

Precision Ag Update

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Precision Ag

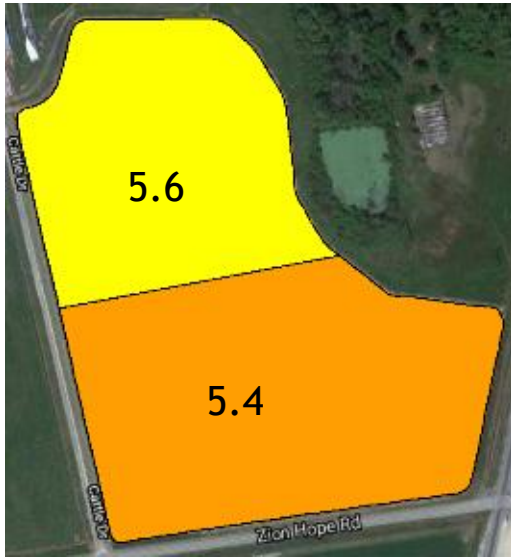
Fertilization

UGA Recommendation:

- Soil pH: 6.0 – 6.3
- P and K: upper to medium range
- N (Rate and Timing)

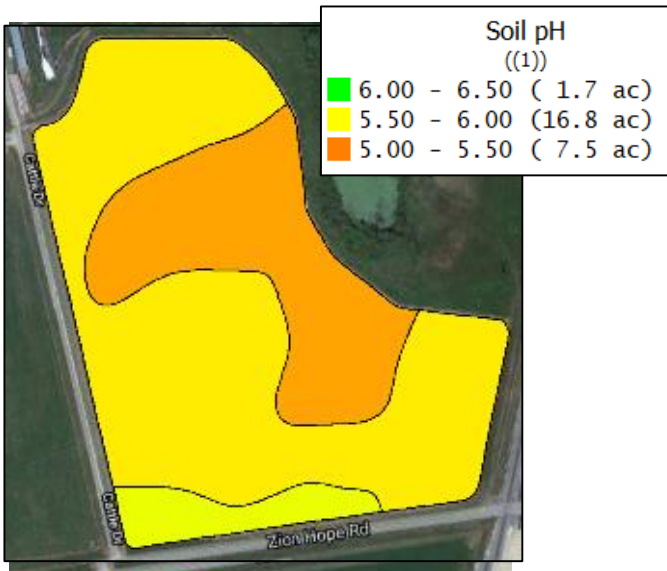


Precision soil sampling to guide VR
fertilizer applications



Uniform Application

Field	Size (acres)	Rate (lbs/ac)	Total Lime (lbs)	Total Cost (\$)
Zone 1	26.0	2000	52,000	\$494
Total			26 ton	\$494



Variable-Rate Application

Field	Size (acres)	Rate (lbs/ac)	Total Lime (lbs)	Total Cost (\$)
Zone 1	7.5	1500	11,250	\$107
Zone 2	16.8	1000	16,800	\$160
Zone 3	1.7	0	0	\$0
Total			14 ton	\$267

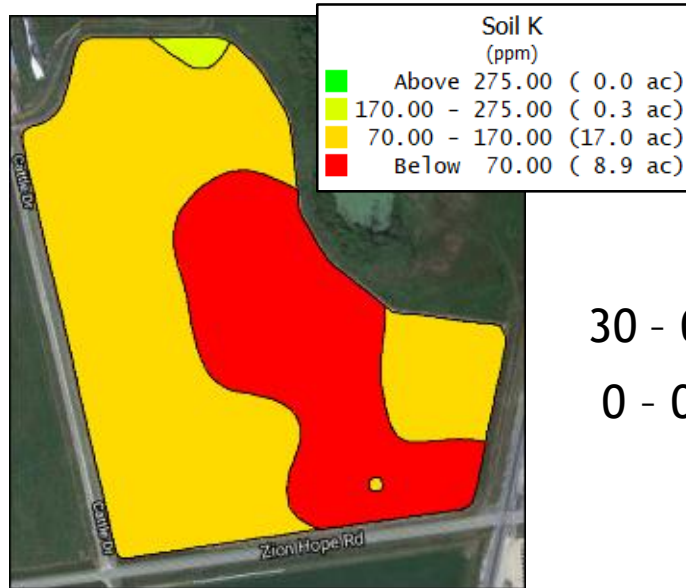
\$227 - \$9/acre



30 - 0 - 110 lbs/ac

Uniform Application

Field	Size (acres)	Cost (\$/ac)	Total Cost (\$)
Field	26.0	124	3,224
Total			\$3,224



30 - 0 - 70 lbs/ac

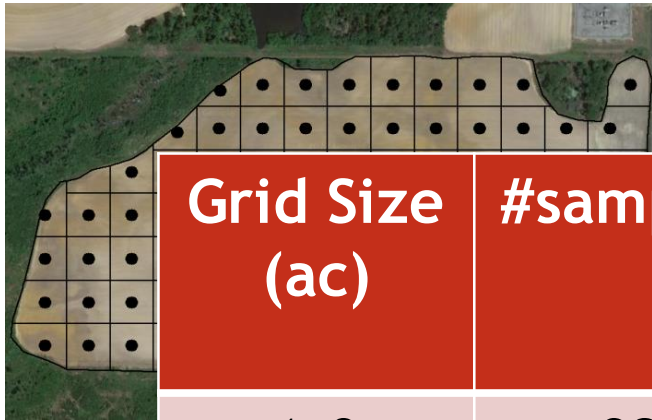
0 - 0 - 40 lbs/ac

Variable-Rate Application

Field	Size (acres)	Cost (\$/ac)	Total Cost (\$)
Field	26.0	89	2,314
Zone 2	9.0	28	252
Total			\$2,566

\$658 - \$25/acre

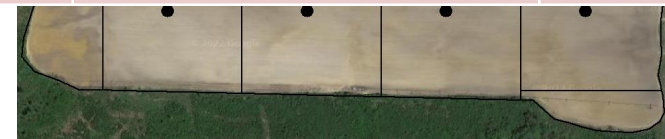
Optimal Grid Size for Soil Sampling?



Grid Size (ac)	#samples	Soil Sampling/ Labor Costs (\$)	Sample Analysis Costs (\$)	Total Cost (\$)
1.0	92	460	552	1012
2.5	35	414	210	624
5.0	17	368	102	470
7.5	13	368	78	446
10.0	8	368	48	416



7.5 ac



10.0 ac

Optimal Grid Size for Soil Sampling?

