ENVIRONMENTAL ISSUES FROM AN ECONOMIC PERSPECTIVE

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There are many dozens of different economic perspectives on environmental issues affecting and affected by agriculture. The particular slice of perspectives I will examine today concerns the effectiveness with which scarce public resources have been devoted to environmental protection associated with agriculture. I will then juxtapose the trend in agroenvironmental protection programs against trends in the structure of the farm sector to arrive at some logically deduced conclusions about future policy pathways.

I begin by reviewing the allocation of public resources to environmental protection associated with agriculture. The two major sources of agroenvironmental protection resources are the federal and state governments, and each of these has different implications for the contribution of private resources by agricultural producers.

Federal Programs

Federal soil and water protection efforts historically have focused on providing economic incentives and the educational and technical assistance backups for voluntary actions by producers to enhance resource and environmental quality. At present there are more than twenty separate U.S. Department of Agriculture (USDA) programs that provide technical assistance, cost-sharing payments, or rental or easement payments as friendly inducements for voluntary actions by producers. This is an expensive approach. Currently, annual federal expenditures are around $3.5 billion, with programmatically related state and local appropriations adding another $500 million to these programs' public cost (U.S. Department of Agriculture). Producers chip in their own resources to these efforts, either by contributing their share of the cost of subsidized conservation structures or practices, or by foregoing future opportunities for alternative uses of land placed in the Conservation Reserve Program (CRP), wetlands reserve, or easements. But, because the programs are voluntary, it is not unreasonable to assume that the producers' share of their costs is yielding some private return in the form of increased land values, decreased variable production costs, or reduced income risk. They thus take more the form of investments than imposed costs.

The many evaluations of this set of voluntary, educational, tech-

nical and financial assistance programs find that the programs are not cost effective. Furthermore, with a few exceptions, their absolute environmental effectiveness is inextricably linked with the necessity of continuous funding. In other words, their environmental benefits are temporary insofar as without continued rental payments or cost-sharing payments, practices will revert in large part to ones that do not address environmental protection goals as effectively, if at all.

This reliance on government subsidies has two substantial, long-term problems. One is that it makes agroenvironmental benefits exceptionally vulnerable to the budget pressures that plague all areas and levels of public programs. Second is that with voluntary programs providing incentives for adoption of existing technologies, andwith technological fixes being avoided by placing vulnerable lands in reserve, there is no inducement for the private development of innovative technology to provide long-term, sustainable agroenvironmental protection.

The exceptions to this impermanence of effect are noteworthy. One exception is the adoption of conservation tillage and the development of new technology to profitably implement conservation tillage. The success of this aspect of agroenvironmental protection, though, owes as much or more to the energy crisis and rising energy costs as to USDA programs. Certainly, the technical and financial assistance programs accelerated the adoption of conservation tillage, but economic pressures would have likely led to similar adoption trends over a more extended period. Conservation tillage is profitable. Its use and increased adoption will continue whether or not it is subsidized.

The other exceptions to impermanence relate to the few technical and financial assistance programs that help producers adopt practices that would, even in the absence of subsidies, be necessitated by environmental regulation. These include wetlands protection, integrated pest management on commodities for which pesticide regulations are restricting chemical control options, and water conservation in regulated watersheds.

There is not a long list of exceptions in this category because to date, and relative to other industries, agriculture has not come under a lot of pressure from environmental regulation. True, the private response to Federal pesticide regulation has put economic pressure on some producers. Wetlands protection and restoration requirements are a burden to agriculture in some regions. Section 402 of the Clean Water Act treats feedlots and large animal confinement operations in the same way as industrial point sources of pollution. The Endangered Species Act, the Central Valley Project Improvement Act, and other federal laws have imposed large costs on producers in localized areas. And, yes, conservation compliance, sodbuster and swampbuster have engendered costs to producers who

have exhibited a willingness to endure those costs in return for farm program benefits.

