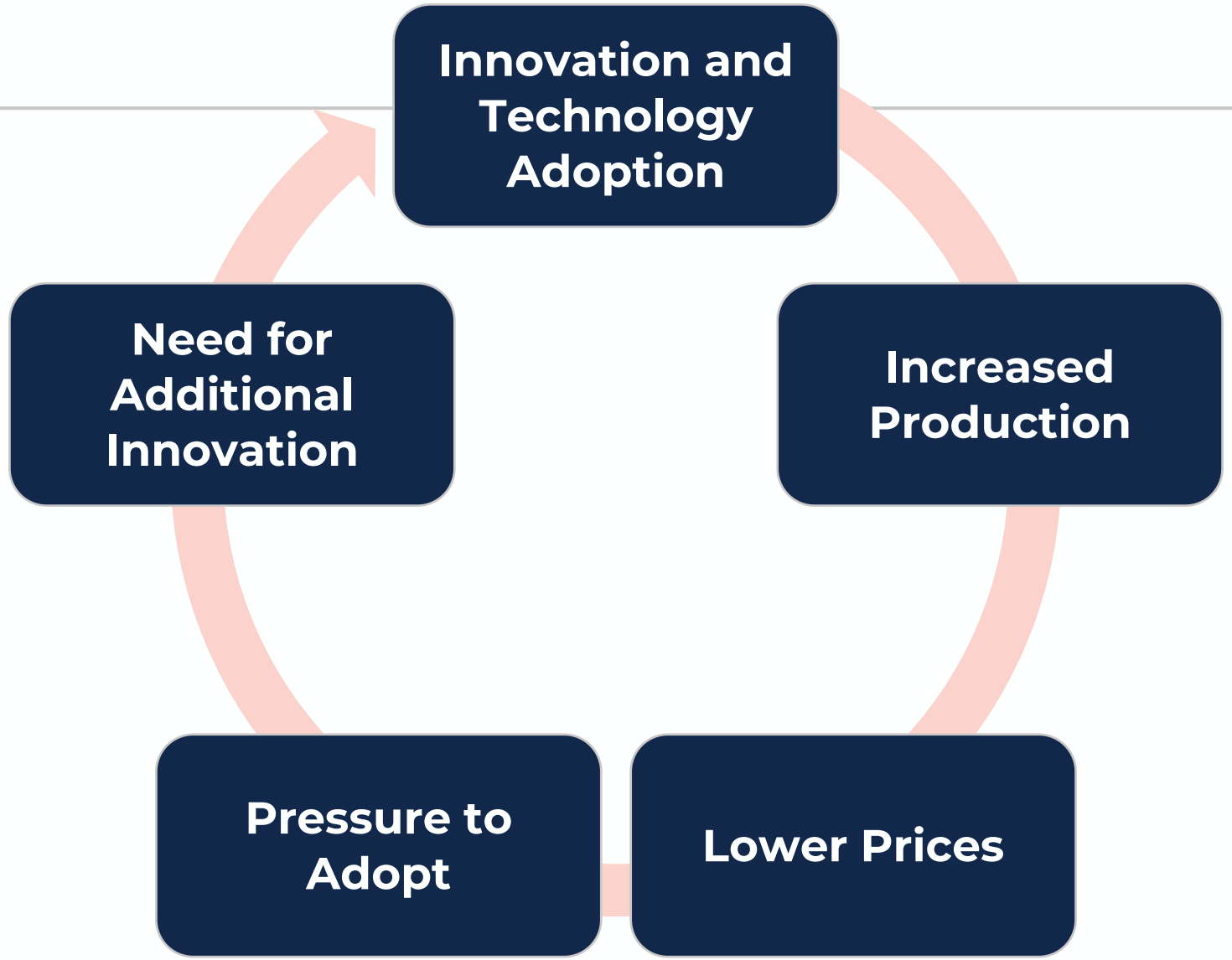
# The Technology Treadmill and the Next Green Revolution

*Grace May*

# The Technology Treadmill and the Green Revolution

- The "**Green Revolution**" began in the mid-20th century and the era is defined by the technological development that took place, which lead to increased production of agricultural commodities
- The agricultural "**Technology Treadmill**" was introduced in 1958 by agricultural economist Willard Cochrane as a way to describe the cycle in which farmers are constantly trying to improve their production and incomes by adopting new technologies
- Agriculture policy at the time combined acreage reductions with price support loans, which often included some costs in their calculations

# The Technology Treadmill



# Farm Policy and Economics : Green Revolution Era to Present-Day

## 1950-1969

- Post-war production boom and new innovations
- Cost-price squeeze
- Mechanization on farms
- Surplus