(2022 - Tift, Worth, Colquitt, Terrell, Jefferson)



1.0 ac



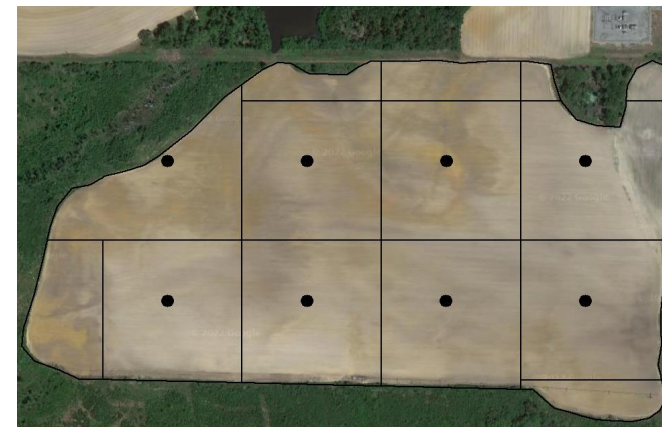
2.5 ac



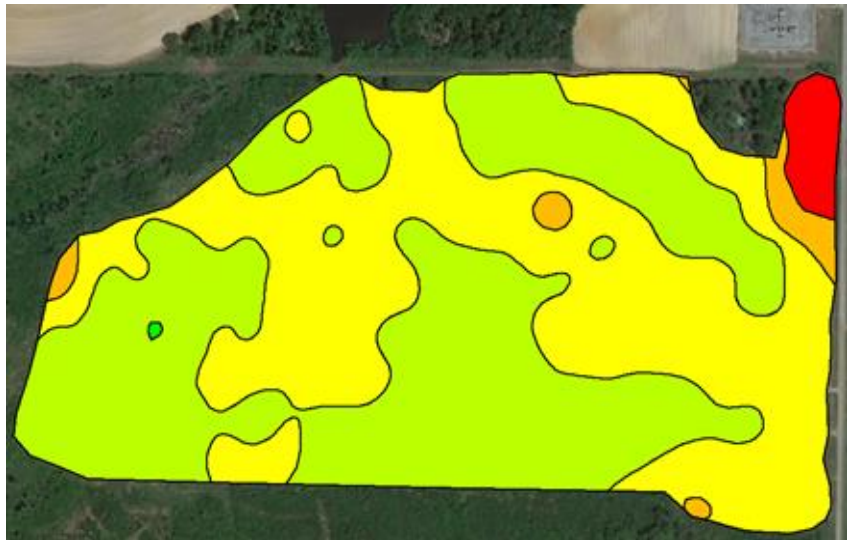
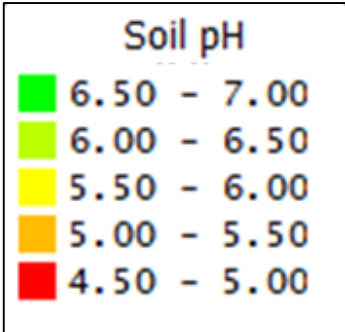
5.0 ac



7.5 ac



10.0 ac



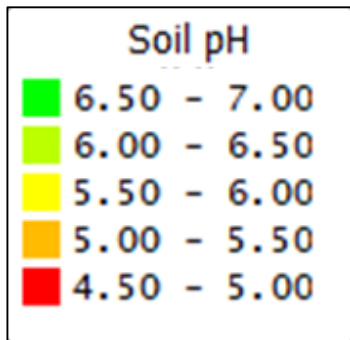
1 ac
(92 samples)



2.5 ac
(35 samples)



5 ac
(17 samples)

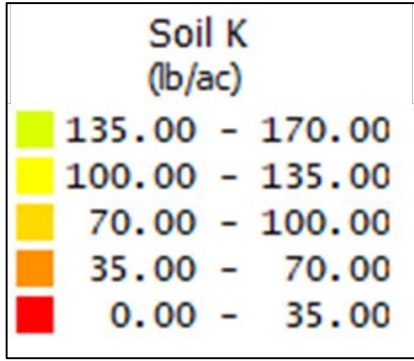


7.5 ac
(13 samples)

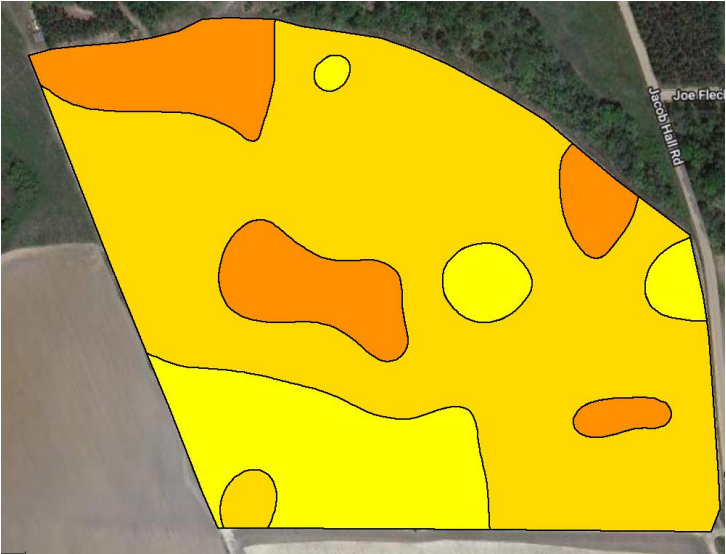
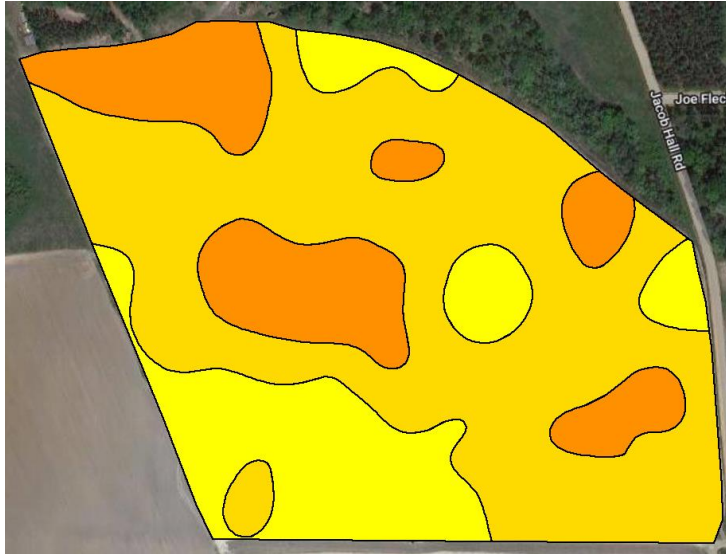


10 ac
(8 samples)





Actual Soil K
Variability
(100 samples)



1 ac
(53 samples)



2.5 ac
(23 samples)



5 ac
(10 samples)

Application Accuracy (%)

Grid Size	F1	F2	F3	F4	F5	F6	F7	F8	F9
1.0	87	89	95	90	95	75	91	90	91
2.5	66	85	92	78	93	82	41	70	13
5.0	51	75	75	81	87	80	68	65	77
7.5	46	66	94	11	92	75	41	70	81
10.0	45	34	65	54	30	75	41	48	76

Grid Size – Effectiveness vs Cost

Application Costs (\$/ac)

