



# **Leading the way... through nursery innovation and tree improvement**

**Virginia Forestry Summit  
Ben Lancaster  
May 1, 2019**



# Leading the way...



Innovative

Disciplined

Focused

Passionate

Professional

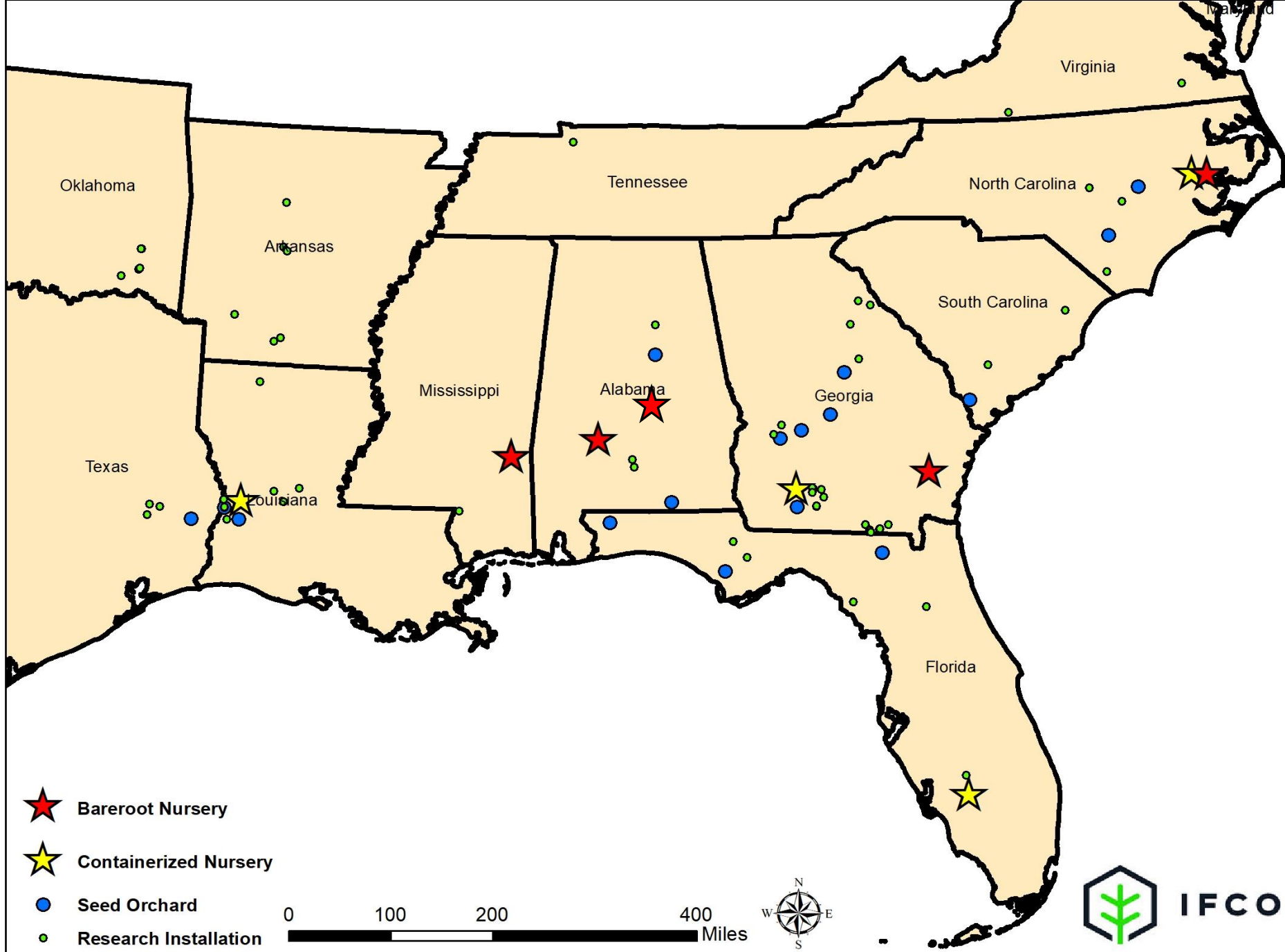
Service  
minded

# IFCO Seedlings' Responsibilities and Commitments

*As a producer of nearly 30% of the regeneration stock that is planted every year this represents a huge opportunity to impact the productivity, quality and health of the SE wood basket!*

