



Crop Availability of Nutrients

- Manure contains many of the nutrients needed for crop production
 - Nutrients are distributed in two forms:
 - **Inorganic component** – Predominantly ammonium (NH₄) and generally readily available for immediate crop usage
 - **Organic component** – Consists of feed particles (ie. soybean meal, corn, and complex organic acids). Must be mineralized prior to crop availability
- Mineralization of N is accomplished by microorganisms in the soil
 - Rate of mineralization depends on soil temp, moisture, and other environmental considerations. Remember this is a biological process.
 - Rate of mineralization very difficult to accurately predict, generally around 1 to 5% per year of soil mineralization.
 - 2,000,000 # in 6" soil * 1% Organic Matter = 20,000 of soil organic matter * 5% = 1,000 pounds of nitrogen. If 2% can be mineralized in the soil = 20 lbs of nitrogen from organic matter added by soil.
 - Manure adds additional organic matter.



Agronomic Benefits of Manure

- Increased Cation Exchange Capacity (Soil)
- Lower Bulk Density (Soil)
 - Increased water and air penetration
 - Reduced compaction
 - Reduced crusting
- Builds soil Organic Matter
 - Improves tilth/ soil structure
- Economics
 - Can replace part or all of commercial fertilizer needs.



Value of Manure

- Commercial Fertilizer Assumptions:
NH₃: \$660/ton or \$0.40/lb N
MAP: \$599/ton or \$0.49/lb P₂O₅
Potash: \$503/ton or \$0.42/lb K₂O
- Swine Nutrient Value (per 1,000 gallons):
N (NH₄ and Organic N): 37.90 # available
1st year N values
P₂O₅: 14.9 #
K₂O: 19.9 #
- Swine Manure Fertilizer Value (per 1,000 gallons):
N: \$15.16
P₂O₅: \$7.30
K₂O: \$8.36
Swine Manure provided: \$30.82 per 1,000 gallons of nutrient value!
- Values above are based on one operation as example. Each operation will have different nutrient value of nitrogen which impacts potential application recommendations and value of manure.



Value of Manure

Total Manure Production	
Finisher size	2400 hogs
Manure production per hog*	1.2 gal /day
Operating days	350 days/year
Gallons / Hog / year	420 gal./hog/year
Manure produced	1,008,000 Gallons/yr.

Manure Test			
	N	P	K
Average test, lb./1000 gal	37.9	14.9	19.9
% available	100%	100%	100%
Lbs. available/1000 gal.	37.9	14.9	19.9
Lbs. available/acre	161	63	85

DNR Manure Plan Maximum Application Rates*	
5 year county avg. corn yield	158.4 bu./acre
plus 10%	174.24 bu./acre
N multiplier for area	1 lbs./bu.
Corn nitrogen need	174.2 lbs./acre
less legume credit	0 lbs./acre
Maximum acceptable N rate	174.2 lbs./acre
Nitrogen availability/1000 gal.	37.9 lbs.
Maximum application rate	4,597 gal./acre

*See DNR Appendix A: <http://www.iowadnr.gov/Portals/idnr/uploads/forms/5424000>

Manure Cost		
Application cost	\$ 0.0110	\$/gallon
Manure cost	\$ -	\$/gallon
Total cost	\$ 0.0110	\$/gallon
Planned application rate	4250	gal./acre
Acres required	237	Acres
Total application cost/year	\$ 11,088	\$ 46.75

Component Value of Manure				
	N	P	K	Fertilizer Value / Acre
Manure availability, lbs./1000 gal	37.9	14.9	19.9	
Commercial fert. cost \$/lb.	\$ 0.40	\$ 0.49	\$ 0.42	
Value, \$/1000 gal.	\$ 15.16	\$ 7.30	\$ 8.36	\$ 30.82
				\$ 130.98

Fertilizer Budget for Comparable Period				
	N	P	K	Budget Total / Acre
Fert. recommendation, lbs/acre	160	63	84	
Commercial fert. cost \$/lb.	\$ 0.40	\$ 0.49	\$ 0.42	
Cost/acre	\$ 64.00	\$ 30.87	\$ 35.28	\$ 130.15
Custom Application cost per acre			\$ 4.80	\$ 134.95

- Based on 4,250 gallons / acre:
 - Manure value \$130.98 based on commercial fertilizer prices
 - Manure minus application: \$130.98-\$46.75 = \$84.23/acre net value of manure to grower
- Supplying 160-63-85 units of commercial fertilizer = \$130.15 per acre
- Commercial vs Manure cost: \$130.15 – \$84.23 = **\$45.92 per acre Manure Advantage** or on 237 acres = \$10,883

ENCIRCASM SERVICES

EXPLORE. EVOLVE. EXCEL.