Grid Size	F1	F2	F3	F4	F5	F6	F7	F8	F9
1.0	43	20	34	33	34	43	40	38	56
2.5	35	14	28	27	30	41	31	33	64
5.0	31	15	23	26	32	41	35	36	55
7.5	33	20	30	5	30	42	30	31	51
10.0	41	17	22	18	39	42	30	22	55

Field 1

Lime

Grid Size	Accuracy (%)	Cost (\$/ac)
1.0	89	20
2.5	85	14
5.0	75	15
7.5	66	20
10.0	34	17

P

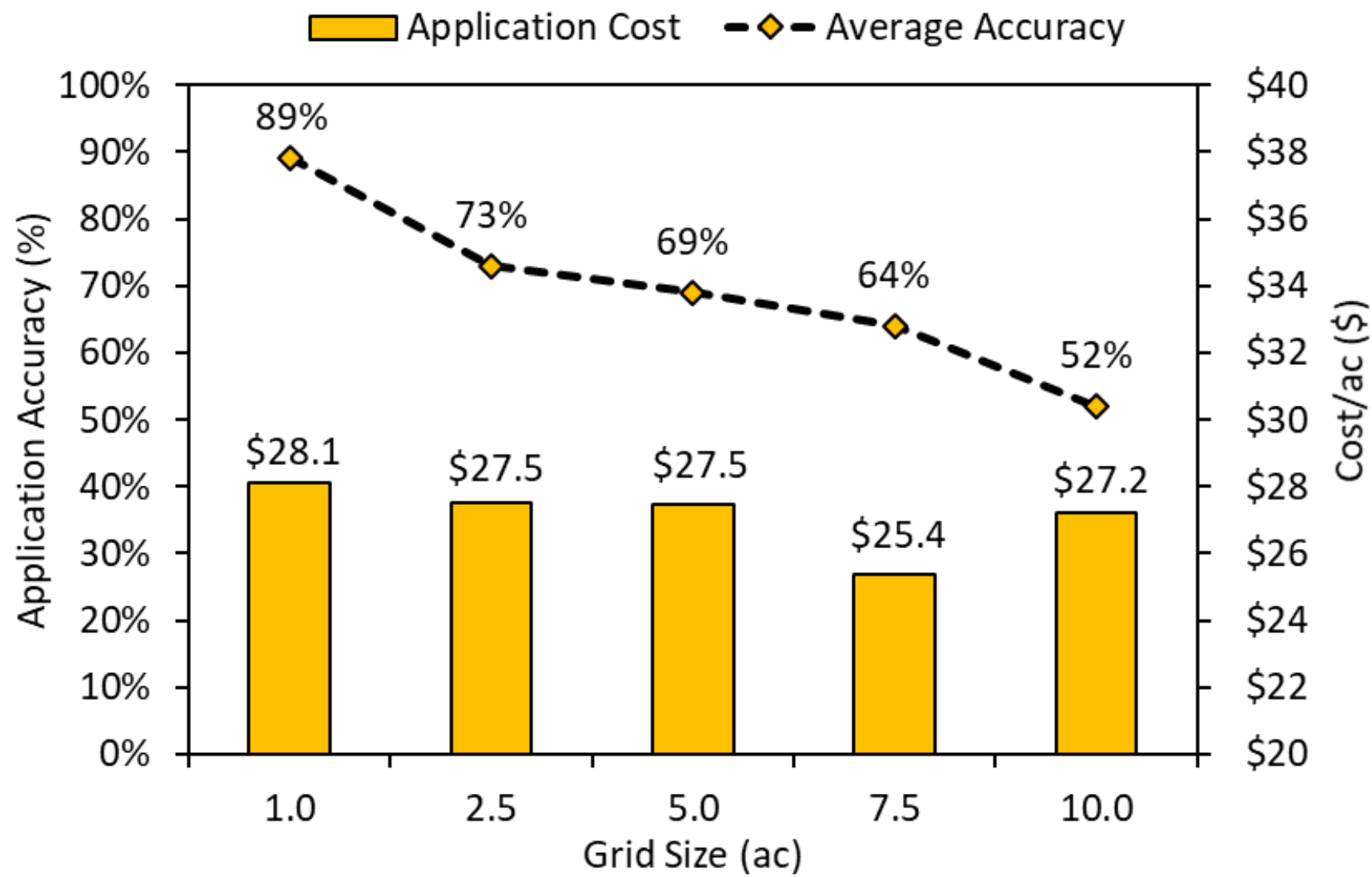
Grid Size	Accuracy (%)	Cost (\$/ac)
1.0	92	16
2.5	82	15
5.0	70	13
7.5	74	14
10.0	77	10

K

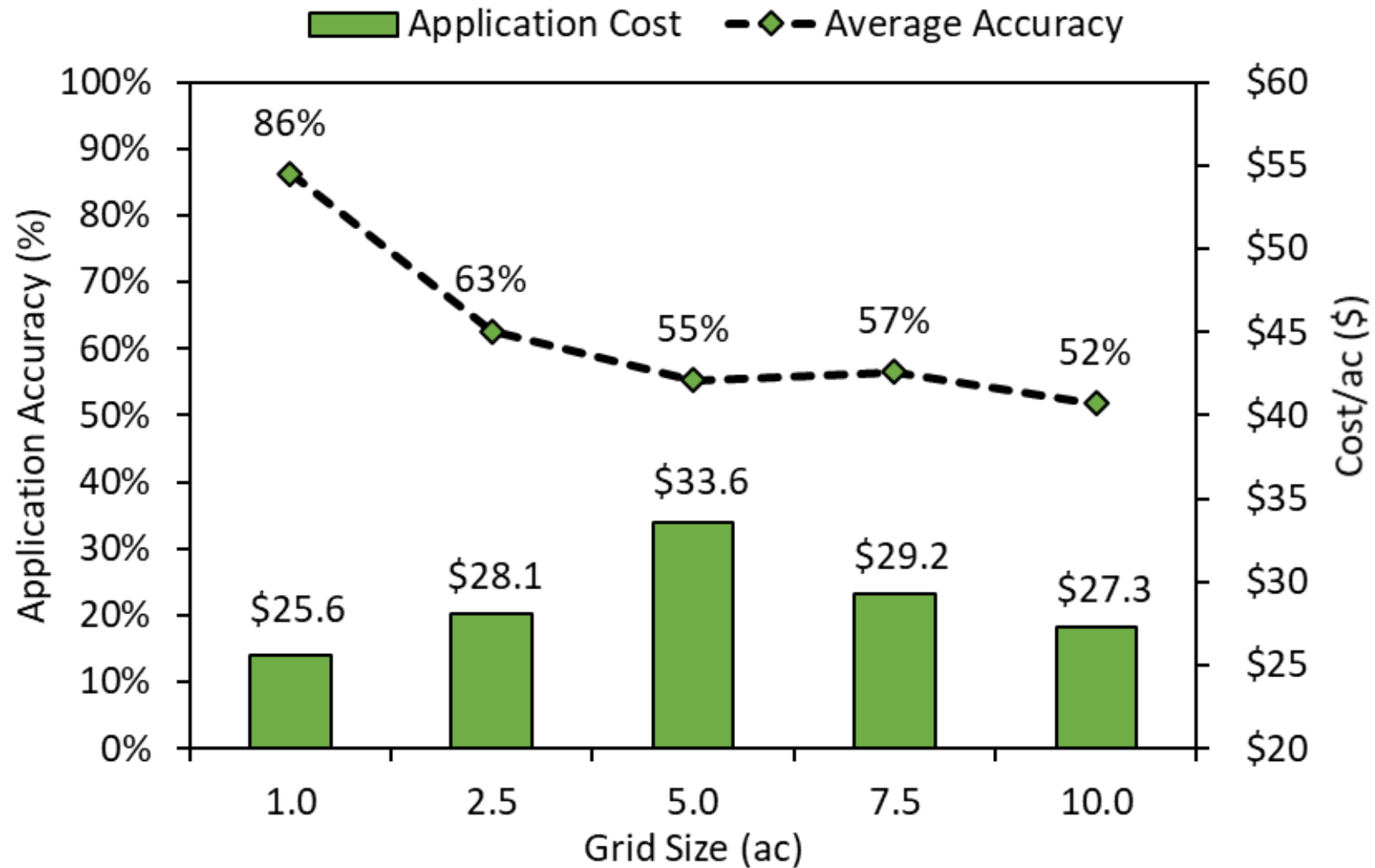
Grid Size	Accuracy (%)	Cost (\$/ac)
1.0	88	89
2.5	72	85
5.0	66	82
7.5	49	86
10.0	44	86