- Develop and provide regeneration stock that continues to increase the productive potential of SE plantations
- Improve stand stem quality
- Provide deployment insight for each IFCO genotype so clients probability of success is increased
- Keep IFCO's breeding program aligned with future timber spec requirements
- Support research programs and cooperatives that improve the forest sector







# IFCO Bareroot Operations

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Washington, NC

Jesup, GA

Pine Hill, AL

White City, AL

Shubuta, MS

**Love Precision Sower**  
(1970's technology)  
Requires 3 people  
Runs 1.2 mph  
Open system (vacuum)  
Brush design to plant seed



**Monosem Sower (2018)**  
Requires 1 person  
Runs 2.5 - 3 mph  
Closed system (vacuum)  
Pin design to plant seed





**Treated seed on vacuum plates**



**6" visual of seed in drill**





# Old Sow Monitor



# New Sow Monitor

- Screens are utilized to monitor each seed tube for seed drop
- The monitors count seed as they fall and computes the minimum, average, and maximum seed drop per second
- This helps to identify seed that may be placed as doubles or skips
- Sounds an alarm if the hopper is empty











Counting out 10 bundles of 100 to  
determine weight of 1000 seedlings

Target is 1000 seedlings per bag  
We target a max of 55 lbs









**Uniformity in the field  
leads to uniform bag  
weights and consistent  
bag counts!**



# IFCO Container Operations

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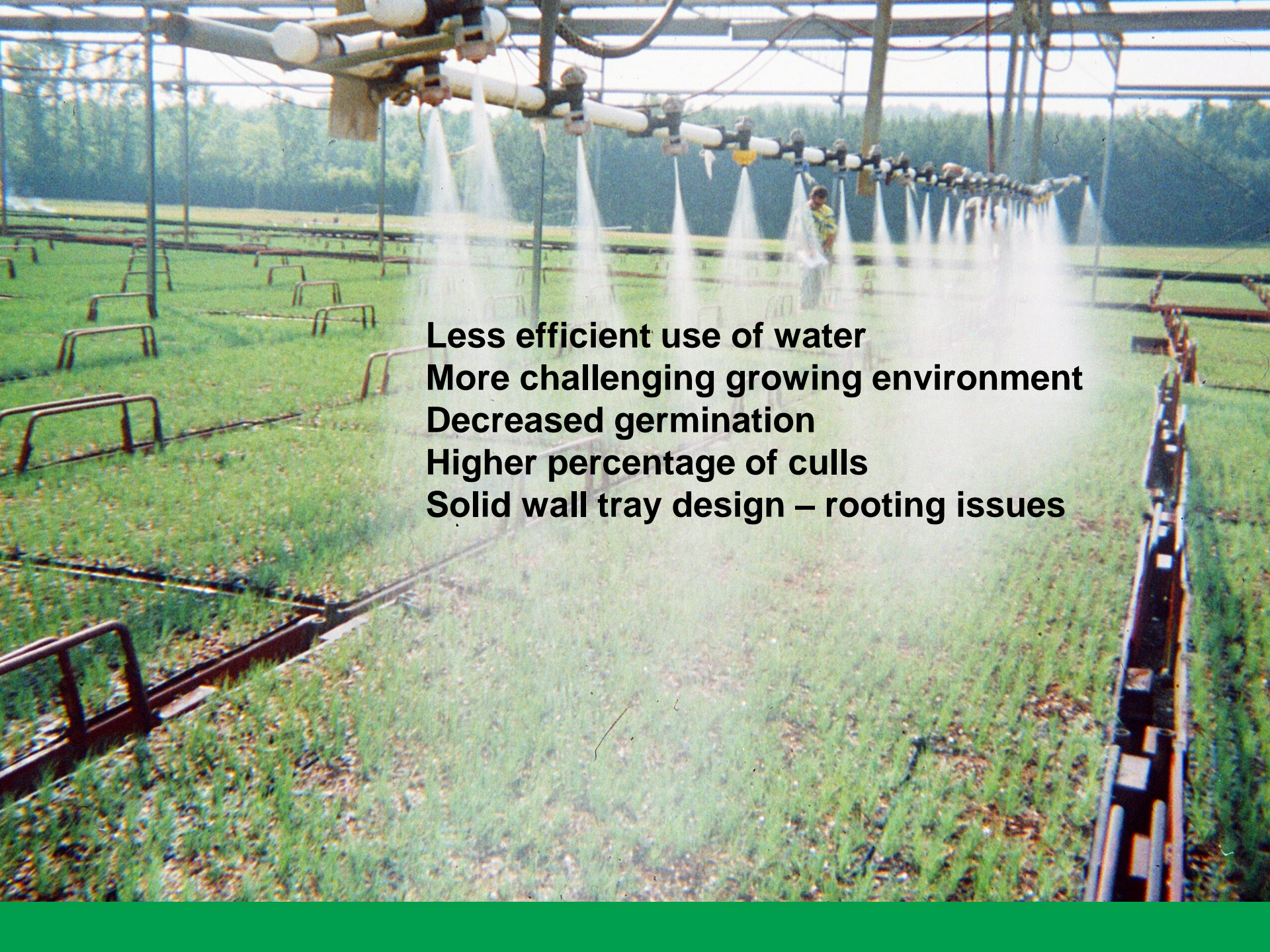
Washington, NC

