

Directed Prescriptions for Cotton Production

*"...because our precision capability
has surpassed our decision capability"*

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Edisto Research & Education Center
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Southern Cotton Growers & Southeastern Cotton
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INTRODUCTION: HOW WE DEVELOP VARIABLE RATE PRESCRIPTIONS TODAY

Typical Steps in Developing Variable Rate Prescriptions

1. Zone Development
2. Productivity Assessment by Zone
3. Rate Assignment
4. Rate Assessment

Zone Definition by Soil Data

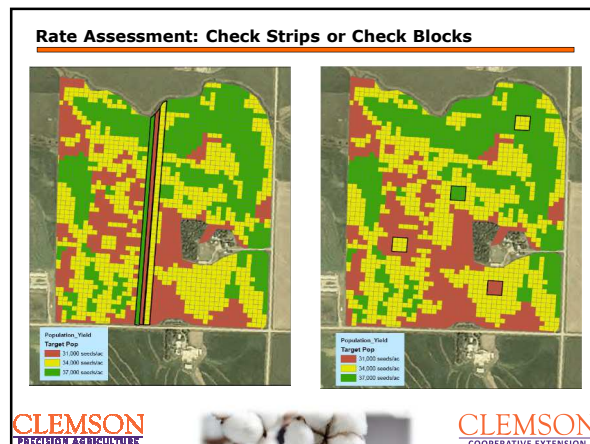
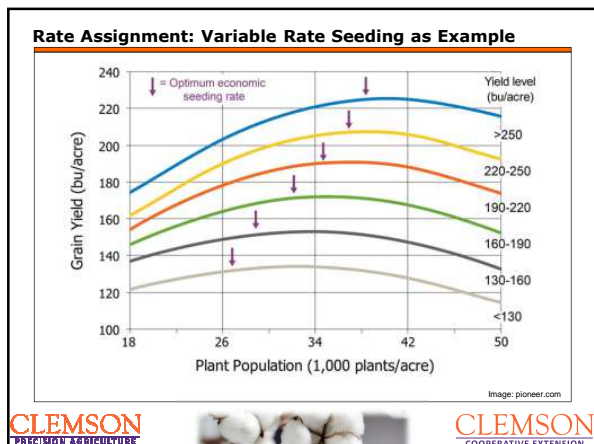
Shallow EC

Soil Map

Zone Definition by "Composite" Yield

Green	0.315 - 7.797
Light Green	0.189 - 0.314
Yellow-Green	0.063 - 0.188
Yellow	-0.063 - 0.062
Orange	-0.189 - -0.064
Red-Orange	-0.315 - -0.190
Red	-1.000 - -0.316

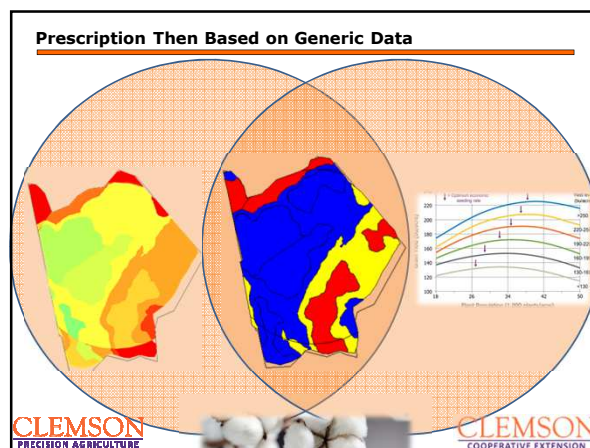
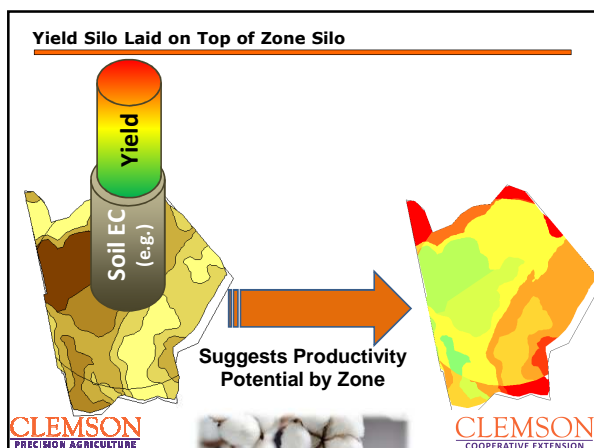
Productivity Assessment by Zone