(Soil sampling = \$4/ac, Sample analysis = \$6/sample)
Lime = \$50/ton, P = \$0.67/lb, K = \$0.68/lb)

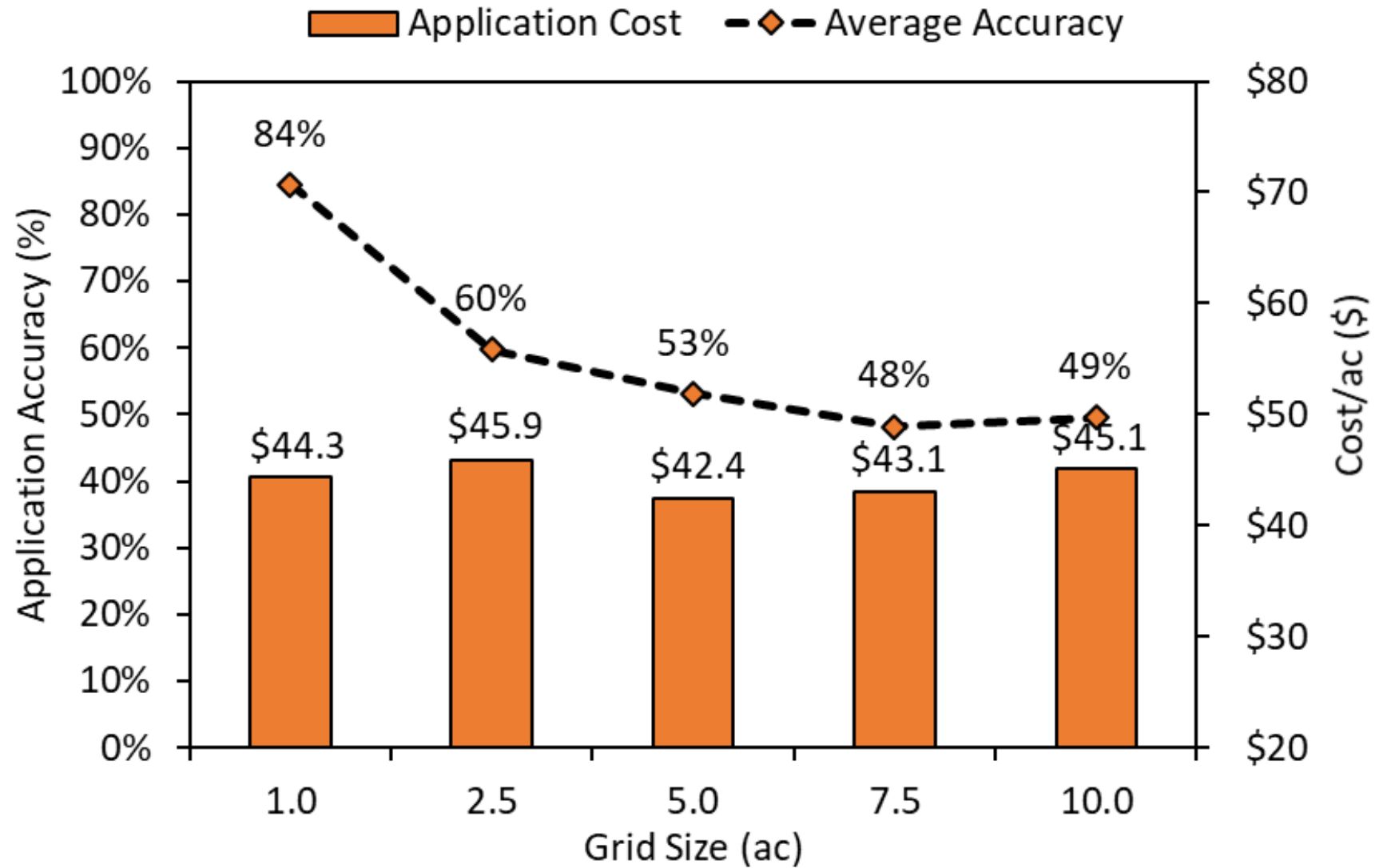
Lime



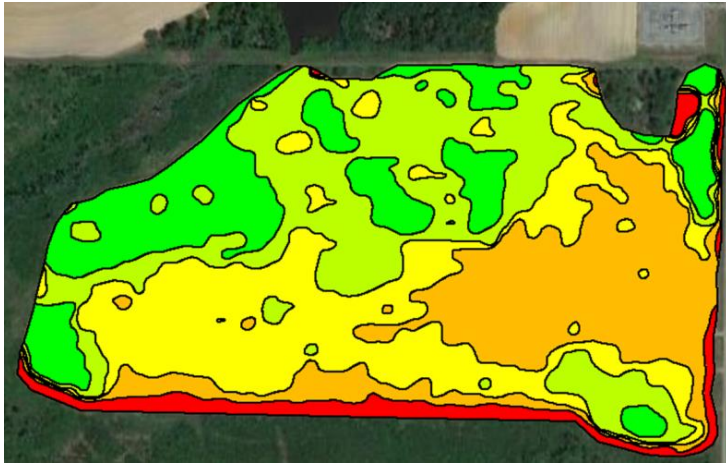
Phosphorus



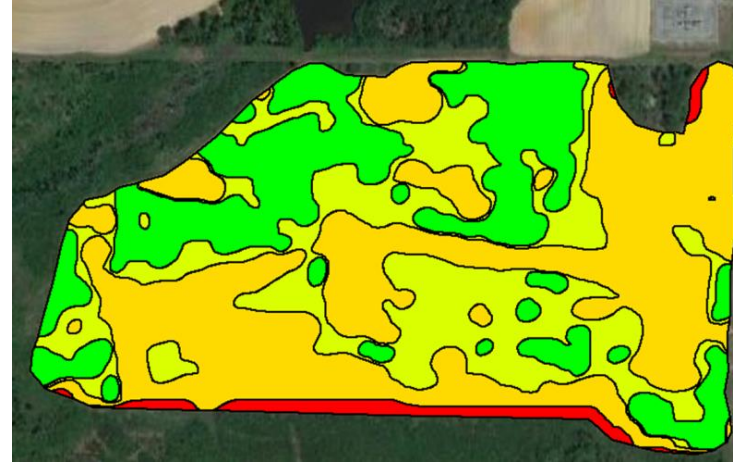
Potassium



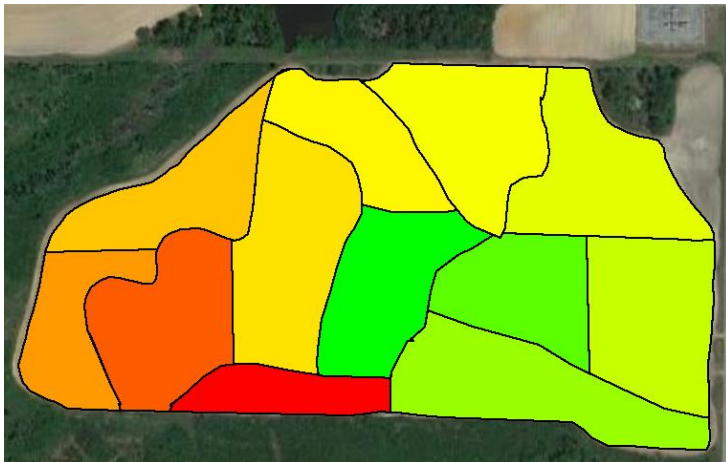
