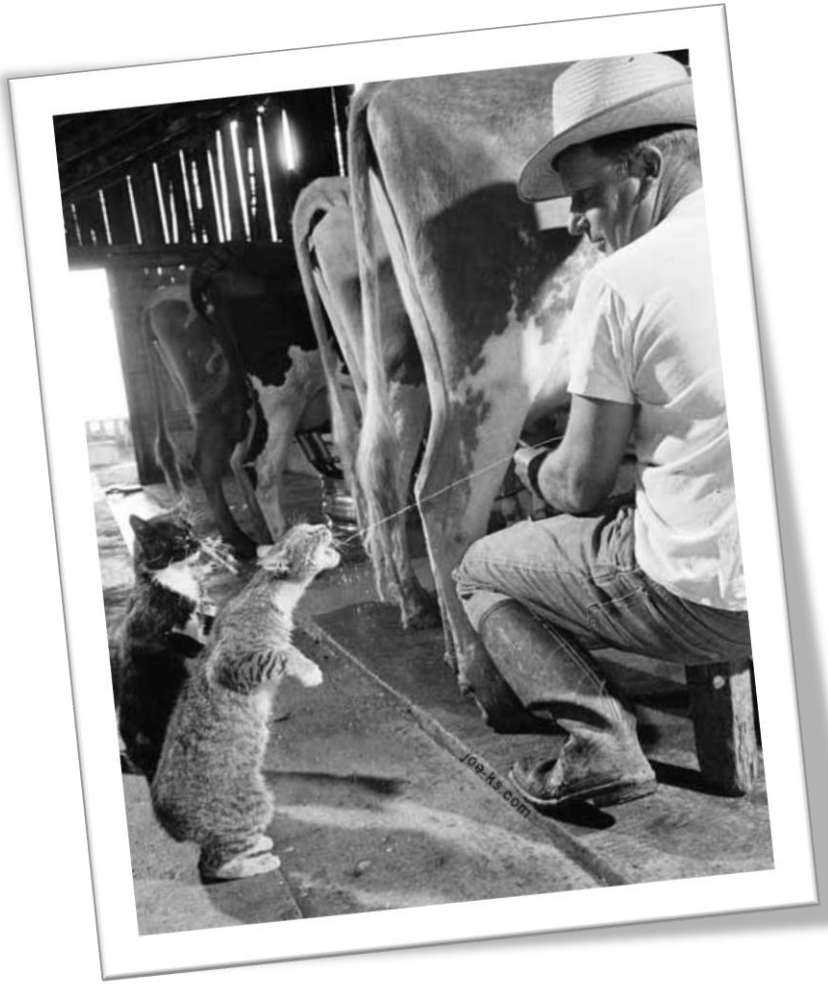
VRT Programs in Dealer Research

Matt Wiebers

December 8, 2010

Indianapolis, Indiana

Then and Now…



	THEN	NOW
Extension Research	More	Less
Crop protection / fertilizer choices	Less	More
Product Lifecycle	Longer	Shorter
Tools for Growers / Complexity	Manual	Computer / Automatic
Financial Risk	Less	More
Mgmt Decisions	Local	Absentee?

Mosaic

A Lot has Changed…

- Farmers recognize the value of technology (push versus pull)
- Multiple price points / entry levels
- Reliability
- Accuracy
- Color / Touch screens

Mosaic

Going Beyond the “Demo Plot”

On-Farm Research

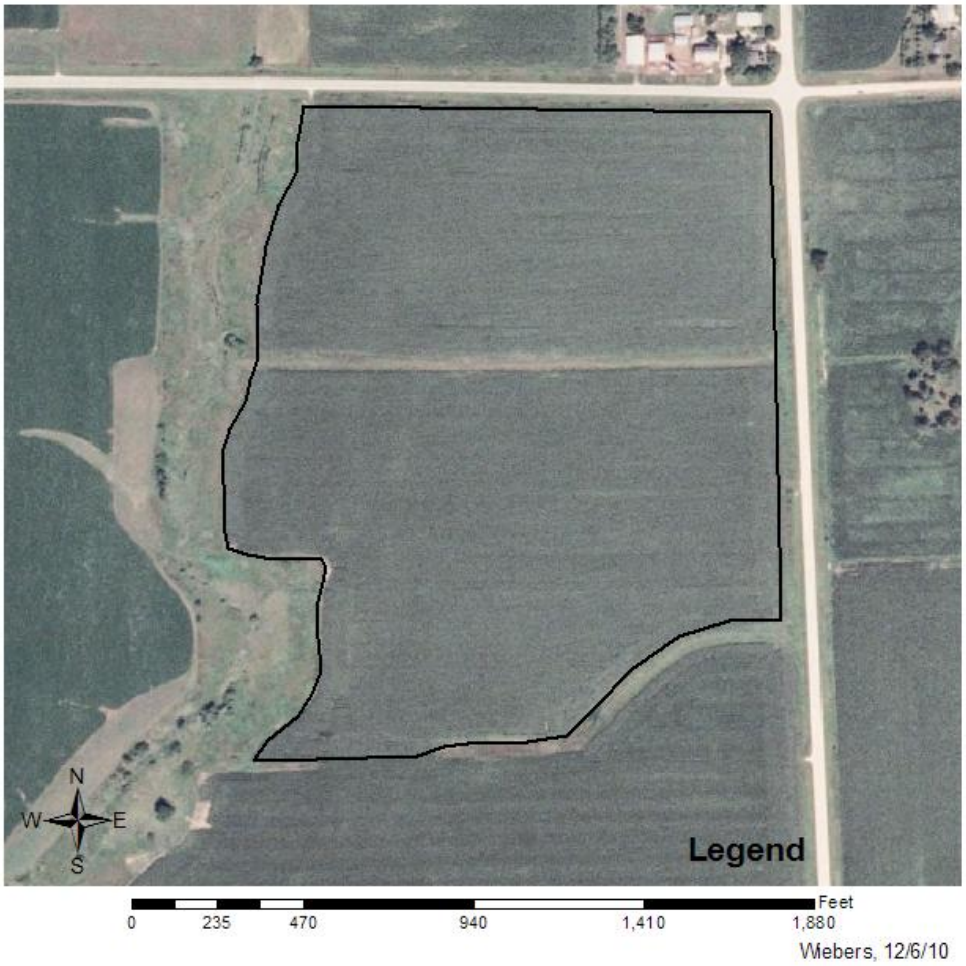
- Not much more complex
- Detect smaller / subtle yield increases
- Data can be as good or better than small plot research
- Build your own local database
- Excellent sales tool

Steps in On-Farm Research

Steps
Define the problem / question
Design the plot plan
Implement the plan
In-Season observations
Harvest
Analysis
Conclusions