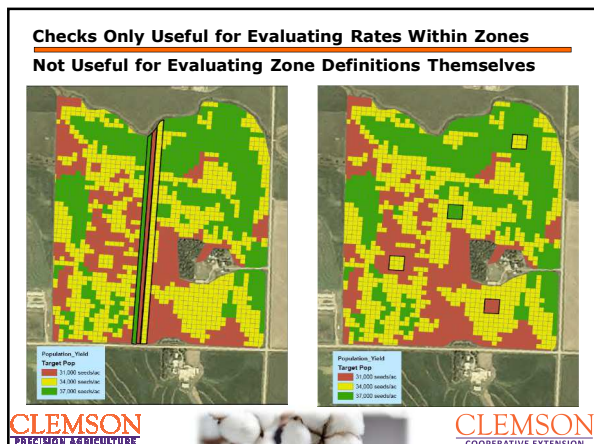


THE PROBLEM WITH TODAY'S PRESCRIPTION PLAN STRATEGIES

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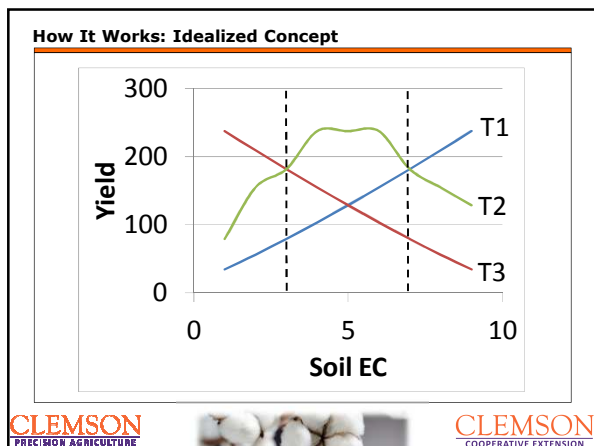
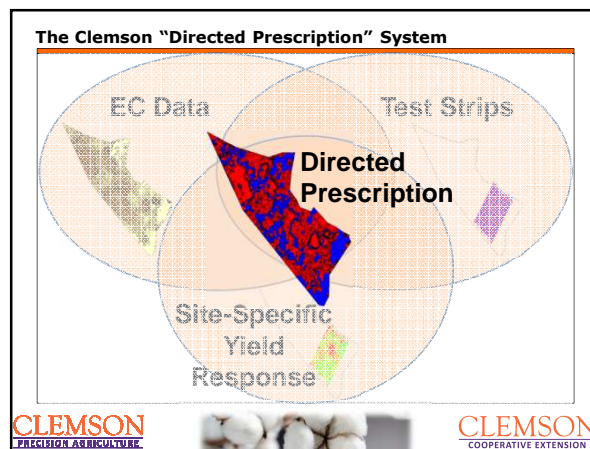
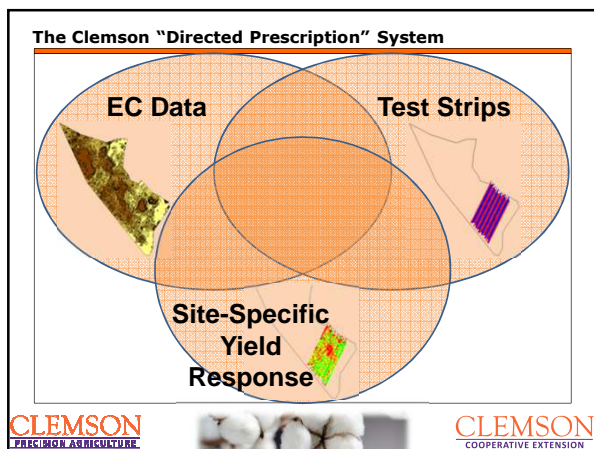




