Extension Service
West Virginia University

National Conservation Innovation Grant Proposal
Precision Nutrient Management Using a Systems Approach in Karst Geology

During the fall of 2009, the West Virginia University Extension Service was awarded a grant to promote and expand the use of new technologies and proven tools to create a comprehensive nutrient management cost sharing program for agriculture producers in Berkeley, Jefferson, and Morgan Counties. The program is directed at producers who farm in the Karst Geology of the region.

It includes several practices that occur throughout the growing season. Many are inter-related which means that to be eligible for one practice, you may have to use another. For example, to be eligible to plant corn fields in cover crops to sequester nutrients, a corn late nitrate stalk test must be taken. To qualify for the cost share on the split application of nitrogen on corn or wheat, a diagnostic test such as a tissue test, PSNT or chlorophyll meter test must be used to determine the amount of N that is required. A cost share is also being offered if a producer hires the use of real time red and near infrared technology to determine nitrogen application rate.

There is a cost share on the use of variable rate application of lime, phosphorous and potassium. A producer is only eligible for this practice if there has been a prescription developed based on GPS referenced yield maps (for P and K) or GPS referenced soil samples.

If producers want to invest in GPS guidance to apply nutrients themselves, or yield monitors to more efficiently manage nutrients there is a cost share for that which would also include software. This would also pay if others are providing these services for the producer.

Finally, there is a specific cost share incentive to move manure from storage facilities beyond the farmstead. Producers will be paid $2.50 per loaded mile for every mile that is further than one mile from the manure storage facility.

NRCS has several levels of nutrient management under EQIP. It is hoped that this will help them develop procedures that will make these cost shared practices more available to the producer as occurs in Maryland, Pennsylvania and Virginia.

Please complete the enclosed application and return at your convenience as signup is continuous. You can submit more than one application over the lifetime of the grant. The following dates will be used to evaluate received applications and rank them for the eligibility for the eligible practices :

March 15, 2010	July 15, 2010	September 15, 2010
January 15, 2011	March 15, 2011	July 15, 2011

Thank you for your interest in participating in this pilot project.

Yours for better farming,

Craig W. Yohn, WVU Extension Agent—Jefferson County
Extension Agent

Eastern Panhandle Conservation Innovation Grant
Participant Application

The Eastern Panhandle of West Virginia is an area with a large percentage of its highly productive and usable agricultural lands underlain with a limestone or Karst geology. This geology has sinkholes and fissures that rise to the surface and allow nutrients and sediments to directly flow into the groundwater. Streams and rivers are vulnerable to surface water runoff which can carry nutrients and sediment, but in this geology it is influenced also by the many springs that are fed by groundwater. Through the use of technology and proven conservation practices this vulnerability can be greatly reduced through the measured application, placement and sequestration of free nutrients.

Tools to improve nutrient efficiency have been used throughout the Mid-Atlantic region for more than twenty years. Programs and tools such as IPM, ICM, PSNT, CSNT, manure testing, spreader calibration, tissue testing, chlorophyll meters and the split application of nitrogen have all been used as parts of the well developed nutrient management plan. Precision soil sampling and nutrient application have also been introduced to producers over the last three years in West Virginia. While these tools have been used in piece and part in the Eastern Panhandle of West Virginia there has not been a comprehensive approach to nutrient management. This is in part due to the lack of incentives to adopt these practices on a consistent basis.

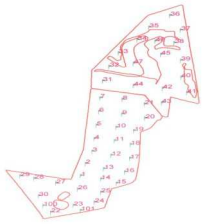
Precision nutrient management includes grid or zone sampling followed by variable rate application allocating lime and fertilizer (phosphorus (P) and potassium (K)) within the field. Field areas with greater fertility receive less while areas with lower fertility receive more. Precision nutrient management can reduce input costs when identifying more fertile areas, while optimizing the probability of an economic response to lime and fertilizer by identifying less fertile field areas

Precision agriculture includes a process of data collection, conversion of data to knowledge, and application of the knowledge to site-specific management within field boundaries. In a study completed in 2008 in Jefferson County, nearly 700 acres of crop and forage land was sampled by precision and conventional methods. The results showed that the precision recommendations would have applied more lime to more acres, more phosphorous to fewer acres and less potassium to fewer acres. The use of precision application of nutrients allows for more uniform and accurate distribution of nutrients throughout the field. For example, areas of over and under application will be prevented. For those areas having residual nutrients due to drought, over optimistic yields or other environmental setbacks, cover crops will be used to sequester those nutrients.