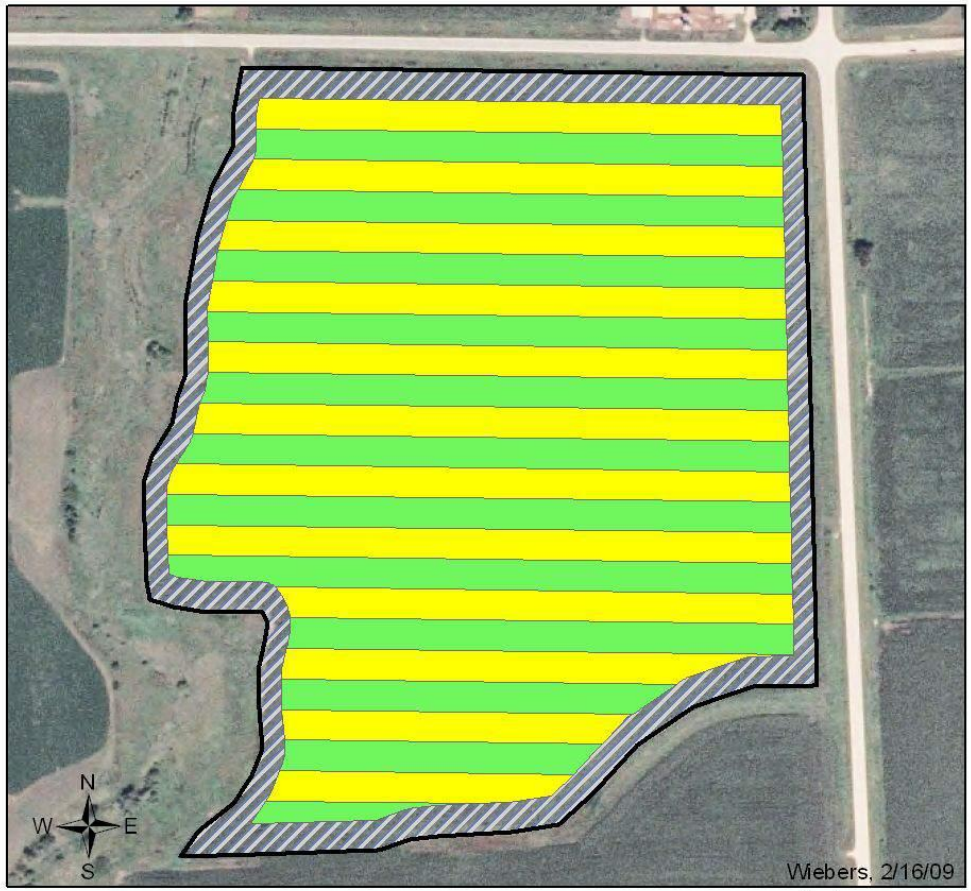
Protocol Designs

Field Selection



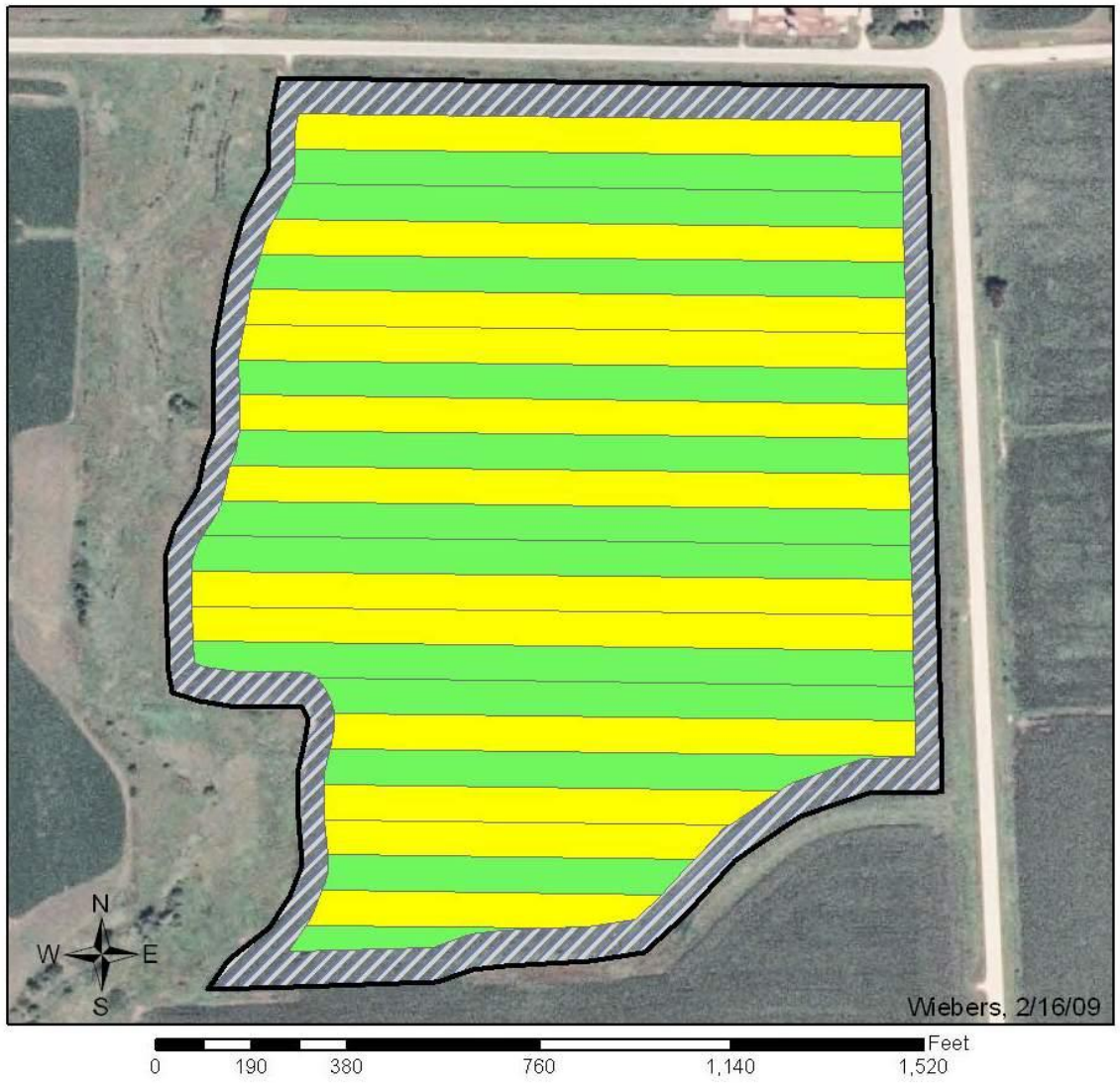
- Farm field with good history
- Farmer with interest, experience, and patience
- Reliable equipment
- Ability to use field for 2+ years

Field Setup – Step 1



- Once the field details area set, coordinate with the precision ag / agronomy staff
- GIS or VRT Mapping program (ArcView, SST, FarmWorks, EasiSuite,SMS)
- Determine the field boundary, headlands, plot direction, width, treatments, etc

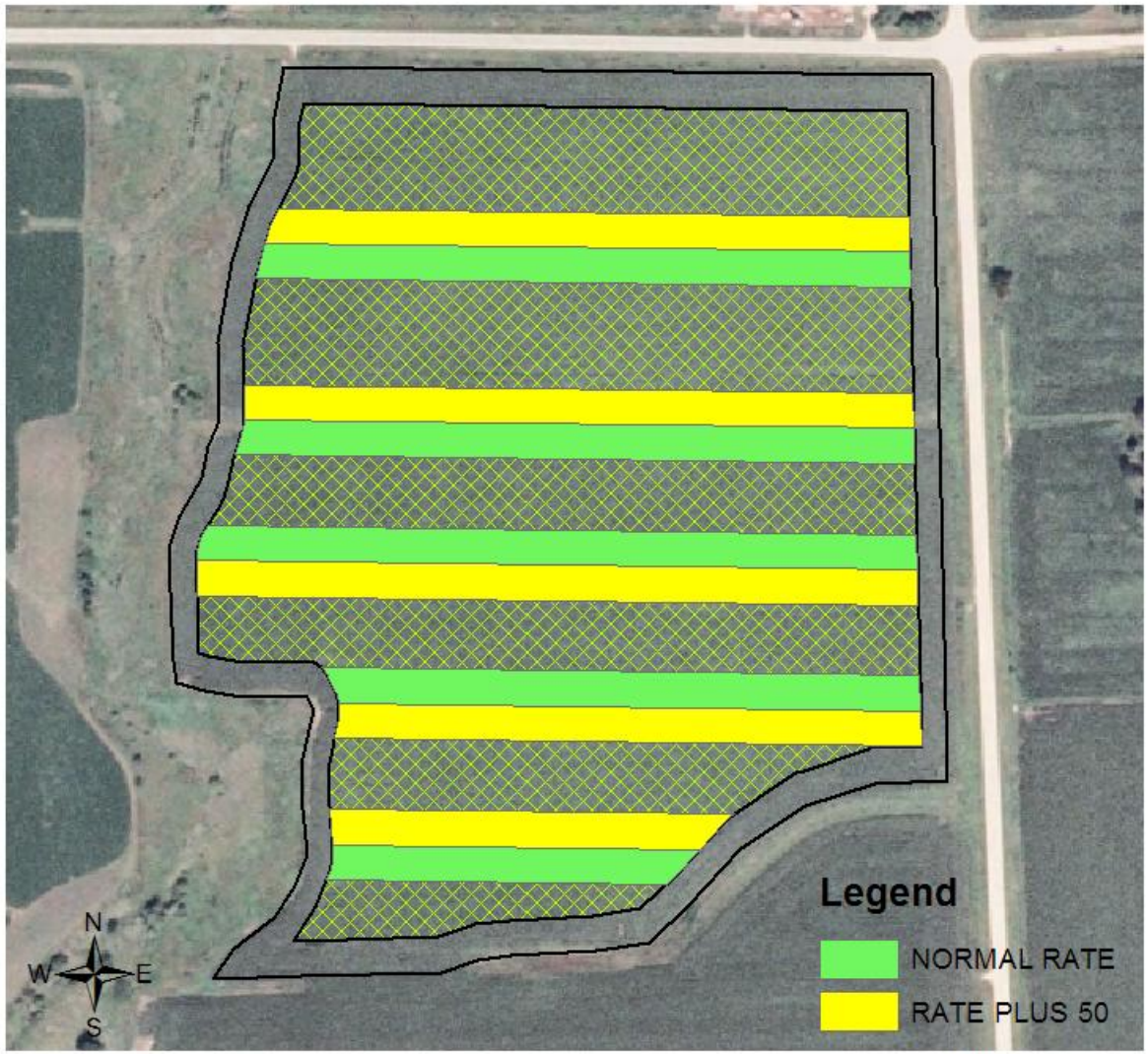
Field Setup – Step 2



Improvements:

