United States Department of Agriculture
Natural Resources Conservation Service

2013 Ranking Period 1

Energy Enhancement Activity – ENR12 – Use of legume cover crops as a nitrogen source

Enhancement Description
This enhancement is for the use of legume cover crops as a primary source of nitrogen in a cropping system. Use of legume cover crops is applicable to conventional, specialty and organic crop production systems.

Land Use Applicability
Cropland

Benefits
Approximately 35,000 cu ft of natural gas is required to produce one ton of nitrogen fertilizer; or on average, 20,000 BTU's are required to produce one pound of synthetic nitrogen; or approximately 140 BTU's are required to produce one gallon of diesel fuel. Legume cover crops can provide 50 to 100 lbs of plant available nitrogen per acre to reduce synthetic nitrogen use and fossil fuel use.

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

Criteria
1. On all acreage where this enhancement will be applied, plant and manage legume cover crops prior to all field or specialty crops raised that require the use of commercial nitrogen.
2. Estimate nitrogen credits from the leguminous crop.
3. The legume cover crop must be selected and managed to supply a **minimum of 40 lbs N/acre credit** for the following crop.
4. Nitrogen credit estimate should consider:
   a. The amount of biomass produced (plant height and maturity)
   b. The nutrient composition of the cover crop (for example, clover vs. vetch)
   c. The decomposition rate of the cover crop during the cash crop growing season based on incorporation of the residue or being left on the soil surface after planting. Note: An example procedure is outlined in "***Managing Cover Crops Profitably, 3rd Edition***" (Sarrantonio, 1998)
5. Seeding rates for the selected cover crop species shall be based on NRCS practice standards or the respective state Land Grant Universities recommendation.
6. Base additional nitrogen application rates for crops following the cover crop on guidelines from the state Land Grant University. Reduce nitrogen application rates by at least the amount credited in #3 above to account for the nitrogen available from the legume cover crop.

Adoption Requirements

This enhancement is considered adopted when the land use acreage has been planted to a leguminous cover crop that meets or exceeds the minimum nitrogen credit from the criteria above.

Documentation Requirements

Written documentation for each year of this enhancement describing the following items is required:

1. A map showing where the enhancement is applied
2. Type of legume cover crop planted
3. Calculations for estimating available nitrogen
4. Application rates of additional nitrogen by field
5. Realistic yield goals for field or specialty crop grown

North Dakota Requirements

Refer to the ND NRCS-305 Cover Crop Workbook for suitable legume species recommendations. Follow NDSU publication, SF-882 for legume nitrogen credits. Legumes must supply at least 40# N for following crop(s) in the rotation.
http://www.ag.ndsu.edu/pubs/plantsci/soilfert/sf882.pdf

References

Clark, A.(editor.). 2007. Managing cover crops profitably. 3rd ed. Sustainable Agriculture Network Handbook Series.

Magdoff, F. and H. van Es. Cover Crops. 2000. *In* Building soils for better crops. 2nd ed. Sustainable Agriculture Network Handbook Series. pp87-96. National Agriculture Library. Beltsville, MD.

Liebman, M., Graef, R., Nettleton, D., Cambardella, C.A. 2011. Use of legume manures as nitrogen sources for corn production. Renewable Agriculture and Food Systems. p. 1-12. Available: http://dx.doi.org/10.1017/S1742170511000299