

# **Final Program Evaluation Report**

## **Carbon Credit Generation Program**

*Funded through the*  
**Natural Resources Conservation Service (NRCS)**  
**Conservation Innovation Grant (CIG) Program**

*Submitted by the*  
**Chicago Climate Exchange, Inc.**

**May 16, 2008**

Project Title: Carbon Credit Generation Program : Cost Effective Procedures to Enroll, Aggregate, Verify and Deliver Agricultural Carbon Credits to Private Sector Markets.

**Program Evaluation Reports:** Program evaluation reports will be made periodically to update NRCS, State Conservationists, and other interested stake-holders on the progress and achievements of the Carbon Credit Generation program. The evaluation reports are to:

- assess aggregation and verification program costs and effectiveness;
- identify key enhancements to address concerns of producers;
- identify refinements that enhance cost-effectiveness and reduce transaction costs;
- evaluate the amount of carbon sequestered/registered/aggregated/verified;
- completion of feasibility assessment of program expansion ( and national potential);
- compare carbon quantities using CCX and US DOE 1605b methods;
- report on the effectiveness and practicality of alternative GHG aggregation, verification, and accounting methodologies.

**CONSERVATION INNOVATION GRANTS  
Biannual Progress Report**

**Grantee Name:** Chicago Climate Exchange, Inc.

**Project Title:** Carbon Credit Generation Program : Cost Effective Procedures to Enroll, Aggregate, Verify and Deliver Agricultural Carbon Credits to Private Sector Markets

**Period Covered by Report:** September 2006 to February 2008

<b>Project End Date:</b> February 2008	

## **Executive Summary:**

The Chicago Climate Exchange with the assistance of the NRCS and other stakeholders have developed a framework to facilitate the participation of producers in the market for CO<sub>2</sub> reduction. Chicago Climate Exchange continues to strive to reduce participation costs while ensuring the credibility of the program. Over the course of the program, verification costs per acres have decreased significantly. This decrease in costs results from an increase in the standardization of verification procedures, the facilitation of state level expertise to provide verification services and the continued success in the enrollment of new producers.

Through the funding provided by the grant, Chicago Climate Exchange expanded the eligible enrollment territory to include many of the agricultural production regions of the US. Further work is required to determine sequestration rates in certain productive agricultural regions of the country. Notwithstanding this lack of information, the program has proven the viability of the aggregation methodology for the agricultural sector.

## **A. Summary of Accomplishments**

### **Background**

The carbon credit generation program sought to further intensify and expand CCX's program to develop, aggregate, verify, register and make available for sale carbon credits from the U.S. agricultural sector in a voluntary rules-based market system. A copy of the grant approval is included in Appendix A. Under this proposal, CCX tested alternative quantification approaches, the viability of an agricultural program to meet the potential demand for carbon credits in the future, and the viability of expanding the proposed program to the national level.

This final report summarizes the results of the effort and assesses the achievements enabled by NRCS funding. This report will address progress in each of the key areas of the grant as well as provide a progress report of our efforts to develop carbon markets for agricultural producers.

### **The Benefits of Conservation Tillage and Grass Plantings**

Conservation tillage practices, including no-till and reduced tillage, have several advantages over conventional tillage practices, especially in drier climates. No-till agriculture has proven to be a viable strategy for sustainable management of soils. In addition to direct economic benefits arising out of higher yields and lower costs or a combination of both, several environmental benefits accrue resultant from these practices. No-till agriculture increases soil organic carbon while conserving soil water and inhibiting weeds. Soil organic carbon enhancement improves agronomic productivity and resource use efficiency, especially in distressed soils. In addition past research suggests that increasing the level of soil organic carbon contributes positively to overall soil quality.

In addition to the many environmental benefits the financial benefits of conservation tillage and grass plantings under the CCX offsets program are significant. Through carbon sequestration and other low-cost emission reductions, the emerging carbon markets introduce opportunities for farmers to realize a new income stream for producers by providing global environmental services. This is an important step toward establishing environmental goods and services as an income source and thereby diversifying risk through income diversification.

