

Using On-Farm Research to Evaluate Profitability

Dave Varner
Extension Educator



10 easy ways to boost profit \$20/acre



Will it work on my farm?



10 easy ways to boost profit \$20/acre



Formulating a hypothesis (a question)

- Well defined research question
- Focus on one practice
- Can be answered with data collected



Testing the hypothesis

- Design the field layout
- Determine what you will measure
- Limit the number of treatments
- Treatments should be the only man-made variable in the field
- Randomize
- Replicate



10 easy ways to boost profit \$20/acre



Randomizing and replicating

Randomization – ensures that favoritism is not given toward a treatment

Replication – reduces the possibility that results are due to chance rather than the treatment



10 easy ways to boost profit \$20/acre



Paired comparison design

Two treatments

(Five pairs required—Seven preferred)

	PAIR 1		PAIR 2		PAIR 3		PAIR 4		PAIR 5		PAIR 6		PAIR 7		
Trt A	Trt B	Trt A	Trt B	Trt A	Trt B	Trt A	Trt B	Trt A	Trt B	Trt A	Trt B	Trt A	Trt B	Trt A	Trt B



10 easy ways to boost profit \$20/acre



Randomized complete block design

Three or more treatments

(Four blocks required—Five preferred)

Block 1				Block 2				Block 3				Block 4			
Treatment A	Treatment B	Treatment C	Treatment D	Treatment C	Treatment D	Treatment A	Treatment B	Treatment D	Treatment A	Treatment C	Treatment B	Treatment C	Treatment B	Treatment D	Treatment A



10 easy ways to boost profit \$20/acre



Implement the plan

- Review the field layout plan prior to entering the field
- Follow the experimental plan
- Record deviations from the plan



Record observations

- Insect pressure
- Precipitation
- Disease
- Weed densities
- Field operations
- Hybrid/variety
- Plant populations
- Weather damage



10 easy ways to boost profit \$20/acre



Collect data

- Use calibrated weigh wagon or yield monitor to collect yield data
- Measure grain moisture for each harvest sample
- Plant populations
- Soil sampling
- Plant height
- Protein or oil analysis
- Pest damage
- Photos



10 easy ways to boost profit \$20/acre



Study data - Statistically

- Statistically analyze data
 - Using Excel
 - Consult with UNL
- Decide what confidence level makes sense to you
 - 90% is acceptable to most farmers
 - 95% and 99% used by researchers



10 easy ways to boost profit \$20/acre



Study Data - Statistically

Results:	Crop	Year	No Lime	Lime	Prob >/T/
pH 5.5/5.5	• Corn	1995	74	73	.59 ns
	• Soybeans	1996	42	43	.32 ns
	• Corn	1997	121	125	.10 *
	• Soybeans	1998	50	58	.0002 ***
pH 5.6/6.3	• Corn	1999	145	149	.177 ns
	• Soybeans	2000	37	43	.0001 ***
	• Corn	2001	130	132	.657 ns
	• Soybeans	2002	43	50	.0003 ***
	• Corn	2003	88	99	.016 **
	• Soybeans	2004	41	44	.0067 ***

* Significant at the 90% confidence level

** Significant at the 95% confidence level

*** Significant at the 99% confidence level

10 easy ways to boost profit \$20/acre



Study data - Economically

- Economically analyze data
- Include all costs...
 - Depreciation
 - Management time
 - Machinery expense
 - Land costs
- Does the benefit justify the treatment cost?



10 easy ways to boost profit \$20/acre



Study data - Economically

UNIVERSITY OF Nebraska Lincoln		Nebraska Soybean and Feed Grains Profitability Project			
		Joe Farmer			
		Tilled Corn			
		24-15-6			
					Actual Costs Per Acre
Acres in Field					60
Crop Yield (bushels)					85.4 / 0
Operator's Share of Yield (%)					100%
Expected Selling Price (\$/bu)					\$2.30 /bu
Total Product Return (\$/ac)					\$196.42 /ac
Other Crop Income (\$/ac)					
Crop Insurance					\$63.00 /ac
Loan Deficiency Payment (LDP) (\$/bu)					\$0.00 /ac
Direct Payments					\$9.50 /ac
Counter Cyclical Payments					\$0.00 /ac
Marketing Gain/Loss (\$/bu)					\$0.00 /ac
Other:					\$0.00 /ac
Gross Revenue (\$/ac)					\$259.42 /ac
Direct Costs					
Seed					16.01
Technology Cost					5.49
Herbicides					24.49
Fungicides					0.00
Insecticides					0.00
Fertilizer					16.25
Crop Insurance					8.66