What about Zone Sampling?



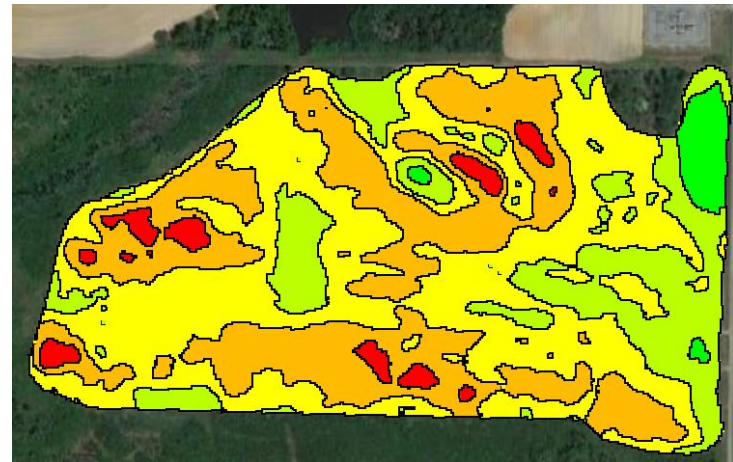
Soil Color/Brightness (5 samples)



Soil EC (4 samples)

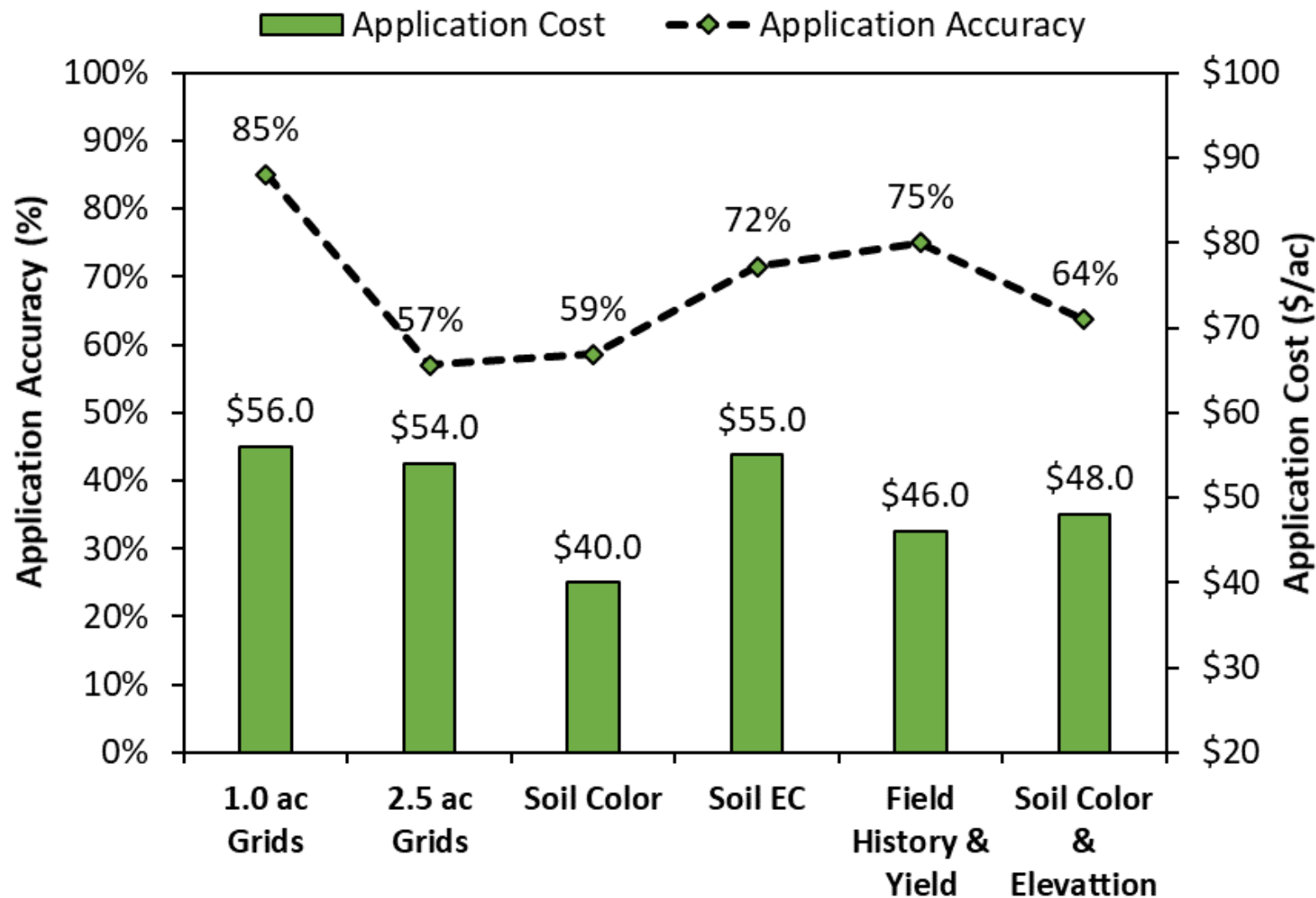


Field Knowledge and Yield (12 samples)



Soil Color and Elevation (5 samples)

What about Zone Sampling?



