


# Opportunities and Challenges for Management of Manure Nutrients

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## High Nutrient Value

Manure and manure nutrients generated from confined animal feeding in Kansas. (from NRCS estimates)

	Manure (tons)	Manure N (lbs)	Manure P (lbs)
As Excreted <sup>†</sup>	23,134,027	278,999,452	83,918,650
Recoverable		97,560,061	65,171,823
Average Annual Fertilizer Sales <sup>‡</sup>		1,491,071,140	184,661,753
% of Fertilizer Sales		6.5	35
Value of Manure Nutrients <sup>§</sup> (\$)		38,494,000	45,791,000

<sup>†</sup> manure and nutrient amount from NRCS 2000 estimates (<http://www.nrcs.usda.gov/technical/NRI/pubs/mantr.html>); equivalent to approx. 12 lbs N/ton and 8.3 lbs P<sub>2</sub>O<sub>5</sub>/ton  
<sup>‡</sup> Average of 2013 and 2014 fertilizer sales from (<https://agriculture.ks.gov/divisions-programs/pesticide-fertilizer/fertilizer>)  
<sup>§</sup> Fertilizer value assuming \$0.39/lb N in urea or DAP and \$0.70/lb of P in DAP based on Feb. 2017 fertilizer price report from <http://www.farmfutures.com>.




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## Know your sources & losses

- Soil test – apply the N&P where they are needed (especially for P)
- Manure test – Know the quantity that you will apply, give it credit!
- Minimize losses (4Rs)




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## 4Rs OF NUTRIENT STEWARDSHIP

Economically, Environmentally & Socially Sustainable Crop Nutrition



The 4Rs promote best management practices (BMPs) to achieve cropping system goals while minimizing field nutrient loss and maximizing crop uptake.



**RIGHT SOURCE**  
Matches fertilizer type to crop needs.



**RIGHT RATE**  
Matches amount of fertilizer to crop needs.



**RIGHT TIME**  
Makes nutrients available when crops need them.



**RIGHT PLACE**  
Keeps nutrients where crops can use them.

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### Right source

- low soil test P
- control risk for runoff and leaching



photo courtesy eXtension



### RIGHT SOURCE

Matches fertilizer type to crop needs.

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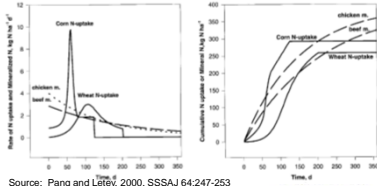
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**RIGHT RATE**  
Matches amount of fertilizer to crop needs.

- Analyze manure & soil
- Give credit to manure
- Keep nutrients balanced
- Apply on rotation



Source: Pang and Litsey, 2000. SSSAJ 64:247-253

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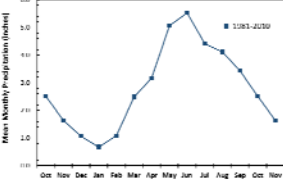


**RIGHT TIME**  
Makes nutrients available when crops need them.

Apply when low risk for loss

- low risk for leaching
- low risk for runoff

Apply at the right time in the rotation




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**RIGHT PLACE**  
Keeps nutrients where crops can use them.

Location in soil

- sub-surface applications

Geography

- Apply on fields where there would be low erosion
- “Precision Application” - Avoid areas of the field where there would be high losses (steep slopes, gullies, etc.)




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## Tools to help

- BMPs
  - cover crops
  - no-till
  - buffers/setbacks
- P-Index – analyze and address...
  - sources of loss (manure, soil, etc.)
  - potential transport mechanisms



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## Stimulant Questions

- What are the 4Rs for manure N mgmt. in your area?
- What are the 4Rs for manure P mgmt. in your area?
- What are the potential conflicts?
- How do the 4Rs compare to typical mgmt.?



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