Ag Decision Maker

File B1-65
March 2007
www.extension.iastate.edu/agdm

Value of Manure Nutrients

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 3,000 gallon per acre rate of application would provide 150 units of nitrogen per acre.

If nitrogen was valued at $0.30 a pound there would be $45 of N value. In addition there would be 105 pounds of P_2O_5, which, if valued at $0.40 per pound, would be worth $42 per acre. There would also be 75 pounds of K_2O, which if valued at $0.25 per pound would bring the total to about $105.75 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 take into account 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 2nd 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.

A Manure Calculator spreadsheet from the Ag Decision Maker web site can assist in these calculations: *http://www.extension.iastate.edu/agdm/livestock/xls/b1-65manurecalculator.xls*.

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

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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 over abundance of manure in one area and the livestock producers are 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 $.01 per gallon as a base rate for applying liquid fertilizer, a producer might spend $30 per acre to get 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 $70 of potential value in a load of manure explains some of the excitement about 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 his 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 they can download a spreadsheet that will help them calculate the fixed and variable costs of operating machinery, *http://www.extension.iastate.edu/agdm/crops/xls/a3-29machcostcalc.xls*. As the spreadsheet 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.

Valuing Manure

As a general rule, liquid swine manure in Iowa is not bought and sold. More frequently crop and livestock producers are trying to negotiate for the reimbursement of the cost of hauling. When dealing with liquid swine manure most hog operators are receiving between $0 and $20 per acre to offset the cost of hauling. A few are having to pay someone to take the manure while others are receiving over $20 per acre for it, either as cash or by covering the hauling charges. This may change as commercial fertilizer costs increase.

Manure Application and Compliance

Most new sources of manure are from livestock confinement units large enough to be called CAFOs (Confined Animal Feeding Operations) by the Iowa DNR. The land where the manure is applied must have a filed manure management plan (MMP) by the livestock operator. All land in the plan will need application agreements with the land owner, as well as other supporting documentation such as 10-acre grid soil fertility tests, RUSLE2 soil erosion calculations, and the Phosphorus Index calculations.

Compliance with other government programs may

require a Comprehensive Nutrient Management Plan (CNMP) by the land operator. It is very important to know the compliance rules before applying manure to a field.

The Manure Management Action Group website is a good place to start research on compliance: *http://extension.agron.iastate.edu/immag/*.

Conclusion

Manure has a lot of valuable nutrients. It can be very cost effective to haul manure to where it is needed. A producer needs to know the quantity of manure available, the nutrient analysis of the manure, the crop needs, the current soil test results, and the handling and application costs.

The use of manure may result in increased or decreased yields when compared to traditional fertilizers depending on any one of a number of reasons. Crop producers need to predict how well they can manage manure as a fertilizer source and what the overall impact will be over a number of years. If they can do this, they will be better able to determine the value of the manure in their farming operations.