### **Timeline**

This report addresses events and achievements since the inception of the Grant in August of 2006 through the conclusion in mid February of 2008

### **Activities**

CCX initiated activities on the grant with a project kickoff meeting in September of 2006. The main deliverables outlined in the grant proposal will serve as a reference point to assess major milestones in the project. These deliverables outlined are as follows:

1. Expand the development and implementation of a market-based system for trading agricultural GHG emissions from conservation tillage, grassland plantings, and small scale forestry for 500 to 1,000 producers on up to 1,000,000 acres in the States involved.
2. Expand enrollment, verification and registration of GHG credits resulting from best management practices in animal agriculture and nutrient management.
3. Assessment of alternative GHG sequestration and quantification systems (i.e. the forthcoming US DOE 1605b, etc) for accounting for agricultural carbon.
4. Multiple educational seminars in the project territory.
5. Establishment of State-level verifiers and aggregators or aggregating representatives.
6. Development of a manual for designing such programs in other geographical areas.

The main items within this evaluation document are presented under the following categories that address the set of program goals and deliverables outlined above.

1. Program Expansion
2. Educational and Outreach Efforts
3. Enrollment of Verification and Aggregation service providers
4. Economics of Program

### **Program Expansion:**

One of the primary objectives of the work effort involved expansion of the eligible territory to include other regions in the country and to investigate the feasibility of other land use sinks for carbon sequestration. CCX invited a group of subject matter specialists, including many world renowned experts, from around the country to form a Soil Carbon Technical Advisory Committee (SCTAC). The SCTAC comprised of a diverse group of experts including personnel from the USDA, university researchers, soil carbon verifiers as well as farm groups. This committee, through a series of teleconferences and meetings, studied the feasibility of expanding the no-till and conservation tillage regions nationally. The expansion of eligible territory for the no-till and conservation tillage program is based on surveys of scientific literature across cropping systems in the U.S., weather patterns and other agronomic parameters. This information is used, along with expert judgment, to assign appropriate soil carbon sequestration rates for the continental U.S. A complete set of rules and crediting rates is included within the materials included in this report as Appendix B.

### **Educational and Outreach Efforts**

A central tenet of the current grant is the development of market for environmental services provided by the agricultural community. Education and Outreach efforts are fundamental to

successful market development. Appendix C consists of a sampling of the marketing and education material provided at the education outreach events and a listing of the frequency of events attended by Chicago Climate Exchange and the enrolled aggregators.

## **Verifier Manual**

The verification manual will be a key component of the project that will be utilized in several other deliverables, and will be an advancement of current procedures for verifying acreage in the CCX program. The document is largely technical, and builds on existing methods and guidelines (such as those of 1605b) to enable a greater set of production practices, geographic areas, and producers to be enrolled in the program. One objective is to standardize the set of procedures among regions and operations. A second objective is to facilitate the verification process such that transaction costs for verification are reduced (providing a greater return for producers and program interest on the part of aggregators). A copy of the verifier manual is included as Appendix D.

## **Aggregator Manual**

The aggregator manual is another key component of the project and will be an advancement of current procedures for enrolling acreage in the CCX program. The manual will focus on crop production practices and eligible regions. The manual was developed to be applicable to conservation farming and rangeland production regions. The intent of the document is to simplify and codify many of the areas of concern of prospective aggregators. The manual specifically addresses: the commercial requirements of being a CCX member, the experience or knowledge required, the commercial processes required to aggregate and verify producers for

participation in the carbon market. Further, manuals for verifiers and aggregators will provide the greatest amount of assistance to potential aggregators and verifiers that are least developed and need assistance most. Several of the current aggregators and verifiers will provide input to the document. A copy of the Aggregator Manual is included as appendix E.

