

Nutrient Management Planning Basics



Plant nutrients are the building blocks of healthy, productive crops. Nutrient management is managing these nutrients for efficient plant growth and water-quality protection. Nutrient management plans document available nutrients, production practices, and other management decisions to maximize productivity while minimizing detrimental environmental impacts.

Nutrient management planning (NMP) is a best management practice (BMP). While the term “nutrient management” is often associated with animal manure management, it applies to all fertility crop inputs, whether organic materials, livestock production byproducts, or inorganic commercial fertilizers.

What Is Nutrient Management Planning?

Nutrient management planning principles are sound fundamentals necessary for good business management.

Nutrient management planning is

- knowing what you have,
- knowing what you need,
- managing wisely, and
- documenting your management.

Nutrient management plans must be site-specific (tailored to the soils, landscapes, and management objectives of the farm).

Nutrient Management Planning Steps

1. Get accurate soil information for each field or management unit:
 - Farm maps including soil series and surface water bodies.
 - Soil-sample each field or management unit, and send to a reputable soil-testing laboratory. Use of the Mississippi State University Extension Service Soil Testing Laboratory is required for some government programs in the state.
2. Develop a fair, realistic estimate of yield potential for each field. It is impossible to predict growing seasons, but yields averaged from the last 5 to 7 years should provide a reasonable estimate.
3. Determine plant-available nutrients from livestock byproduct amendments. The BMP is to sample the manures that will be used. Table values are available, but accurate nutrient content of manure is site/animal/diet/management-specific. More information on testing broiler litter is available at <http://extension.msstate.edu/publications/information-sheets/soil-and-broiler-litter-testing-basics>.
4. Estimate residual nutrient contributions from fertilizer or manure applied in previous seasons. Usually 50 to 60 percent of nitrogen in animal manure is available to growing plants the first year after application. Subsequent manure nutrient use by plants without additional applications is usually a sliding, declining scale for about three growing seasons.
5. Environmental assessment tools such as the Mississippi Phosphorus Index (PI) are available to determine the potential risk of offsite movement of nutrients on a field-by-field basis. The PI incorporates site-specific soil conditions and applied BMPs in the evaluation process. Soil test phosphorus levels, soil permeability, field slopes, litter application rates, distance to surface water, and other factors are used to determine the probability of nutrient movement in the landscape. If the PI rating is low, NMP may be based on crop nitrogen needs. If the PI is medium, you may need to use additional BMPs. If the PI shows a high potential risk for P movement in the landscape, base nutrient management on crop P requirements as determined by the soil test recommendations.
6. Apply animal manure and/or commercial fertilizers to supply nutrients at rates based on soil recommendations or determined through the risk assessment process.
7. Keep records of nutrient sources and application dates, rates, and methods.

Help with Nutrient Management Planning

Nutrient management plans are required as part of the general environmental permitting process for various animal operations in Mississippi. Also, operations without livestock but using animal manures whose transport is subsidized by a cost-share program may be required to prepare an NMP. For these required plans, NMPs developed according to the practice standards of the Mississippi Natural Resources Conservation Service are acceptable.

These formal plans may be developed by local agents of the Natural Resource Conservation Service or other state-approved alternative providers of conservation-planning services, such as crop consultants or professional engineers.

The planners listed above or other trained personnel may develop nutrient management plans for other uses. Individual farmers may develop NMPs to use in their own management systems or to meet lender requirements.

Summary

- Know the soils and fields of your farm.
- Be realistic about what you can produce.
- Determine the nutrients you will remove.
- Find out what you have available from this year's application.
- Calculate nutrients available from previous applications.
- Assess environmental risk of nutrient movement.
- Use common sense when putting nutrients out.
- Keep relevant field records.

Best Management Practices for Nutrient Management Using Manure

- Soil test to assess fertility status.
- Determine nutrient and moisture content of the manure.
- Use common-sense, attainable yield goals.
- Use the Phosphorus Index to determine application guidelines.
- Rotate fields receiving manure to avoid nutrient buildup and maximize nutrient use.
- Use additional fertilizers only when manure nutrients do not meet crop yield goals.
- Incorporate manure when possible.
- Calibrate application equipment.
- Avoid applying manure on wet soils to minimize compaction, runoff, and leaching/denitrification.
- Avoid surface application of manure near surface waters.
- Use grass filter strips along ditches and waterways to reduce soil erosion, runoff, and nutrient losses.
- Manage overall water flow to maximize water time on the soil surface before drainage.
- For annual crops, apply manure as close to the time of crop use as possible.
- Use fall cover crops to minimize soil erosion and runoff and to maximize nutrient use from manure applications.

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