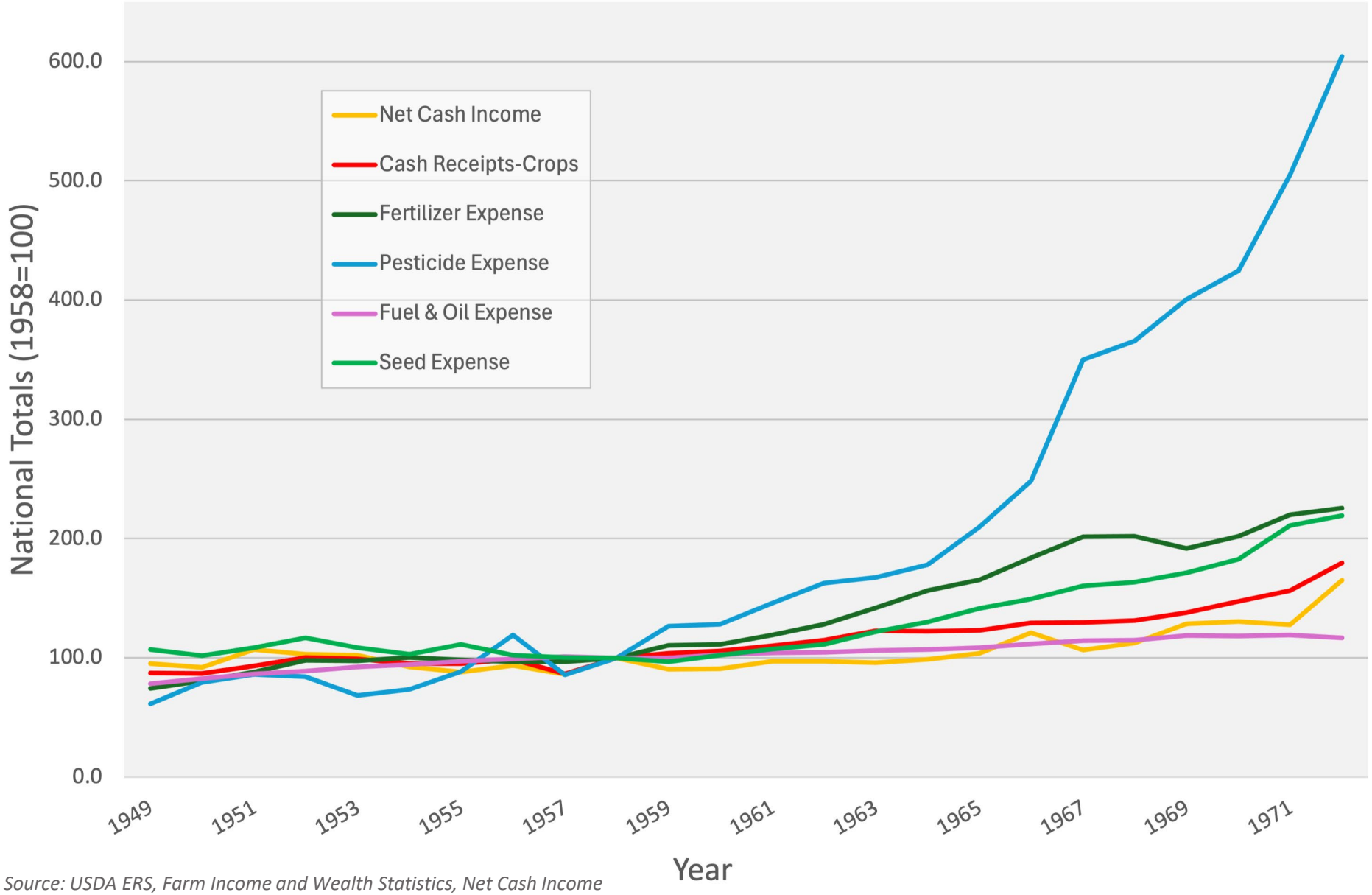
## 1970-1989

- Sharp rise in prices in early 70's
- Farmers increase production, which also increases debts
- 1980's farm crisis, heavily affecting farmers, especially those with heavy debt loads

## 1990-2015

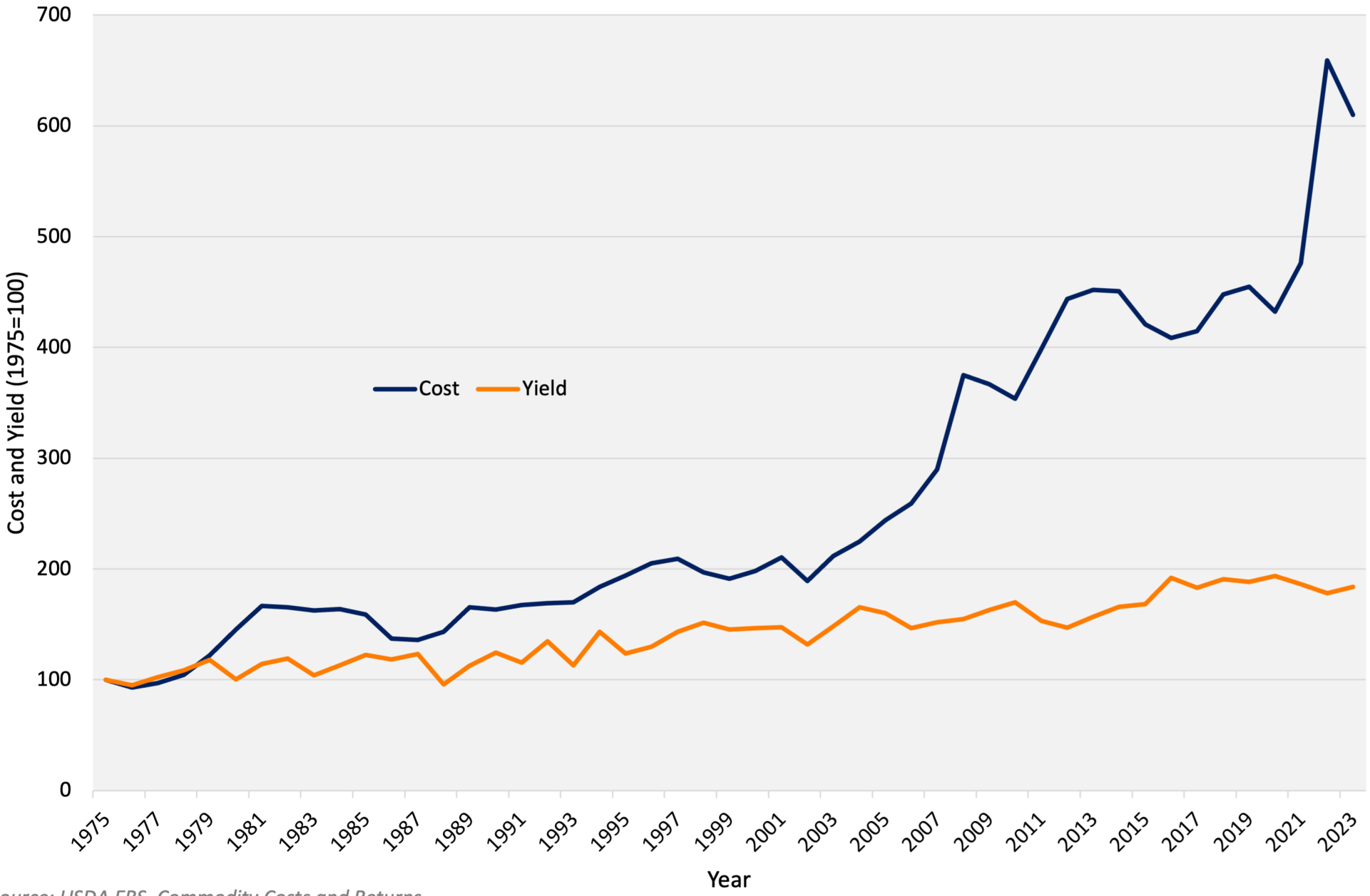
- Technology breakthroughs
- Increasing yields
- Farm consolidation and industrialization
- Crop Insurance