Added Randomization

Field Setup – Step 3

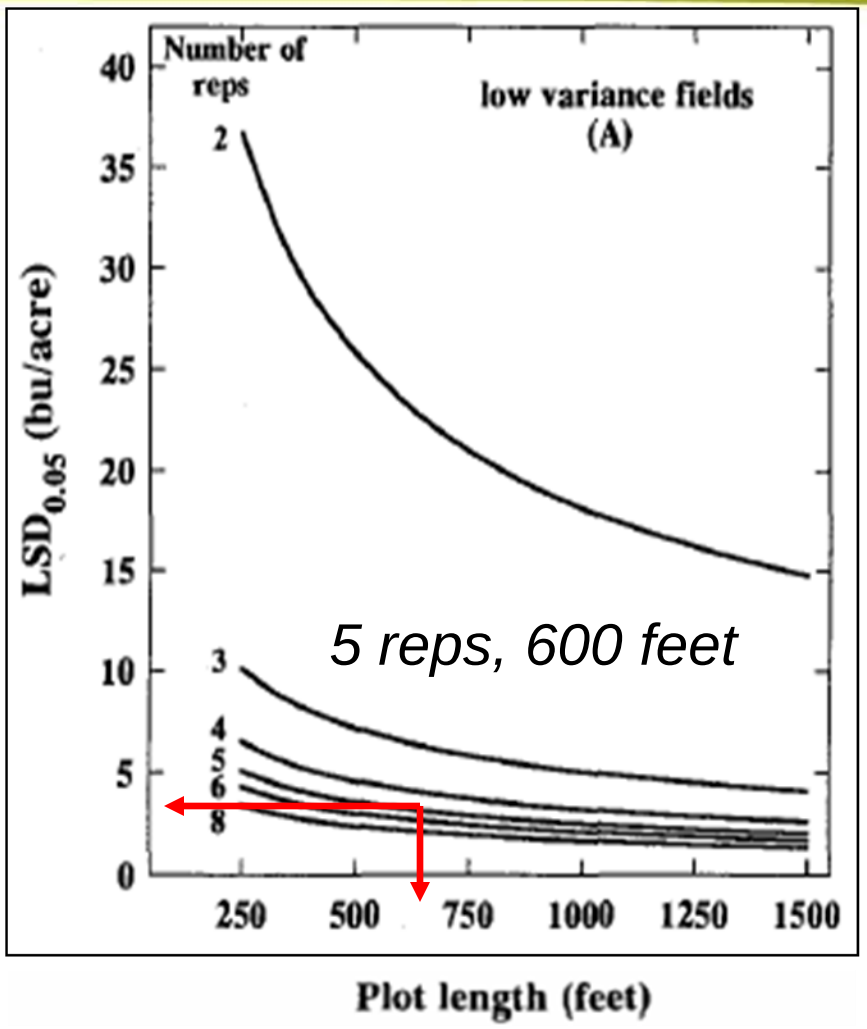


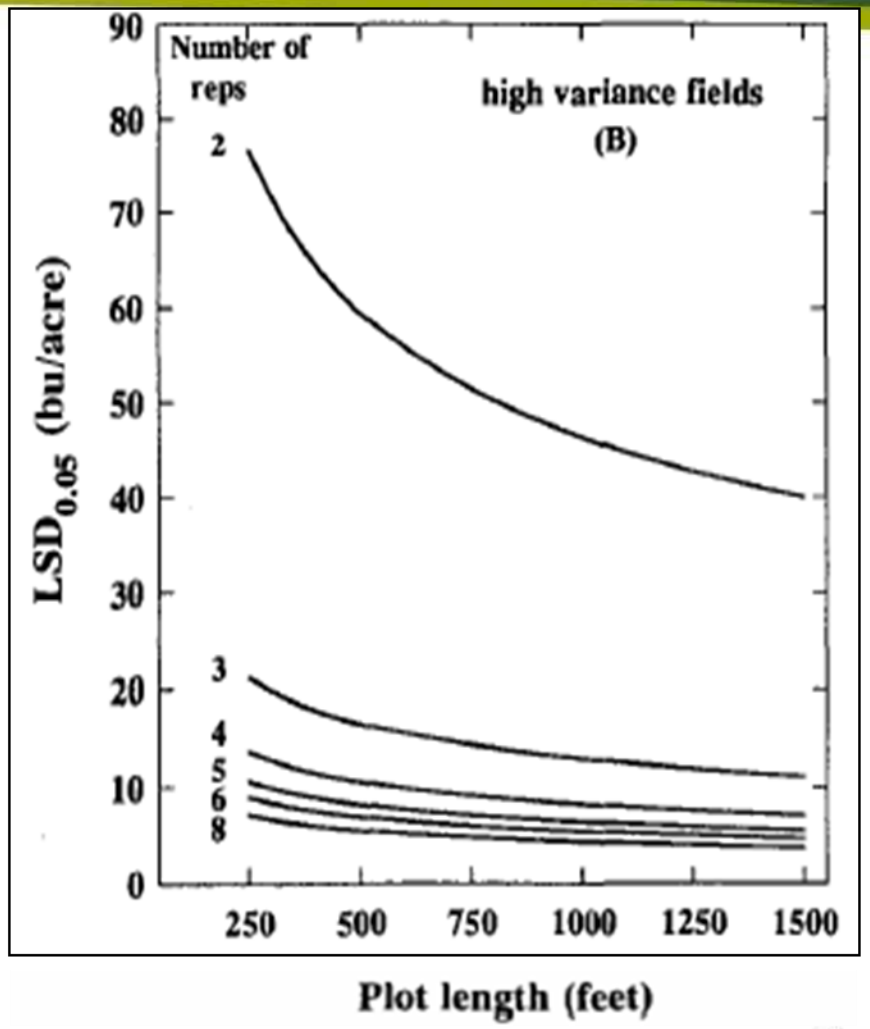
Improvements

Selected 5 replicated pairs / strips from the 12

- Use Farmer input
- Knowledge of the field
- Stats suggest limiting to 5-6 reps

Replications and Plot Length

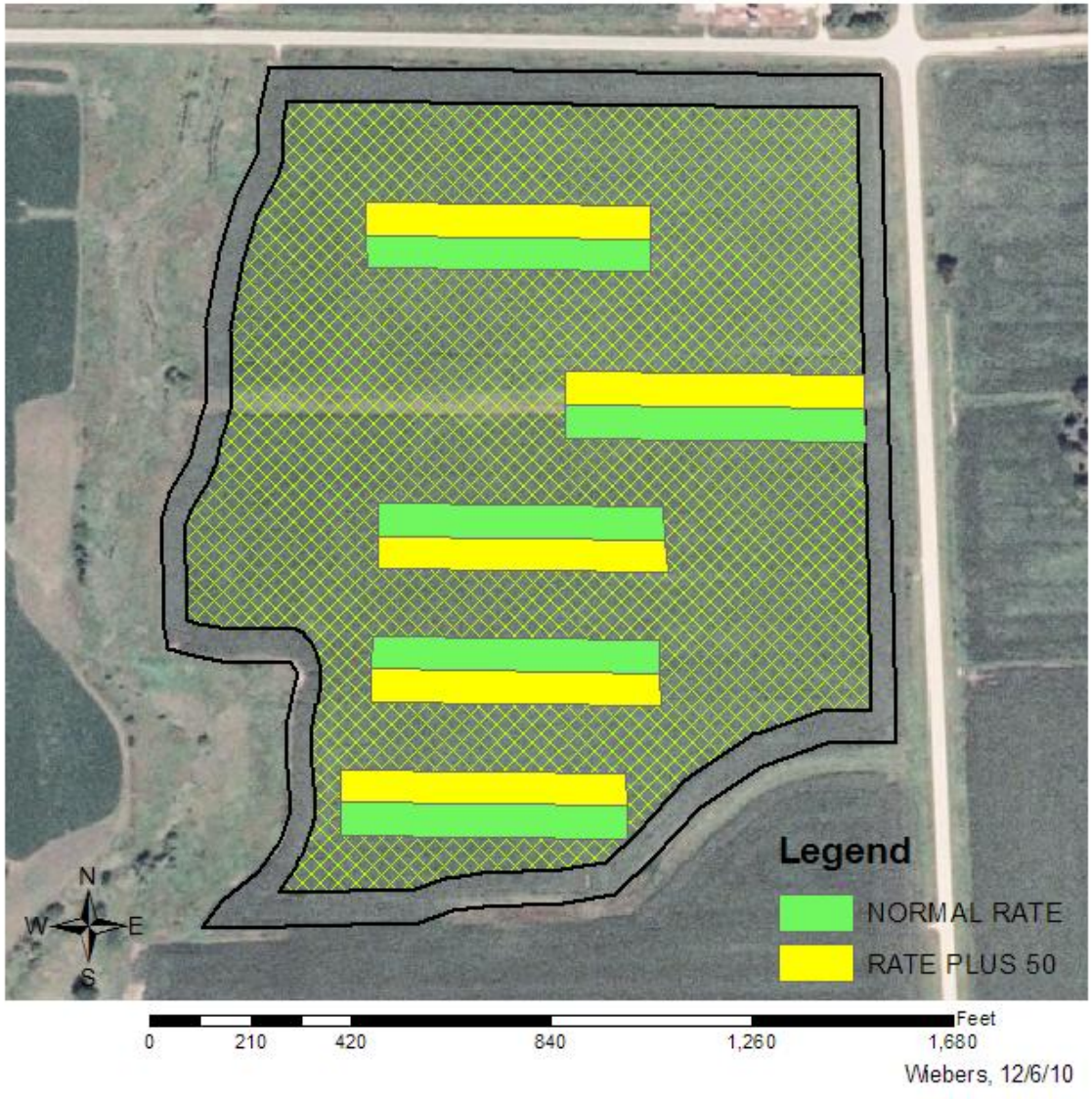




Source: *Wuest et al. 1994. J. Prod. Agric.* ***7:****211-215*

Slide Data Source: Chris Holzapfel, IHRF, Jan 2009

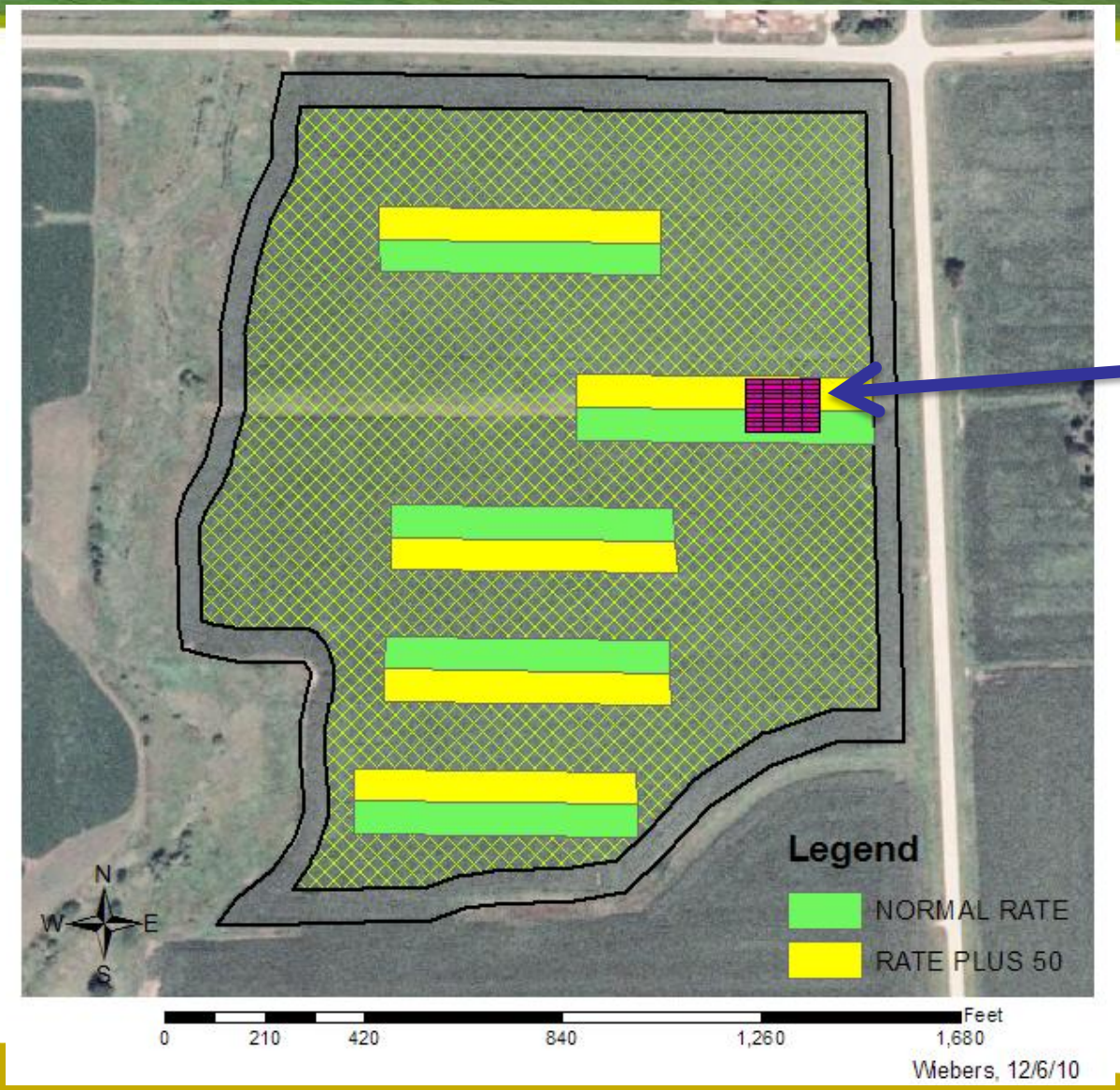