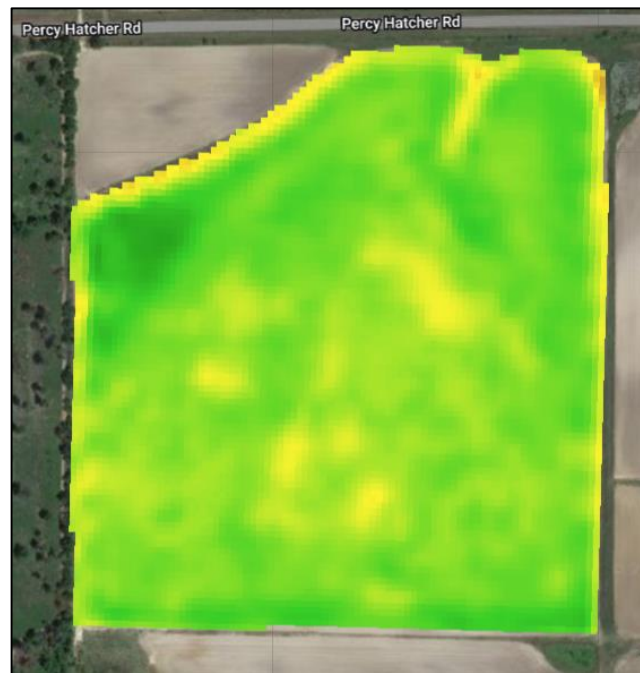
On-Farm Seeding Rate Research



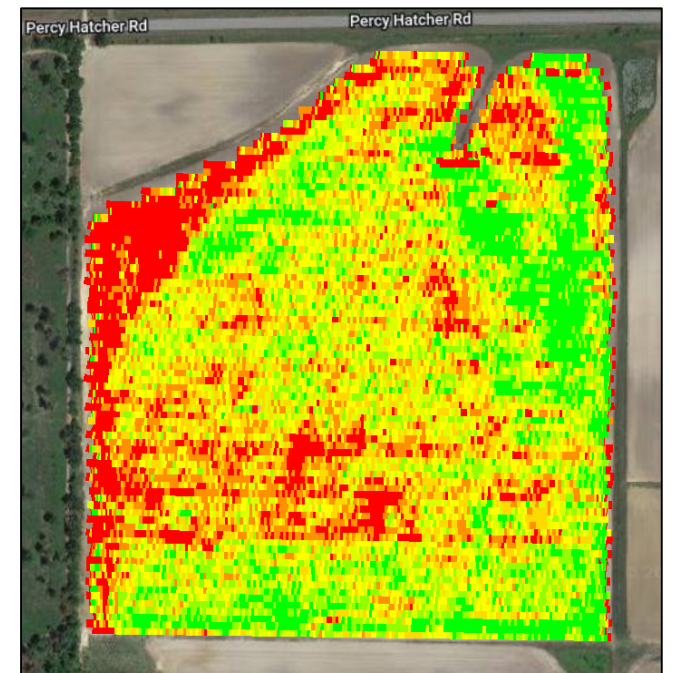
Does variable-rate seeding makes sense in cotton? Does it pay off?



Bare Soil Imagery



In-season crop imagery



Yield Map

Study Locations

❖ Field 1: School House

- Colquitt County
- 68 acres
- Irrigated



❖ Field 2: Hatcher North

- Mitchell County
- 44 acres
- Irrigated



❖ Field 3: Payne Reinke

- Colquitt County
- 22 acres
- Irrigated

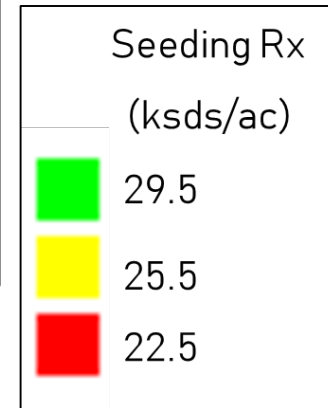
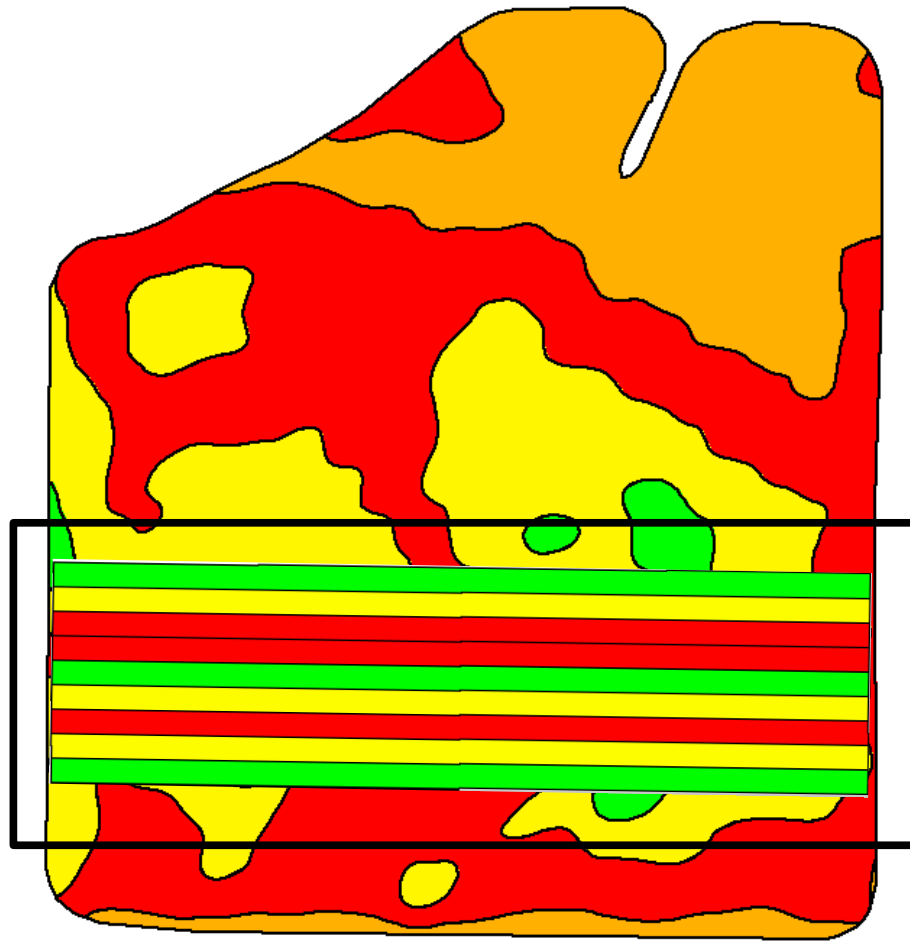