# National Totals: Income, Cash Receipts, and Expenses
# 1958=100




*Source: USDA ERS, Farm Income and Wealth Statistics, Net Cash Income*

## Cost and Yield Per Planted Acre, 1975-2023
## (1975=100)



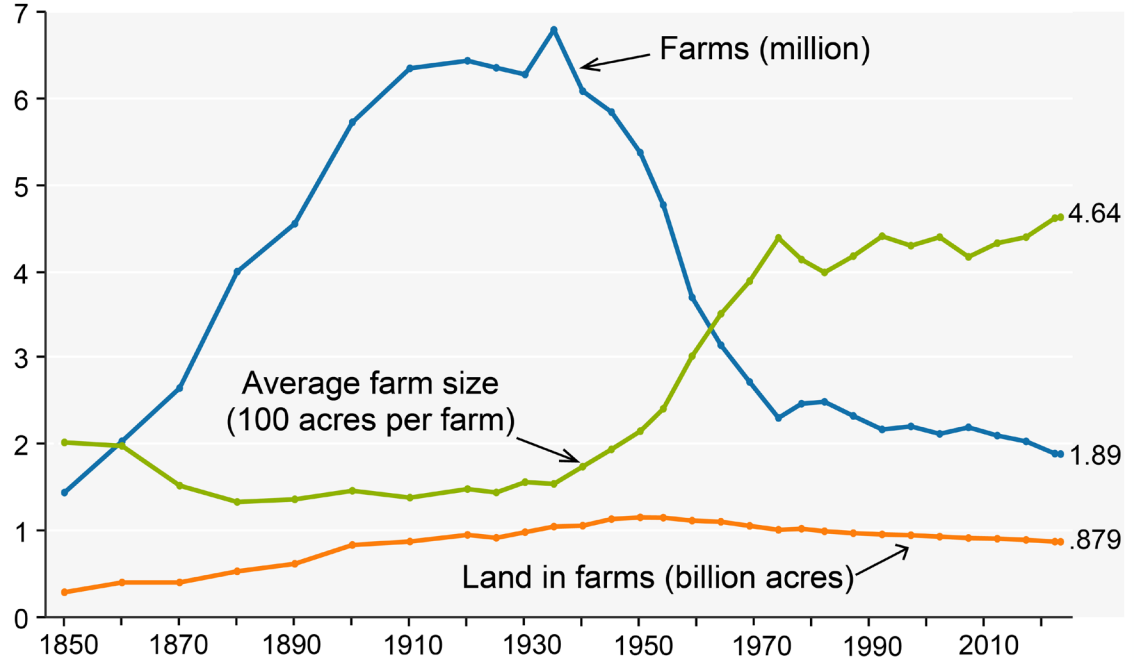

*Source: USDA ERS, Commodity Costs and Returns*

# How do we find a balance?

- Production has increased, and so have costs
- The number of farms is decreasing while farm size is increasing
- Costs and production are not the only issues to balance
- How should agriculture policy be considered if the goal is to get this right for farmers and society?

**Farms, land in farms, and average acres per farm, 1850–2023**

Million farms, billion acres, or 100 acres per farm




Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, Census of Agriculture (through 2022) and *Farms and Land in Farms: 2023 Summary* (February 2024).

# References


Blank, S. C. (2018). The Profit Problem of American Agriculture: What We Have Learned with the Perspective of Time. *Choices*, *33*(3), 1–7.

