

Land Application Worksheet

Farmer Jones has a farm located in Chatham County. He is preparing to spread broiler litter on a field with a Cecil loam soil type. This was a soybean field in the prior year. The litter will be incorporated within two days and supply nutrients to his corn crop.

His corn-yield goal (RYE) is 176 bushels per acre, and he needs to apply the equivalent of 134 pounds of nitrogen per acre. Farmer Jones used starter fertilizer on his corn crop at a rate to supply 16 pounds of nitrogen per acre and 16 pounds of phosphorus per acre. He intends to supply the rest of his nitrogen needs using broiler litter incorporated within two days.

How much litter does he need to spread to meet the nitrogen needs of his corn crop? Will he need to supplement the crop with additional potash or phosphate to satisfy his soil-test recommendations of 50 pounds per acre of each nutrient? The answers are given in the worksheet. Use Table 2 to estimate available nitrogen carryover from legumes.

Table 2. Estimated residual nitrogen provided by legumes grown in rotation.

Legume¹	Residual Nitrogen Available (lb/acre)
Alfalfa ²	80–100
Hairy vetch ²	80–100
Crimson clover ²	60–75
Austrian winter pea ²	50–60
Soybeans ³ harvested for seed	15–30
Peanuts ³ harvested for seed	20–40
¹ Assumes good stand. ² Killed before planting current spring crop. ³ Legume planted in previous year or season. More nitrogen available if fall-planted crop immediately follows legume; less nitrogen available with spring-planted crop.	

Worksheet: Determining the nutrient needs of your crop

	Example	Your Farm
1. Crop to be grown	Corn	
2. Total nutrients required		
a. N (RYE website) (lb/acre)	134	
b. P ₂ O ₅ (soil test) (lb/acre)	50	
c. K ₂ O (soil test) (lb/acre)	50	
3. Pounds of starter of preplant fertilizer used		
a. N (lb/acre)	16	
b. P ₂ O ₅ (lb/acre)	16	
c. K ₂ O (lb/acre)	0	
4. Residual N credit from legumes (Table 2) (lb/acre)	20	
5. Net nutrient needs of crop (lb/acre)		
a. Nitrogen: Total need (item 2a) minus additional N from starter (item 3a), minus legume (item 4) N: 134–16–20 (lb/acre)	98	
b. Phosphorus: Total need (item 2b) minus additional nutrients from starter (item 3b) P ₂ O ₅ : 50–16 (lb/acre)	34	
c. Potassium: Total need (item 2c) minus additional nutrients from starter (item 3c) K ₂ O: 50–0 (lb/acre)	50	
6. Nutrient totals in manure. If analysis report already gives available nutrients, skip this item.		
a. Total N (Nutrient Management website or waste analysis) (lb/ton)	57.8	
b. P ₂ O ₅ (lb/ton)	40	
c. K ₂ O (lb/ton)	48.6	
7. Nutrients available to crop (items 6a, 6b, and 6c) × availability coefficients. If analysis report already gives available nutrients, fill in those numbers.		
a. Available N: 57.8 × 0.6 (lb/ton)	34.7	
b. Available P ₂ O ₅ : 40 × 1.0 (lb/ton)	40	
c. Available K ₂ O: 48.6 × 1.0 (lb/ton)	48.6	
8. Application rate to supply priority nutrient		
a. Priority nutrient	Nitrogen	
b. Amount of priority nutrient needed (lb/acre from item 5a)	98	
c. Rate of manure needed to supply priority nutrient (item 8b)÷(item7a): 98÷34.7 (tons/acre)	2.8	

	Example	Your Farm
Rate of Manure to Apply		
9. Pounds per acre of all nutrients supplied at the application rate required to meet the needs for the priority nutrient. For each nutrient, enter the available nutrients (items 7a, 7b, and 7c) × manure rate (item 8c)		
a. N supplied: 34.7×2.8 (lb/acre)	97	
b. P_2O_5 supplied: 40×2.8 (lb/acre)	112	
c. K_2O supplied: 48.6×2.8 (lb/acre)	136	
10. Nutrient balance: net nutrient need (-) or excess (+) after application of manure at calculated rate. Subtract the net nutrient needs of the crop (items 5a, 5b, 5c) from the nutrient rate applied (items 9a, 9b, 9c)		
a. N balance: $97 - 98$ (lb/acre)	-1	
b. P_2O_5 balance: $112 - 34$ (lb/acre)	+78	
c. K_2O balance: $136 - 50$ (lb/acre)	+86	
<i>Source: Calculation format modified from Pennsylvania Department of Environmental Resources, Field Application of Manure, October 1986.</i>		

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