Field Setup – Step 4



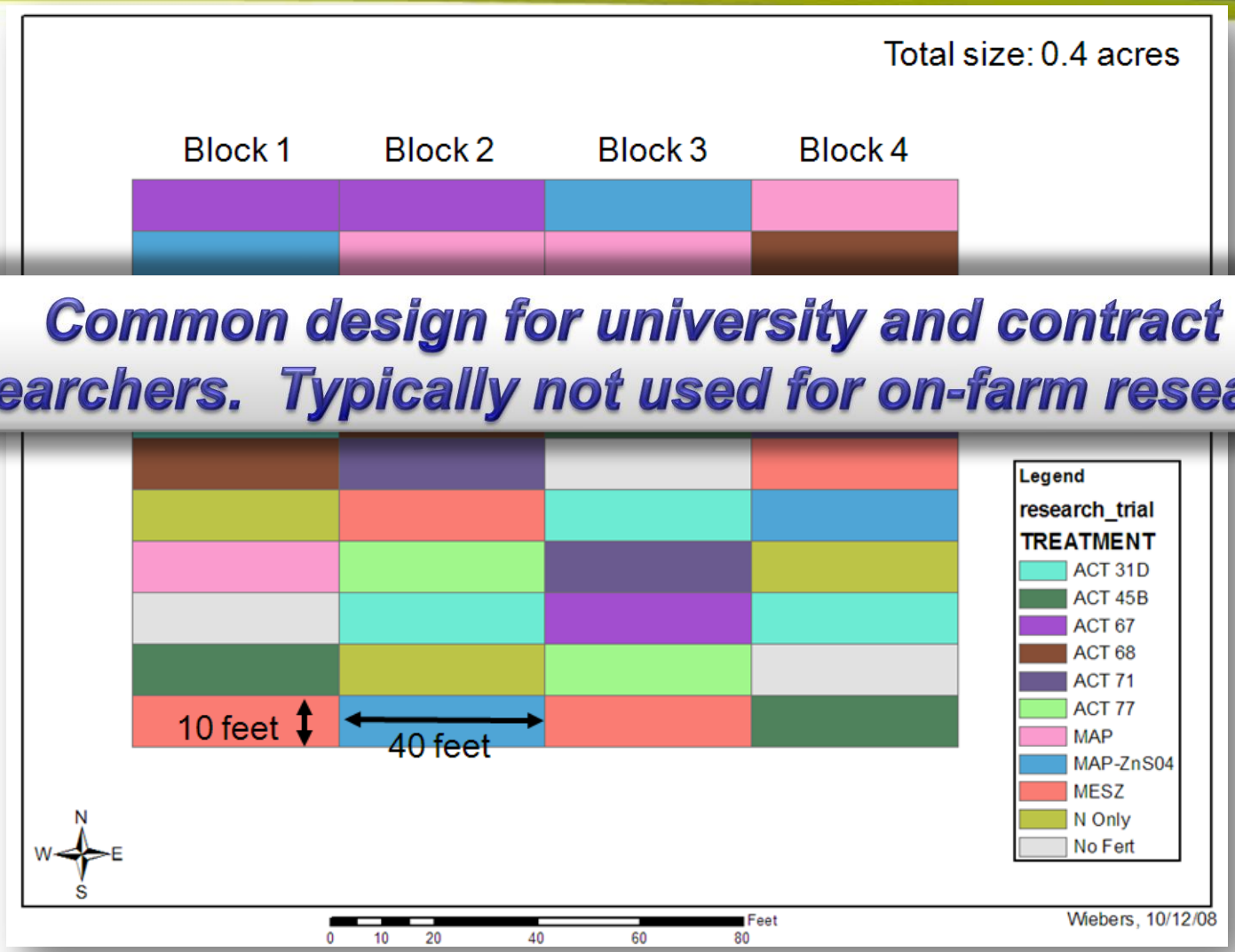
Improvements

- Reduced length to 600 feet
- Reduced cost to farmer / disruption to field
- Set location of strips in uniform soil type

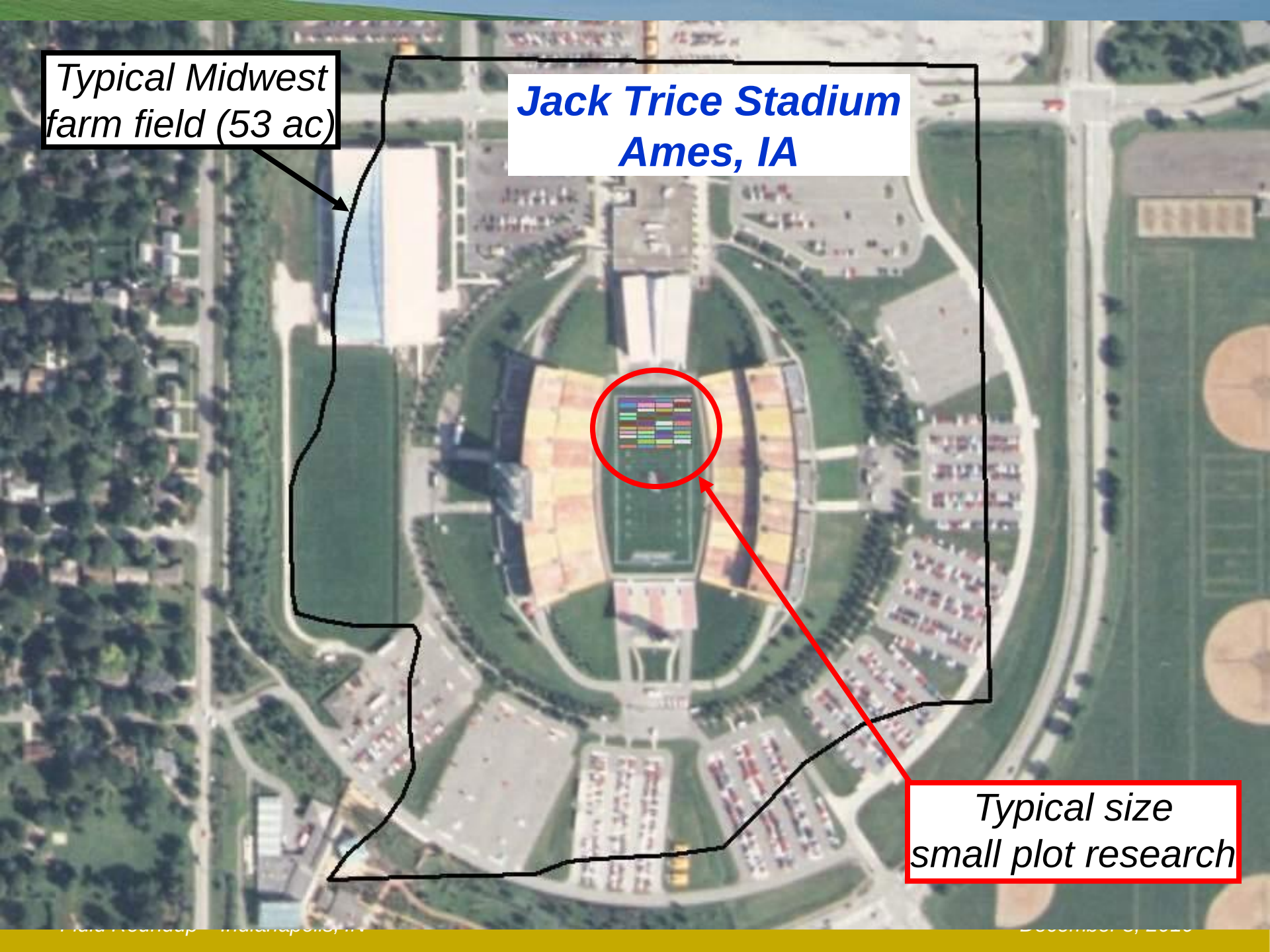
Compared to a Small Plot Research Trial



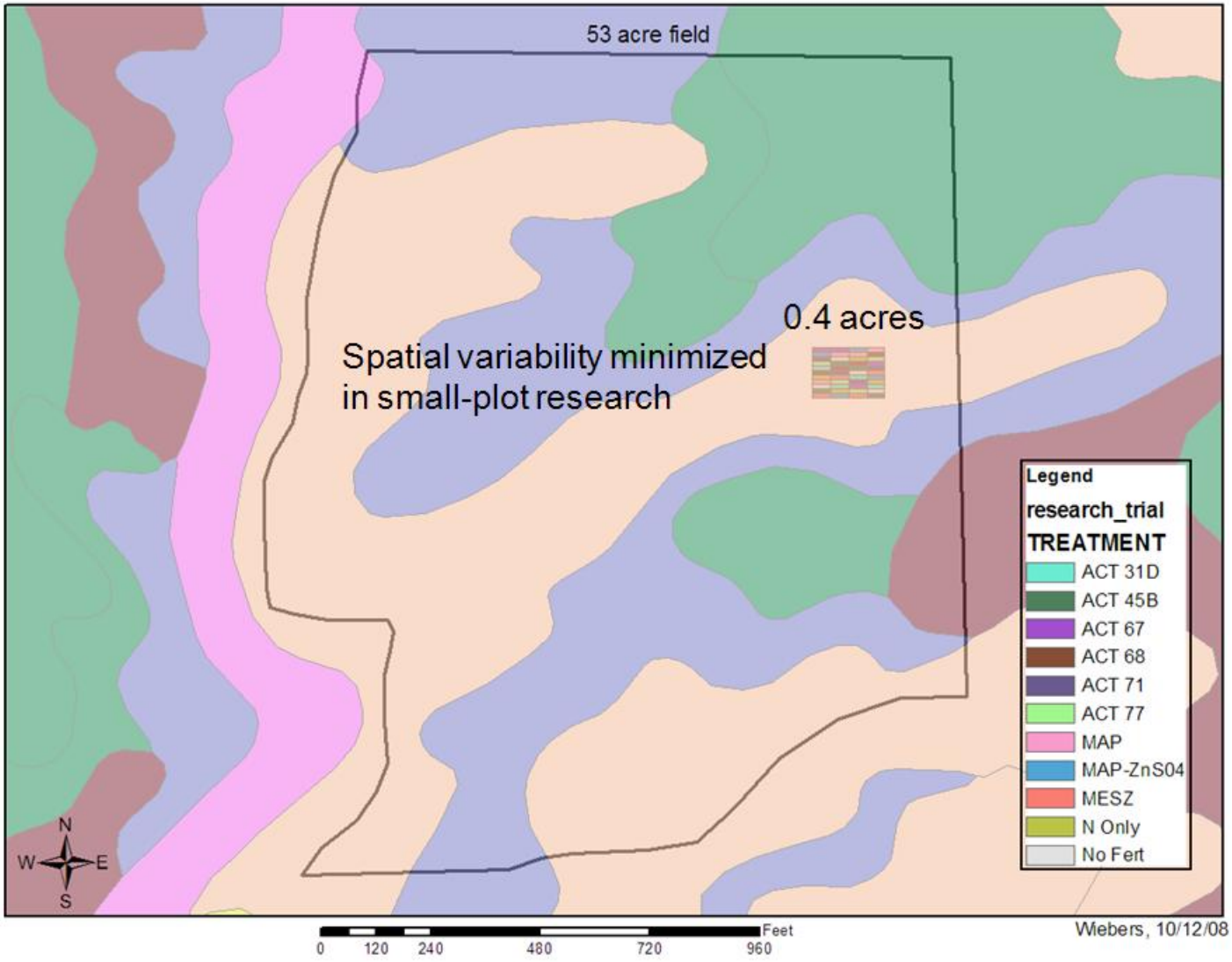
Randomized Complete Block Design (RCBD)



Common design for university and contract researchers. Typically not used for on-farm research.