But, in general, and so far, USDA has pushed the voluntary assistance approach, the EPA has placed the majority of initial responsibility for control of nonpoint, agricultural source pollution on the states, and states have responded to highly varying degrees.

State-Level Environmental Protection Related to Agriculture

An ambitious survey of state programs by Ribaudo and Woo reveals that as of three years ago, slightly more than half of the states had environmental laws that do or could affect agricultural production costs. Their findings indicate that . . .

- Nine states restrict some uses of some pesticides that pose water quality threats.
- Six states impose pesticide and/or fertilizer taxes or registration fees as revenue raising strategies.
- Six states impose standards on the technology for chemical application through irrigation.
- Seventeen states require some sort of nutrient best management practices, though penalties for noncompliance range from mere nuisance to substantial fines, and cost-sharing and technical assistance is offered by most of these States to reduce the financial burden on farmers.
- Nineteen states require some degree of soil erosion control to address water quality issues, although in ten of these, practices are only required if complaints are filed by a citizen or government agency, most of the states cost-share the implementation of any practice that is required, and requirements are nullified in three states if cost-share assistance is not available.
- Cropping practices near vulnerable bodies of surface or coastal waters are restricted in Maryland and Pennsylvania.

While some individual producers are no doubt greatly affected financially by these state regulations, the regulations do not add up to any significant aggregate, national effect—at least not yet. But, there are several reasons to expect the pace and severity of state environmental regulations affecting agriculture to increase in coming years.

First is the requirement under the Federal Coastal Zone Management Act that states develop and implement measures to restore and protect coastal waters, in conformance with EPA guidelines, backed up by the threat of federal regulation should state plans fail to meet federal guidelines. This fairly new requirement is significant not only because it provides strong incentives for regulation of some agricultural activities in coastal states, but also because it represents a

favored model for more aggressive pursuit of non-point, agricultural source pollution under a reauthorized Clean Water Act. I think it is increasingly clear that federal environmental mandates will be pressuring states to take new actions on agricultural sources of ground water, surface water, coastal water, and wetlands protection.

While nothing requires that federally-induced state actions take the form of regulatory standards, fees, or taxes, a second factor—fiscal austerity—makes the regulatory approach more likely than in the past. Continuing, large government subsidies for the adaptation of agricultural producers to environmental protection needs are unlikely given federal and state budget problems. Thus, the impermanent environmental gains that have historically been purchased with government subsidies may be able to be retained only through regulatory action, and EPA appears to be providing incentives for that action to come from the states.

Experience with the Clean Air Act and federal legislation on hazardous wastes, which in earlier years prompted states to implement plans that meet national guidelines, suggest that the degree to which states respond to federal incentives can be expected to vary significantly across states.

Lester notes four basic factors that appear to explain the extent to which states pursue environmental protection policies and program implementation. The first of these is the severity of pollution problems, as measured not only by the incidence of problems, but also by how strongly they are disvalued by the population they affect. This population-weighted severity influences the degree of pressure brought upon states to develop and implement environmental protection policies. Heimlich has developed a composite Environmental Benefits Index which measures precisely this notion of the severity of environmental problems related to agriculture. His representation suggests that, on average, the population-weighted severity of agroenvironmental problems is greatest in Long Island; eastern New Jersey; the Chesapeake Bay Region; eastern North Carolina; Florida; Alabama; along the Chicago lake plain; in the Mississippi Delta region of Missouri, Tennessee, Arkansas, Louisiana, and Mississippi; in the corn belt; in Southern Texas and the Texas panhandle; and in the south part of California's Central Valley and south central Arizona (Heimlich). If problem severity were the only factor, the states affected here would be those most likely to enact environmental legislation affecting agriculture. But other factors appear to be equally important in predicting states' behavior in this regard.

Lester's second factor is wealth. Simply put, "States with greater fiscal resources are assumed to spend more on environmental protection than those with fewer fiscal resources" (Lester, p. 71). The third factor, organizational capacity, considers administrative and legislative structure of state governments as a predictor of environmental policy outputs. The fourth factor is partisanship, which

weakly links environmental protection with Democratic leadership and majorities.