Study Design

- **Three Seeding Rates**

- 22.5 (ksds/ac)
- 25.5 (ksds/ac)
- 29.5 (ksds/ac)
(Grower Nominal)

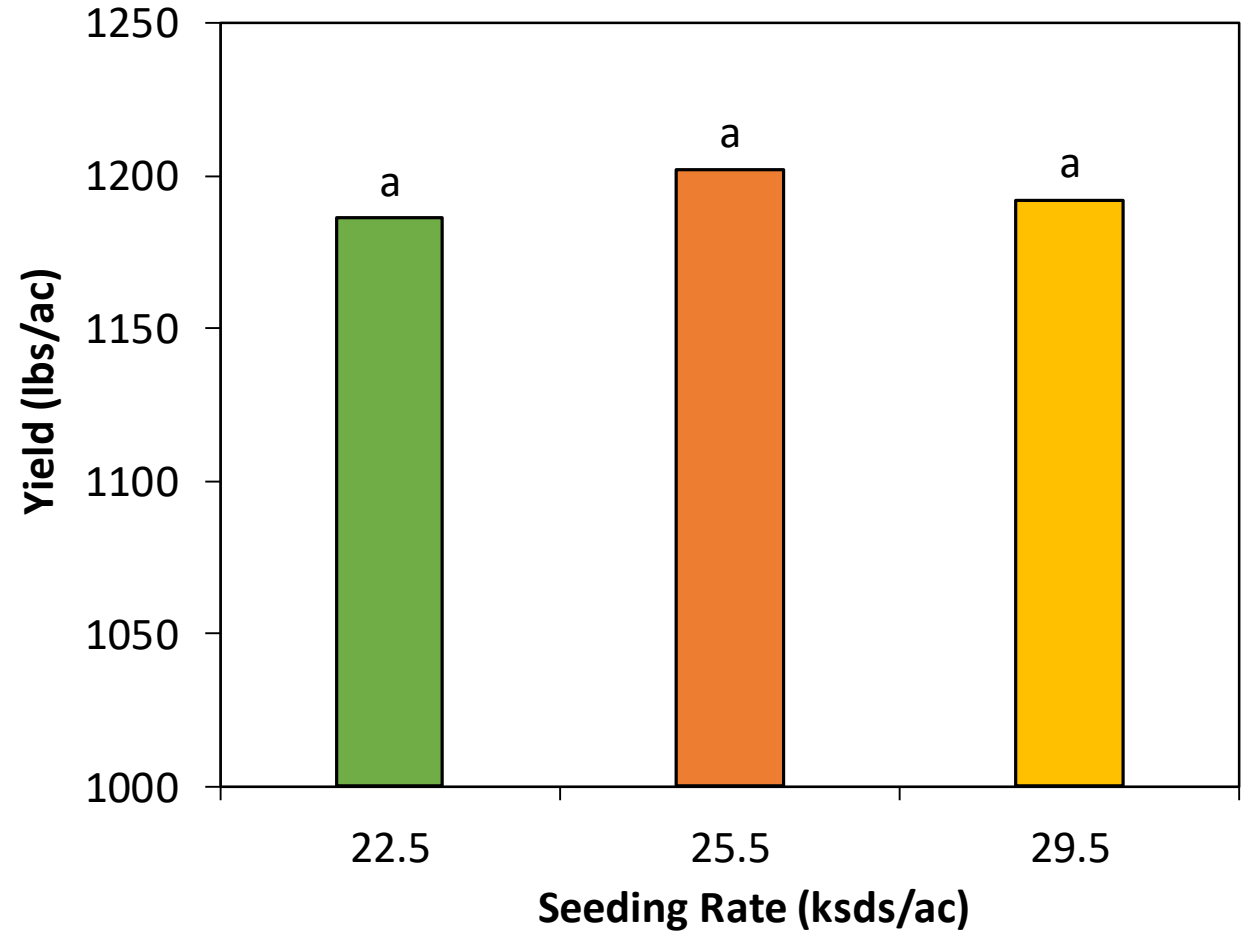
- Three replications and seeding rates randomized within each replication



12 row planter - 36" rows

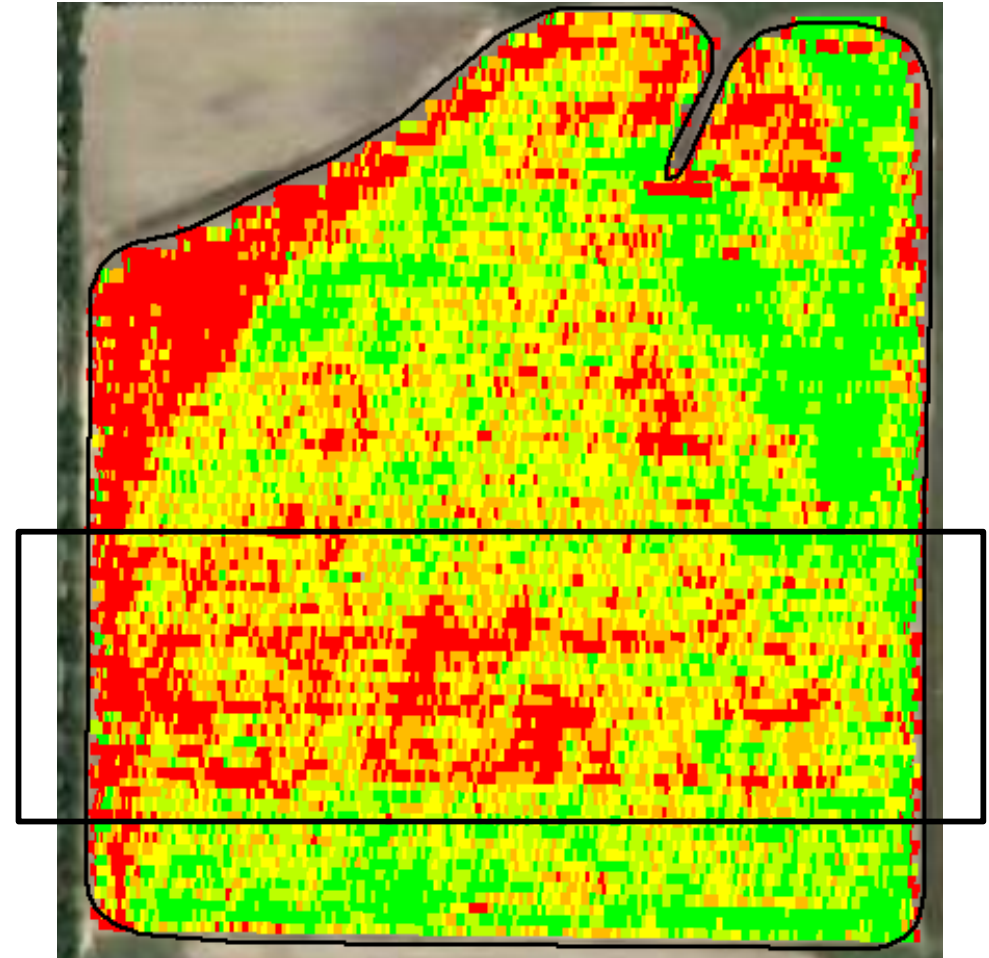
Field 2 - Hatcher *Yield by Seeding Rate*