Typical Midwest farm field (53 ac)
Jack Trice Stadium
Ames, IA
Typical size small plot research

Digital Soil Map

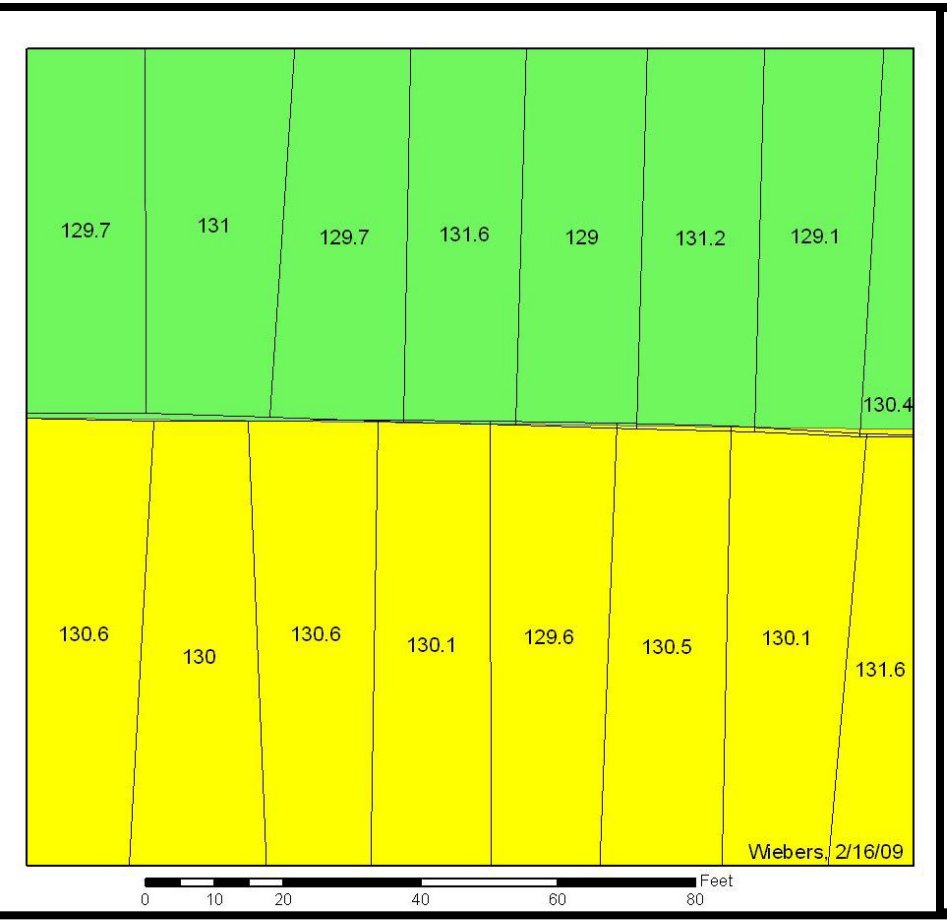


In-Season Observations

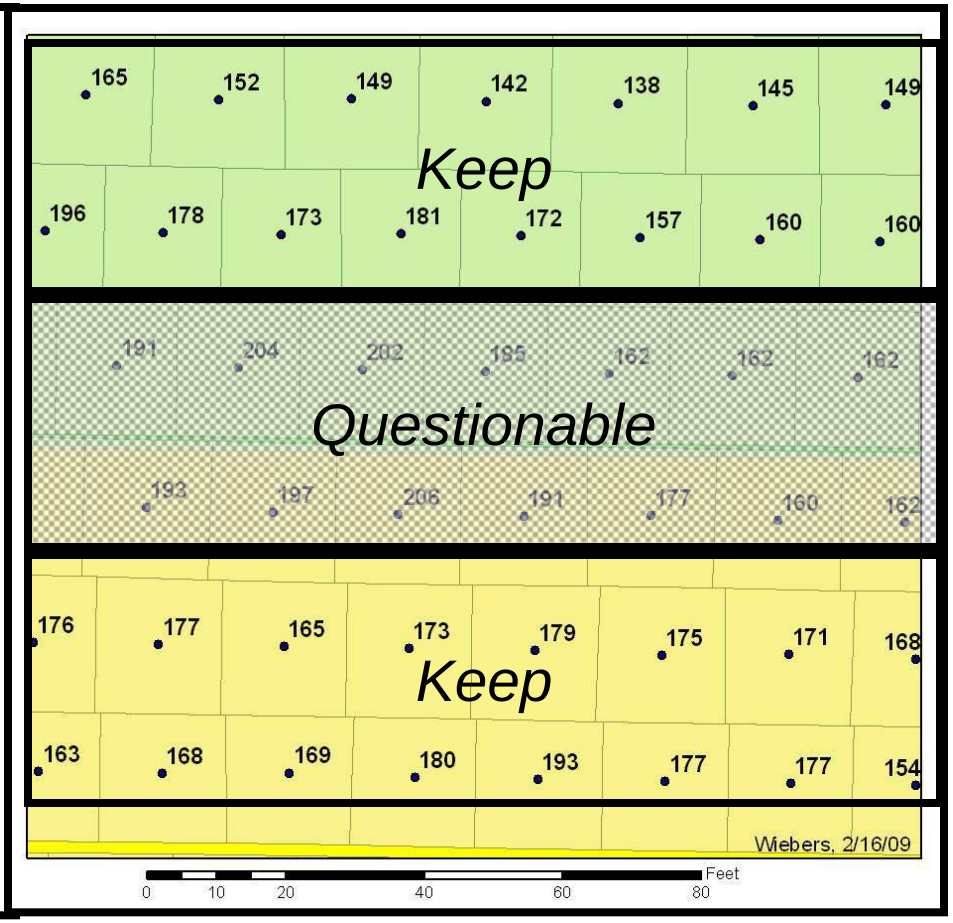
- Control factors that could influence yield (weeds, insects)
- An aerial photo is a cost-effective way to monitor the field
  - Can be used after harvest as a yield data filtering tool

Data Analysis

Planter / Applicator Map



Yield Measurements



Data Analysis

IHARF
INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

On-Farm Research – Data Analysis Tool (v1.1): Paired T-test

Study: Corn Nitrogen **Year:** 2008 **Measurement:** Grain Yield

Observations (Inputs)			
Pair	Treatment		Difference
#	1	2	(1-2)
1	167	180	-13
2	165	185	-20
3	147	160	-13
4	185	203	-18
5	180	179	1
6			0
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15			0
16			0
17			0
18			0
19			0
20			0
21			0
22			0
23			0
24			0

Results (Outputs)		
	Treatment	
Statistic	1	2
n (# of samples)	5	5
Mean	168.8	181.4
Standard Deviation	14.8	15.4
95% Confidence Interval	13.0	13.5
Paired T-test		
	p-value[z]	
Mean difference (1-2)	-12.6	
Probability > T	0.026	

Notes:

Disclaimer: IHARF accepts no responsibility for the use of this spreadsheet and assumes no responsibility or liability for any errors, inaccuracies, or omissions. The user accepts all responsibility for results and interpretations arising from this tool and use of these materials constitutes full acceptance and understanding of these disclaimers.

Questions or Feedback? Email: chris.holzapfel@agr.gc.ca Phone: (306) 695-4200

IHARF
INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

On-Farm Research – Data Analysis Tool (v1.1): Paired T-test

Study: Corn Nitrogen **Year:** 2008 **Measurement:** Grain Yield

Observations (Inputs)			
Pair	**Treatment**		**Difference**
#	**1**	**2**	**(1-2)**
1	167	180	-13
2	165	185	-20
3	147	160	-13
4	185	203	-18
5	180	179	1
6			0
7			0
8			0
9			0
10			0
11			0

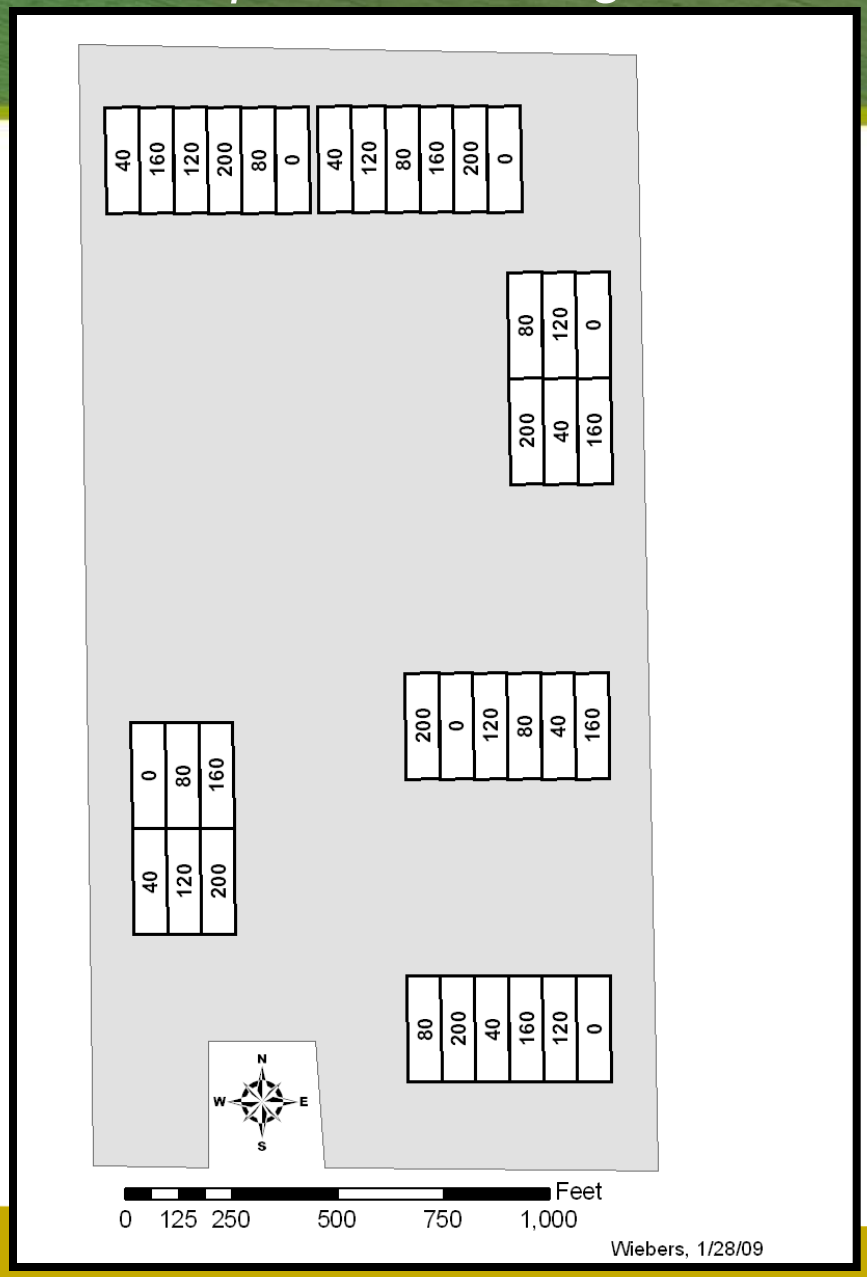
Results (Outputs)		
	Treatment	
Statistic	1	2
n (# of samples)	5	5
Mean	168.8	181.4
Standard Deviation	14.8	15.4
95% Confidence Interval	13.0	13.5
Paired T-test		
	p-value[z]	
Mean difference (1-2)	-12.6	
Probability > T	0.026	