Precision Soil Sampling, Recommendation Cost Share Precision agriculture is used to improve the agronomic, environmental and economical perspective of crop management from in-field variability. This management requires the use of a GPS (Global Positioning System) and information management tools such as GIS (Geographic Information System) to assess management information and understand variations. Precision soil sampling and recommendation must include all of the following:

- Precision soil sampling (zone) or "smart sampling" in no larger than 2.5 acre grids
- Analysis through a Certified Lab using Mehlich I analysis
- Recommendations based on West Virginia University Soil Testing Lab in accordance with the NRCS 590 Nutrient Management Standards.

- Development of database and maps which interpolate sample results and provide files to producers which then will be used to variably apply nutrients to their small fields.



Variable Rate Application of Nutrients Cost Share Utilize precision sampling or a GPS based yield monitoring system to collect field-specific crop data, and a software/record keeping system that analyzes that data. Nutrients shall be applied based on West Virginia Soil Testing Lab and West Virginia NRCS 590 Nutrient Management Standards.

Producers may utilize software/record keeping systems that analyzes that data which may used to recommend variable rate fertilizer, lime, and/or variable rate planting. This system involves the development and use of an extensive record keeping system of crop management and yield data inputs using GPS technology. This technology may be purchased by the producer or the producer may utilize a service(s) that provides this technology.

Nitrogen Use Efficiency

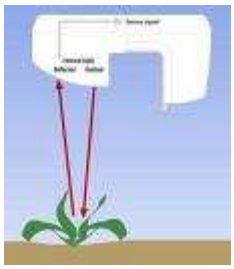
<u>Apply the Proper Rate of Nitrogen</u>

- Develop a Pre-Season estimate of Nitrogen based on expected yields, yield history or yield monitor data for predominant soil types within the field. *(all non-legume crops)*; Adjust nitrogen application based on previous manure use and/or green manures *(all non-legume crops)*. Depending on growing crop and type of nutrient(s) used, implement in-season nitrogen adjustments based on Pre-Sidedress Nitrate Test (PSNT) *(corn and previous manure application only),* Leaf Chlorophyll Meter (LCM), or Tissue Test. *(corn, small grain).*

- The Late Season Corn Stalk Nitrate Test is a reliable end of season indicator of crop N status. It provides a good assessment of whether the crop had the right amount of N or too much N or whether it ran out of gas. This information combined with records of N management can be very useful for making future management decisions.

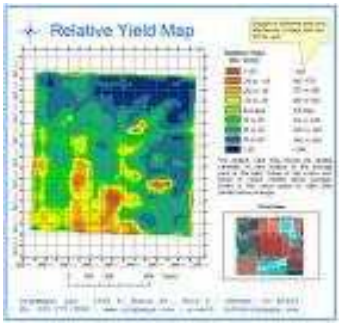
Apply Nitrogen Timed to Crop Demand

- Apply nitrogen as close to crop uptake as possible avoiding any application of nutrients during the winter months *(all non-legume crops)*; Split or side dress application of nitrogen with no more than 50 lbs. of commercial nitrogen applied per acre at planting (*corn and wheat*). Rates will be tied to one of the three tests cost shared namely Pre-Sidedress Nitrate Test (PSNT) *(corn and previous manure application only),* Leaf Chlorophyll Meter (LCM), or Tissue Test. *(corn, small grain)* or utilization of real time red and near infrared technology to determine nitrogen application rate on the crop (*wheat and corn*).



Cover Crop Planting to Sequester Nitrogen The purpose of the cover crop is to sequester as much unused nitrogen as possible. Fields found to be in the optimum or excess range according to the Penn State Late Season Corn Stalk Nitrate Test would be eligible for this program. A second eligible practice is the planting of a cover crop after small grain harvest. This could include annual grasses, legumes and forage radishes.

On Farm Yield Monitoring and Guidance Provide producers with precision technology including hardware and software to collect field-specific crop data, and evaluate data to improve nutrient allocation. Hardware may include yield monitors, light bars, GPS guidance etc. A software/record keeping system that analyzes data which may be used to recommend variable rate fertilizer, lime, and/or variable rate planting would be eligible for cost share. GPS/record keeping is done with commercial software. There are numerous software programs on the market that a program participant may use. The hiring of a service that can provide this information such as a custom harvester or planter or commercial service that can provide mapping is also eligible.



Animal Manure Use Efficiency through Offsite Transfer This is for farms with concentrated animals and a waste storage facility where an excess of nutrients is identified on the farm with the facility. This will provide an opportunity to reduce the cost of transporting farm produced manures off the farm to eligible fields that the farmer may manage or to another cooperating producer. Crop field must be greater than one mile from the manure pit for the farmstead and have a nutrient management plan on file. Participating farmers will keep records on loads, spreader capacity, acres treated, manure analysis and nutrients applied based on the analysis.

