Introduction

The 1985 Food Security Act (FSA) ushered in a new era of U.S. agri-environmental policy. Although much attention has been focused on large-scale, long-term land retirement through the Conservation Reserve Program (CRP), the adoption of compliance mechanisms was an important agri-environmental policy innovation. In general, compliance mechanisms require farmers to meet some minimum standard of environmental protection on environmentally sensitive land as a condition of eligibility for Federal farm program benefits—principally farm commodity program payments. Coupled with changes in the 1985 FSA that made commodity program participation more attractive to producers, compliance mechanisms have come to play a significant role in U.S. agri-environmental policy. The most recent farm bill, the Farm Security and Rural Investment Act of 2002, retained compliance mechanisms with only minor technical revisions.

At present, compliance mechanisms address soil conservation on highly erodible land—provisions widely known as "Conservation Compliance" and "Sodbuster"—and wetland conservation—a provision widely known as "Swampbuster." Conservation Compliance requires producers already cropping highly erodible land (HEL) to implement soil conservation plans or risk losing their Federal farm program benefits (see box, "Soil Erodibility and Soil Erosion"). Sodbuster places similar, albeit more stringent, requirements on producers who bring previously uncropped HEL into crop production. Under Swampbuster, producers who convert wetland for crop production can lose Federal farm program benefits.

Compliance mechanisms are part of broader strategies for soil conservation and wetland protection. CRP and Conservation Compliance/Sodbuster were enacted in 1985 as part of an overall strategy to conserve soil. Farmers who already cropped HEL could adopt required conservation systems or retire land by enrolling it in the CRP, while Sodbuster was designed to deter farmers from bringing more HEL into crop production. Swampbuster was also one of a number of policy changes designed to stem wetland loss in agriculture. The Tax Reform Act of 1986 eliminated tax breaks that encouraged conversion of land to crop production, reducing the incentive to convert both HEL and wetland to crop production, complementing the Sodbuster and Swampbuster provisions of the 1985 FSA. The Wetland Reserve Program (WRP), enacted in 1990, restores and protects previously drained wetlands on agricultural land.

Since compliance mechanisms have taken effect, soil erosion on HEL cropland and wetland conversions for agricultural production have declined sharply (Heimlich et al., 1998; Claassen et al., 2000; 2001). Nonetheless, questions about the effectiveness of compliance mechanisms remain: What proportion of overall cropland erosion reduction is actually due to Conservation Compliance? Is Swampbuster actually constraining wetland conversion for agricultural production? Will environmental benefits increase if compliance is extended to address additional environmental problems?

Soil Erodibility and Soil Erosion

Largely through compliance mechanisms, U.S. soil conservation policy targets highly erodible land (HEL). HEL is defined as land with an erodibility index (EI) of 8 or larger. The erodibility index is, in turn, defined by the ratio of inherent erodibility to the soil loss tolerance. Inherent erodibility for a given soil is the rate of erosion (tons per acre per year) that would occur on land that was continuously clean-tilled throughout the year. The soil loss tolerance is an estimate of the rate of soil erosion that can occur on a given soil without significant long-term productivity loss. Thus, the erodibility index captures both the propensity of a soil to erode and the potential for damage from erosion. Actual soil erosion, however, reflects a complex interaction of climate, topography, soil characteristics, land use, and land management practices. Actual erosion is typically far less than a soil's inherent erodibility due to ground cover (grass, trees, crops, crop residue) and conservation practices (e.g., terraces or windbreaks) installed by farmers and landowners.

While soil erosion is difficult to measure under field conditions, physical process models can be used to predict both inherent erodibility and the average annual rate of soil erosion, given climate, topography, soils, land use, and land management. The Universal Soil Loss Equation (USLE; Wischmeier and Smith, 1978) and, more recently, the Revised Universal Soil Loss Equation (RUSLE; see http://www.sedlab.olemiss.edu/rusle/overview.html), and the Wind Erosion Equation (WEE; Skidmore and Woodruff, 1968) have been used widely in conservation planning and program implementation.

Because average annual erosion rates can be estimated with and without various conservation practices, the models have greatly facilitated policy implementation. Farmers, working with conservation planners, can use physical process models to develop cost-effective conservation systems. These models are used to implement conservation compliance and other USDA conservation programs.

In this report, we define compliance mechanisms, discuss their general characteristics, analyze the effectiveness of compliance mechanisms (with particular focus on the role of Conservation Compliance in reducing soil erosion on highly erodible cropland), and discuss the potential for expanding compliance to address nutrient runoff and leaching from land in crop production.