## **Enrollment of Verification and Aggregation service providers**

Since the inception of this grant in September of 2006, several aggregators and verifiers have been enrolled. These new market participants have been active in the project cycle. In total, 4.9 million acres have been enrolled within the U.S. Enrollment is being actively pursued by several entities including non-profit farm associations, non-profit associations and for profit entities.

Active entities include:

- AgraGate Climate Credits Corp. (an entity of the Iowa Farm Bureau Federation)
- North Dakota Farmers Union
- The Delta Institute
- Kentucky Corn Growers Association
- First Capital Risk Management
- National Carbon Offset Coalition
- Tatanka Resources

These entities are actively pursuing aggregation in states already active in the program and in those regions wherein eligibility was recently expanded. Table 1 lists participation by state, total number of acres, contracts and tons that have been enrolled.

Table 1 State Level Participation by Acres, Contracts and Tons

	<b>Total contracts</b>	<b>Total acres</b>	<b>Total registered tons since August 2006</b>
AL	1	150	800
CO	149	263,472	104,700
GA	1	218	200
IA	511	269,476	778,500
IL	29	21,080	212,300
IN	87	56,417	98,900
KS	244	275,160	384,200
KY	6	5,272	77,100
MD	8	5,014	6,500
MI	17	8,624	48,000
MN	168	52,438	67,400
MO	67	32,013	60,300
MT	173	417,734	286,800
ND	1,149	1,519,014	1,339,400
NE	1,022	902,809	1,275,600
NY	1	326	200
OH	84	46,435	71,000
OK	7	20,949	3,600
PA	6	2,702	3,600
SC	4	894	200
SD	585	815,982	582,000
TN	5	5,739	4,200
TX	5	2,744	7,600
VA	1	639	800
WA	4	1,471	7,600
WI	100	26,978	61,400
WY	24	122,235	1,800
<b>Total</b>	<b>4,458</b>	<b>4,875,987</b>	<b>5,484,700</b>

**Participation by Verification Firms**

CCX also approved new soil carb on verification firms as a result of funding provided by the grant. These include North Dakota Association of Soil Conservation District as well as Association of Seed Certifying Agencies. These organizations with their national reach are expected to aid in bringing down the transaction costs for verification. The following firms are approved to provide verification services for CCX program participants:

- Agri-Waste Technology, Inc
- Association of Illinois Soil and Water Conservation Districts

- Association of Official Seed Certifying Agencies
- Michigan Association of Conservation Districts
- North Dakota Association of Soil Conservation Districts
- SES Inc.
- TUV SUD Industrie Service GmbH

## **Economics of the Program**

Consistent with the objectives of the grant, increased participation by aggregators and verifiers have been significant. A measurable benefit of increased participation is the reduction in transaction costs. The cost per acre for verification has decreased significantly in comparison to previous years. Verification which occurred during the final stage of the grant occurred at a cost per acre of approximately \$0.034, which is a fraction cost of the verification work done in the early stages of the program. The participation of conservation associations has provided significant cost savings in performing verification services when compared to parties external to the region.

