Carbon Credits on the Chicago Board of Trade?

That this is even being discussed as a serious possibility shows how quickly the carbon cycle has gone from what seems to many to be an arcane science to securing a place in the world's economic and political arena.

All this happened recently when soil carbon entered the debate over international agreements about greenhouse gases. Web sites have already appeared, offering to trade credits on stored soil carbon just as air pollution credits are currently traded worldwide. Carbon boards of trade have set up shop in the United States, Canada, and New Zealand—although not yet at the Chicago Board of Trade—and no credits have been traded. But carbon prices have been set initially at $6 to $8 a ton.

All the hubbub comes from the fact that soils, through plants, can capture carbon from industrial carbon dioxide emissions and reduce atmospheric levels of this greenhouse gas.

Even if fears of global warming prove unfounded, there would be no regrets about stockpiling carbon in our soils. Soil carbon has so many other benefits that it seems priceless.

For starters, soil carbon is what made our prairie soils so black and fertile. It helps soil retain more water and nutrients and helps soil hold together, making it better able to resist erosion by rain or snowmelt. This makes soil more productive and able to support bigger and better crops at the lowest possible economic cost to farmers.

Soil carbon also lowers environmental costs to farmers, their communities, and society by keeping soil—and any attached pesticides or nutrients—out of streams, lakes, and other bodies of water, where they become pollutants.

So it wouldn't hurt to stockpile a couple of hundred million tons of carbon in U.S. farm and rangeland soils and bring the land closer to what it was centuries ago.

And that's exactly what a team of ARS scientists, working with USDA's Natural Resources Conservation Service (NRCS) and universities, has determined to be the potential storage capacity of U.S. farm and rangeland soils. Ronald Follett leads the team from Fort Collins, Colorado, and is a co-editor of two books that discuss this potential. His colleague, Marlen Eve, recently used NRCS land-use data to estimate that these lands are currently accumulating 20 million metric tons of carbon a year. When you add that to Follett's figure of the potential for U.S. farmers to store another 180 million metric tons of carbon a year with improved management and new techniques, you have 200 million metric tons that can be deposited in the carbon bank each year.

Eve's figures were the official U.S. figures used in recent international discussions on limiting greenhouse gas emissions. Eve and other ARS scientists served as technical advisors at these meetings.

International concerns about rising CO_2 levels have given a needed boost both to ARS research on the carbon cycle and to conservation tillage—a range of practices that limits or reduces tillage to varying degrees. In developing soil carbon storage estimates, Follett's team documented that conservation tillage is the best way to store carbon—short of not growing an annual crop. The only practice that exceeds conservation tillage's ability to store carbon is resting land as unharvested perennial grasslands, as is done in existing USDA programs such as the Conservation Reserve Program. This program pays farmers to plant highly erodible land with perennial grasses or trees that are retained for at least a decade.

There are other practices known to store carbon, including minimizing or eliminating fallow, planting winter cover crops, and maintaining buffer zones.

Buffer zones can be large wetlands or large areas planted with grass, shrubs, trees, or other plants to filter out soil or attached pollutants from runoff. They stand between a farm field and a stream or other body of water or drainage ditches.

Fallowing is the practice of leaving fields unplanted, in this case for at least a year to give the soil a chance to stock up enough moisture for a profitable crop. Farmers in the arid West have traditionally relied on this technique because their land doesn't receive enough rain for a crop every year.

Follett's team studied land-use changes over the past few decades and saw a decline in the use of fallow. This occurred at the same time USDA increased flexibility in farm programs, giving farmers more planting options. Farmers used yearly crop rotations and practices that conserved more water in the soil and included crops that either required less water or had roots deep enough to reach water missed by the previous crop.

Because the change in practices mirrored a liberalization of farm programs, it demonstrates that changes in farm policy can cause farmers to store even more soil carbon. That lesson is not being lost in planning U.S. conservation and agricultural legislation.

Whether carbon storage has a place in international agreements or not, its place on the domestic agenda seems secure. It could be as carbon credits traded on private or public markets or both. It could also be as incentive payments for farm practices that store carbon and conserve other resources.

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