

Publications

TR-93

Erosion and Sediment Damages and Economic Impacts of Potential 208 Controls: A Summary of Five Watershed Studies in Texas

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This report summarizes results of economic analyses of erosion and sedimentation in five agricultural watersheds in Texas (see fig. 1). Economic analyses of the study areas considered both the on-farm economics of soil conservation and the economic consequences of various sedimentation control options. These topics were joined in the studies because they deal with different facets of the same problem. Unlike some potential pollutants,

soil particles transported from a farmer's field that may become a problem downstream are a valuable resource, not a waste product. Because soil is valuable in itself, some level of soil conservation is going to be economically desirable even if downstream damages are not present or are not considered by the farmer. Results of the studies show that soil conservation does indeed pay in many situations and that its value is greater the longer the planning horizon of a farmer. This suggests that an educational program in this regard may reduce sediment damage while increasing farm income at the same time .

Sediment can cause environmental damage (off-site costs) both directly and indirectly. Directly, the soil particles can cause environmental damage by filling up reservoirs and flood control structures and by deposition in other places. Indirectly, sediment can cause environmental costs by carrying plant nutrients that are potential pollutants. For the study watersheds, no evidence was found that the concentration of plant nutrients in the water posed health hazards to livestock or humans, nor caused undue eutrophication in the watersheds. Consequently, the study focused on off-site sediment damages resulting from shortened economic lives of reservoir and flood control structures and from sediment deposition in the watershed.

Annualized off-site sediment damages ranged from a high of 26 cents per ton of gross erosion in Lake Lavon watershed to 14 cents per ton of gross erosion in Duck Creek, to 13.5 cents per ton of gross erosion in Lower Running Water Draw, to a negligible amount in Turkey Creek and Cameron County. These estimates are considerably lower than off-site sediment damages in corn belt watersheds (Lee & Guntermann). Policy Options for Controlling Sediment

Public policies that can be implemented to abate off-site sediment damages include direct regulation, provision of economic incentives, education, and public investment. For point sources of pollutants, regulations are typically directed toward the pollutant at or near the point of emission into waterways. However, this is infeasible with non-point sources such as sediment because they enter waterways at an infinite number of points. Hence, regulations must be directed toward the practices that cause erosion and thus sedimentation.

The economic incentive option includes alternatives such as Federal or State cost-sharing for adoption of conservation practices, and disincentives such as taxes or penalties on erosion. Education is a viable policy option in situations where producers are not adopting soil conservation practices that would be profitable. In these situations a successful education program would increase producer's income as well as reducing off-site sediment damages. Public investment could be used to pay for dredging sediment from reservoirs and flood control structures to prevent loss of flood control, water supply and recreational benefits.

Social benefits and costs of various policy options based on direct regulation, taxation, and provision of economic incentives were estimated for three watersheds: Lake Lavon, Duck Creek, and Lower Running Water Draw. Items considered in the benefit-cost analysis were: (a) farm income consequences; (b) off-site sediment damages abated; (c) governmental cost or revenue; and (d) administration and enforcement costs associated with each policy. The major conclusion of this social benefit and cost analysis is that off-site damages are not large enough to warrant controls on agricultural activities in any of the watersheds; that is, the costs to society of controls exceed the total benefits to society for all of the policy options considered. Another conclusion is that an education program that emphasizes the on-farm profitability of

conservation practices may reduce sediment damages while simultaneously increasing farm income.

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