Moultrie, GA

Labelle, FL

DeRidder, LA





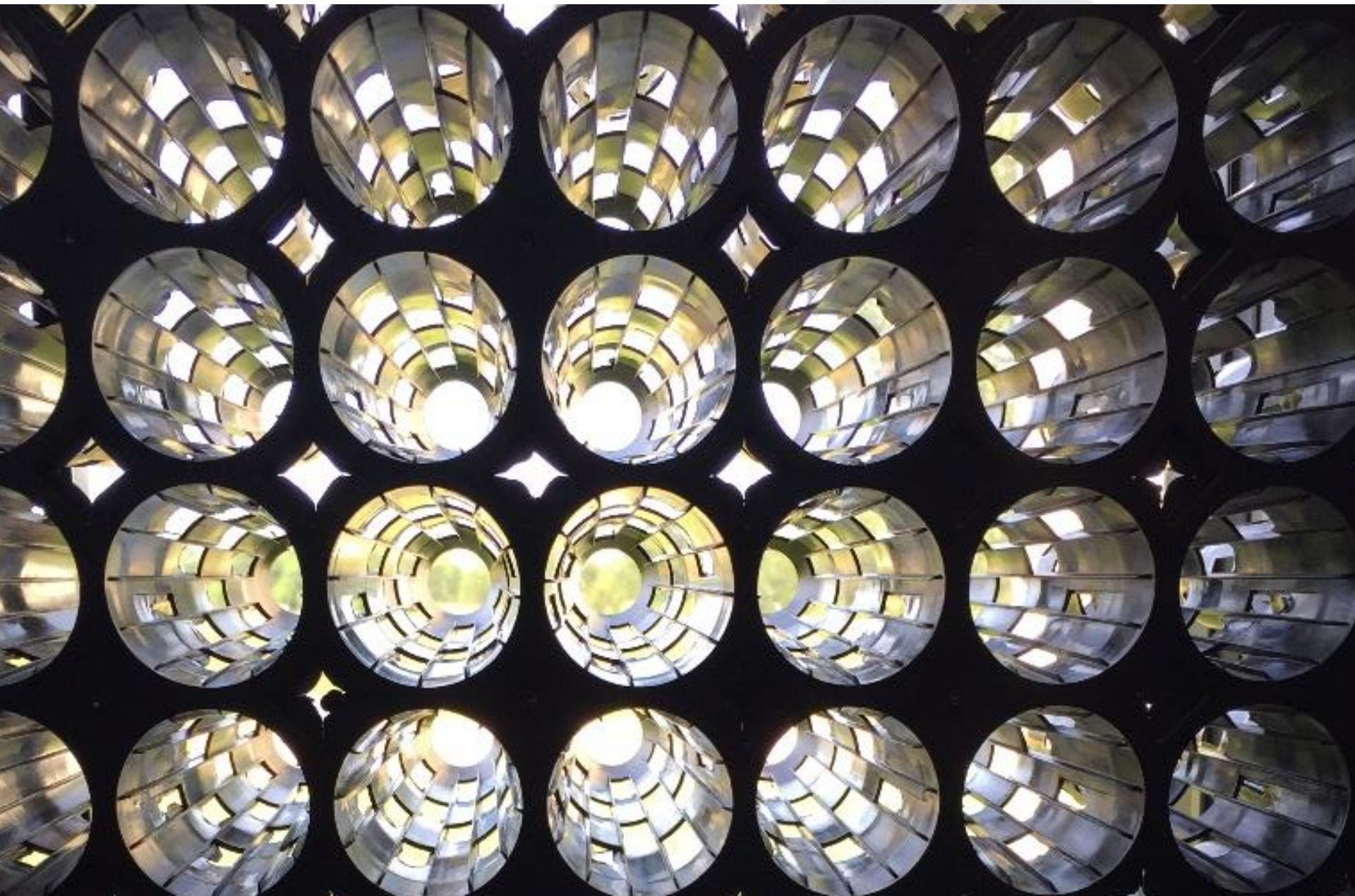
**Less efficient use of water**  
**More challenging growing environment**  
**Decreased germination**  
**Higher percentage of culls**  
**Solid wall tray design – rooting issues**







# Time for a change





**Moultrie, GA (Brownlee farm)**  
**4 million seedlings per pivot**  
**160 acres of cooperative tests and**  
**genetic characterization trials at**  
**this location**





**DeRidder, LA (Evans facility)**  
**Orchard and nursery operations at one location**





**Washington, NC**

**Bareroot and Container operations at one location to better serve you**





## Top clipping seedlings

### Old technology

- Requires 3-4 people to operate
- 4' cutting deck
- Creative design but not the safest job at the nursery





## IFCO proprietary top clipper

- 21' cutting surface
- One operator
- 60% reduction in time – Efficient!
- Leads to more uniformity in the crop





# International Forest Genetics & Seed: Developing and Delivering Operational Gain

- Supply IFCO and IFCO BR with seed for nursery operations, from managed seed orchards and seed production areas
- Backed by Research and Development
  - Cooperatives' relationships
  - Internal tree improvement and characterization
  - Seed orchard management
  - Nursery stock optimization