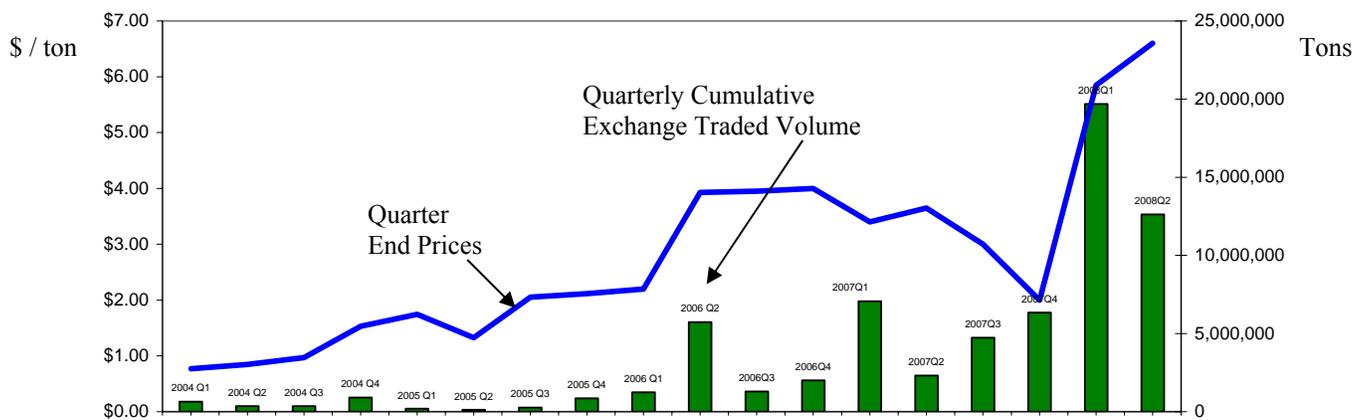
Similar general principles apply to the aggregation process. Those parties that are local and have existing networks in the producer communities tend to have significantly greater participation than entities that are external to the producer community at the time of initiation. The result is that aggregation businesses that leverage existing networks such as the Farm Bureau network and the National Farmers Union have had greater enrollment success than other groups. CCX staff has observed an increase in the level of interest in aggregation from agricultural related business, i.e. those with established producer networks. It is expected that increased competition

in the aggregation business will result in greater benefits for producers as transaction costs are decreased and competition increases the share of revenues from the sale of offsets.

**Summary of the Financial Proceeds Transferred to Enrolled Producers:**

Since the inception of the grant, the value for one metric ton of sequestered CO<sub>2</sub> has fluctuated between \$1.90 per ton and \$7.00 per ton. Since August of 2006, a total of 5,484,700 metric tons of CO<sub>2</sub> from soil sequestration were registered in at Chicago Climate Exchange through the carbon credit generation program. At current market prices of \$7.00 the notional market value of sequestration services provided by producers is approximately \$40.0 million. The following illustrates quarter ending market prices along with quarterly cumulative exchange traded volume since inception of the CCX program.

Figure X: Quarterly CCX Market Price and Exchange Trading Volume: 2003 – current



**Summary of Grant Tasks and Deliverables by CCX**

The grant was broken out into the six distinct deliverables listed here. This section of the report summarizes the work product achieved by Chicago Climate Exchange and the enrolled aggregators.

Deliverable 1: Document entitled “ *Carbon Credit Generation Project Implementation Plan*”: After Convening a meeting of the project team, including representation from the State Conservationists, a refined implementation plan will be developed. This will included a refinement of core tasks, such as the design and implementation of in-field verification systems, methods to recruit farmers, aggregators and program evaluation and reporting.

Chicago Climate Exchange developed in coordination with aggregators, verifiers and state level conservationists a document entitled “*Carbon Credit Generation Project Implementation Plan*”. The document was delivered to NRCS during the first grant progress report in February of 2007 and included a detailed timeline for implementing the components of the grant.

Deliverable 2: NRCS deliverable document titled “*Methods for Conducting In-Field Inspections for Carbon Credit Generation* ,” is to develop and enhance methods for conducting in-field inspections of participating farmers with the following areas of focus:

- i. Identifying enrolled parcels, verifying no-till, and quantifying benefits;
- ii. Identifying and training private and public sector staff;
- iii. Determining appropriate inspection rates (on the basis of statistical and cost-efficiency considerations);
- iv. Verification reporting, auditing of the verification process; and
- v. Assess and reduce transaction costs for small scale participants.

The report is for distribution to current and potential verifiers (and aggregators) to act as the standardized procedures for validating crop and rangeland acreage for the CCG program.

This document has been developed by Chicago Climate Exchange and is entitled “ *Methods for Conducting In-Field Inspections for Carbon Credit Generation* ” also commonly referred to as the ‘*verifier manual*’.