**A NEW CONCEPT IN
VARIABLE RATE PRESCRIPTION DEVELOPMENT:
THE CLEMSON "DIRECTED PRESCRIPTION" SYSTEM**

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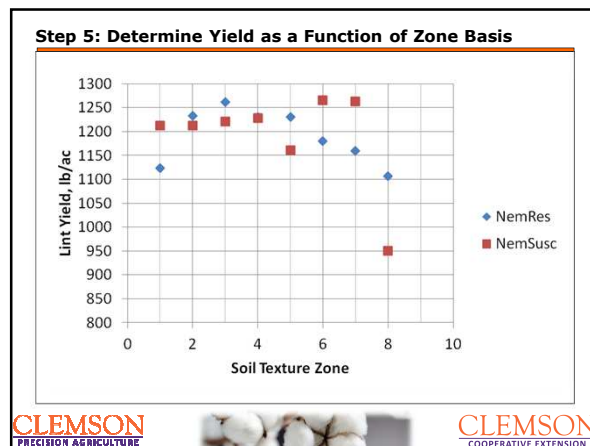
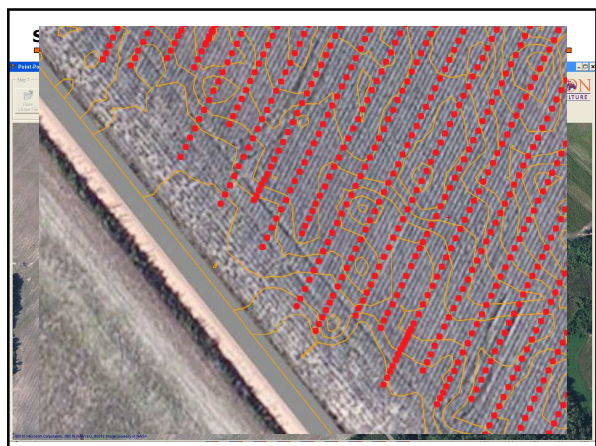
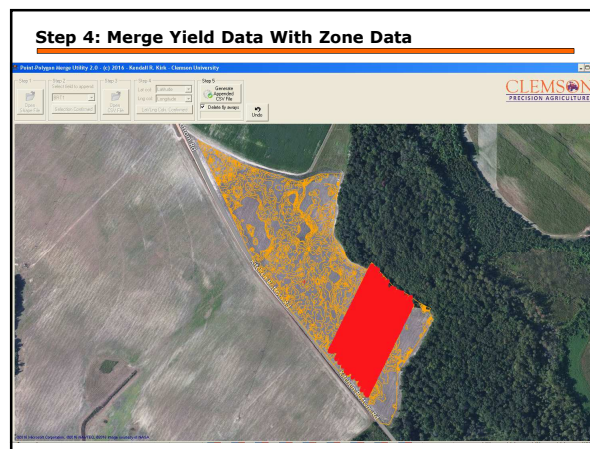