Chavas, J.-P., Chambers, R. G., & Pope, R. D. (2010). *Production Economics and Farm Management: A Century of Contributions*. https://www-jstor-org.proxy2.library.illinois.edu/stable/40647993?searchText=agriculture+technology+treadmill&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dagriculture%2Btechnology%2Btreadmill%26so%3Drel&ab_segments=0%2Fbasic_search_gsv2%2Fcontrol&refreqid=fastly-default%3A31c4dcfc75f952fca13f844c80803de4&seq=16

Clynes, T. (2024, January 12). *US farmers seek a different kind of green revolution*. https://vitalsigns.edf.org/story/us-farmers-seek-different-kind-green-revolution

Coppess, J. (2018a). A Surplus of Problems and Disagreement, 1950–1969. In *The Fault Lines of Farm Policy* (pp. 95–134). University of Nebraska Press. https://doi.org/10.2307/j.ctv80c9cw.9

Coppess, J. (2018b). The Commodity "Roller Coaster" and the Crash, 1970–1989. In *The Fault Lines of Farm Policy* (pp. 135–172). University of Nebraska Press. https://doi.org/10.2307/j.ctv80c9cw.10

Coppess, J. (2019). A Brief Review of the Consequential Seventies. *Farmdoc Daily*, *9*(99). https://origin.farmdocdaily.illinois.edu/2019/05/a-brief-review-of-the-consequential-seventies.html

Grunwald, M. (2024, December 13). Opinion | Sorry, but This Is the Future of Food. *The New York Times*. https://www.nytimes.com/2024/12/13/opinion/food-agriculture-factory-farms-climate-change.html

Hamilton, S. (2016). Revisiting the History of Agribusiness. *Business History Review*, *90*(3), 541–545. https://doi.org/10.1017/S000768051600074X

Institute, T. C. (2015, November 11). *The World Must Step Off the Chemical Farming Treadmill*. Cornucopia Institute. https://www.cornucopia.org/2015/11/the-world-must-step-off-the-chemical-farming-treadmill/

Kaniuka, R. P. (2023). *Fueling the Green Revolution*. https://www.ars.usda.gov/oc/timeline/green/

Keller, A., & Kassel, K. (2024). *The number of U.S. farms continues slow decline*. http://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=58268

Lawton, K. (2016). *Taking a look back at the 1980s farm crisis and it's impacts*. https://www.farmprogress.com/marketing/taking-a-look-back-at-the-1980s-farm-crisis-and-it-s-impacts

Levins, R. A., & Cochrane, W. W. (1996). *The Treadmill Revisited*. https://www.jstor.org/stable/3146915

Nelson, B. (2024). *Echoes of '80s Farm Crisis in Current Economy*. American Farm Bureau Federation. https://www.fb.org/market-intel/echoes-of-80s-farm-crisis-in-current-economy

*Net cash income*. (n.d.). Retrieved January 6, 2025, from https://data.ers.usda.gov/reports.aspx?ID=17831

# References Continued


Pingali, P. L. (2012). Green Revolution: Impacts, limits, and the path ahead. *Proceedings of the National Academy of Sciences*, *109*(31), 12302–12308. https://doi.org/10.1073/pnas.0912953109

Rodriguez, J. M., Molnar, J. J., Fazio, R. A., Sydnor, E., & Lowe, M. J. (2009). Barriers to adoption of sustainable agriculture practices: Change agent perspectives. *Renewable Agriculture and Food Systems*, *24*(1), 60–71.

Sands, R. (2023). *Population and income drive world food production projections*. http://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=108060

Schapsmeier, E. L., & Schapsmeier, F. H. (1979). Farm Policy from FDR to Eisenhower: Southern Democrats and the Politics of Agriculture. *Agricultural History*, *53*(1), 352–371.

*The Pesticide Treadmill | Pesticide Action & Agroecology Network (PAN)*. (2022, December 14). https://www.panna.org/resources/the-pesticide-treadmill/

*USDA releases 2022 Census of Agriculture data*. (n.d.). Retrieved January 6, 2025, from https://www.nass.usda.gov/Newsroom/2024/02-13-2024.php

Wang, S. L., Njuki, E., Nehring, R., & Mosheim, R. (2024). *USDA ERS, Productivity Growth in U.S. Agriculture*. https://www.ers.usda.gov/data-products/agricultural-productivity-in-the-united-states/productivity-growth-in-u-s-agriculture/

Zulauf, C., Paulson, N., Coppess, J., & Schnitkey, and G. (2023). The Post 1990 New Normal: Stable Real US Crop Prices. *Farmdoc Daily*, *13*(199). https://origin.farmdocdaily.illinois.edu/2023/10/the-post-1990-new-normal-stable-real-us-crop-prices.html