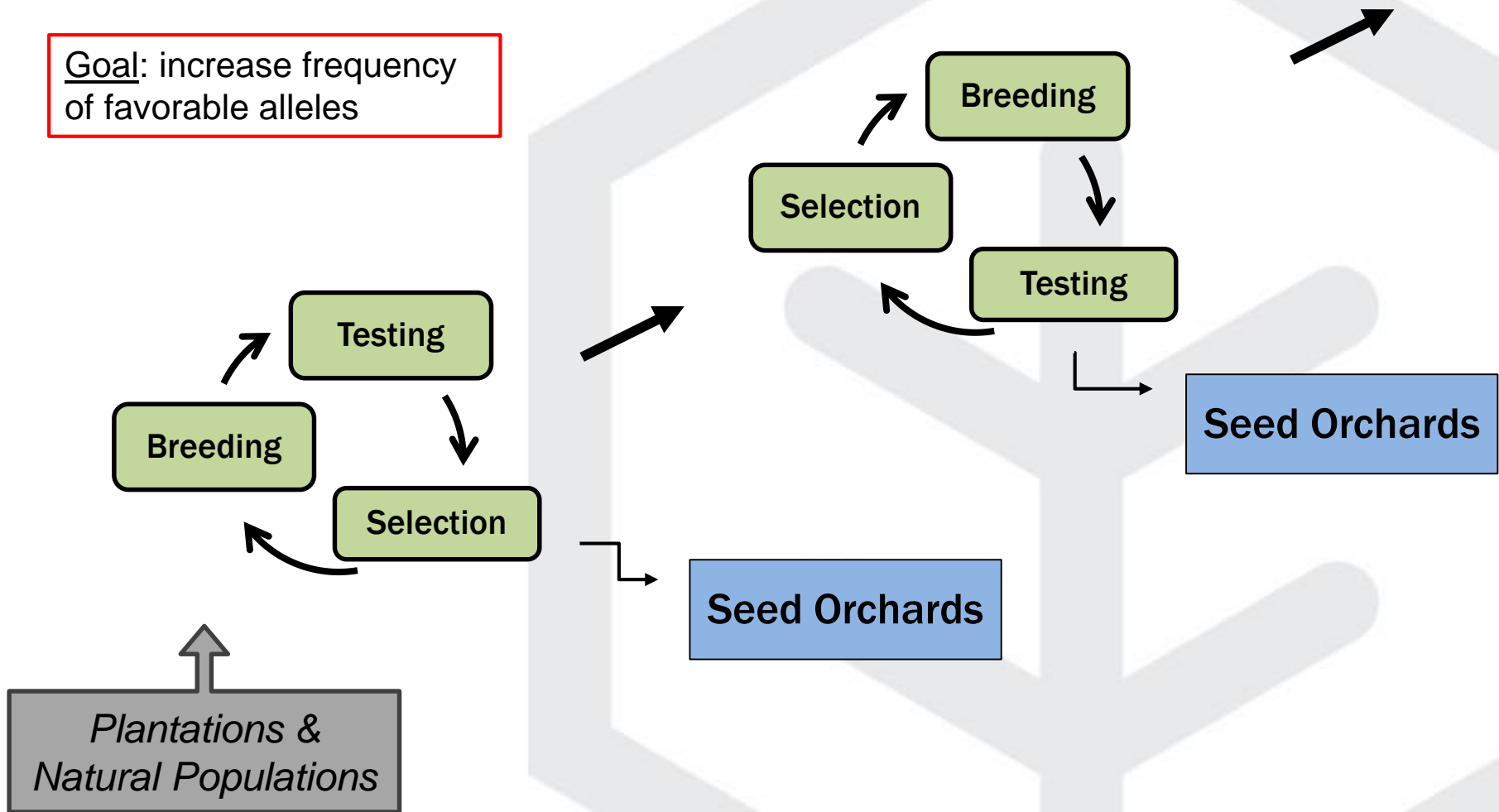
# Cooperative Forest Genetics Research

- Drawing on >175 years of tree improvement
  - ✧ North Carolina State University Tree Improvement Program
  - ✧ Cooperative Forest Genetics Research Program
  - ✧ Western Gulf Forest Tree Improvement Program
- Benefits of cooperative-associated research
  - Access to germplasm
  - Wealth of knowledge and experience = leverageable intellect
  - Third party verification
  - Pooled resources