DU PONT

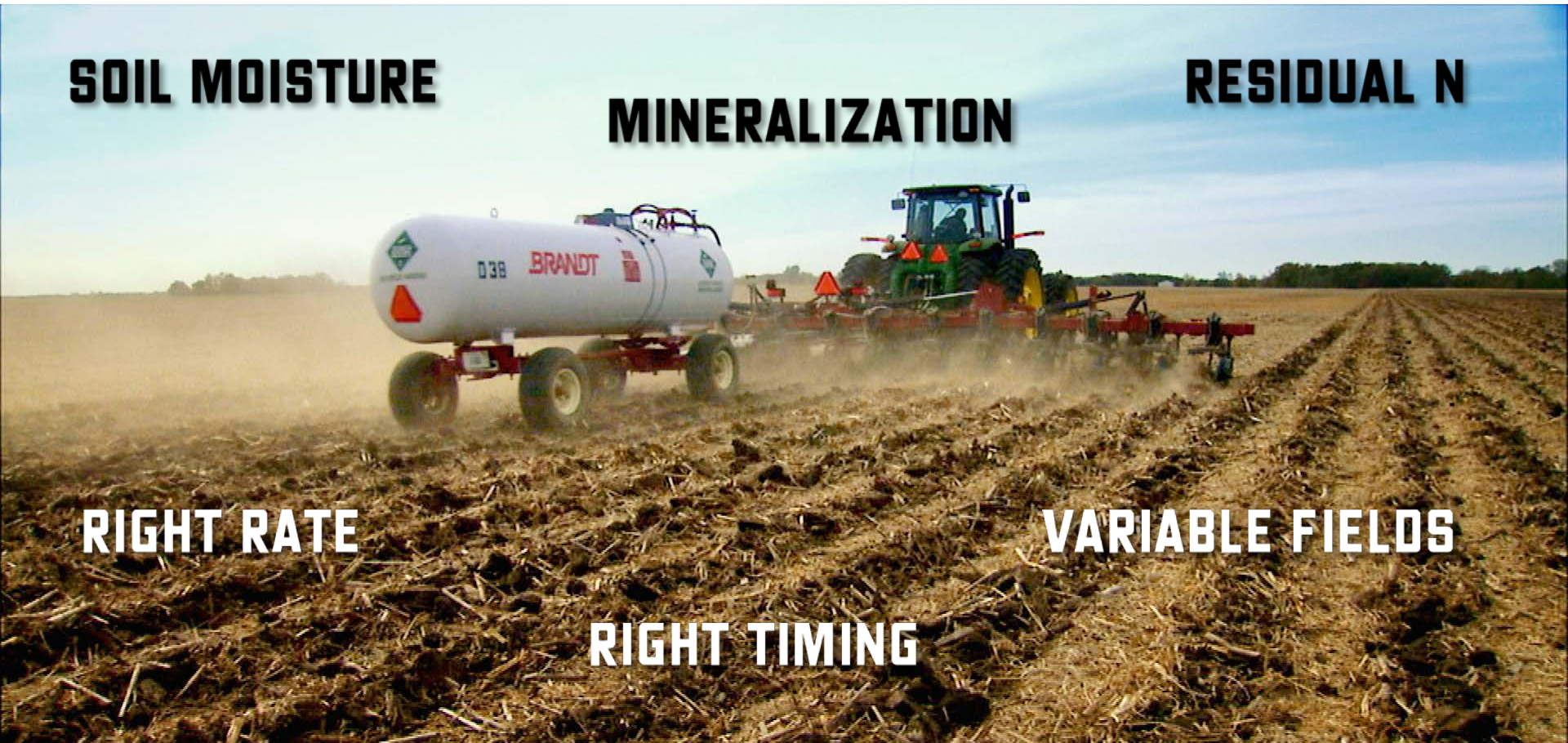
 PIONEER

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encircaSM



ARE YOU CURIOUS TO KNOW WHERE YOU STAND?