Farm
Foundation®
Accelerating people & ideas

# Yasmeen Saleem

## University of Florida

Farm Foundation®
Accelerating people & ideas

# Effect of Reclaimed Water on Blueberry Seedling Growth and Root Morphology

**Presented by:** Yasmeen Saleem

**Supervisor:** Dr. Davie Kadyampakeni
**Co-advisor:** Dr. Shinsuke Agehara

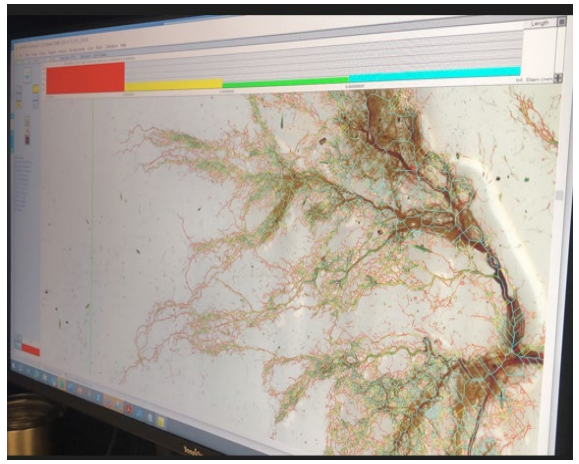
## Irrigation

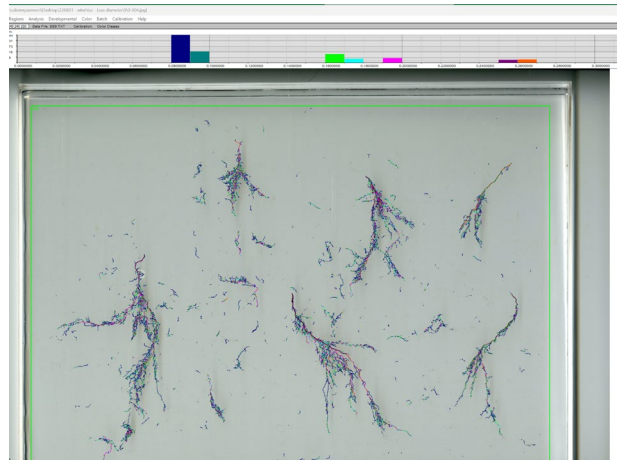

## Rhizotron

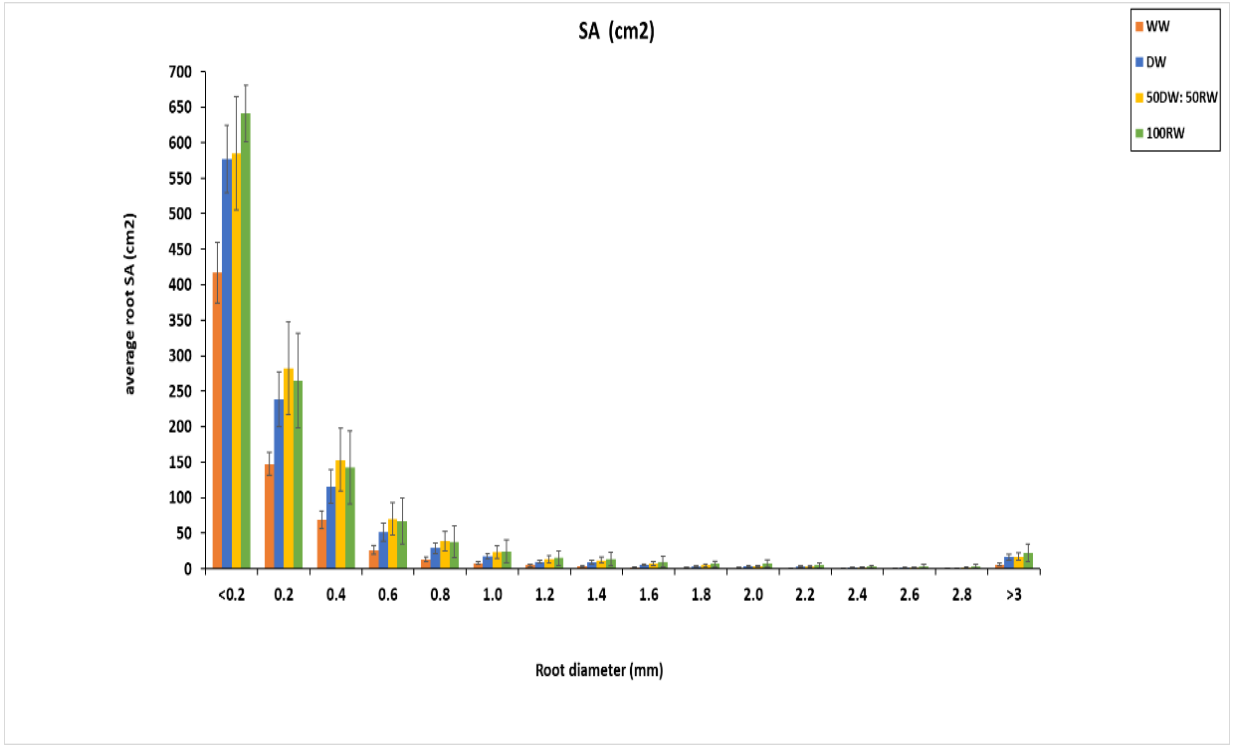
## Before


## After ☺

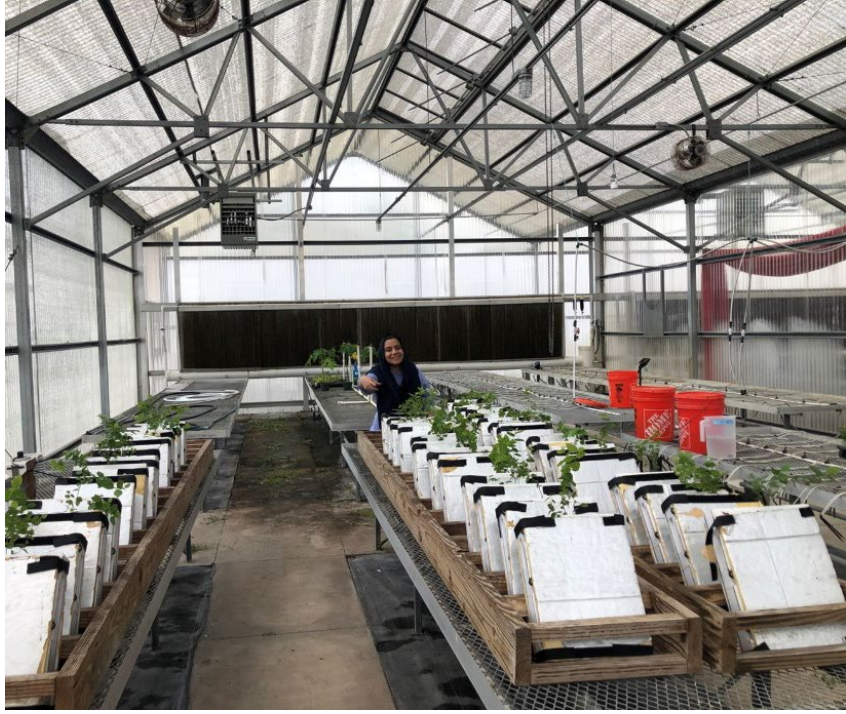

## WinRHIZO Software

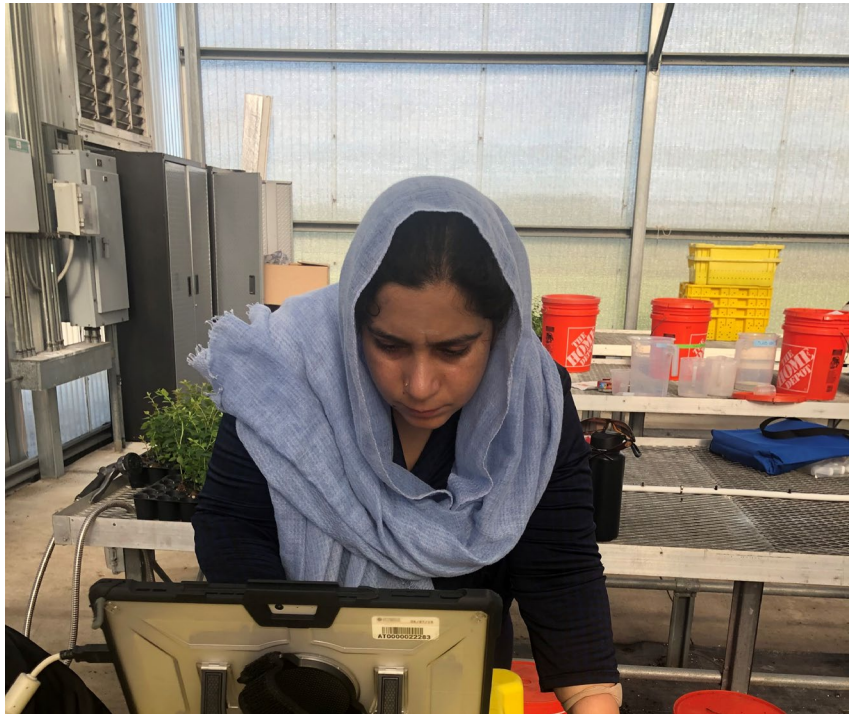







UAG

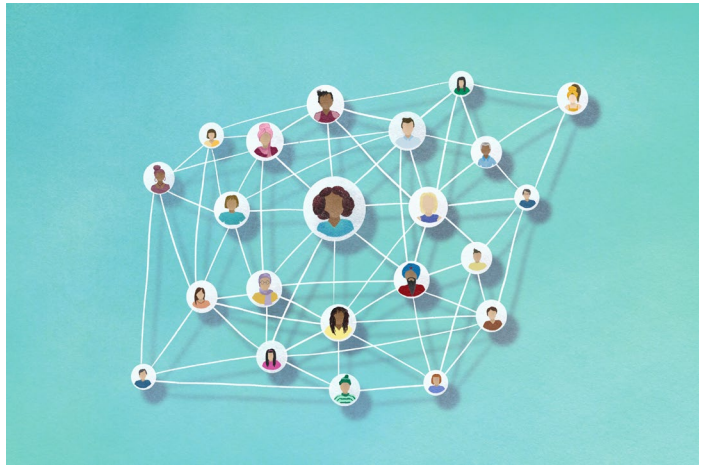