Deliverable 3: NRCS deliverable document titled “Carbon Credit Aggregation Procedures,” is to identify and prepare carbon credit aggregation procedures with the following area of focus:

- i. Finalize contract specifications and reporting methods;
- ii. Identify and train aggregation entities;
- iii. Enroll aggregators with CCX, establish CCX registry and trading accounts; and
- iv. Prepare process for quantifying offsets using US DOE 1605b methods.

The report is for distribution to current and potential aggregators to act as the standardized procedures for aggregating the verified acreage into the CCG program.

This document has been developed by Chicago Climate Exchange and is entitled “Carbon Credit Aggregation Procedures” also commonly referred to as the ‘*aggregator manual*’ and is included in this report.

Chicago Climate Exchange also prepared a process for quantifying offsets using US DOE 1605b methods. The US DOE 1605b approach involves using the “Comet VR” carbon calculation tool to estimate carbon sequestration on individual farms. Whereas Chicago Climate Exchange has elected to determine, with an expert group of soil scientists, the average sequestration rates for the various major

land resource areas (ML RAs) based on published peer reviewed literature for the given conservation tillage practice.

CCX staff in conjunction with our aggregator members have compared carbon sequestration rates generated using the CCX approved values and the US DOE 1605b COMET-VR on-line carbon calculation tool. Results of this exercise have proved informative. On average, the carbon sequestration values generated by inputting enrolled CCX farms and parcels into the COMET-VR calculation tool have been lower than the values approved by CCX. However, in some instances the values have come quite close or been roughly the same as those approved by CCX.

While the reported sequestration values have differed it perhaps equally or more important to note that many aggregators who assisted with this exercise expressed that the options provided by the COMET-VR calculation tool for crop rotations and other management practices did not allow for an accurate representation of the farms activities. While it is impossible for CCX to know, this may explain some of the differences in rates found between COMET-VR and the CCX approved rates.

CCX feels that a more systematic research approach to comparing COMET-VR with CCX approved values, as well as other established values from research stations, etc., is warranted. Such an effort may be enhanced with the collaboration of entities such as the Consortium for Agricultural Soils Mitigation of Greenhouse Gases (CASMGs), USDA ARS, or other soil carbon research institutions.

The role of the verifier in the Chicago Climate Exchange soil program process is two fold involving both a office and a field component. First, the verifier is to ensure that the information on enrolled participants is accurate, well maintained and properly reflects producer sign ups. The second stage of the process involves a field component wherein the verifier is to ensure the participating producers performed the specified practices on the enrolled acres.

Deliverable 4: State Level Seminars: State level seminars will be conducted in each of the states involved, with the assistance of the verifiers and aggregators representing each of the states or regions. Training and education materials will be developed for future carbon credit generation efforts.

Chicago Climate Exchange, the various enrolled aggregators, verifiers and extension services hosted, presented, and attended several numerous seminars. To facilitate each of the seminars, training and educational material was provided by all the stakeholders including Chicago Climate Exchange, the aggregators and other interested parties. A copy of the education and material is included in this report.

Deliverable 5: Program implementation will use the developed methods and procedures to create a standardized system for trading agricultural emission offsets from conservation tillage and grassland plantings. The project deliverable is enrollment of 500 to 1,000 producers on up to 1,000,000 acres in the States involved.

Chicago Climate Exchange enrolled several new aggregators and many new producers over the period of the grant. New acres enrolled in the program exceeded 4.8 million and new enrollments are 4,458 contracts. These new acres and contracts were enrolled in existing and new states wherein the program was expanded. Producers were enrolled into the aggregators databases. Verification occurred on the enrolled acres pursuant to the procedures of the CCX program. Verification reports were provided to CCX and tons issued into the CCX registry accounts in the name of the aggregators. Pursuant to the agreements between aggregators and producers, the aggregators had the ability to access the market to sell the registered tons to other Members of the Chicago Climate Exchange.

Deliverable 6: Final project evaluation of the CCG is to evaluate the success of the stated goals and effectiveness of the project deliverables.

This report consists of the deliverable for this portion of the grant. The executive summary of this report specifically addresses the evaluation points.