What Is a Comprehensive Nutrient Management Plan?

A Comprehensive Nutrient Management Plan (CNMP) is a strategy for obtaining the maximum economic return from your on- and off-farm nutrient resources while protecting the quality of the environment, especially our ground and surface waters. Successful nutrient management requires comprehensive planning and recognizes that every farm has its own set of circumstances that affect the efficiency of nutrient use. The best CNMP is one that is tailored to the farming operation and the needs of the person implementing the plan—the Delaware farmer.

What Are the Goals of a CNMP?

The main goal of a CNMP is efficient nutrient use—which begins by balancing the nutrients entering a farm with those leaving the farm. Nutrient inputs are brought to the farm through feeds, fertilizers, animal manures, etc.; whereas nutrients leave the farm through crop removal and animal products. When the quantity of nutrient inputs to the farm greatly exceeds the quantity of nutrient outputs from the farm, there is greater risk of nutrient losses to ground and surface water supplies. It is important to know and understand the nutrient “mass balance” for each farming operation. Those farms with nutrient surpluses, which are common in animal agriculture, should be carefully evaluated for the potential of nutrients to contribute to nonpoint source pollution of water supplies.

Just as important to a successful CNMP are the “best management practices (BMPs)” for nutrient use—the most efficient means to select the right nutrient rate and apply the nutrients in a uniform, timely manner. Doing this not only increases agricultural profitability, but also reduces nutrient losses and thus protects the environment.

Why Are CNMPs Needed in Delaware?

In 1999 Delaware established a State Nutrient Management Program, to be administered by the Delaware Nutrient Management Commission. The purpose of this program is to “formulate a systematic and economically viable nutrient management program which will both maintain agricultural profitability and improve water quality in Delaware.”

Who Must Have a CNMP?

All animal feeding operations with greater than eight animal units or any person who owns, leases or otherwise controls property in excess of 10 acres upon which nutrients are applied shall develop and implement a nutrient management plan. Most of Delaware’s farmers and many other nutrient users (home lawn care companies, golf courses, etc.) will be required to develop and implement a CNMP. Specific requirements for a CNMP in Delaware can be obtained from the Delaware Department of Agriculture.
Developing a Comprehensive Nutrient Management Plan

Know Your Farming Operation
You will need several maps of your farm, including a general field map with crops to be grown, a soils map, a topographic map, and a map that identifies the location of all surface waters. You should also determine the nutrient "mass balance" for your farm—the difference between all nutrient inputs (feed, fertilizers, manures, etc.) and nutrient outputs (crops, animal products).

Get Your Soils and Plants Tested
Complete and accurate soil testing is essential to the success of any nutrient management plan. Soil tests should be taken within the year of the initial management plan and repeated as needed. In-season nitrogen tests, such as the pre-sidedress soil nitrate test (PSNT) and the leaf chlorophyll meter, are the most efficient way to determine the fertilizer N needs of many crops. Be sure and select a soil testing laboratory that is familiar with Delaware soils, cropping systems, and nutrient management practices. Nutrient application rates should always be based on soil test recommendations. Plant analysis can supplement soil testing and help identify nutrient deficiency and the presence of excess nutrients in your soils.

Assess Your “On-Farm” Nutrient Resources
Many of the nutrients required for optimal crop production are already present on your farm in animal manures, crop residues, or from previous legume crops. When making decisions on amounts of fertilizer to purchase and apply to your farm, it is important to quantify the nutrients already present from these other sources so that fertilizer amounts can be reduced accordingly. An essential part of this determination is an accurate nutrient analysis of livestock manures or other by-products that will be applied on your fields. Information on how to determine your on-farm nutrients is available from University of Delaware Cooperative Extension.

Take Credit for Your On-Farm Nutrients
Once you have assessed your on-farm nutrients, you should adjust your commercial fertilizer applications to account for these nutrient credits. This not only reduces your fertilizer costs, but also helps to protect water quality by avoiding over-application of nutrients that can be transported to both ground and surface waters. Two key steps in this process are keeping accurate records of manure application rates and an understanding of the plant availability of manure nutrients relative to commercial fertilizers.
Determine the Best Nutrient Application Rates and Timing
Nutrient application rates should always be based on realistic yield goals. Once you have tested your soils and assessed the amount of "on-farm" nutrients, it's easy to determine the additional nutrients needed for economically optimum yields. The timing and application of fertilizers and manures should be based on plant nutrient uptake rates and patterns to maximize crop recovery of added nutrients and minimize nutrient losses from your farm. This not only saves money, but helps to protect our ground and surface waters. When using manures it is important to plan ahead for manure applications and make sure that your spreader has been calibrated to ensure that you are applying the rates you planned.

Manage Your Farmstead—Manure Storage and Barnyard Practices
Manure and other organic wastes, such as dead animals, should be handled, stored, composted, or otherwise managed in a manner that protects ground and surface waters and public health. Store manure according to recommended practices to reduce the potential for leaching and runoff of nutrients from storage areas. Keep clean water clean! Divert rain water from barnyard and manure storage areas.

Control Erosion, Runoff and Leaching of Nutrients
Implement conservation practices which minimize the movement of soil, organic materials, and nutrients from land to water. Examples include riparian buffers, filter strips, grassed waterways, vegetated field borders and conservation tillage.
Identify Alternative Uses for Excess Manures

If your manure production exceeds nutrient needs on-farm, you should identify alternatives to land application of your manure nutrients. Potential options include: selling manures to farmers with nutrient deficiencies, composting manures for use by homeowners, or possibly selling manures to pelletizing plants or energy producing facilities.

Keep Records and Monitor Success

To know if your CNMP is accomplishing the goals you’ve set it’s essential to keep good, detailed records that help you monitor your progress. You should keep all results from soil, plant, and manure tests and examine how they change with time due to your management practices. Records should also be kept on crop yields, manure production, manure exports, nutrient application rates, timing and application methods. When you have a major change in production, your plan should be updated to reflect these changes.

Where Can You Obtain Information Needed for your CNMP?

University of Delaware Cooperative Extension [(302) 831-2501] can provide information on soil testing, manure analysis, and the most efficient nutrient application rates, methods, and timing. New Castle County (302) 831-2667; Kent County (302) 697-4000; Sussex County (302) 856-7303.

USDA Natural Resources Conservation Service can help you map your farm and provide guidance on soil conservation practices that can help reduce nutrient losses in erosion, runoff, and leaching. New Castle County (302) 832-3100; Kent County (302) 697-2600; Sussex County (302) 856-3990.

Conservation Districts work closely with the University of Delaware and USDA-NRCS to provide technical assistance in farm planning and advice on CNMPs.

The Delaware State Nutrient Management Planning Program will be organized and administered by the Delaware Department of Agriculture. For information call: (302) 739-4811.