**Why involve with Farm Foundation Cultivator**

**Hope to achieve**

**I can contribute**



Professional connection & networking

Career development & collaboration

Knowledge & research experience

# Thank You

Contact: Yasmeen Saleem
saleemyasmeen@ufl.edu

Phone #: +1 863-377-0862

PhD Candidate
Soil, Water, and Ecosystem Sciences Department,
Citrus Research & Education Center (CREC) - University of Florida, 700 Experiment Station Rd, Lake Alfred, FL 33850 USA


Farm
Foundation®
Accelerating people & ideas

# Raymond Yan

## Penn State University

Farm Foundation®
Accelerating people & ideas

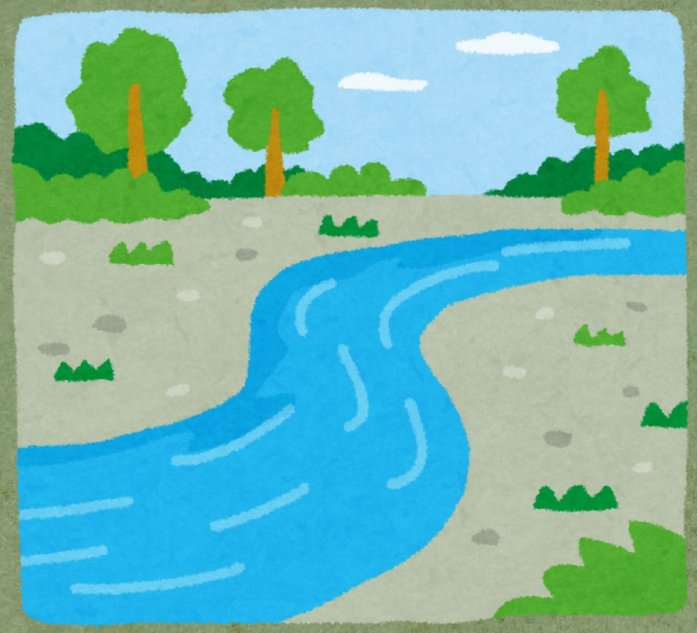
# How Ag Conservation Technologies Inspired Solutions to Wildlife Issues

