No-Till On The Plains 2001 Speakers - Jim Kinsella

Reduce Global Warming Potential With No-till

Lexington, IL 61753

Jim operates a 850-acre farm which has been in a continuous no-till corn/soybean system since 1977. He has been monitoring yields for eight years and using GPS to map yields and control inputs for seven years. Besides his farming operation, Jim also manages the Ag Tec Center located on the farm in cooperation with DuPont Ag Products. The Center is devoted to evaluating the latest technology in agriculture and then helping other farmers adopt this technology to improve efficiency and environmental stewardship.

Jim holds a BS in Agronomy and an MS in Soils from Southern Illinois University.

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Most debates over solutions to global warming have been concentrating on the combustion side of the carbon cycle. This is unfortunate because the biological side of the carbon cycle (photosynthesis and mineralization) may offer the greatest opportunities for practical solutions.

There are approximately 320 million acres of land in the U.S. which is still being tilled to grow field crops. Current and past tillage practices have mineralized much of the stored organic matter (humus) in these soils, releasing billions of tons of CO_2 into the atmosphere. This oxidation of humus, along with the increased combustion of fossil fuel (old buried humus), has surely contributed to the increasing concentration of CO_2 in the atmosphere in this century. Using our humus depleted cropland as a biological sink for some of the excess CO_2 appears to be a practical and cost effective method of reducing atmospheric CO_2 levels.

On our home farm in Central Illinois we have been growing corn and soybeans in a complete no-till system since 1975. In that period our soil organic matter has more than doubled, going from an average of 1.9% in 1974 to 3.9% in 1999. In just 26 years we have taken around 10 tons of carbon from the atmosphere and added it to the top 7 inches of soil on every acre. We have also increased SOC (soil organic carbon) below the 7 inch level due to increasing earthworm activity and increasing root volume and depth.

The adoption of no-till farming has been slow, primarily because there currently is a disincentive to no-till, called mineralization. Tillage temporarily increases the O_2 level in the soil which increases the mineralization rate of organic matter thus enhancing the release of CO_2 into the atmosphere. There is a corresponding oxidation of nutrients contained in the organic matter, the most abundant being nitrogen. These released nutrients, which become available for plant uptake, provide a short term economic advantage for tillage. Since plant nutrients have a known value and C doesn't, SOC is sacrificed to temporarily increase nutrient availability to plants. This is a short term benefit to the producer but a long term detriment to the quality of our soil, water and air.

To offset this nutrient advantage provided by tillage there must be a value placed on carbon and an economic incentive to store it. There is a wide range of estimates of the value of C, but considering its energy value, the value of humus and the liability of excess CO_2 in the atmosphere, it would seem a value of $100/T or 5¢/ lb. of C would be quite reasonable. For once farmers have the opportunity to set the price for something they produce, in this case SOC. I propose that farmers set $100/ton of C as their "minimum wage" for taking CO_2 out of the atmosphere and storing it in their soils.

The most practical method of providing this incentive appears to be a modification of our existing farm support system to pay farmers for the C they sequester and store. These incentives could come as cash payments, tax

credits or credits for crop risk or income insurance. This would be similar to other voluntary farm programs such as CRP. The incentive would have to be high enough to encourage participation as well as to offset additional expenses and/or risk.

There is considerable variability between crops and environments on the amount of carbon sequestered and retained. The Agriculture Research Service could use existing information and begin gathering additional data to develop carbon retention models on which payments would be based. Models could also be developed and payments made for humus added to the soil by various cover crops, as well as from applications of manure, sludge, landscape waste and other sources.

The carbon payments should stay with the land and would be redeemable, at least in part, if and when broadcast tillage is resumed. It makes no sense to pay farmers to sequester and store carbon and then allow them, or other farmers, to till the soil sending most of the recently stored carbon back to the atmosphere without retribution.

If a carbon storage incentive was part of the 2002 Farm Bill, we would have 8 years to refine all aspects of the concept and we could lead the rest of the world into compliance with the Kyoto Accord by 2010. Besides improving air quality, a carbon storage incentive would greatly reduce soil erosion, improve soil and water quality, improve productivity and our global competitiveness and make our agriculture sustainable.

For a very minimum cost to taxpayers farmers now have the opportunity to provide the public with something beyond just abundant and cheap food; (1) A reduced risk of effects from global warming, (2) a cleaner environment and, (3) long term food security. WHAT A BARGIN!