

## Overview of Carbon Trading in Agriculture

### What is Carbon Trading and What is Cap-and-Trade?

Since the beginning of the industrial revolution, combustion of fossil fuels for energy has increased the concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere. Carbon dioxide is a “greenhouse gas” that allows UV light to pass through the atmosphere but traps the heat radiated back from the earth, causing the average temperature of the atmosphere to increase. Carbon trading is a strategy for mitigating the emission of CO<sub>2</sub> and other greenhouse gases through a “Cap-and-Trade” system.

Cap-and-Trade systems are regulatory programs that cap harmful emissions such as mercury, sulfur and carbon by limiting them through a permitting system, and distribute the emissions permitted to different stakeholders. These rights are called allowances, permits or credits. Stakeholders can buy and sell the rights to the permitted emissions after initial distribution. The goal of the cap is to prevent further increases in net emissions. For example, a given polluter may find it more economical to reduce emissions well below their cap and sell the resulting “carbon credits” to a polluter who cannot easily modify their operations to meet the cap limit. Once the cap is achieved, regulators lower the cap further, thus systematically reducing net emissions over time.

The Kyoto Protocol is a global Cap-and-Trade program to mitigate the man-made production of greenhouse gases. While the United States has not signed the Kyoto Protocol, individuals, companies and states are voluntarily making agreements to reduce

emissions or purchase credits from others who have reduced emissions on a public exchange called the Chicago Climate Exchange (CCX)

([www.chicagoclimatex.com](http://www.chicagoclimatex.com)), or on private exchanges such as the Carbon Fund or others listed on an Environmental Defense webpage:

([www.fightglobalwarming.com/page.cfm?tagID=270](http://www.fightglobalwarming.com/page.cfm?tagID=270)).

In December 2005, seven northeast states agreed to the Regional Greenhouse Gas Initiative (RGGI, [www.rggi.org](http://www.rggi.org)), a proposed Cap-and-Trade program that would regulate carbon dioxide emissions from only the electric sector beginning in 2009.

### What are the Greenhouse Gases Produced on a Farm?

Carbon trading is a somewhat inaccurate term since there are other greenhouse gases that are not carbon-based that contribute to climate change. However, since CO<sub>2</sub> is the major greenhouse gas, the term carbon trading is appropriate and is considered an umbrella term for the trading of all greenhouse gases. Other common agricultural greenhouse gases are methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). These gases are much more potent in their ability to retain heat in the atmosphere. Methane has a global warming potential (GWP) 23 times greater than CO<sub>2</sub>, and N<sub>2</sub>O has a GWP 296 times greater than CO<sub>2</sub>. As such, all other important gases are multiplied by their conversion factor to obtain CO<sub>2</sub> equivalents, or CO<sub>2</sub>e. (For example, 23 tons of CO<sub>2</sub> or 1 ton of CH<sub>4</sub> equal 23 tons of CO<sub>2</sub>e.) Reductions in CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O can be traded in carbon trading markets.

### What is Carbon Sequestration?

Carbon sequestration is a term used to describe storage of carbon in a biological or geological sink. Biological sinks are soil, plants, trees, and the ocean. For carbon sequestration to have a meaningful impact on the atmosphere, it is necessary to ensure that the carbon remains sequestered and is not released back into the atmosphere through other biological processes.

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## What is Fossil Fuel Displacement?

Fossil fuel displacement is any practice that reduces the amount of fossil fuel combusted for energy. Displacement of fossil fuels reduces the amount of buried carbon released into the atmosphere. These absolute emission reductions are considered tradable on some markets. Efficiency is also tradable. See [www.icbe.com/carbon/database/priceconverter.asp](http://www.icbe.com/carbon/database/priceconverter.asp) to calculate the value of avoided fossil fuel.

## What are Offsets?

Offsets are greenhouse gas reductions achieved by non-regulated parties. In the case of RGGI, the regulated parties are large electric power plants. Greenhouse gas mitigation achieved by non-regulated parties, such as farms, can be purchased as offsets by a regulated power plant to meet a small fraction of their required cap. Offset opportunities relevant to farms under RGGI include methane capture, end-use efficiency for natural gas, propane or heating oil, and planting trees. In effect it is a payment from regulated or voluntary entities to the agricultural sector for early adoption of practices that reduce greenhouse gas emissions without regulation. The RGGI Model Rule describes the terms for each offset category (see [www.rggi.org](http://www.rggi.org)).

## What are the Opportunities to Trade Carbon?

Currently, carbon trading is a futures market in the U.S. In Europe, where greenhouse gases are regulated, carbon sold for \$16-30/metric ton between January and June 2006. In the U.S., it has sold for \$2-4/metric ton on CCX, and \$4-8/metric ton on the private exchanges. There may be some financial gain for those

who invest in carbon trading before it is mandated. As such, farmers, landowners, and others should be cautious when signing a contract for \$2/metric ton over several years. The market is rapidly changing and there are many unknowns about how to quantify and verify tradable units to ensure that these units do not leak back into circulation.

## What is a Saleable Unit of Carbon Credits?

Carbon credits on the CCX sell in 100-metric-ton units. Often a single practice, farm or entity is unable to amass a sufficient quantity of carbon credits to merit a saleable trade, and a middleman, or aggregator, is necessary to collect different farms' credits. An aggregator is a person, firm, or entity that collects credits from several individuals through contracts to sell in 100-metric-ton units to a buyer. (See the CCX rulebook at [www.chicagoclimatex.com/info/rulebook.html](http://www.chicagoclimatex.com/info/rulebook.html).)

## Summary

Greenhouse gas emissions are currently unregulated in the U.S. Anyone interested in trading carbon credits should realize there is a futures market for carbon trading and the rules of the game are still being developed. Income generated from carbon trading could help pay for adoption of new practices and improve farm viability. Close attention should be paid to the language in contracts and the requirements (percentages, time commitment) to ensure flexibility to adjust to a changing regulatory system.

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