Seeding Rate (sds/ac)	Plant Population (plants/ac)	Emergence (%)
22,500	19,037, b	85
25,500	19,723, b	77
29,500	24,200, a	82



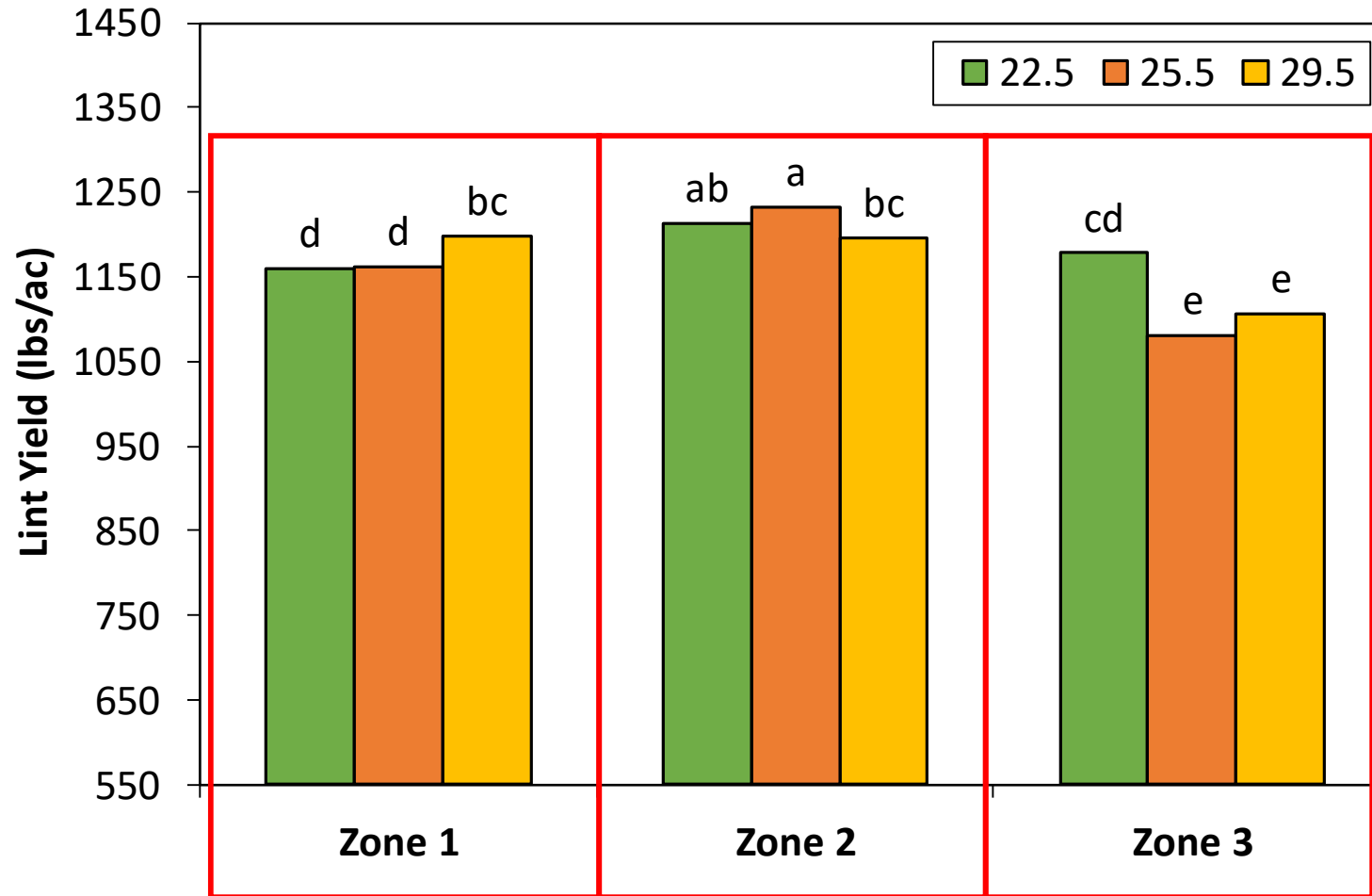
Field 2 – Hatcher

Yield by Management Zone



Field 2 – Hatcher

Yield by Management Zone



Cotton Seeding Rate Vs Yield Economics

Zone	Seeding Rate (seeds/ac)	Seed Cost (\$/ac)
1	22.5	\$62
1	25.5	\$70
1	29.5	\$79
2	22.5	\$62
2	25.5	\$70
2	29.5	\$79
3	22.5	\$62
3	25.5	\$70
3	29.5	\$79

Fertilizer Application Practices & Technology Survey

1. In which county (or counties) do you farm?

2. How many total acres do you farm?
a) ≤500 b) 501-1000 c) 1001-2001 d) 2001 - 3000 e) 3001 - 5000 f) >5000

3. Please select all row crops that you grow on your farm?
a) Corn b) Cotton c) Peanut d) Soybean e) Other _____

3. Where do you receive information about fertilizer application practices or technology? (select all that apply)
a) Agriculture Industry (b) Consultant/Salesperson (c) University Extension
d) Internet/Online Media (e) Magazines or other print media (f) Other (please specify) _____

4. Who takes soil samples in your fields?
a) I do or my employee b) Crop Consultant (c) Fertilizer retailer/Coop
d) Soil Laboratory e) Precision Ag company f) Other: _____

5. Which soil sampling method do you (or whoever takes your soil samples) currently use on your farm?
a) Composite sampling - one to two samples per field
b) Random locations within the field based on knowledge/history (no grids or computer-generated zones)
c) Grid sampling (uniform size grids)
d) Zone Sampling (management zones)
e) Other (please specify): _____

6. If you use grid sampling, what size grids do you use?
a) 1 ac b) 2.5 ac c) 5 ac d) 10 ac e) Other (please specify) _____

7. If you use zone sampling, what is your preferred method for creating the zones? (select all that apply)
a) Knowledge of field (b) Aerial imagery (c) Soil type maps (d) Elevation data
e) Soil EC (f) Yield maps (g) Two or more data layers combined _____

8. What is your target depth for a soil sample core?
a) 6" b) 8" c) 10" d) Other (please specify) _____

9. How many soil cores do you collect for one composite sample (or within each grid/zone)?
a) 4-5 b) 6-7 c) 8-9 d) 10+ e) Other (please specify) _____

10. How often do you soil sample in your fields?
a) Every year b) Every 2 yrs c) Every 3 yrs d) Other (please specify) _____

Thanks!

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