United States Department of Agriculture
Natural Resources Conservation Service 2012 Ranking Period 1

Energy Enhancement Activity – ENR10 – Using nitrogen provided by legumes, animal manure and compost to supply 90 to 100% of the nitrogen needs

Enhancement Description
This enhancement involves using nitrogen produced by legumes and/or available animal manure and compost to supply 90 to 100% of nitrogen nutrient needs for crops, hay and/or forages produced on the farm.

Land Use Applicability
Cropland, Pastureland

Benefits
Annually 12 million tons of nitrogen fertilizers are used to produce crops on over 90 million acres. It requires 35,000 to 40,000 ft^2 of natural gas to produce one ton of nitrogen fertilizer accounting for 1/3 of the energy input to crop production. Managing legumes, manures and compost properly can replace the need for additional nitrogen fertilizer and reduce the energy footprint of the farming operation.

Conditions Where Enhancement Applies
This enhancement applies to all crop and pasture land use acres.

Criteria
1. Follow a nutrient management system that utilizes nitrogen from legumes, animal manures and compost as the sole source of nitrogen for production.
2. Follow Land Grant University (LGU) recommendation for legume nitrogen production when estimating available nitrogen for crop production.

a. For a more accurate estimate, utilized the guidance in "Northeast Cover Crop Handbook" chapter 2.

3. Utilize manure and compost nutrient analysis when estimating available nutrients for crop production.
4. Manure must be applied according NRCS Nutrient Management Conservation Practice Standard (590). Contact your local conservationist for assistance with Conservation Practice Standards.
5. Utilize cover crops to trap N were appropriate (e.g. following manure application on soils with low residue levels, on soils that have been tilled, or where the fall manure applications was made for a spring planted crop).
6. Manure from off farm sources can be used.
7. This enhancement does not include the removal of crops that require nitrogen from the rotation, e.g. eliminating corn to avoid use of nitrogen fertilizer.

Adoption Requirements
This enhancement is considered adopted when no synthetic sources of nitrogen (only organic sources) are being used for crops, hay and/or forages produced on the farm.

Documentation Requirements
Crop production records that include:

1. Source of organic nitrogen, e.g. cover crop, manure
2. An estimate of available nitrogen and method used to estimate
   a. Lab analysis
   b. Biomass calculation
3. Soil test results for each treatment area
4. Amount of manure and/or compost applied per acre
5. Manure nutrient analysis (if applicable)
6. Listing of fields
7. Estimate of legume biomass produce each year

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Reference: 590 – Nutrient Management

Supplemental Minnesota Criteria

- This enhancement is not applicable to crops that do not require nitrogen fertilization (e.g. alfalfa).

- Crop nitrogen needs will be determined by using University of Minnesota (UofM) or contiguous land grant university guidance. In some cases UofM guidance automatically accounts for nitrogen supplied by previous years' legume crops. In other cases, tables are presented that specify the amount of nitrogen provided by previous legume crops.
  http://www.extension.umn.edu/CommodityCrops/

  http://www.extension.umn.edu/distribution/cropsystems/DC5886.html

- Laboratory reports of manure nutrient content often do not define the amount of such nutrients available to the crop in the 1st, 2nd and succeeding years following the manure application(s). A calculator and/or job sheet for estimating nutrients available from manure are located at:
  http://www.mn.nrcs.usda.gov/technical/ecs/nutrient/manure/manure.htm

Supplemental Documentation Requirements

- Calculations used to determine respective crop nitrogen needs.