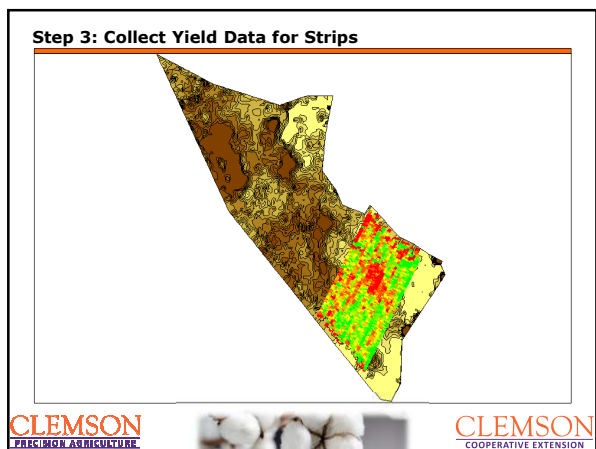
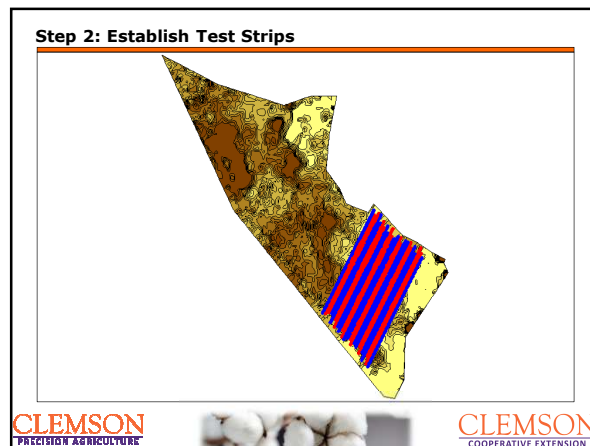
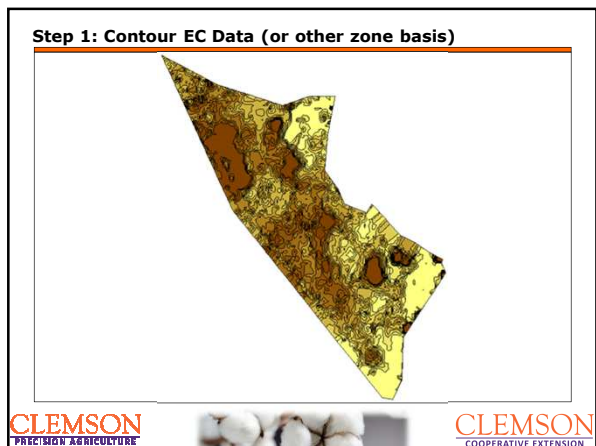
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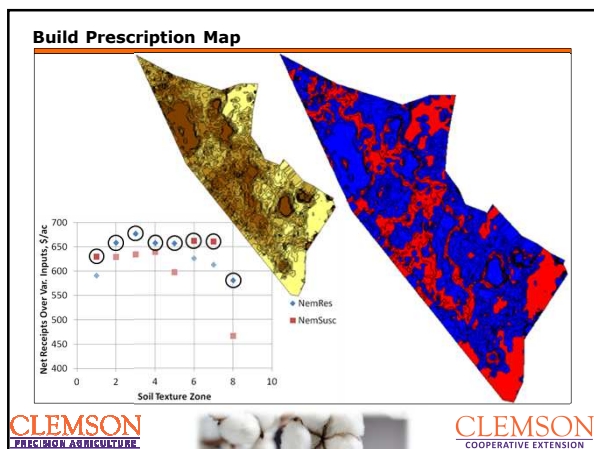
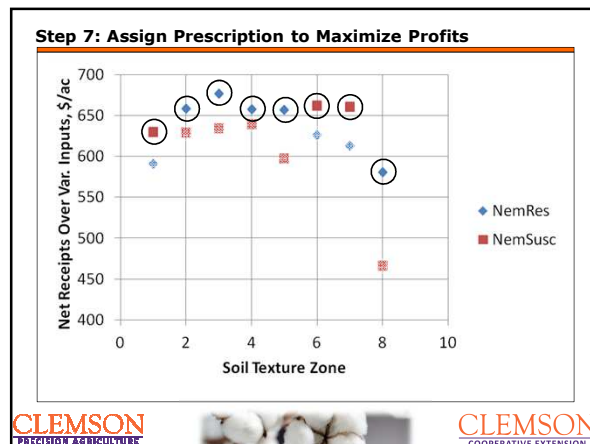
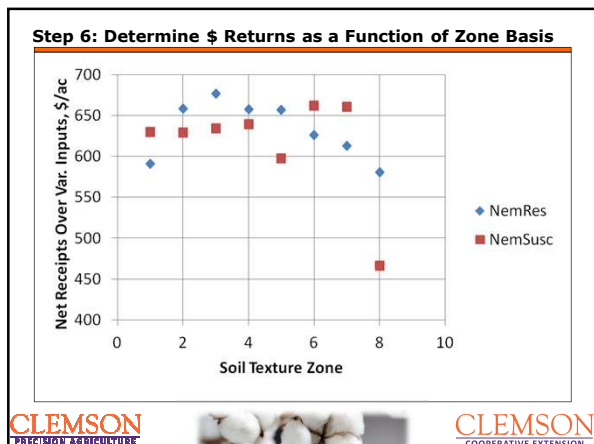


