

Using Manure Analysis Results

Manure as a Resource



Overview

Livestock manure is a valuable resource. When applied to cropland, manure:

- Provides nutrients for crop production,
- Improves soil structure and water holding capacity, and
- Reduces the amount of commercial fertilizer needed to reach yield goals.

To fully realize the fertilizer value of manure and protect the environment, a nutrient management plan is recommended for each field that will receive manure. The plan is a plant food budget for the field. Balancing the nutrients added with uptake by the crop prevents nutrient buildup and helps prevent surface and ground water pollution.

Nutrient management plans include:

- Yield goals for the crops to be grown in the rotation,
- Plant nutrients needed to reach the goals,
- Soil test results for each field,
- Manure supplied nutrients based on an estimate from lab analysis
- Credits for nutrients supplied from other sources such as legumes,
- The amount of commercial fertilizer required to meet the remaining crop production needs,
- Identification of areas where manure should not be applied, and
- Identify fields for emergency manure application.

An accurate estimate of the nutrients available from manure is influenced by:

- Manure sampling collection, prepared, and shipping methods (See SD-FS-36)
- Manure application methods
- Manure application rates
- Improperly calibrated equipment will result in over or under applying manure (See SD-FS-43)
- Expected nutrients from manure may be insufficient to reach yield goals,
- More, or less, commercial fertilizer than needed could be applied, and
- Nutrient build up in the soil may affect future manure applications to the field.

Nutrient Availability

The nitrogen, phosphorus and potassium in manure are present in two forms:

- Organic compounds and
- Inorganic compounds.

Nutrients become available for plant growth when organic compounds decay. During the decay process, bacteria and fungi convert the organic compounds to inorganic compounds by a process called mineralization. The rate of mineralization is affected by temperature, moisture, soil chemistry, soil biology and time. Therefore, not all the nutrients in the organic compounds are available for use by plants the year manure is applied. Mineralization occurs most rapidly in warm, moist, neutral to slightly alkaline soils. For South Dakota, a common rule of thumb for nitrogen mineralization is:

For More Information

- [Contact SD NRCS](#)
- Local Conservation District
- NRCS Agricultural Nutrient Management Team
1820 N. Kimball Suite 4, Mitchell, SD 57301
(605) 996-1564, Ext. 4
- [SD Nutrient Management Web page](#)
- **For information or assistance with regulatory requirements:**
South Dakota
Department of
Agriculture and Natural
Resources Livestock
Services Program
Pierre, SD
Phone: (605) 773-4647
<https://danr.sd.gov/Agriculture/Livestock/FeedlotPermit/default.aspx>

About one-third of the organic nitrogen becomes available each year for three years following a manure application.

The South Dakota Experiment Station found the following amounts of the nutrients are usually available for crop production during the year the manure is applied:

Inorganic Nitrogen 100%

Organic Nitrogen 35%

Phosphorus 80%

Potassium 100%

Using the Analysis Report

Most laboratory reports provide information about the moisture, dry matter and nutrient content of the manure sample submitted. The format of the report may vary with the type of manure submitted, the analysis requested, and the laboratory completing the analysis. The test results are usually reported:

- As a percent by weight per ton or 1,000 gallons, depending on whether it is solid or liquid manure
- on both an “**As Received**” and “**Dry Matter**” basis.

Manure is normally applied in the form it was sampled. Therefore, the “**As Received**” results must be used to plan a manure application.

Fertilizer recommendations are based on the:

- Inorganic (N) nitrogen and
- Phosphorus (P_2O_5) and potash (K_2O) oxide equivalents

Calculating the nutrient value of manure as fertilizer

The fertilizer value of manure is calculated using information provided by the laboratory report. The method used to apply manure and the length of time between application and incorporation reduces the nutrients available for plant growth. Producers can expect a one to five percent nitrogen loss with same day incorporation or a knifing application. After four days, the nitrogen content of manure left on the soil surface may decrease by as much as 30 – 40%. Thirty percent of the nitrogen content of manure applied through sprinkler irrigation systems is commonly lost to the atmosphere.

Delays in incorporating manure increase the potential for phosphorus to pollute streams and lakes if run off occurs.

To reduce nutrient losses and prevent pollution:

- Incorporate surface applied manure within 24 hours, and
- Do not spread manure on frozen or snow covered ground.

Worksheets for preparing a nutrient management plan are available at Natural Resources Conservation Service (NRCS) and Conservation District offices.