Mosaic

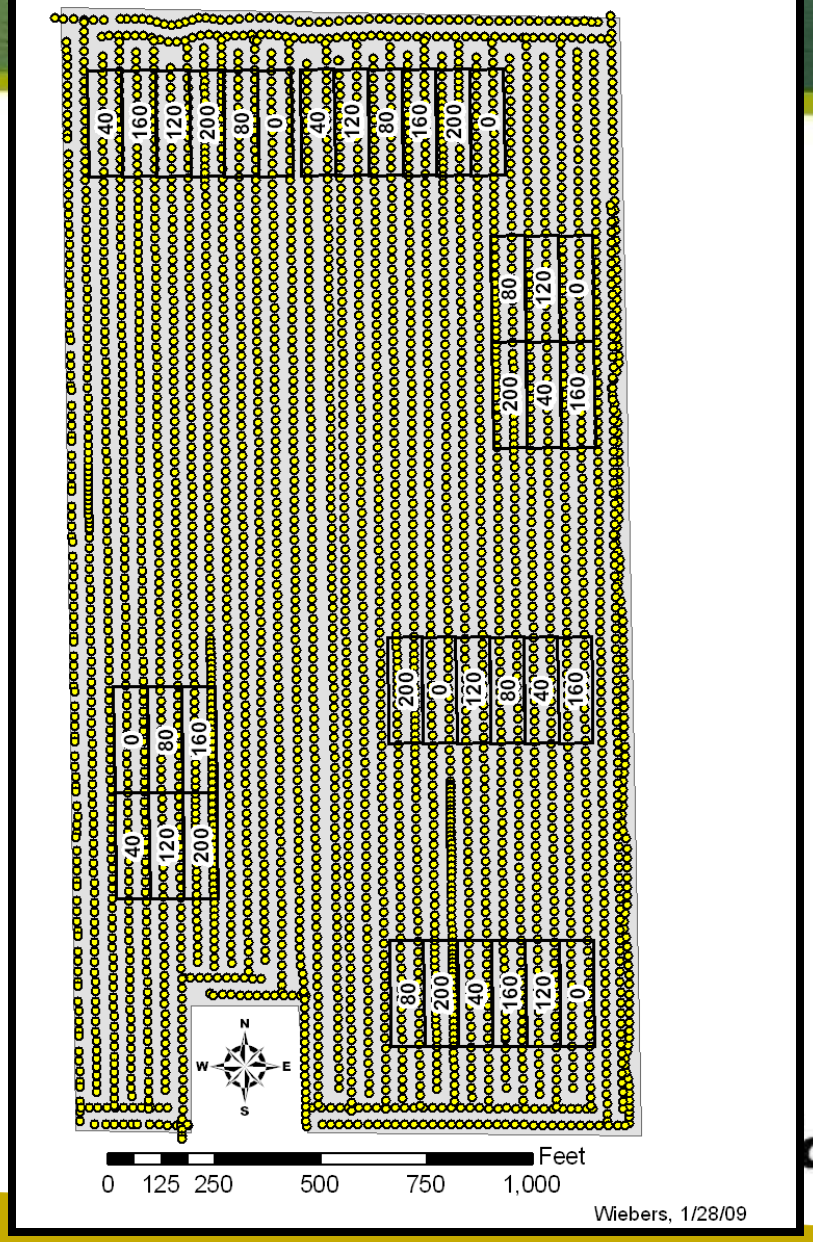
Example of a Nitrogen Study using this Approach

Paris, Illinois 2007

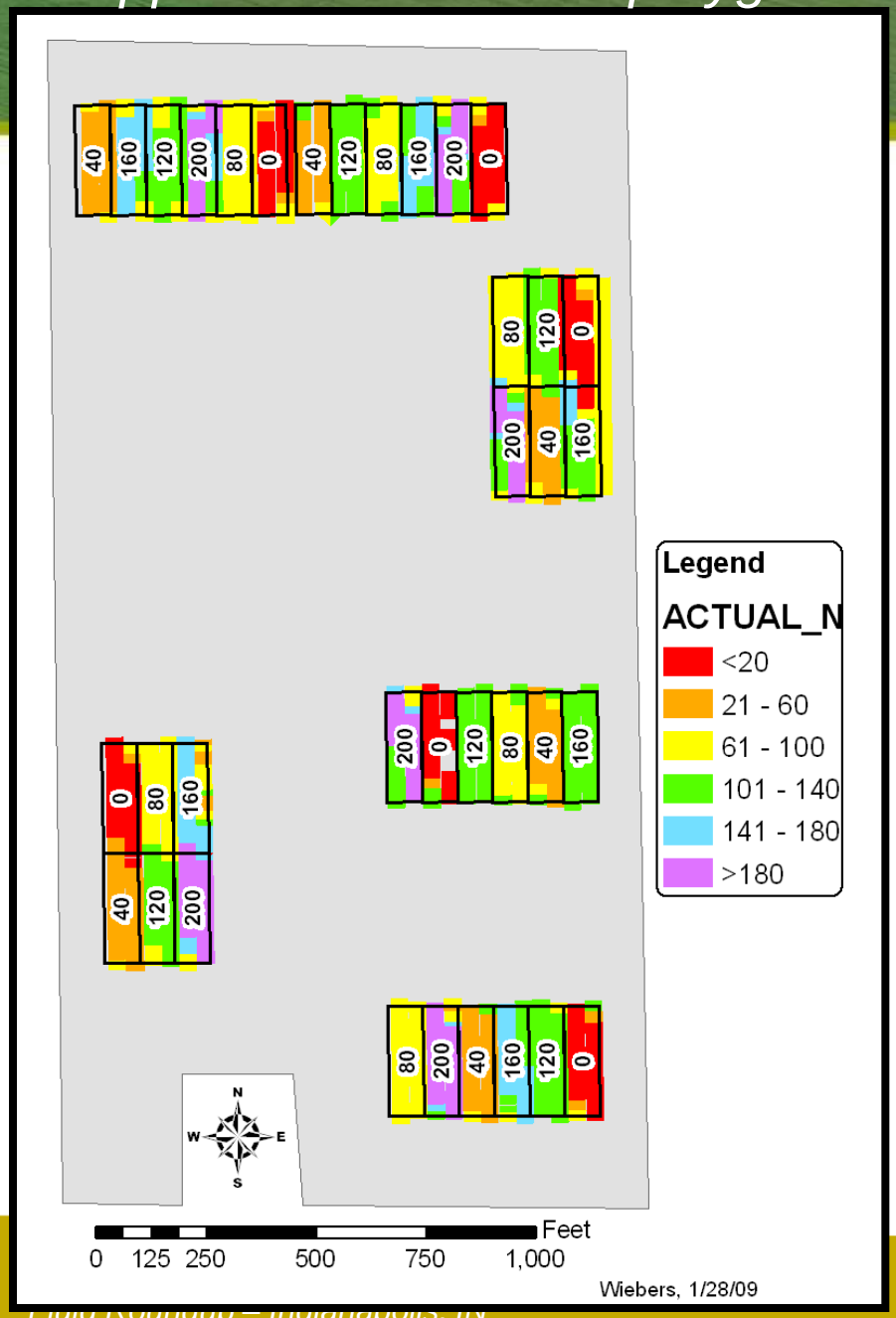
Experiment Design



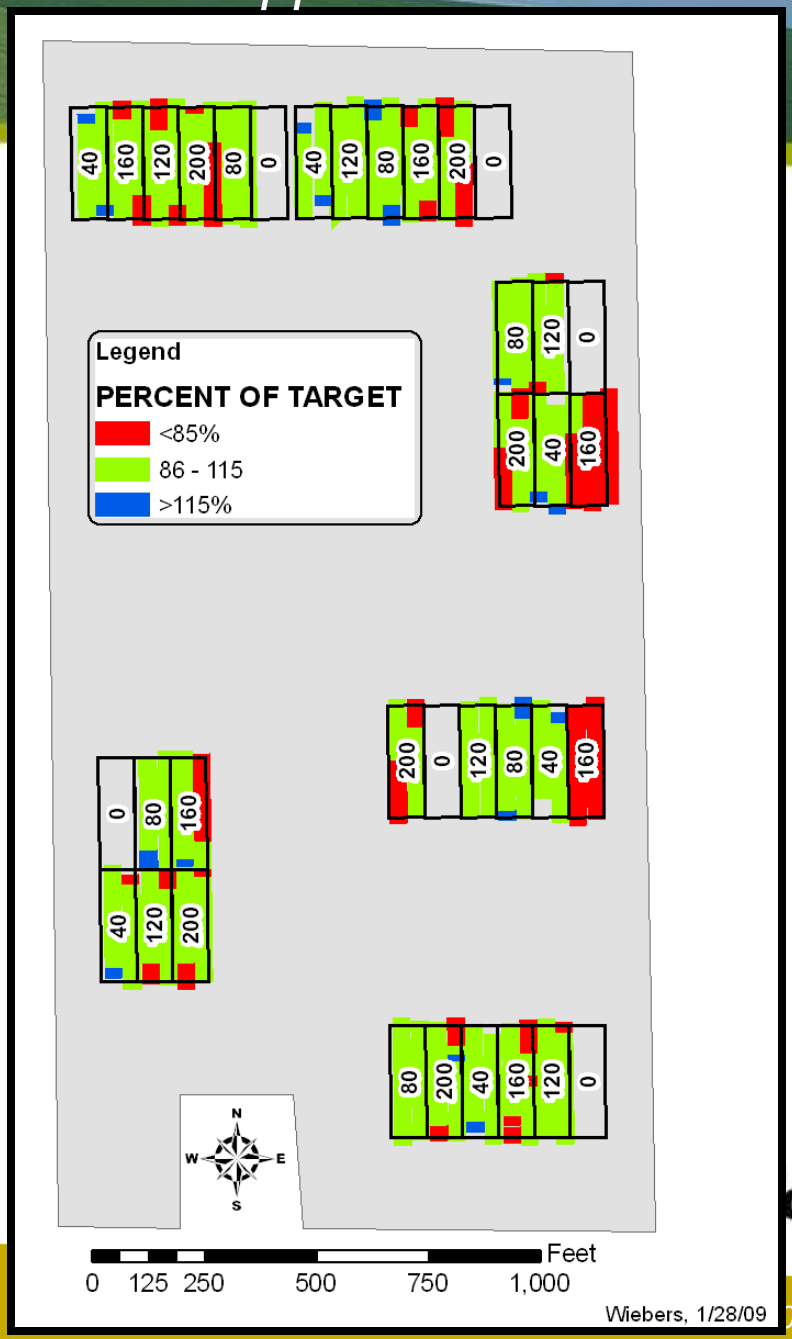
As-applied points (PF3000)