# Tree Improvement Cycle

Goal: increase frequency of favorable alleles









# Progeny Testing and Genetic Characterization

## Tree Improvement Cooperatives

- Volume
  - Straightness
  - Rust Resistance
  - Forking/Ramicorn
  - Wood Properties
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## Genetic Characterization (IFG&S)

- Branch Size
- Branch Angle
- Internode Frequency
- Broken Tops
- Sinuosity
- Whole Tree Grade





# Moultrie North February 2018

Single Family, Open-Pollinated seedlots constitute  
80-85% of U.S. South plantation establishment





# Moultrie North February 2018

Full-sib deployment offers greatest genetic gains





**In the old days, all cones were  
picked and mixed together.  
Therefore, seedlot selection  
was easy, because everything  
was the same (Average)**



Photo credit: Dr. Steve McKeand



**Today, all orchard ramets  
are picked and  
processed by individual  
family, for both OP and  
CMP seedlots**





# Seedlot Selection for Forest Management



- Today, there are more options than ever before in the history of forest management
- Result of maturation in forest economy over last two decades
- Now, all levels of genetic gain are for sale!



# Seedlot Selection for Forest Management



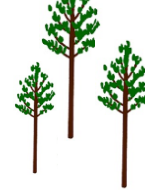
- There are more options today than ever before in the history of forest management
- Result of changes in forest economy over last two decades.
- Now, all levels of genetic gain are for sale!
- How to know what is the best family to plant...

**SHOW ME THE DATA!**



# Loblolly Pine **PRS**<sup>TM</sup>

## Performance Rating System



Full-sib Family Code: **1-CMP124**

**PRS**<sup>TM</sup> Ratings — Predicted Family Performance

**P**roductivity Rating **78**

**R**ust Resistance Grade **A+**

**S**tem Form Grade **A+**

The **PRS**<sup>TM</sup> ratings indicate that the progeny of family is projected to be:

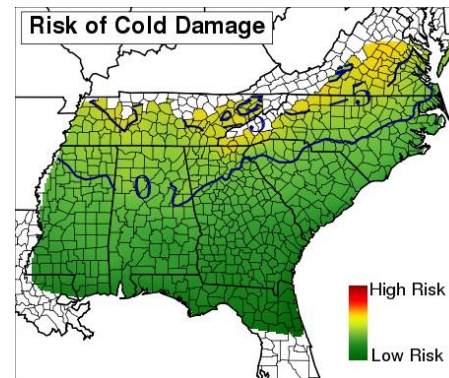
**P = 78** → Approximately 78% greater stem volume at age 6 compared to the combined average of local non-improved loblolly pine checklots across the **Piedmont regions of Georgia, the Carolinas, and the Upper Gulf Coastal Plain.**

**R = A+** → **Superior** for resistance to fusiform rust disease

**S = A+** → **Superior** for stem straightness

The minimum winter temperature "origin" of Family **1-CMP124** is 9.72°F (0° line). Planting in the green shaded areas on the map up to 5°F colder (south of -5° line) has minimal risk of cold damage<sup>1</sup>. Planting in areas that are 5-10°F colder than the origin (between -5° and -10° lines) will increase the risk of cold damage. Areas that are more than 10°F colder than the origin are too cold and planting is not advised (north of -10° line).

Full-sib family **1-CMP124** has not been explicitly field tested, but both parents of this cross have been tested by members of the *NC State University Cooperative Tree Improvement Program*. The performance of this cross is expected to be the average breeding value of the 2 parents for all traits.



