Strategies for Input Spending: Making the Most of Your Fertilizer Dollars

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Decisions to be made:

- Where to cut?
- Where not to cut?
- Consequences of decisions?

Production costs for corn with yield potential of 150 bu/a.

	$/a	%
Land preparation	22.00	7.7
Seed and planting	20.00	7.0
Chemicals and application	20.00	7.0
Cultivation	7.50	2.6
Harvesting, hauling	36.00	12.7
Drying storage	18.00	6.3
Land, taxes, interest	120.00	42.3
Insurance	5.00	1.8
Other, lime, etc.	5.00	1.8
Fertilizer	30.30	10.8
Total	283.80	100.0

Colliver, 1993

10 Basic Principles of Fertilizer Economics

1. In tough times the efficient survive.
2. Profit maximum where returns just pay for investment.
3. Last bushel is least expensive to produce.
4. Lime and immobile fertilizer are capital investments.
5. With dollars short, consider alternatives.

10 Basic Principles of Fertilizer Economics

6. Most crop response to first units applied
7. More profit may be lost by under than over application of fertilizer.
8. Land and fertilizer can be substituted for one another.
9. All soils/crops do not respond the same.
10. Individuals can’t set farm policy.

Influence of soil test P on sufficiency, probability of response, and expected yield increase.

Soil test P	% Sufficiency	% Probability of Response	Expected yield inc. at 125 bu/a	Expected yield inc. at yield goal 150 bu/a
ppm	%	%	-------bu/a------	
7	69	98	-	-
12	87	70	16	20
17	94	50	8	9
22	96	20	5	6
27	98+	<1	2	3

Colliver, 1986

Example: Soil Test = 17; YG = 125

94% sufficiency

8 bu/a expected yield increase

50% probability

= 4 bu/a/yr

∴ 32 lbs P_2O_5 ($0.25 and $2.00 corn)

Increase in Profit at Lancaster from P and K Topdressing

	Lancaster (6 yr Avg.)		
K_2O levels	0 P_2O_5	57 P_2O_5	114 P_2O_5
	$ profit above fertilizer cost		
0	---	-8.26	-20.02
120	32.40	25.14	22.88
240	34.30	35.04	29.78
480	26.10	33.34	21.58
720	20.40	15.14	3.88

Initial soil tests P=34 K = 171

Based on hay at $80/ton; P2O5 at $0.26/lb; K2O at $0.14/lb.

Adapted from Kelling, 1984.

Methods to Improve Nutrient Use Efficiency:

- Avoid N losses
- Use proper timing, placement, and choice of materials
- Use banded fertilizer
- Make annual additions
- Concentrate on low testing fields

Grow Best Crop Possible:

- Variety
- Tillage
- Population
- Weed control
- Timeliness
- Rotations

Soil pH and row applied P on corn grain yield at Arlington, WI.

Lime Treatment (T/A)	Row P_2O_5 treatment (lb/a)		
	0	35	70
	----------Yield, bu/a--------		
0	123	129	134
3.1	126	140	137
6.2	132	139	140

Original soil pH was 4.8 and Bray P_1 34 ppm (Kelling, Wolkowski, and Fixen, 2 yr. Avg.)

Average Nitrogen Response on Continuous Corn at Arlington, WI, (8 yr Average)

lbs/a of N added	Cost of 40 lbs of N **	Yield (bu/a)	Value of added yield **	Profit per acre		Return per dollars spent
				from each N increment	from all N fert	
0	--	92	--	--	--	--
40	$6.00	127	35	$70.00	$64.00	$11.67
80	6.00	143	16	32.00	26.00	5.33
120	6.00	152	9	18.00	12.00	3.00
160	6.00	155	3	6.00	0.00	1.00
200	6.00	156	1	2.00	-4.00	0.33

** Assuming the cost of N as anhydrous ammonia to be 15 cents/pound and no application cost and value of corn to be $2.00/bu.

Our Priority Listing (in order):

1. Lime to 6.5 if growing alfalfa; 6.0 for most other crops
2. Use manure for building P and K and N on corn
3. Take legume credits
4. Use recommended N on corn
5. Use row P and K through optimum testing fields (all crops)

Our Priority Listing (in order):

6. Apply recommended P and K on very low and low testing fields
7. Apply 75% of recommended P and K to forages
8. Apply other recommended fertilizer
9. Apply micros only where needed
10. Avoid “silver bullet” search

7 “Fail-Safe” Steps for Maximizing Fertilizer Returns with Limited Resources

1. Soil test to determine need.
2. Lime adequately
3. Grow best crop possible
4. Use “right” rate
5. Take nutrient credits
6. Maximize efficiency /avoid losses
7. Avoid unnecessary additions

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When Dollars are Short:

- Skip H, VH, and EH testing fields
- Where tests are about equal- better to apply some to all, rather than rec. on some and 0 on others
- Satisfy N needs first: then row P and K on optimum soils and below

Risk Associated with Various Soil Test Levels