As-applied converted to polygons

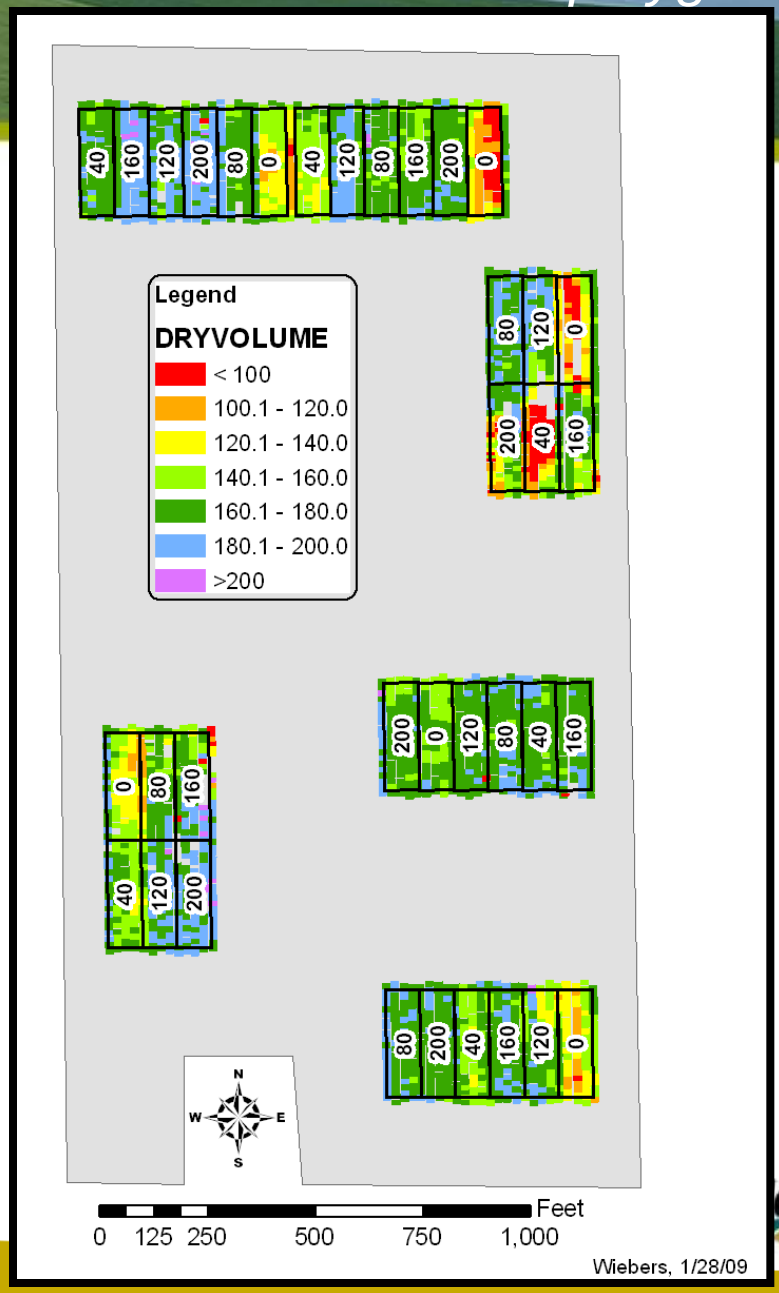


As-applied Scorecard



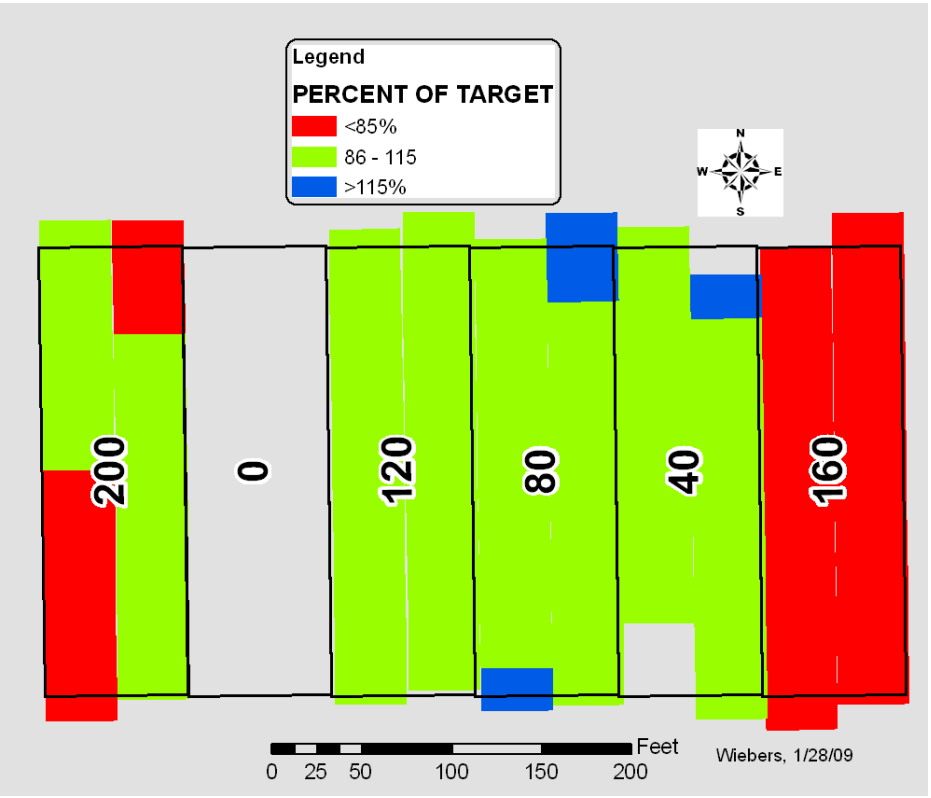
Yield data (PF3000)

