

Accounting for Nutrients When Applying Manure

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Manure's Role in Water and Soil Management

Greater soil aggregate stability resulting from soil biological activity that is fueled by organic amendments can reduce runoff and erosion (e.g. non-point source pollution).

Organic N in manure is less prone to leaching than inorganic N in fertilizer.

Manure's Role in Nutrient Management

Research shows that when equivalent rates of nutrients are applied as manure or commercial fertilizers, nutrient losses from manure applications are similar to or below those associated with chemical fertilizers.

P

N

K



N

Valuing Manure in Cropping Systems

Fertilizer value

Organic matter

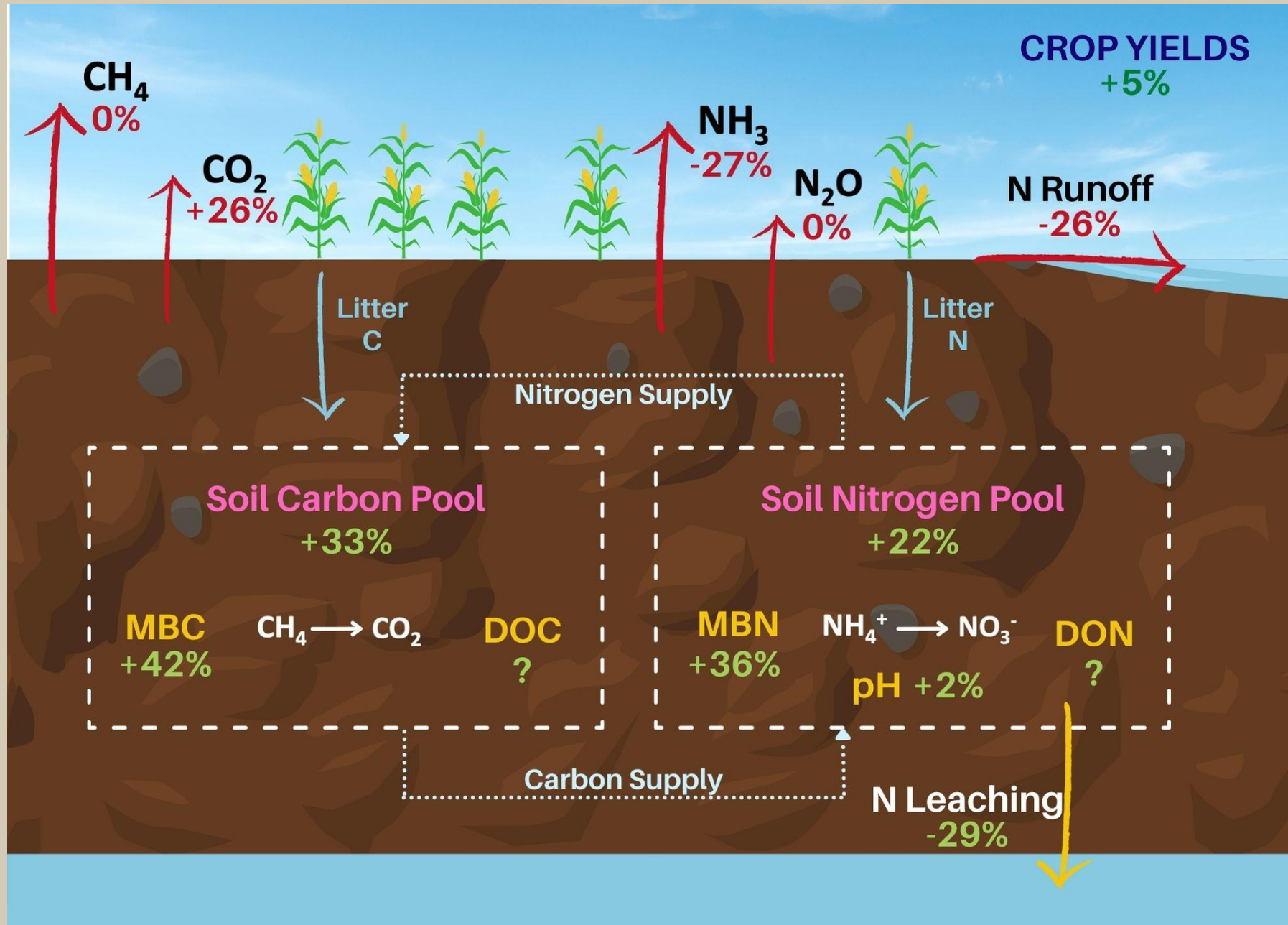
Microorganisms

Yield boost

Pest management



141 Studies of Crop/Soil Changes from Substituting Manure for Fertilizer



L. Xia et al. 2017.
Environmental Science & Technology.

Typical Nutrient Concentrations in Manure

Nutrient	Beef Cattle <i>(lbs/ton)</i>	Broiler Chickens <i>(lbs/ton)</i>	Swine Finisher <i>(lbs/1000 gal)</i>	Dairy Cows <i>(lbs/1000 gal)</i>
Organic N	22	60	17	13
Ammonium-N	2	15	42	12
Phosphate	23	27	40	25
Potash	30	33	24	40
Sulfur	2	?	3	6
Zinc	0.2	?	0.7	0.5

NebGuide G1335

Determining Crop Available Nutrients from Manure



What analyses do I need?

Total N = Ammonium N + Organic N

Phosphorus as P_2O_5

Potassium as K_2O



NOTE: Use your Adobe Reader® to fill in the blanks in the following form and print out the results. Use the Tab key on the computer keyboard to move through the form. The form will automatically calculate equation solutions. The file cannot be saved to your computer, but can be completed and printed to create a record.

Step 1. Is manure measured in: ton (solid or semi solid manure)?
 1,000 gallons (slurry or liquid)?
 acre-in (lagoon or holding pond effluent)?
 (Replace "?" with appropriate unit of measure.)

Print Blank Form

Check one.

Step 2. Calculate total manure nitrogen applied.

Total Ammonium-N			
Manure Rate (?/acre) (lb/acre)	X	NH ₄ From Analysis (lb/?)	= Total (lb/acre)
