Have Enough Land to Apply Your Manure?

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Do you have enough land to apply manure? In order to answer this question, you must collect a few pieces of information. You will need: current soil test levels for your fields, amount of phosphorus (P) excreted by your livestock, crop rotation, P removal, distance to surface waters, and capacity of manure storage.

Let's start by looking at the manure application guidance provided by the Generally Accepted Agricultural and Management Practices (GAAMPs) for Manure Management and Utilization that is applicable specifically to this topic.

1. The agronomic (fertilizer) rate of N recommended for crops should not be exceeded by the amount of available N added, either from manure application or from manure plus fertilizer N application and (or) other sources.

2. If the Bray P1 soil test level for P reaches 150 lb/acre (75 ppm), manure applications can be made where the rate of manure P added does not exceed the P removed by the harvested crop. Manure can be applied at a rate equivalent to the amount of P removed in 4 years by crops. Guidance surrounding N application in number 1 above still applies. If the Bray P1 soil test level for P is greater then 300 lb/acre (150 ppm), then manure applications should be discontinued until soil test P levels drop below 300 lb/acre. To protect surface water quality, adequate soil and water conservation practices should be employed.

3. Manures should not be applied to soils within 150 ft of surface waters or to areas subject to flooding unless: a) manures are injected or surface-applied with immediate incorporation (i.e., within 48 hours after application) and (or), b) conservation practices are used to protect against runoff and erosion losses to surface waters.

The amount of P_2O_5 removed by crops can be determined using tables in the Manure Management and Utilization GAAMPs. Table 1 provides an example of removal rates of P_2O_5 for various crops.

For a very basic example, determine how many acres are in a given crop each year. Then for each crop multiply the expected yield by the removal rate to get pounds of P_2O_5 removed per acre. Then multiply this by the number of acres of that crop; the result is pounds of P_2O_5 removed. Do this for each crop and sum the crops to arrive at the total P_2O_5 removed from your farm's cropland.

Determining Whether You Have Enough Land

The following steps are used to determine whether or not you have enough land to apply all of your manure.

Table 1. Crop removal rates of P_20_5.

Crop	Form	Unit	P_20_5 Removed
			lb P_20_5/unit
Alfalfa	(Hay)	ton	13
	(Haylage)	ton	3.2
Corn	(Grain)	bu[a]	0.37
	(Silage)	ton	3.3
Potatoes	(Tubers)	cwt[a]	0.13
Soybean	(Grain)	bu	0.88
Sugar beet	(Roots)	ton	1.3
Wheat	(Grain)	bu	0.62
	(Straw)	ton	3.3

Source: Manure Management and Utilization GAAMPs.
[a]bu=bushel; cwt=100 lb.

Table 2. Amount of P_20_5 removed on a hypothetical farm - current situation.

Crop	Land		Yield	Unit		P_20_5 Removed		P_20_5 Removed
	Acres					lb P_20_5/ unit		lb P_20_5
Corn silage	125	x	15	T/acre[a]	x	3.3	=	6,188
Corn grain	175	x	125	bu/acre[a]	x	0.37	=	8,094
Alfalfa hay	50	x	5	T/acre	x	13	=	3,250
Alfalfa								
Haylage	275	x	14	T/acre	x	3.2	=	12,320
Soybean	75	x	35	bu/acre	x	0.88	=	2,310
Total	**700**							**31,952**
[a]Tons/acre; bushels/acre.								32,162

1. Eliminate fields with soil test P levels greater then 300 lb P/acre (150 ppm).

2. Eliminate fields or portions of fields that are within 150 ft of surface water, if you are broadcasting manure and not incorporating it within 2 days.

3. Categorize remaining fields into N based (soil test P levels less than 150 lb P/acre) or P based (soil test P level between 150 and 300 lb P/acre) application. It would be prudent to apply manure at P based rates on all fields, to keep soil test P levels from building. This should insure future availability of land for manure application.

4. Determine the crop rotation in your fields.

5. Calculate crop removal for each field over the rotation.

6. Try to solve the puzzle: Is there enough land or is more needed?

Let's walk through an example. Suppose you have 40,000 lb P_2O_5 in manure produced annually on your farm. This is the amount of phosphorus (on P_20_5) excreted and can be calculated based on feed rations. Phosphorus in feed rations is typically listed as elemental P. Therefore, to convert to P_20_5 divide the value for elemental P by 0.44.

Next, determine how many acres are really available for manure application. Say you have 1,300 acres but 150 acres have soil test P levels greater then 300 lb P/acre, 50 acres are within 150 ft of surface water and you broadcast manure and incorporate it when you have time, and 400 acres you'd prefer not to use because they are too far away. This leaves you with 700 acres to spread on (1300 - 150 - 50 - 400 = 700).

Next determine the amount of P_2O_5 removed each year by crop production on your farm. Table 2 gives an example of this calculation. For this hypothetical farm, 32,162 lb P_2O_5 are removed each year. If we take the lb P_2O_5 produced and subtract crop removal from it, there is an excess of 7,838 lb P_2O_5. Therefore, something needs to be done to resolve this situation.

Use These Tips for Solving Land-Base Problem

The following are a few tips for solving this land-base problem.

1. Obtain more land suitable for manure application. Do this by buying, renting, or trading with a neighbor.

2. Be willing to haul manure to fields that are further away and which may not have received manure applications previously.

3. Change manure application and incorporation methods so that ground within 150 ft of surface waters can be used.

4. Adjust crop rotations. Crops that remove a lot of biomass remove a lot of P; corn silage is a good example. This could be done by rebalancing purchased vs. grown feeds.

5. It might be possible to improve crop yield through improved management.

6. Are there new technologies that you could implement that would reduce the amount of P in the manure?

7. Reduce manure P production. This can be accomplished by not overfeeding P or using phytase in hog and poultry rations.

Once you have worked through these calculations, you will have a good idea as to whether you have enough land to apply all of the manure produced on your farm. Also, if you are considering expanding your operation, use this procedure to determine if you have enough land-base for more manure.

After you have determined that sufficient land-base exists, there are additional questions to consider to fine tune manure applications. In situations where a farm has less than 6 months of storage, the crop rotation needs to allow windows of opportunity to spread manure. The same philosophy exists for winter spreading. Ask yourself, are there suitable fields for winter spreading that essentially eliminate the risk of runoff to surface waters?

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Genetics

AI Bulls Ranked by Conception Rates

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Improving fertility is a common goal for many dairy herds. Getting cows pregnant in a timely manner is important in maintaining a profitable dairy business. Let's look at the factors influencing conception rates in dairy cattle and tools available to rank bulls on fertility.

Improvement in many traits of interest in dairy cattle can be achieved in two ways. You can select animals that are genetically superior for the traits. Or you can make management changes that positively impact the traits. Quite often dairy producers use a combination of the two approaches.

Selection based on accurate genetic evaluations yields cumulative responses over time but will be slow when heritabilities are low (i.e. the proportion of variation due to genetics is small). The relative emphasis placed on genetic selection for a specific trait depends on its heritability and economic importance.

Factors Influencing Conception Rates

Conception rates are influenced by a variety of factors. Management and environmental factors account for 96% of the variation in conception rates. Herd differences in nutrition, metabolic disorders, reproductive health, heat detection, and climate can result in significant differences in conception rates.