FINDINGS

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Is Carbon Sequestration in Agriculture Economically Feasible?

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Increased atmospheric concentrations of carbon dioxide and other "greenhouse" gases have contributed to the gradual rise in global temperatures over the last 50 years. Two options for reducing the amount of carbon in the atmosphere are to increase the amount of land planted with permanent grassland or forest vegetation and to reduce the frequency or intensity of tillage operations. Either option would store—or sequester—additional carbon on the affected lands. In February 2002, the White House announced a plan to reduce the growth of U.S. greenhouse gas emissions, in part by developing incentives for farm and forestland owners and operators to adopt land uses and management practices that extract carbon from the air and sequester it in soils and vegetation.

U.S. agricultural soils have lost, on average, about one-third of the carbon they contained before wide-scale cultivation began in the 1800s. Soil science studies suggest that changes in land use and land management practices could increase the carbon content of crop and grazing land soils by 104-318 million metric tons per year. Forestry studies suggest that afforestation of cropland and pasture could add another 91-203 million metric tons per year.

While the U.S. farm sector's technical potential to store carbon is important to know, it is really the economic potential for storing carbon that is most directly relevant to policymakers. Using different incentive payment structures, ERS researchers analyzed the economic feasibility of increasing carbon levels in soils and vegetation by providing various levels of payments to convert croplands and pasture to trees, shift cropland to permanent grasses, and/or increase the use of conservation tillage systems.

At payment levels below $10 per metric ton of additional permanently stored carbon, landowners find it more cost-effective to adopt conservation tillage practices, as compared with other changes to land use and management practices. At higher payment levels, converting cropland to trees becomes more cost effective. For payments equal to $125 per metric ton of additional permanently stored carbon, farmer adoption of conservation tillage and afforestation of crop or grazing land could yield 72-160 million metric tons of carbon, enough to offset 4-8 percent of gross U.S. emissions of greenhouse gases in 2001. Converting cropland to grass did not prove to be a cost-effective option at any payment level analyzed.

The economic potential, even at the $125-payment level, is much less than the technical potential suggested by soil science and forestry studies because activities that are technically feasible are not always economically feasible. Furthermore, the share of the technical potential that is economically feasible varies greatly across activities because of the wide variation in the costs farmers would incur in adopting different carbon-sequestering land uses and practices.

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This finding is drawn from . . .

Economics of Sequestering Carbon in the U.S. Agricultural Sector, by Jan Lewandrowski, Mark Peters, Carol Jones, Robert House, Mark Sperow, Marlen Eve, and Keith Paustian, TB-1909, USDA, Economic Research Service, April 2004, available at: www.ers.usda.gov/publications/tb1909/