20 t/ac <input type="text"/>	X	5 lb/t <input type="text"/>	= <u>100</u> <input type="text"/>
From Manure Analysis: <u>5 lb. NH₄</u> ton			

Total Organic-N from Present Application			
Manure Rate (?/acre)	X	Organic-N From Analysis (lb/?)	= Total (lb/acre)
20 t/ac <input type="text"/>	X	13 lb/t <input type="text"/>	= <u>260</u> <input type="text"/>
From Manure Analysis 13 lb. organic N/ton (this year) 11 lb. organic N/ton (2 years ago)			

Total Organic-N from Past Applications			
Manure Rate (?/acre)	X	Organic-N From Analysis (lb/?)	= Total
1 year ago: <u>0</u> <input type="text"/>	X	<input type="text"/>	= <u>0</u> <input type="text"/>
2 years ago: <u>20 t/ac</u> <input type="text"/>	X	<u>11 lb/t</u> <input type="text"/>	= <u>220</u> <input type="text"/>
3 years ago: <u>0</u> <input type="text"/>	X	<input type="text"/>	= <u>0</u> <input type="text"/>



Step 4. Sum crop available nitrogen applied

Part 3.		Crop Available Manure Nitrogen Applied			Crop Available Nitrogen	
Ammonium	+	Organic-N	+	Residual Organic-N	=	
<u>50</u>	+	<u>104</u>	+	<u>22</u>	=	<u>176</u> lbs. N/acre
<input type="text" value="0"/>		<input type="text" value="0"/>		<input type="text" value="0"/>		<input type="text" value="0"/> lbs. N/acre

Step 5. Calculate available phosphate and potash at known manure application rate.

P ₂ O ₅ concentration in manure:	<u>12 lb/t</u>	<input type="text"/>	lb/?	K ₂ O concentration in manure:	<u>21 lb/t</u>	<input type="text"/>	lb/?
lb P ₂ O ₅ /?	X	?/acre	X	% available	=	lb P ₂ O ₅ /acre	
<u>12 lb/t</u>	X	<u>20 t/ac</u>	X	0.7	=	<u>168</u>	
<input type="text"/>		<input type="text"/>		0.7		<input type="text" value="0"/>	
lb K ₂ O/?	X	?/acre	X	% available	=	lb K ₂ O/acre	
<u>21 lb/t</u>	X	<u>20 t/ac</u>	X	0.8	=	<u>336</u>	
<input type="text"/>		<input type="text"/>		0.8		<input type="text" value="0"/>	

Step 6. Summarize crop available manure nutrients for selected application rate: 20 t/ac ?/ac.

Available Manure Nitrogen

176 lb/acre
 lb/acre

Available Manure P₂O₅

168 lb/acre
 lb/acre

Available Manure K₂O

336 lb/acre
 lb/acre