

Bringing Greenhouse Gas Benefits to Market: Nutrient Management for Nitrous Oxide Reductions

Delta Institute and National Wildlife Federation

This project will support farmer implementation of nutrient management practices using greenhouse gas (GHG) emission reduction credits while testing different models and protocols for measuring and marketing on-farm GHG emission reductions. The project team will draw lessons for future GHG market design and participation, with the goal of enrolling producers in a program that generates market-quality GHG reduction credits from nutrient management and conservation practices. Further, the team will identify the opportunities and barriers of implementing nutrient management GHG programs via the comparison of different protocols, quantification models and outreach mechanisms.

Though several nutrient management protocols have been developed, they remain relatively untested in the public domain. The project team proposes to measure, monitor, and verify the GHG emission reductions resulting from nutrient management, using protocols meeting the stringent requirements for regulatory compliance. At the outset, the team will focus on the American Carbon Registry protocol.

This project uniquely combines high-quality protocols with on-the-ground technology transfer and utilizes a diverse array of existing knowledge, technical skills and networks to leverage the team's experience for successful implementation. This approach, combined with the team's direct investment in agricultural GHG credits, will help farmers overcome social, economic, educational and technical barriers in adopting conservation practices. The nutrient management approach focuses on reductions in nitrous oxide (N₂O) emissions, rather than soil carbon sequestration. An avoided emission of N₂O, unlike sequestration, is a permanent GHG reduction with no risk of reversal. Therefore farmers can receive the full value of credits without the multi-year contracts of sequestration projects.

The project team will enroll producers through educational workshops held throughout Illinois, Michigan and Oklahoma as well as through personal contacts, network and relationships. We aim to enroll a high diversity of producers including organic/conventional, and different scales of operation. At the workshops, producers will share their impressions of GHG markets and nutrient management and have an opportunity to work through the enrollment materials. Farmer data will then be entered into a database system for tracking purposes, while field data will be entered into biogeochemical process models for calculation of GHG credit to be submitted for verification and registration.

The team will also closely monitor the replicability, scalability and policy implications of the project's approach, particularly around precise carbon monitoring, fair market access for a wide range of producers, integration with other programs, and measurable environmental co-benefits. These items will draw on the project team's experience of protocol analysis, experience with aggregation to efficiently reduce barriers of entry to carbon markets, integration of existing water quality and carbon sequestration payments with N₂O credit and documentation of water quality co-benefits.

During the project timeframe, new methodologies (particularly the Climate Action Reserve Nutrient Management Project Protocol) and environmental regulations will emerge that demand considerable analysis and engagement with farmers. Over the three years, the project team will document how fluctuations in the price of carbon, new protocols, and environmental regulations change perceptions and interest in carbon markets. As producers adopt creditable nutrient management practices, the project team will achieve its ultimate goal of creating environmental benefits and economic opportunities through market-based innovation.

Background Information for the C-AGG Chicago Meeting July 20-21, 2011

Project: Bringing Greenhouse Gas Reductions to Market: Nutrient Management for Nitrous Oxide Reductions

1. What are the major goals of the project?

- Research and analyze existing and planned nutrient management protocols to understand implementation requirements.
- Analyze different nutrient management models with real producer practices and data to understand variability on GHG credit values.
- Create an efficient system to enroll, manage, and aggregate producers to earn GHG credits for nutrient management and conservation practices.
- Enroll producers, register projects, coordinate verification and registration, and complete GHG credit transactions.
- Evaluate different implementation strategies to understand the most effective enrollment structure for producers.
- Use new on-the-ground experience to generate policy recommendations.

2. What is the project timeline?

August 2011-July 2014.

3. Which GHGs are targeted by the project, and/or which activities?

Nitrous oxide emissions from comprehensive nutrient management practices including 4-Rs, tillage and cover cropping.

4. Can you provide an estimate of tons of CO₂ equivalents (per year, and/or over the course of the project) that the project might mitigate/abate?

Depending on participation and performance level, we anticipate the project will generate 36,000-40,000 tons CO₂e (up to 4,000 in year one and 24,000 in year three).

5. What methods or protocols will the project use to measure or estimate GHG emissions and emissions reductions (e.g. direct measurement, sampling, models, etc)?

Protocols: ACR's "Methodology for N₂O Emissions Reductions through Changes in Fertilizer Management", CAR's forthcoming Nutrient Management Protocol. Models: EPIC/Apex, DNDC, COMET-VR.

6. Do you anticipate or envision any obstacles or barriers to achieving your project goals and outcomes as currently set out, or activities that you believe will be challenging?

- Carbon prices are low relative to commodity prices and low relative to amount of time needed to improve nutrient management.
- Farmer skepticism of trading programs after decline of CCX and federal prospects
- Farmer perception of regulatory risk (e.g. quantifying practices could lead to state/EPA intervention).

7. Have you identified any data or knowledge gaps associated with the project?

- Farmer records are likely to be insufficient without detailed consultation or crop advisor involvement.
- Model calibration in project locations.

8. Please list the project partners affiliated with the project.

American Farmland Trust, EKO Asset Management Partners, American Carbon Registry, Conservation Technology Information Center, Oklahoma State University, Oklahoma Conservation Commission, and DNDC Applications, Research & Training.