

NUTRIENT MANAGEMENT PLANNING STEPS

1. Collect and evaluate information about the overall farm.
2. Determine realistic yield expectations from producer records or soil specific information contained in this manual.
3. Inventory on-farm nutrients available in soils, manure, legumes, etc.
4. Establish nutrient requirements for the crop or rotation.
5. Evaluate field limitations based on environmental hazards or concerns.
6. Allocate on-farm and purchased nutrients to fields.
7. Identify nutrient timing and placement methods to maximize crop uptake and minimize environmental losses.

COMPONENTS OF A NUTRIENT MANAGEMENT PLAN

A complete Nutrient Management Plan is designed for proper management of nutrients through all stages of handling, application and utilization. Following the plan will result in a cost effective and environmentally sound use of plant nutrients. A plan also documents the proper rate and timing of nutrient applications.

A complete description of the components of a nutrient management plan is outlined in the Nutrient Management Training and Certification Regulations. The following information offers a brief outline and explanation of the various parts of a plan. All plans must be written to the criteria set forth in the Regulations. This document was written using plans generated from DCR's Online Plan Writing Application/Module.

Topics 1-9 are recommended to include in the plan for the farmer. Topics 10-14 are reports or maps created by planning software that are generally background information relating to how the planning system calculates recommendations. There are generally not for the farmer and are for nutrient management program use.

Plan for Farmer

1. Plan Identification Sheet

This is a page at the front of the plan which contains information such as the farmer's name and address, planner's name and certificate number and county and watershed code for the farm. Information about the acreage of each crop and the various animal enterprises on the farm are included as well to give an overview of the plan.

2. Narrative

This section is used to describe the operation, and to assist with tailoring the plan to the individual. Write statements that are clear, concise and to the point. If some information is already included on the balance sheet (e.g. timing, testing, tillage) it is not necessary to include it here.

Information regarding cropping on farm:

1. Describe cropping practices such as no-till or minimum till and how they relate to the application of nutrients in the plan.
2. Document nitrogen credits given for legume crops and the important role cover crops play in capturing nitrogen between crops.
3. Make note of the proximity of fields to streams, erosion control, environmentally sensitive areas, etc. and what precautions address each issue.

Information regarding animals on farm:

1. Describe the type of animal/manure system (i.e. dairy, hog, poultry, etc.)
2. List the number of animals of all maturities.
3. The amount of manure produced.
4. How the manure is handled.
5. Explain how manure amounts were derived by either your own volume calculations or records the farmer has provided to document the amount of manure generated annually, such as number of loads of manure for each clean out.
6. If there is excess manure, make note of the plan(s) in place to dispose of the manure such as finding other farmers to use it, reducing nutrient content of the manure so that less land will be needed in future plans or acquiring additional land to spread it on.
7. List management considerations such as frequency of testing and the value of proper timing of manure applications to get the most benefit from its' nutrient content.

For farmers with a VPA permit:

A set of Special Conditions are required to be part of each plan. They can be found [here](#) under the "Ag-Specific Information" tab. These documents must be included in the plan, without any alteration. In these cases, the narrative of the plan will be supplemental to the information listed in the Special Conditions document. Information in the narrative cannot override or negate the guidance contained in the Special Conditions. *Note:* Information included in the narrative is enforceable through the VPA permit. If you include any information outside the special conditions make sure it is being followed/will be followed by the farmer.

3. Plan Maps

Plan mapping has evolved over time, originally a copy of a Farm Service Agency aerial photograph was recommended. Now with the availability of aerial imagery through ArcGIS, Google Earth, or other imagery sources there are other options to use for mapping purposes. If the plan is being written through the DCR's Online Nutrient Management Planning App maps are generated through mapping feature as they are drawn out and can be printed for planning purposes.

Maps should include: field boundaries, field numbers/names, acreage, environmentally sensitive areas (i.e. wells, erosion control structures, drainageways, etc.), and manure storages if applicable.

4. Balance Sheet

The balance sheet was developed to provide the farmer with a ready reference regarding nutrient management recommendations. The columns used in the balance are explained below. All recommendations should be provided on a per acre basis.

1. Land Unit Identifier/Name: They can be grouped in any order which you feel best suits the farmer's operation. Separate recommendations should be made for each individual field, unless two or more fields are of similar productivity group and soil test levels are similar.
2. Acres: The acres can be given by field or as a total for each group identified on the page.
3. Year: Calendar Year the recommendations are being made.
4. Crop: List the farmer's rotation(s) as they relate to each field. There is one line for each crop in the rotation.
5. Nutrient Needs: This is where nutrient crop needs are shown based on VALUES or farmer records for each crop.
6. Legumes and Manure Residuals: The amount of nitrogen credit given to legume cover crop or residue, from manures, biosolids, and other sources. Values for these sources should be explained in the plan narrative.
7. Season: Spring, Summer, Fall, Winter applications.
8. Manure/ Biosolid Rates: The amount of material which can be safely spread on each acre, limited preferably by phosphorus needs. In no circumstances should total plant available nitrogen applications exceed levels based upon VALUES productivity group or actual yield history.