Yield data converted to polygons

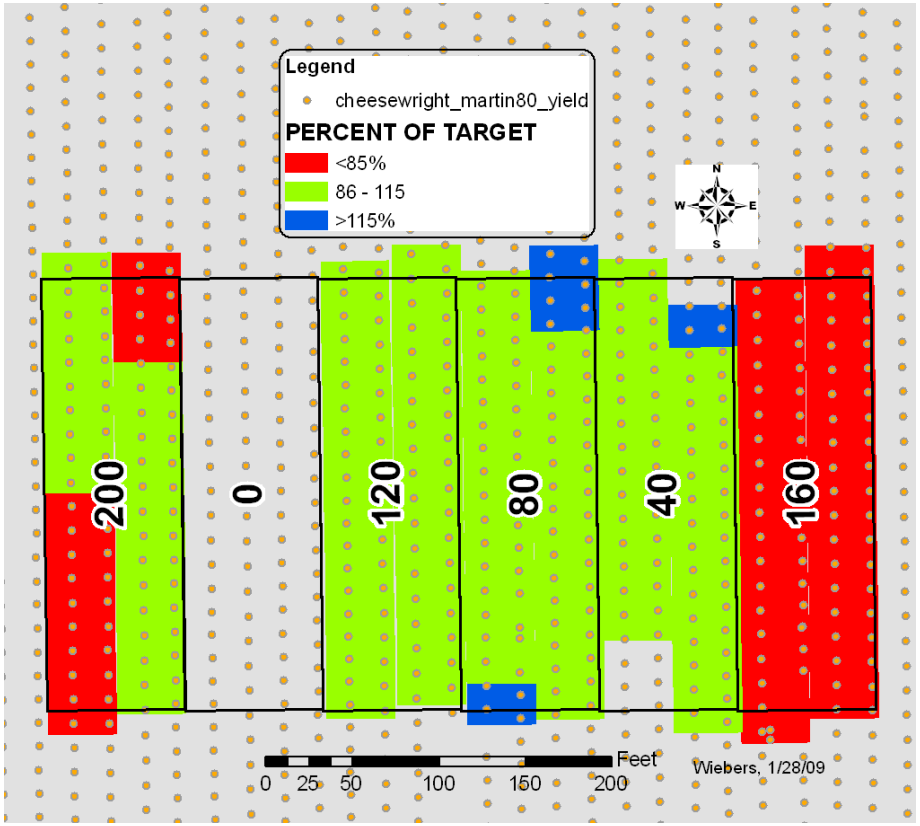


Data analysis

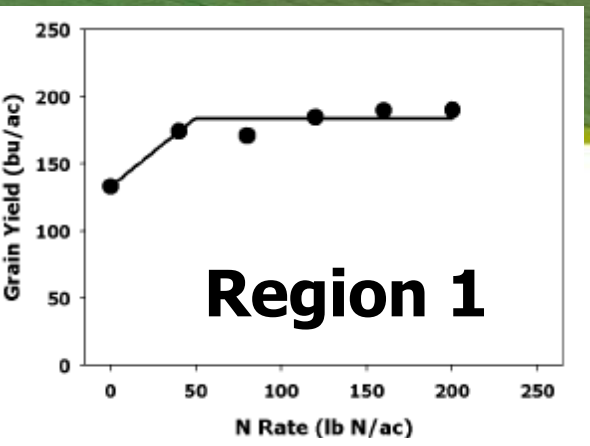
As-applied -% of Target Rate

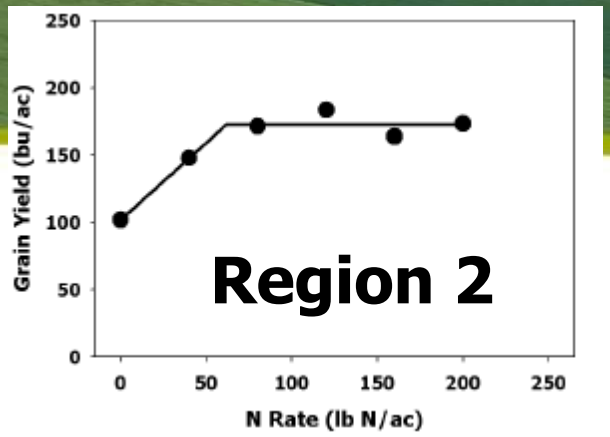


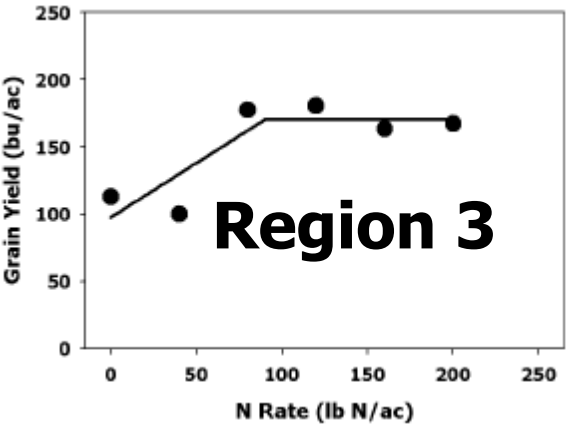
As-applied with yield overlay

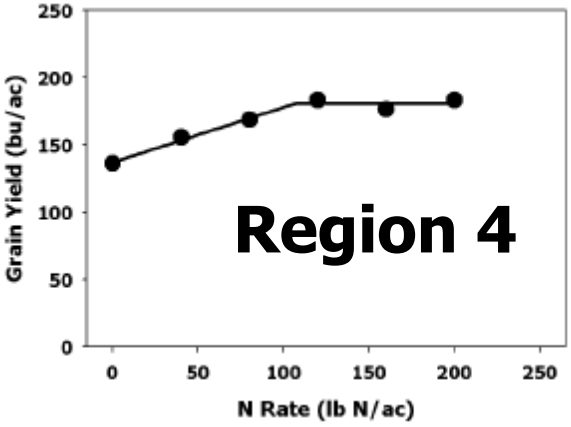


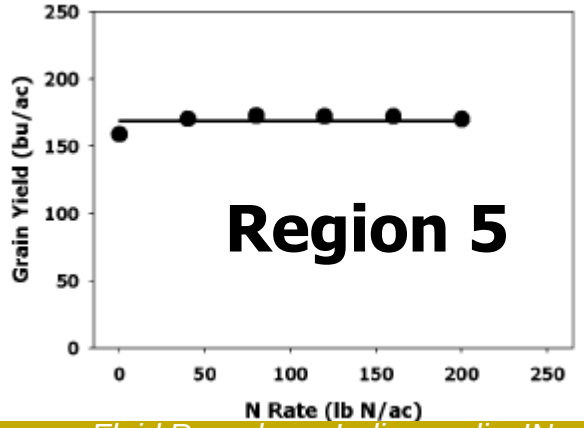
Yield Response Curves

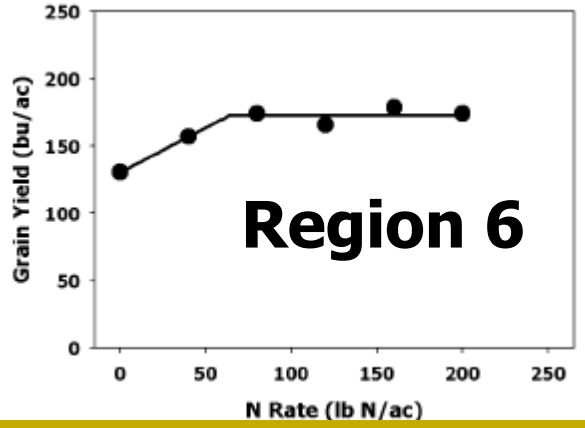


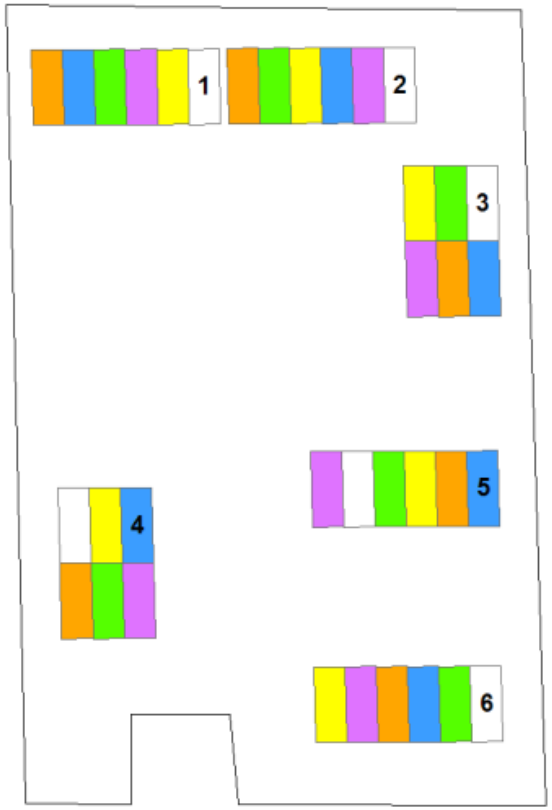




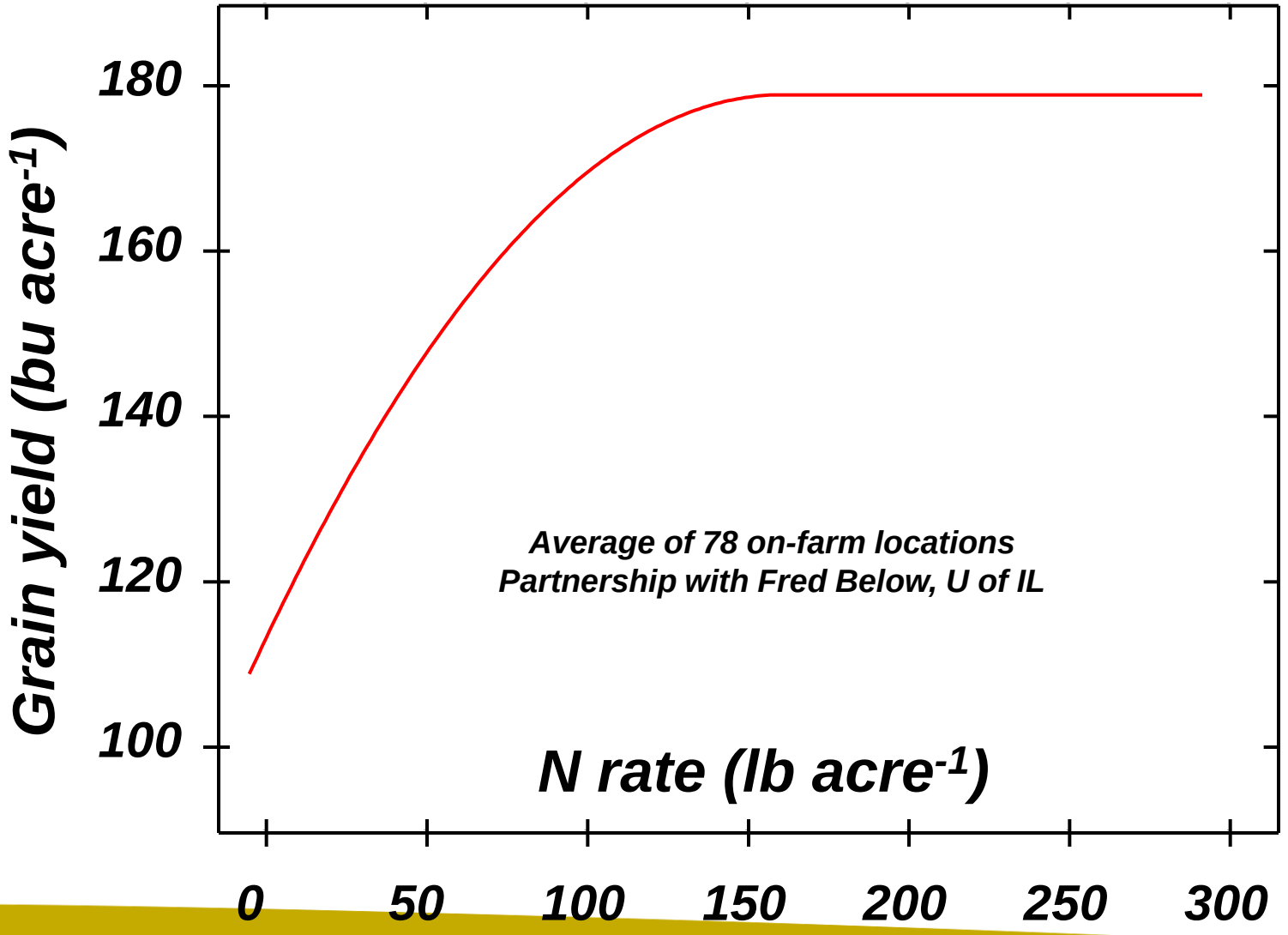








Typical Corn Response to Fertilizer N



Mosaic Experiences

- CV (Coefficient of Variation) is one measure of variability
  - STDEV / MEAN

Mosaic On-Farm Research

Field	CV	N Source
Dale E	3.49	NH3
Ellis JLFQ	3.88	UAN
Obowa	5.2	Urea
Hovel	13.5	Urea

Small plot trials, U of IL

Field	CV
Small Plot UI	8.16
Small Plot UI	8.26
Small Plot UI	12.3
Small Plot UI	7.87

Source: Matias Ruffo, PhD

Quotes

"Properly conducted paired-comparison trials on Iowa farms in 1987 were capable of detecting finer treatment differences than some experiment station research"

(P. Rzewnicki, et al. Fall 1988. American Journal of Alternative Agriculture, Vol. 3, No. 4).

"On-farm research does not replace experiment station work, which often uses more complex designs. The point is that for what these simple on-farm trials set out to accomplish, they do a very credible job."

Source: Rick Exner, ISU Extension PFI Coordinator and Richard Thompson, Practical Farmers of Iowa

Mosaic