**EXAMPLE APPLICATION:
DUAL VARIETY PLANTING IN COTTON**

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CONCEPTUAL PROFIT ANALYSIS

CLEMSON PRECISION AGRICULTURE COOPERATIVE EXTENSION

Conceptual Profit by Zone, \$/ac

Zone	NemRes	NemSusc	Dual Variety
1	\$80.33	(\$33.57)	\$80.33
2	\$113.04	\$160.36	\$160.36
3	\$126.06	\$161.79	\$161.79
4	\$157.25	\$97.39	\$157.25
5	\$157.34	\$139.03	\$157.34
6	\$176.96	\$134.41	\$176.96
7	\$158.56	\$129.08	\$158.56
8	\$91.16	\$129.52	\$129.52
Average	\$132.59	\$114.75	\$147.76

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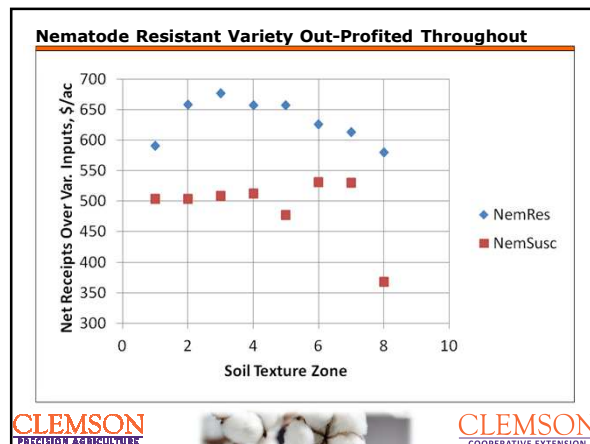
\$15.17/ac Return

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THE TRUTH



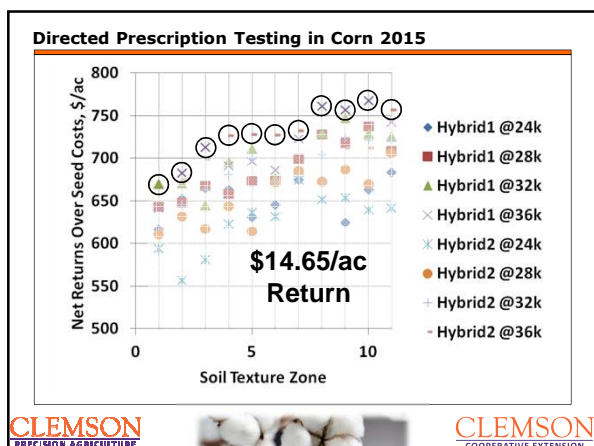
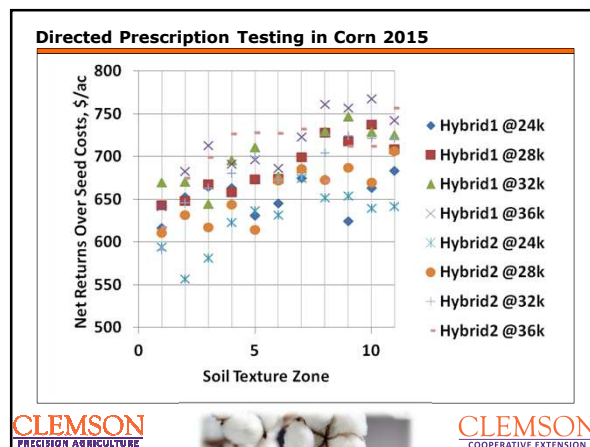
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BUT IT DOES WORK...



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CONCLUSIONS



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"Directed Prescriptions" vs. Conventional Prescriptions

"Directed Prescriptions"	Conventional Prescriptions
Zone boundaries are fluid	Zone boundaries are static
Finite management zones	Coarse management zones
Continuing learning capability	Limited learning capability
Prescriptions developed from in-field data	Prescriptions developed from off-site data or nebulous
Integrates yields with zones with prescriptions	Stacks yields and prescriptions on top of zones

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- Potential Pitfalls**
- Repeatability
 - Yield limiting factors next year will not be same as this year
 - Best suited for irrigated land
 - Pooled data from multiple years possible
 - Yield monitor accuracy
 - Calibration required
 - Post-process calibration desirable
 - Software can automatically clean yield data
 - Ease of implementation
 - Software design
 - Compatibility with V.R. controllers
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- The Vision for the "Directed Prescription" System**
- System applicable to all crops in rotation
 - Only portion of field used for prescription
 - 5-10% in strip tests for next year's prescription
 - 90-95% in prescription from last year's data
 - Site-specific applications in cotton
 - Dual variety planting
 - Variable rate seeding
 - V.R. nematicide
 - Variable rate K
 - Software
 - Simple interface
 - Free
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- The Clemson "Directed Prescription" Software**
- User Uploads
 - Strip treatment plan (shapefile)
 - Contoured EC data (shapefile)
 - Yield data (csv or shapefile)
 - User Inputs
 - Relative cost per treatment \$/ac
 - Commodity market price \$/yield unit
 - Software outputs
 - Profit analysis by treatment
 - Recommended prescription plan (tabular, user-overridable capability)
 - Prescription map (shapefile)
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- Research Work to be Done**
- Validate method
 - Irrigated on-farm trials
 - At least 2-year tests
 - Comparison to conventional methods
 - Long term: Non-irrigated trials
 - Evaluate economic benefit
 - Complete software development
 - Evaluate best zone basis
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