

NUTRIENT MANAGEMENT

What is Manure Really Worth?

Bob Koehler, Southwest Research & Outreach Center
Bill Lazarus, Department of Applied Economics
University of Minnesota

The increasing price of commercial fertilizer has heightened interest in the use of livestock manure for supplying crop nutrients and has significantly increased the value of manure as a nutrient source.

Over the past year more producers have been considering the contribution of manure value to cash flow in livestock operation budgets, and seeking an appropriate market value in exchange situations between livestock producers and crop producers. More crop producers also appear to be seeking livestock manure as a major nutrient source, either by purchasing from a livestock producer or by adding livestock to their operations, particularly swine finishing.

Determining the economic value of the nutrients in livestock manure can be tricky. Nutrients in commercial fertilizer are acquired by paying for the nutrients and a small application charge. With manure you, in effect, "acquire" nutrients by paying for the cost of application, even if you already have ownership of the manure in a storage structure.

Additionally, commercial fertilizer supplies the amount and ratio of nutrients you need or ordered. With manure, you get the amount and ratio of nutrients that it contains, which complicates the determination of a value. Even when a rate that supplies the correct amount of nitrogen

is applied, the amount of phosphorous and potash applied may not match what you would have purchased commercially, and amounts applied above crop need probably have no value.

In the past, manure application costs often exceeded the value of the nutrients applied. Now, in many situations, the nutrient value in the manure exceeds the cost of application.

A formula that estimates manure value can be described by: Net Economic Impact of Manure = Value of Year 1 Fertilizer & Application Costs Replaced + Residual Value (Mostly Year 2 if any) +/- Non- NPK Yield Response - Manure Application Costs.

Manure value can be calculated on a per acre applied basis, per unit of weight or volume, per storage unit, or per operation. The value will vary widely, influenced by factors such as the amount of N, P₂O₅, and K₂O required per acre by the crop, manure nutrient concentration in the manure, application rate, potential yield response attributed to manure beyond N-P-K application, and application cost per ton or gallon. The same manure in terms of nutrient concentration can have widely differing value depending on crop need and accuracy of application.

Producers are strongly urged to make calculations based on their own situations. However, some "thumb rules" can provide guidelines if one is assured that application rate will be based on the recommended nitrogen rate and that application costs are

approximately \$0.01 per gallon. For "weak" manure (about 25 pounds N/1000 gal.) and a nitrogen-only crop need the manure value is often about 50% of application cost. For "hot" finishing barn manure (50-60 pounds N/1000 gallons) and a nitrogen-only crop need (fields that have high soil test levels of P_2O_5 and K_2O) the manure value is about equal to the cost of application. For "hot" finishing barn manure and fields that need both nitrogen and moderate P_2O_5 and K_2O levels the total value can be significantly above the cost of application.

The use of phytase in swine diets and its impact on manure value is also a current hot discussion item. Many seem to be concerned about the reduced phosphorous levels in the manure. However, typical nitrogen based application rates of about 3500 gallons of manure per acre (swine finishing manure) will still supply phosphorous additions of 55-70 pounds per acre, even if the P_2O_5 level in the manure is only 20 pounds per 1000 gallons. University of Minnesota recommended P_2O_5 application rates for corn do not suggest more than those amounts unless soil test levels are in the low or very low range. Thus, many fields, especially those that have received manure in the past, should not be negatively affected by this practice and the feed cost savings will not be lost in reduced fertilizer replacement value.