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9. Incorporation (IT): How manure is applied to the field (injected, incorporated after 2, 4 days, not incorporated, irrigated). Each instance has a different coefficient attached that affects how plant available nitrogen (PAN) in the manure is calculated.
10. Manure/Biosolid Applies N-P-K: The amount of N-P-K being applied to the crop from the application rate.
11. Net Need: The balance column to show the farmer what nutrients have been applied versus the amount shown in the Nutrient Needs column. This is determined by subtracting the amount of residual nutrients and any organic sources recommended from the nutrient needs for that year's crop. Nutrients that have been applied in excess are shown in parentheses.
12. Commercial N-P-K: Provides the farmer with recommendations regarding the amount of fertilizer which should be purchased. It should address the needs identified in Net = Needs - applied N-P-K column
13. Notes: Special considerations regarding nutrient application, field conditions, tillage practices, etc. can be footnoted here. Numbers are used to reference notes explained below the spreadsheet.
14. Lime Recommendations: The amount of lime that should be applied to the field in that year and season.
15. Summary P removal credit: How much phosphorous is removed by that crop. For example corn removed 0.38 lbs./bu. A corn yield of 140 bu./ac would remove 53.2 lbs./of phosphorus.

5. Soil Test Summary

This is the summary of the most recent soil tests. These are the tests that the nutrient recommendations for P-K needs of the crops are based on. The sheet details the results of the P_2O_5 and K_2O soils tests by each field. The results are shown in what method the selected soil analysis lab uses, Mehlich 3 ppm, Mehlich 1 lbs./ac, etc. The date of the tests, acres of the field, soil pH, and lime recommendations are also displayed.

6. Field Productivity

To be cost effective and environmentally sound, all nutrient recommendations are based on the yield capabilities of the soil. Realistic yield expectations should be developed for each individual field using VALUES information or the farmer's yield records.

This report displays the predominate soil of the field and the associated productivity group for major crops based on that soil. If the farmer yield has been used during the input of the crop it will override the VALUES productivity group. Environmentally sensitive soil

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characteristics such as erosion class, slope, coarse textures, and leaching potential are also listed for each field. Any limitations should be listed as a note under the crop yields and reflected in the plan recommendations.

7. Application Summary

A more pared down version of the balance sheet, this report breaks down each crop type by year and shows the fields that are in that collection. Each field shows the season that an application is occurring. The applications can be manure, biosolids, commercial fertilizer, or some combination. The crop nutrient needs are not shown on this report it is only the rate of the manure/biosolid application or the n-p-k rates of commercial fertilizer. This sheet can be useful when dealing with custom fertilizer blends or for the person who will be spreading the manure across the farm.

There is another report called the “Nutrient Recommendation Worksheet” that is similar to the Application Summary, but leaves blank column for actual rates and acres to be filled in. Copies of these can be given to the farmer if they would like to use them as a record keeping document for manure or fertilizer applications.

8. Manure Production

Calculating nutrient availability from land applied organic materials is an important component of a nutrient management plan. Most organic materials that planners deal with will either be animal manures or biosolids.

The manure production summary lists all organic sources used in the plan, manure, biosolids, and others. It will show the analysis associated with the source and the PAN that is calculated. Also shown is the incorporation rates, surface applied rates, and residual nitrogen for three years. These rates are used in determining how much manure should be applied to the fields. The calculations used to determine the amount of manure based on animal type, numbers confinement, weight, and production factors can also be found here.

9. Manure Spreading Summary

This summary is best used to see the amount of manure applied across the plan. A running total of manure applied for the season is calculated which can be compared to the amount available. This can aid in the distribution of manure or biosolids.

Reports for Office/Online File

10. Soil Map

Soil Maps are automatically generated when using the Online Plan Writing Application. The mapping portion is tied to SSURGO, the soil survey geographic database created and maintained by the USDA-NRCS. SSURGO is the current format of soil surveys. When creating a field boundary in the Online Plan Writing Application soils are automatically associated. A predominate soil button is a feature that can be used to apply the predominate soil at fields. Copies of these maps can be generated in the Application.

11. Farm Summary

This is a summary of the information by field. It shows the crop rotation, soil test history, environmental warming, p-index summary, and general spatial information.

12. Land Unit Summary

This is a report that is similar to the Farm Summary. It does not list current crop rotations but does list previous conditions.

13. P-Index

If the phosphorous environmental threshold or phosphorous index (p-index) is used in the plan to apply organic sources of nutrients the calculations that are used to determine of the field is n-based, p-based, or no applications can be found in this report.

14. Erosion Calculations

To use the P-Index either a RUSLE II number from a conservation plan or the erosion risk assessment (ERA) must be used to determine the amount of soil most likely lost from a field. If the ERA is used to determine this amount the calculations that go into the potential soil lost can be seen in this report.