SOIL MOISTURE

MINERALIZATION

RESIDUAL N

RIGHT RATE

VARIABLE FIELDS

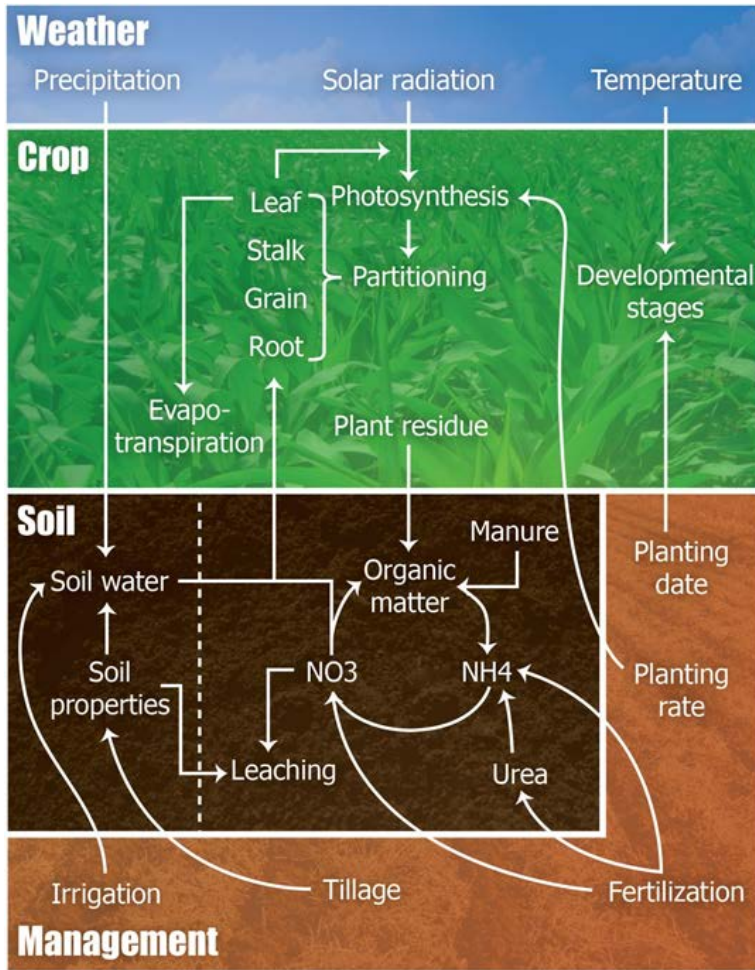
RIGHT TIMING

EVOLVE.

EncircaSM services provide estimates and management suggestions based on statistical and agronomic models. Encirca services are not a substitute for sound agronomic and management practices. Individual results may vary and are subject to a variety of factors, including weather, disease and pest pressure, soil type, and management practices.



FOUR KEY INPUTS HELP ADVANTAGE THE ENCIRCA SERVICES NITROGEN MODEL



WEATHER



AGRONOMY



SOILS



CUSTOMIZED

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NITROGEN LEVELS BY DECISION ZONE



Estimated Current N Level: 196 lb/ac

Growth Stage: V8

Precipitation since planting: 6.2"

Accumulated GDU: 677

Yield Target: 230 ?

► Monitoring

Your Nitrogen Bottom Line ?

\$91.00
Nitrogen Cost Per Acre

► Planning & Prescription

REAL-TIME ESTIMATES

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SIMULATE NITROGEN LEVELS THROUGHOUT GROWING SEASON



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Manure and Encirca

- Weather to predict organic manure being available
- Ability to track manure source by field
- Manage manure variability within Encirca
- Nitrogen available and loss based on weather and application method
 - Swine: 1st Yr 30-35%, 2nd Yr 5-10%, 3rd Yr 0-5%
 - Beef: 1st Yr 35-55%, 2nd Yr 10-15%, 3rd Yr 5-15%
 - Poultry: 1st Yr 40-55%, 2nd Yr 10-15%, 3rd Yr 0-10%

New Manure Source ✕

Source Name: Swine

Nutrient Type: Swine: Slurry storage, dry feeders

NH4-N⁺:	27.4	P2O5⁺:	14.9
Organic N⁺:	10.5	K2O⁺:	19.9
Dry Matter %:	6.1	Organic N 1st Year %:	35

Comments: |

† Values are measured in pounds per 1000 gallons.

Save Cancel

Application Parameters

Date: * 04/01/2015

Product: * Manure

Source: * Swine

Method: * Direct Injection

Rate: * 4250 (Gallons) Inhibitors:

Available N: 110.6275 lb/ac

Organic N: 15.61875 lb/ac

Application Completed

Comments:

* Required Field

Cancel Apply

* Values based on ASAE- March 2005 Source

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Summary

Benefits of using manure

- Increased Cation Exchange Capacity (Soil)
- Lower Bulk Density (Soil)
- Builds soil Organic Matter
- Economics



Benefits of Encirca Nitrogen Management service

- Provides real-time field-level Nitrogen status
- Predicts future Nitrogen status at critical growth stages
- Includes estimated organic matter mineralization