10 easy ways to boost profit \$20/acre



Drawing conclusions

- On-farm research allows you to test agronomic practices on your soil using your machinery and management system.
- Field experimental layout is key to successful research.
- Today's yield monitors and weigh-wagons make yield data collection convenient.



10 easy ways to boost profit \$20/acre



Drawing conclusions

- Good data leads to sound management decisions.
- Decisions should be based on multi-year comparisons.
- What is the cost:benefit ratio for each treatment?
- How will your management plan change based on the results?



10 easy ways to boost profit \$20/acre



UNL On-Farm Research Results

<http://cropwatch.unl.edu>

University of Nebraska-Lincoln (UNL) Extension On-Farm Research (CropWatch) - Windows Internet Explorer

http://cropwatch.unl.edu/web/farmresearch/home

File Edit View Favorites Tools Help

Links Google Customize Links Fillmore Central Public Schools

Windows Live corn population counts + cropwa

What's New Profile Mail Photos Calendar MSN Share

Google Search corn population counts + cropwatch

Share Sidewiki Check Translate AutoFill com population counts cropwatch

Corn - Plant Population University of Nebraska-Li...

CropWatch: Farm Research

Farmers working with UNL to Address Farm Research Questions

Navigation

- [On-Farm Research Home](#)
- [Corn Research](#)
 - Nutrient Studies
 - Production Studies
 - Pest Management Studies
- [Soybean Research](#)
 - Nutrient Studies
 - Production Studies
 - Pest Management Studies
- [Corn/Soybean Rotation](#)
 - Nutrient Studies
 - Production Studies



Farm Research

Welcome to the University of Nebraska-Lincoln Extension Farm Research Web site!

You read agriculturally-related magazines and attend seminars. You hear of new tools and ideas that other producers are trying. You wonder if any of these tools and ideas will work for you on your operation. That's where farm research can help provide you these answers. Producers working with UNL in farm research groups realize the value of conducting valid scientifically based research on their own farms.

- This research is conducted the full field length and replicated throughout the field to obtain more data across field variability. This research is also performed in a way which can be statistically analyzed.
- Experimental design is important for conducting a valid scientific test.
- Randomization is important for not giving an advantage to one treatment over another as the treatments are replicated across the field.
- Learn more about [Designing Your Farm Research Comparison](#).

There are currently two formalized on-farm research groups in Nebraska:

- The [NE Soybean and Feed Grain Profitability Project](#) and.
- The [Greater Quad County On-farm Research Group](#).

There are also several UNL Extension Educators working with producers in farm research trials **independently across the state**. If you are interested in learning more about farm research or conducting your own trials, please contact any of the UNL Extension Educators working with farm research groups from the links provided above or in the right-hand column under Farm Research Groups.

Farm Research Groups

- [Nebraska Soybean and Feeds Grain Profitability Project](#)
- [Greater Quad County On-Farm Research](#)
- [Additional Farm Research Efforts in Nebraska](#)
- [2010 Nebraska Farm Research Studies](#)

Farm Research Impacts

- [NSFGPP - Producers Voice Approval](#)
- [Nebraska Soybean and Feed Grain Profitability Project Shows Financial Impact](#)
- [Quad Counties Farm Research Impact](#)

Frequently Asked Questions (FAQ)

- [What are the benefits of farm research?](#)
- [How do I design a farm research comparison?](#)
- [How are the results on this Web site different from other farm research?](#)



Internet 100% 63°

Using On-Farm Research to Evaluate Profitability

David Varner
Extension Educator
1206 W 23 St Extension, Fremont, 68025-2504
(402)727-2775
dvarner1@unl.edu



10 easy ways to boost profit \$20/acre