<sup>1</sup>These adaptability guidelines were developed by the USDA Forest Service (Schmidtling 2001), Southern Pine Seed Sources, available at: [http://www.srs.fs.usda.gov/pubs/gtr/gtr\\_srs044.pdf](http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs044.pdf)

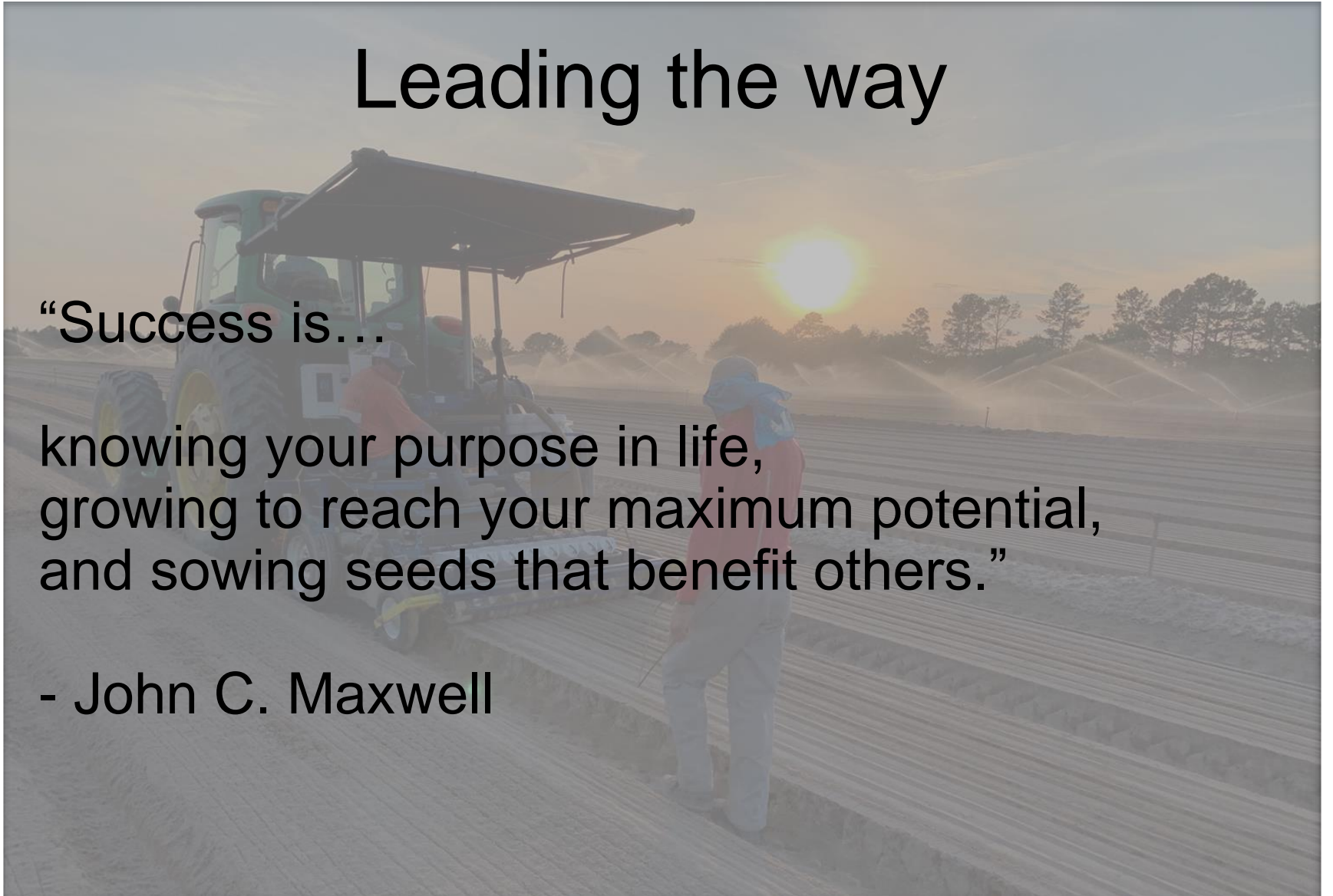


# Leading the way

“Success is...

knowing your purpose in life,  
growing to reach your maximum potential,  
and sowing seeds that benefit others.”

- John C. Maxwell





# Thank you



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