United States Department of Agriculture

CONSERVATION ENHANCEMENT ACTIVITY

E590A

CONSERVATION STEWARDSHIP PROGRAM

Improving nutrient uptake efficiency and reducing risk of nutrient losses

Conservation Practice 590: Nutrient Management

APPLICABLE LAND USE: Crop (Annual and Mixed), Crop (Perennial)

RESOURCE CONCERN: Water, Air

ENHANCEMENT LIFE SPAN: 1 Year

Enhancement Description

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses to surface and groundwater and reduce risks to air quality by reducing emissions of greenhouse gases (GHGs).

The wide variability of soils, rainfall, fertilizer rates, products, placement, and timing will all influence the actual crop yield. Enhanced fertilizer products are not a yield enhancement guarantee. Products that claim yield enhancement benefits may not be applicable to this enhancement.

Note: Some technologies in this enhancement apply to use of commercial fertilizer only.

Criteria

- Documentation of producer's record of nutrient management meeting all NRCS Conservation Practice Standard Nutrient Management (CPS 590) general criteria and additional criteria to minimize agricultural nonpoint source pollution of surface and groundwater.

Select two or more (not already utilized) strategies for nutrient use efficiency:

CONSERVATION STEWARDSHIP PROGRAM

Strategy 1: Enhanced Efficiency Fertilizers (EEF) which contain **nitrification inhibitor** products resulting in delayed nitrification processes, by eliminating the bacteria *Nitrosomonas* in the area where ammonium is to be present.

- Materials must be defined by the Association of American Plant Food Control Officials (AAPFCO) and be accepted for use by the State fertilizer control official, or similar authority, with responsibility for verification of product guarantees, ingredients (by AAPFCO definition) and label claims.

- Application timing, method, N source, soil texture, and tillage regime are all factors that should be evaluated to determine where nitrification inhibitors should be used. Before buying an inhibitor make sure scientific evidence backs up all claims. Producers and/or consultants should be wary of any product that does not have solid scientific data demonstrating that the inhibitor activity matches the advertised benefit.

- EEF products must be recommended by state Land Grant University (LGU) and concurred with by NRCS on all treatment acres to supply at least 50% of the pre-emergent and early post emergent LGU recommended nitrogen budget requirements for the crop(s) grown. Common chemical products used to interrupt the nitrification process include, Dicyandiamide (DCD), and 2-chloro-6 (trichloromethyl) pyridine.

Strategy 2: Enhanced Efficiency Fertilizer (EEF) products which contain **urease inhibitor** products to temporarily reduce the activity of the urease enzyme and slow the rate at which urea is hydrolyzed.

- Materials must be defined by the Association of American Plant Food Control Officials (AAPFCO) and be accepted for use by the State fertilizer control official, or similar authority, with responsibility for verification of product guarantees, ingredients (by AAPFCO definition) and label claims.

- Application timing, method, N source, soil texture, and tillage regime are all factors that should be evaluated to determine where urease inhibitors should be used. Before buying an inhibitor make sure scientific evidence backs up all claims. Producers and/or consultants should be wary of any product that does not have solid scientific data demonstrating that the inhibitor activity matches the advertised benefit.

- EEF products must be recommended by state Land Grant University (LGU) and concurred with by NRCS on all treatment acres to supply at least 50% of the pre-emergent and early post emergent LGU recommended nitrogen requirements for the crop(s) grown.

- Common chemical products that are known to affect urease formation are N-(n-butyl) thiophosphoric triamide (NBPT) and ammonium thiosulfate (ATS).

Strategy 3: Slow-release or controlled release formulations of nitrogen fertilizer for at least 50% of the pre-plant and/or post emergent applications.

- Use of slow-release or controlled-release nitrogen fertilizer products to improve nutrient use efficiency.

  Uncoated Nitrogen Fertilizers include: Ureaformaldehyde (UF) reaction products, Ureaform and Methylene ureas**.**

  Coated Nitrogen Fertilizers include**:** Sulfur-coated fertilizers, Polymer-coated fertilizers and Polymer/sulfur coated fertilizers.

Strategy 4: Nature-based fertilizer and Soil Amendments

- Use of Nature-based Fertilizer and Soil Amendments such as bio-stimulants and bio-fertilizers to:
  - Enhance uptake and efficient use of nutrients, both applied and existing.
  - Improve soil health by enhancing beneficial soil microorganisms.
  - Stimulate root growth to increase water use efficiency.

Strategy 5: In-season soil nitrate sampling.

- Use pre-sidedress soil nitrate test (PSNT) to determine the need and/or amount of additional nitrogen to be applied during sidedress/topdress N application. Conduct a PSNT for the selected crop (e.g. corn) to determine if additional N fertilizer is needed.

- The use of PSNT is not recommended for all soil types and field situations. Consult your local state LGU for guidance.

Strategy 6: Use in-season plant tissue sampling and analysis as a complement to soil testing.

- Follow local LGU and/or laboratory guidelines for interpretations of the results and appropriate adjustments in the application of N and other nutrients. *End of season stalk*

nitrate testing is not applicable if the enhancement is only contracted for one year, as results must be used to evaluate and adjust nutrient management in the following year, as needed.

Strategy 7: Split nutrient applications.

- Apply no more than 50% of total crop nitrogen needs within 30 days prior to planting (or in the case of hay or pasture after green up of dormant grasses). Apply the remaining nitrogen after crop emergence (or green up).
- Post emergent nitrogen may be reduced based on crop scouting, in-season soil sampling/analysis, or plant tissue sampling/analysis. Nutrient availability should be timed to crop uptake.

Strategy 8: Time nutrient application timing to match nutrient uptake timing.

