Introduction to Carbon Trading in Agriculture

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What is Carbon Trading?
Since the beginning of the industrial revolution, combustion of fossil fuels for energy has increased the concentration of carbon dioxide (CO_2) in the atmosphere. Carbon dioxide is a "greenhouse gas" (GHG) that allows Ultra Violet (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 (To learn more about the science of climate change, http://www.climateandfarming.org/pdfs/FactSheets/I.1Science.pdf). Carbon trading is a strategy for mitigating the emission of CO_2 and other GHGs through a "Cap-and-Trade" system.

What is Cap-and-Trade?
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 distributing 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 (for more on Cap-and-Trade, see Fact Sheet A2).

The Kyoto Protocol is a global Cap-and-Trade program to mitigate the man-made emissions of GHGs. 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, See Fact Sheet C1), or through private sales with organizations such as the Carbon Fund: (www.fightglobalwarming.com/page.cfm?tagID=270). Currently ten northeast states have agreed to the Regional Greenhouse Gas Initiative (RGGI, www.rggi.org, See Fact Sheet D2), a Cap-and-Trade program that will 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 GHGs that are not carbon-based that contribute to climate change. However, since CO_2 is the major greenhouse gas, the term carbon trading is appropriate and is considered an umbrella term for the trading of all GHGs. Other common agricultural GHGs are methane (CH_4) and nitrous oxide (N_2O) (see Fact Sheet A3). These gases are much more potent in their ability to retain heat in the atmosphere. CH_4 has a global warming potential (GWP) 23 times greater than CO_2, and N_2O has a GWP 298 times greater than CO_2. As such, all other important GHGs are multiplied by their conversion factor to obtain CO_2 equivalents, or CO_2e (For example, 23 tons of CO_2 or 1 ton of CH_4 each equal 23 tons of CO_2e). Using established protocols, measured reductions in GHGs can be traded in carbon trading markets.

Selling Agricultural Offsets
Offsets are GHG emission reductions achieved by non-regulated parties. Offsets are environmental attributes defined by rules and contracts according to adoption of practices that have been demonstrated to reduce GHG emissions and may be monetized. For agriculture, offsets can be achieved by three main mechanisms: carbon sequestration (storing carbon in forests or soils), by fossil fuel displacement (alternative energy or energy efficiency), by GHG destruction (combusting methane to reduce its GWP). In the case of RGGI, the regulated parties are large electric power plants. GHG 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. For offset opportunities relevant to farms see Fact Sheet A4; for CCX offset opportunities, see Fact Sheets in section C; for RGGI offsets, see Fact Sheets in section D.