

Value of Manure Nutrients

File B1-65

The change in the size of livestock operations has resulted in increased interest in valuing manure and using it as a crop nutrient. Manure, especially deep pit liquid hog manure, is widely accepted as a viable source of organic nutrients. Its use as a fertilizer replacement has increased the interest in putting a value on the use of manure. In part, this interest has supported the growth of the livestock industry in recent years.

Component Pricing

The most common method of valuing fertilizer is component pricing. The manure is sampled and tested to determine the nutrient content. Then this analysis is used to determine the value based on commercial fertilizer prices. A typical hog finishing manure might test 50-35-25 pounds of nitrogen, phosphorus (as P_2O_5), and potassium (as K_2O) per 1,000 gallons. If the manure was injected with minimal losses and the nitrogen was readily available, a 5,000 gallon per acre rate of application would provide 225 units of nitrogen per acre.

If nitrogen was valued at \$1.00 per pound there would be \$225 of N value. In addition, there would be 175 pounds of P_2O_5 , which, if valued at \$0.62 per pound, would be worth \$108.50 per acre. There would also be 125 pounds of K_2O , which if valued at \$0.56 per pound (\$70 per acre) would bring the total to about \$385 per acre. There can be a considerable range in the projected prices of commercial fertilizer nutrients, depending on material type (dry, liquid, or gas), method of application, and the time of year applied. In addition, the manure would contain other components such as sulfur, iron, and organic matter. This method does not consider nitrogen losses and crop utilization.

Manure Nutrient Value versus a Commercial Fertilizer Budget

Manure is a fertility package. The nutrient components as applied will not be in the

same proportion as a commercial fertilizer recommendation. Value adjustments may need to be made to account for these differences. Some manure components that are in excess of crop needs may be discounted. Consideration also should be given to shortages (especially P and K) if they need to be supplemented commercially.

A typical manure management plan for a corn-soybean rotation will call for the manure to be applied before the corn crop at a rate calculated by the nitrogen need. The P and K components included in this application may be sufficient for the second year soybean crop. A nutrient cost comparison should be made to a typical two-year commercial fertilizer budget.

A continuous corn manure management plan will call for annual applications based on nitrogen need. It is likely the pounds of P and K applied will exceed crop maintenance needs. If background soil fertility levels are already high, these extra nutrients could be discounted.

The [Manure Calculator Decision Tool](http://www.extension.iastate.edu/agdm/livestock/xls/b1-65manurecalculator.xlsx), www.extension.iastate.edu/agdm/livestock/xls/b1-65manurecalculator.xlsx, from the Ag Decision Maker website can assist in these calculations.

Bulk Commodity Market Price

Another method used to price manure is to price it as a bulk commodity where you have sellers and buyers. If you are in an area that has an abundance of supply and limited demand, the price will be driven down. If demand outstrips supply, the price will be bid up until it balances out with the demand. The nutrients will have a different value depending on the location and local situation. Transportation and distribution costs become a factor in what the value is worth and how much the buyer can negotiate the price. If there is an overabundance of manure in one area and the livestock producers are

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faced with high transportation costs to move it out of the area, they may be willing to reduce the price if they can avoid significant transportation costs.

Transportation Costs

Transportation costs can be broken down into two general categories. The first is commercial or custom hauling. Iowa has developed a very significant and important industry around commercial hauling for both liquid and dry manure. Commercial haulers usually set their rates on a per gallon basis, with a variety of premiums and discounts. Premiums are based on distance, rates, and set-up fees to name a few considerations.

Using \$.017 per gallon as a base rate for applying liquid fertilizer, a producer might spend \$85 per acre to have manure applied. Even if there is a surcharge of \$.001 per mile for hauling, it adds only \$3 to \$6 to the total cost for going an extra mile or two. Comparing that cost with the potential value in a load of manure explains some of the interest in constructing new hog finishing facilities by farmers that just produce grain.

Alternatively, some producers may decide to haul their own manure. This could be a crop producer who wants to haul someone else's manure to their own farm, or it could be a livestock producer who needs to dispose of manure. If the farmer already has a tractor that is adequate for pulling an applicator there are additional opportunities for savings. If producers are interested in calculating their own costs, this [AgDM Machinery Cost Calculator](http://www.extension.iastate.edu/agdm/crops/xls/a3-29machcostcalc.xlsx), www.extension.iastate.edu/agdm/crops/xls/a3-29machcostcalc.xlsx, can help calculate the fixed and variable costs of operating machinery. As the Decision Tool demonstrates, a person who

uses a tractor that they already are using in their crop operation can lower the fixed costs and overall costs of hauling manure.

Limitations

Some of the concerns with using manure as a source of crop nutrients are soil compaction from application, uniformity of the product, uniformity of application, fixed analysis, impact on planting date, increased weed pressure, or increased disease pressure. The "net present value" of applying phosphorus and potassium on very high testing soils may not equal the cost of the freight. Manure is not always a uniform product. Even from year-to-year, there are differences in manure nutrient analyses because of changing swine diets that include phytase, dried distillers grains and synthetic amino acids. Manure from these rations tend to have lower nutrient analysis, making them less valuable per gallon. This is also increasing the cost of application per unit of fertilizer. This highlights the importance of having and using a good manure analysis program.

Additional resources

[Manure Calculator Decision Tool](http://www.extension.iastate.edu/agdm/livestock/xls/b1-65manurecalculator.xlsx),

www.extension.iastate.edu/agdm/livestock/xls/b1-65manurecalculator.xlsx

[How to Sample Manure for Nutrient Analysis](http://store.extension.iastate.edu/product/5059),

store.extension.iastate.edu/product/5059

[Manure: A Valuable Commodity](http://store.extension.iastate.edu/product/15122),

store.extension.iastate.edu/product/15122

[Using Manure Nutrients for Crop Production](http://store.extension.iastate.edu/product/12874),

store.extension.iastate.edu/product/12874

[How to Interpret Your Manure Nutrient Analysis](http://store.extension.iastate.edu/product/13669),

store.extension.iastate.edu/product/13669

[Iowa Manure Management Action Group](http://www.extension.iastate.edu/immag/), www.extension.iastate.edu/immag/

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