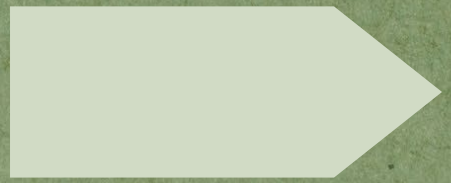
**RAYMOND E. YAN**

AGRICULTURAL AND BIORENEWABLE SYSTEMS MANAGEMENT

PENN STATE UNIVERSITY

# Cross-Pollinating Ideas





Water & Conservation

Wildlife Issues

# Can we apply methodologies used in identifying conservation effectiveness for identifying wildlife crop damage?

Riparian Buffers

Wildlife Crop Damage

# White-Tailed Deer: A Big Problem

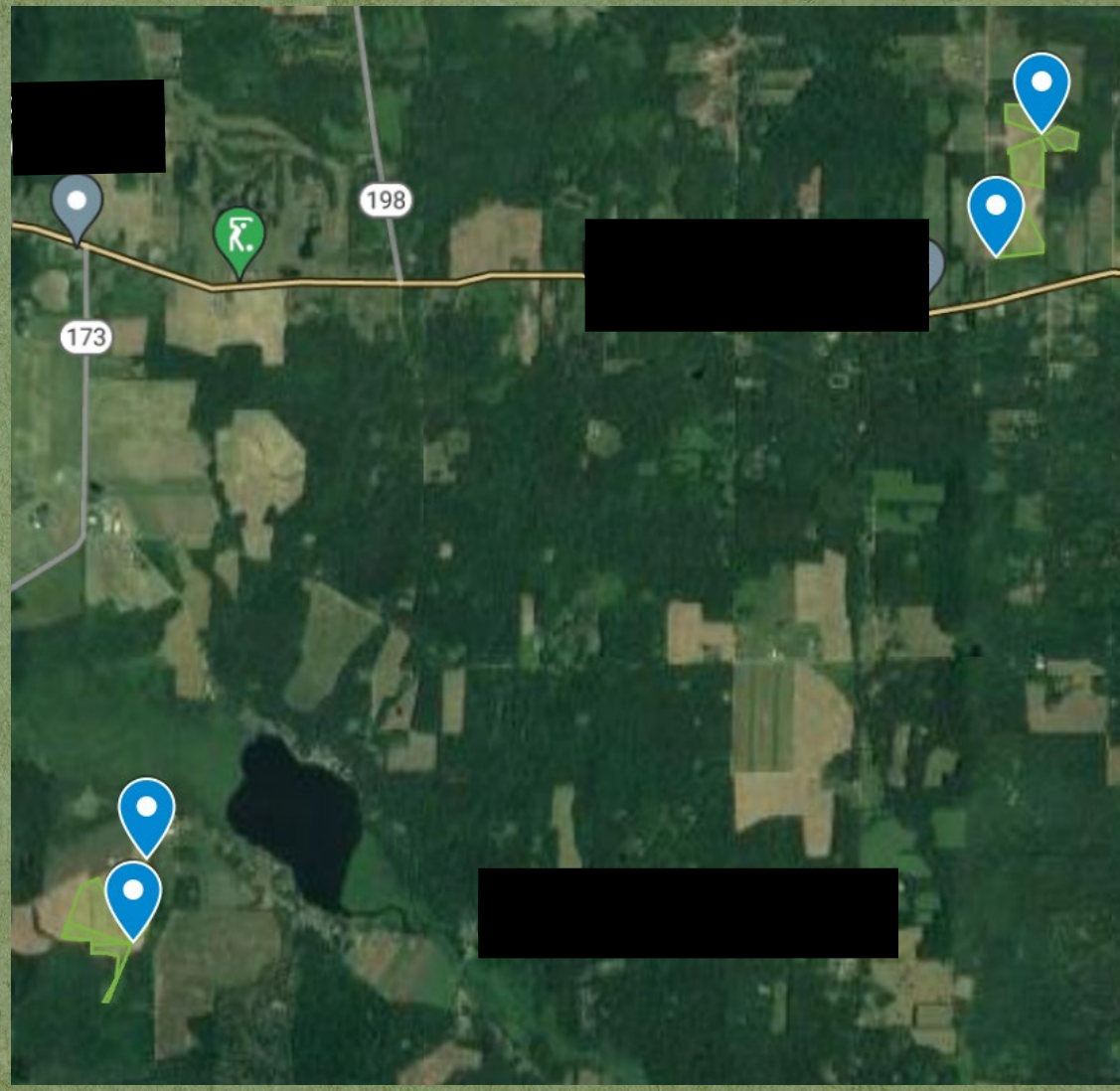
USDA crop insurance data estimates that Pennsylvania suffered north of $20 million in losses on corn in 2017.

Besides this estimate, there exists very little quantification at field level (ie. differentiate wildlife damage from weather damage)

*“What does this mean for those working in crop insurance, wildlife policy, etc?”*