Extension Service
West Virginia University

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Eastern Panhandle Conservation Innovation Grant Application Form

Name_____ Farm Name_____

Address_____ Farm Number_____

_____ Field(s) _____

Phone #_____ Tract #_____

Email_____

Best Management Practices (BMP's) applied for:

BMP's	Limits	Cost-Share Rate	Yes (X)	No (X)	Amount applied for
Precision Soil Sampling	Not to exceed 200 acres	$6.00 per acre			_____ acres of Forage _____acres of Row Crop
Variable rate application of P,K or Lime	Not to exceed 200 acres. Must have precision Sampling or yield maps	$8.00 per acre for lime $8.00 per acre for P\K application			_____ acres of Forage _____ acres of Row Crop
Nitrate Application Evaluation	Not to exceed 5 fields that have had manure application	$5.00 per field			_____fields
Split N Application	Corn or wheat using nitrate evaluation tool prior to application not to exceed 200 acres	$8.00 per acre			_____ acres
Late Corn Stalk Nitrate Test	Not to exceed 5 fields	$5.00 per field			_____ fields
Cover Crop	Fields must have Late Corn Stalk Nitrate Test in Optimum or High Range	$26.65 per acre by October 15th (drilled) $23.85 per acre by October 15th (broadcast) Could be piggy backed with State or EQIP) Program (90% cost share—$59.94 per acre)			_____ acres Previous Crop: _____
On Farm Yield Monitoring and Guidance	Farm Enterprise must be no less than 175 acres	$8.00 per acre			_____acres
Distance Hauling of Animal Manures	Must be generated on the farm. Filed must be greater than .5 miles from manure storage	$2.50 per loaded mile			_____miles

1. **Have you ever participated in any USDA cost-share programs ? ____Yes ____ No**
If so, which ones? Please list:

_____

_____

2. **Do you have farm records established with the appropriate USDA Service center Agency?**
____ Yes _____ No If no, you must establish them with the appropriate USDA Service Agency prior to submitting this application.

3. **Are you applying to participate in a conservation program as an (check one of the following):**

Individual (Please enter name and tax identification number:
Name: **Tax Number:**

Entity (Corporation, Limited Partnership, Trust, Estate, etc.)
Please enter entity legal name and tax identification number:
Name: **Tax Number:**

Do you have the appropriate documents including proof to sign for the entity?
____ Yes _____ No

Joint Operation (General Partnership, Joint Venture)
Please enter joint operation legal name and tax number identification:
Name: **Tax Number:**
Do you have the appropriate documents including proof to sign for the joint venture?
____ Yes _____ No

4. Is the land being offered for enrollment used for crop or livestock production?

____ Crop Production **Crops:**

____ Livestock Production **Livestock Type (s):**

5. The land offered under this application is (check all that apply):

____ Private Land **____ Public Land**

6. Certification of control of the land offered under this application:

____ Deed or other evidence of land ownership
____ Written Lease Agreement Years of control are _____ through the year _____

7. Is the land offered under this application enrolled in any other conservation program?
____ Yes _____ No

8. Have you produced at least $1000 of agricultural products through livestock or crop production in the last year?
____ Yes _____ No

On the farms identified above the Applicant agrees to participate in the identified program if the offered is accepted by West Virginia University. The undersigned shall hereafter be referred to as the "Participant." The participant understands that starting a practice prior to contract approval causes the practice to be ineligible fro program financial assistance. The participant will obtain the landowner's signature on the contract or provide written authorization to participate in the programs being offered if not the participant.

Applicant Signature	Date

Return Applications to:
Conservation Innovation Grant
Craig W. Yohn
1948 Wiltshire Road, Suite 3
Kearneysville, WV 25430

Questions?
Call
Craig Yohn—304.728.7413, ext. 2
Mary Beth Bennett—304.264.1936
Denis Scott—304.258.8400

PUBLIC BURDEN STATEMENT

In accordance with the Privacy Act of 1974 (5 USC 552a) and the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0578-0013. The time required to complete this information collection is estimated to average 45 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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PRIVACY ACT STATEMENT

The following statement is made in accordance with the Privacy Act of 1974 (5 USC 552a). This information is used to track contract or agreement progress. The authority for requesting the following information is 7 CFR 630 (Long Term Contracting); 7 CFR 1410 (CRP); 7 CFR 631 and 702 (IEQIP); 7 CFR 636 (WHIP); 7 CFR 622 (WPFPP); 7 CFR 1465 (AMA); 7 CFR 1469 (CSP); 7 CFR 625 (HFR); 7 CFR 1494 (FRPP); and 7 CFR 1467 (WRP). Furnishing information is voluntary and will be confidential; however, it is necessary in order to receive assistance.