- Apply nutrients no more than 30 days prior to planting date of annual crops. Nutrient availability should be timed to crop uptake.

Strategy 9: Nutrient placement below soil surface.

- Nutrients are injected or incorporated into the soil as soon as possible, no more than 24 hrs. of being applied.

Strategy 10: Use EEF technology for **phosphorous** fertilizer applications.

- EEF products must be recommended by state Land Grant University (LGU) and concurred with by NRCS.

CONSERVATION STEWARDSHIP PROGRAM

Documentation and Implementation Requirements:

Participant will:

- ☐ Prior to implementation, provide documentation for review by NRCS showing a record of implementing nutrient management meeting all applicable NRCS Conservation Practice Standard Nutrient Management (CPS 590) general criteria and additional criteria to minimize agricultural nonpoint source pollution of surface and groundwater, including existing 590A strategies. List EEF strategies or materials that have been implemented:_____
- ☐ Prior to implementation, develop and document a planned nutrient budget, yield goal, and applications (pounds/acre active ingredient, nutrients must include at a minimum N-P-K).
- ☐ Prior to implementation, select two or more new nutrient use efficiency strategies or technologies not already used. **Selections:**_____
- ☐ During implementation, keep records to document actual nutrient applications (pounds/acre active ingredient, nutrients must include at a minimum N-P-K).
- ☐ During implementation, minimize soil surface disturbance during nutrient placement.
- ☐ During implementation, notify NRCS of any planned changes to verify the planned system meets the enhancement criteria.
- ☐ During implementation, additional record keeping requirements for specific strategy or technology:
    - In-season soil nitrate sampling. Records and documentation must include results (including reference strips) and adjustments in nutrient management based on results.
    - In-season plant tissue sampling and analysis. Records and documentation must include type of test used (stalk, leaf, chlorophyll, infrared, or other plant tissue), results (including reference strips), and adjustments in nutrient management based on results.
    - Nutrient placement below soil surface. Records and documentation must include method of injection or incorporation time and depth.
- ☐ After implementation, make documentation and records available for review by NRCS to verify implementation of the enhancement.

CONSERVATION STEWARDSHIP PROGRAM

NRCS will:

- ☐ As needed, provide technical assistance to meet the criteria of the enhancement.
- ☐ Prior to implementation, provide and explain NRCS Conservation Practice Standard Nutrient Management (CPS 590) as it relates to implementing this enhancement.
- ☐ Prior to implementation, review documentation to verify a record of implementing nutrient management meeting all NRCS Conservation Practice Standard Nutrient Management (CPS 590) general criteria and additional criteria to minimize agricultural nonpoint source pollution of surface and groundwater.
- ☐ Prior to implementation, verify the development of a planned nutrient budget, yield goal, and planned nutrient applications.
- ☐ Prior to implementation, verify the selection of two or more nutrient use efficiency strategies or technologies.
- ☐ During implementation, evaluate any planned changes to verify the planned system meets the enhancement criteria.
- ☐ After implementation, review documentation and records to verify implementation of the enhancement.

NRCS Documentation Review:

I have reviewed all required participant documentation and have determined the participant has implemented the enhancement and met all criteria and requirements.

Participant Name _____ Contract Number _____

Total Amount Applied _____ Fiscal Year Completed _____

_____ _____

NRCS Technical Adequacy Signature Date

WASHINGTON SUPPLEMENT TO CONSERVATION ENHANCEMENT ACTIVITY

CONSERVATION STEWARDSHIP PROGRAM

E590A

Additional Criteria for Washington

- In addition to the criteria specified in the National job sheet E590 the following additional criteria apply in Washington when option for "Use Enhanced Efficiency Fertilizer (EFF)" is chosen:
  - Participant must consult with their CCA/Agronomist or chemical representative to ensure the product selected will meet the enhancement purpose and work with their cropping rotation and management.
  - The below table has a list of chemicals or compounds that provide enhanced efficiency fertilizer functions that have been show to aid in the reduction of nitrogen losses to the environment when used properly and in the right conditions. A list of Common Product Names is also included just as a reference and is not all inclusive. Additional chemical or compounds used needs to be reviewed by the area or state agronomist.

Chemical or Compound	Common Product Names	Process Affected
Dicyandiamide (DCD)	Guardian®	Nitrification Inhibitor
N-butyl-thiophosphoric triamide (NBPT)	Agrotain®	Urease Inhibitor
NBPT + DCD	Agrotain®Plus, SuperU®	Nitrification & Urease Inhibitor
Nitrapyrin: 2-chloro-6 (trichloromethyl) pyridine	N-Serve®, Instinct®	Nitrification Inhibitor
Polymer-coated urea (PCU)	ESN®, Polyon®, Nutricote®, Duration®, Escote®, Osmocote®	Coated, slow release
Sulfur-coated urea (SCU)	Enspan®, XCU®	Coated, slow release
PCU + SCU	Tricote®, PolyPlus®, Poly-S®	Coated, slow release
Urea formaldehyde	Nitroform®, Folocron®	Uncoated, slow release
Isobutylidene Diurea	IBDU®	Uncoated, slow release
Melamine	Nitrazine®	Uncoated, slow release
Triazone	N-Sure®, TriSert®	Uncoated, slow release
Crotonylidene Diurea	Crotodur®, CDU®, Triabon®	Uncoated, slow release

- In addition to the documentation requirements specified in the National job sheet E590 the following additional documentation requirements apply in Washington when option for "Use Enhanced Efficiency Fertilizer (EFF)" is chosen:
  - Participant must have documented that their CCA/Agronomist or chemical representative has verified the selected product will meet enhancement objectives and work cropping rotation and management.