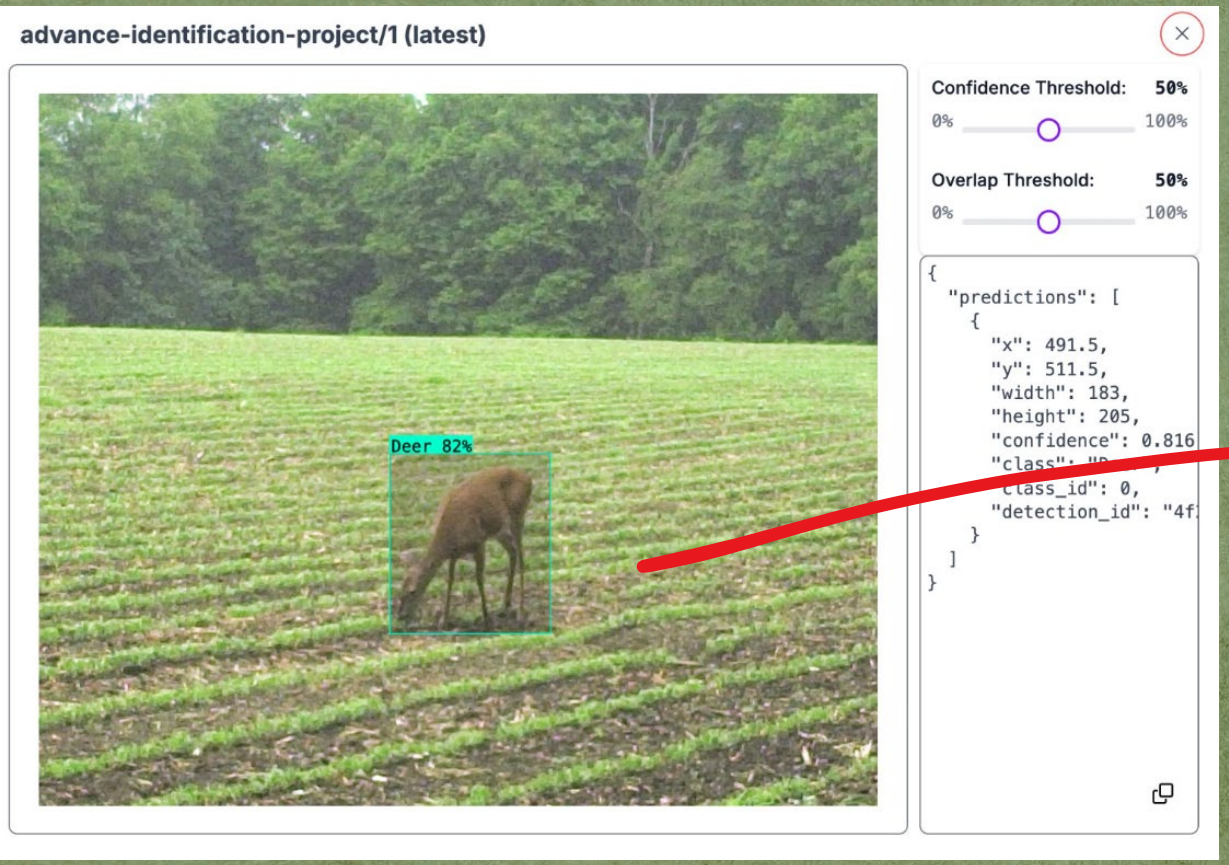
# Assembling A Team

- Large dairy operation in Northwestern Pennsylvania (1,100 holsteins)
- 6 student research team members
- Soybean, Alfalfa (Fall 2024 harvest)



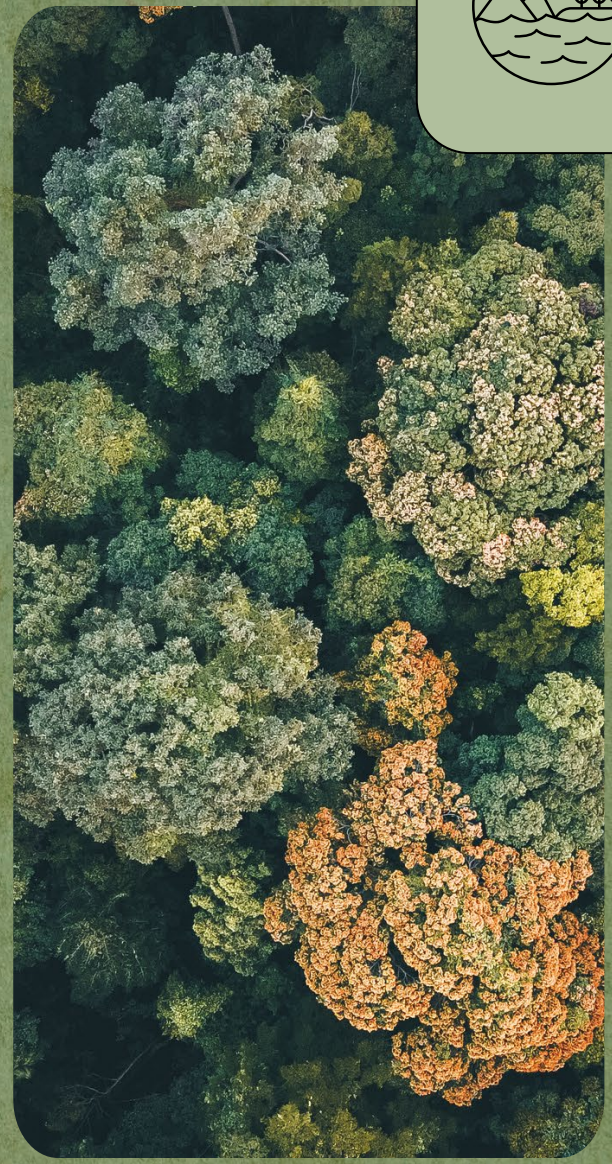

*Crawford County, PA*

# Ongoing project - some initial findings




# Acknowledgements

Penn State College of Agricultural Sciences
Department of Ag and Biological Engineering
Penn State Nittany AI Alliance
Pennsylvania Farm Bureau
Penn State Extension
SKYi Drone Footage
Apple Shamrock Dairy
Lockheed Martin Space
Farm Foundation




Farm
Foundation®
Accelerating people & ideas