

## Comprehensive Nutrient Management Planning

A comprehensive nutrient management plan (CNMP) is the overall conservation system that addresses all aspects of an animal feeding operation. The elements a CNMP needs to address are described in the USDA Natural Resources Conservation Service's "Comprehensive Nutrient Management Planning Technical Guidance", December 2000. A copy of the Technical Guidance is available on the world wide web at: <http://www.nhq.nrcs.usda.gov/Programs/ahcwpd/CNMPTG.pdf>

### Comprehensive Nutrient Management Plan

For a comprehensive nutrient management plan (CNMP), as described in the "Comprehensive Nutrient Management Planning Technical Guidance", there are six basic elements to be addressed in planning.

#### **Feed Management**

Plan the modification of animal diets to reduce the amount of nutrients in manure.

#### **Manure and Wastewater Handling and Storage**

Plan manure handling, collection, storage, and treatment measures to prevent water pollution. This planning would include design and construction of clean water diversions, pond and lagoon storage liners, storage structures, manure and organic by-products treatment facilities, and methods to manage animal mortality.

#### **Nutrient Management**

Develop nutrient management plans for land application of manure following Natural Resources Conservation Service (NRCS) standards and guidance. This element involves the development of nutrient budgets (for all sources of nutrients used on the farm) based on crop needs and existing soil nutrient loading, as well as the use of phosphorus indices and soil nutrient thresholds.

#### **Land Treatment Practices**

Develop conservation and management practices that are required to minimize the movement of nutrients on the landscape and conserve the nutrient value for crop production. This includes

the planning and design of practices that address tillage and crop rotation systems, erosion and runoff control, and conservation buffers.

#### **Record Keeping**

Keep the necessary records to support management decisions and document actions associated with the animal feeding operation. Record keeping is a responsibility of the livestock or poultry producer and may vary depending on the enterprise, the producer's objectives, and state and local regulations. However, the planner(s) must work with the producer to make sure the necessary information is collected and tracked. Records need to be kept on the amount of manure produced, how the manure is utilized, and current soil, plant, water, and manure analyses.

#### **Other Manure and Wastewater Utilization Options**

Address alternative uses of manure, such as sale of manure or compost off-site, power generation, feed stock, and other innovative solutions needed when land application opportunities are limited and/or livestock and poultry producers desire alternative value-added approaches to manure and wastewater use.

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### Nutrient Management Element of a CNMP

The nutrient management element of the CNMP, as defined by USDA NRCS, contains nine components (listed below) to be included as part of the element's plan. This plan is used when manure and other organic nutrients (along with other sources of nutrients) are land-applied for production of food, fiber, or forage.

### **1. Providing site maps, including a soil map**

These maps are generally part of the overall conservation plan, and can be aerial photographs, computer generated, geographic information system (GIS) maps and printouts, hand-drawn sketches, or any another acceptable form.

Information will be given for the land where nutrients are to be applied. This information will include field boundary and acreage, location of any sensitive areas, soil types present and their associated soil interpretation, plus any other pertinent information.

### **2. Location and description of sensitive resource areas**

If present, sensitive resource areas will be delineated on the site map. Sensitive areas may be highly erodible land (HEL), sole-source aquifer recharge areas, soils that are highly leachable, fields that have a high risk for phosphorus transport, or areas in close proximity to neighbors or public areas. Sensitive areas usually require some form of reduced or restricted nutrient application. Assessment tools and maps to determine sensitive areas are available in the NRCS Field Office Technical Guide (FOTG).

### **3. Soil, plant, water, and organic material sample analysis results**

Nutrient management is based on crop requirements and the resources available to supply these crop nutrients. All appropriate sample analyses will be part of the nutrient management component. These analyses become basic information to complete the nutrient budget. Appropriate explanation of each analysis needs to be presented to the producer.

### **4. Current or planned crop production sequence or crop rotation**

Nutrient application is based on crop requirements. Planning the crop rotation will determine the nutrient needs, nutrient carryover to subsequent crops, and windows of opportunity to apply organic waste material. A three to five year history of past, present, and future crops is essential for planning nutrient management.

### **5. Expected yield**

The expected crop yield is a basis for determining the level of nutrients required for that particular crop. Generally, the higher the yield the higher the nutrient requirement. There are a number of methods

available to determine expected yield. Soil, climate, crop variety, and management skills are all factors. Consult with the land grant university for those

acceptable methods used in the area.

### **6. Quantification of all nutrient sources available**

Nutrient sources may include soil reserves, commercial fertilizer, animal manure and other organic waste products, irrigation water, atmospheric deposition, and legume credits. Many of the estimates of nutrient sources are determined by laboratory analysis or crop history.

### **7. Develop a nutrient budget for the crop rotation being planned**

A nutrient budget determines the amount of nutrients available from all sources and compares this to the amount of nutrients required to meet the expected yield. If the crop yield requirement for nutrients exceeds the currently available sources, then an additional source of nutrients is needed. If nutrient supplies exceed crop requirements, however, then management measures must be taken to ensure the excess nutrients are either reduced or their application will not cause detrimental effects to plants, soil, water, or air resources.

### **8. Recommended rates, timing, and method of nutrient application**

These are the three specifications for nutrient application that are given to the producer. All three specifications are part of the nutrient management element plan. The rate of nutrient application depends on the results of the nutrient budget. Timing is determined by crop growth stage, field conditions for application equipment, and climatic conditions that can affect the transformation and transport of nutrients. How the nutrient is applied will be based on its form and consistency, soil and weather conditions, and potential for movement or loss to the environment.

### **9. Operation and maintenance of the nutrient management plan**

A number of management items need to be reviewed and updated on a regular basis. Soil tests will be taken periodically to track soil reserves. Application equipment will be calibrated to supply uniform and precise amounts of nutrients. A safe working environment will be maintained while handling and storing nutrient products. Records of nutrient application also will be kept by the producer.