Using these factors and past performance as predictors, Lester classifies the states according to their likelihood of developing environmental response to decentralized responsibility in the 1990s (Table 1). In this scheme, the environmentally progressive states are those judged to have both a high commitment to environmental protection and strong institutional capabilities to follow through on that

Table 1. Expected Nature of State Environmental Policy Development

Environmentally Progressive States		
California*	Florida*	Illinois*
Maryland*	Massachusetts*	Michigan*
New Jersey*	New York*	Ohio*
Oregon	Pennsylvania*	Washington
Wisconsin*	Virginia*	
"The Strugglers"		
Connecticut*	Delaware*	Hawaii
Indiana*	Iowa*	Kentucky*
Maine*	Minnesota*	Montana
South Dakota	Vermont	
Maintainers of Status Quo:		
Alabama*	Alaska	Arkansas*
Georgia*	Louisiana*	Missouri*
Oklahoma	South Carolina*	Tennessee*
Texas*	West Virginia	
Environmentally Regressive States		
Arizona*	Colorado	Idaho
Kansas	Mississippi*	Nebraska
Nevada	New Hampshire	New Mexico
North Carolina*	North Dakota	Rhode Island
Utah	Wyoming	

**Also have a large area of agroenvironmental problem severity as represented by Heimlich's index.*

Source: Categorization according to Lester, 1990

commitment; the "strugglers" have strong commitment but limited resources and/or limited institutional capabilities; those States most likely to maintain the status quo have strong institutional capabilities but weak commitment to environmental protection; and the environmentally regressive States have both weak commitment and limited institutional capabilities (Lester).

The states along whose name an asterisk (*) appears in Table 1 are those that also have a large area of agroenvironmental problem severity as represented by Heimlich's index. One indication of this overlap of categories is that agricultural producers in California, Florida, Illinois, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Wisconsin, Virginia, Connecticut, Delaware, Indiana, Iowa, Kentucky, and Minnesota will be more likely than others to experience increased costs associated with State environmental protection programs affecting agriculture. Another implication is that severe environmental problems associated with agriculture are less likely to be addressed through state actions in: Alabama, Arkansas, Georgia, Louisiana, Missouri, South Carolina, Tennessee, Texas, Arizona, Mississippi, and North Carolina. Admittedly, these implications are very grossly cut, but they are surprisingly consistent with the past history of States' environmental regulation of agriculture.

Intergovernmental Relations: Implications for Resource Allocation

Given the joint expectations that public funds for voluntary, technical and financial assistance programs are going to decline, and that State environmental regulation will accelerate, but at different rates across States, what does this imply for the future allocation of ever-scarcer Federal conservation and environmental assistance funds?

If the primary goal of federal assistance programs is to provide adequate environmental protection associated with agricultural activities, then the federal-state intergovernmental relations reviewed here would suggest that federal funds should be directed to areas of severe agroenvironmental problems that are unlikely to be resolved through state action. On the other hand, if an important goal of the historically voluntary assistance programs of the federal government is to prevent farmers from experiencing economic hardship in the quest for environmental protection, then intergovernmental relations suggest that federal funds should be concentrated in those states where environmental regulation would otherwise cause the greatest economic burden for farmers, thus assisting farmers' adaptation to more environmentally progressive States' actions. The choice between these options is further complicated when one also considers concurrent trends in the structure of American agriculture.

Adding the Effects of Agricultural Industrialization

American agriculture is undergoing a rapid structural change which involves coordination and vertical integration of the stages of food and fiber production, processing and marketing (through contracting and corporate ownership) and the consolidation and often geographic concentration of, units of production. Industrialization is most common in the production of vegetables, some fruit and specialty crops and poultry. It is proceeding rapidly for hog and other livestock enterprises and is expected to affect the grain and feed sectors in the next decade (Council on Food, Agricultural and Resource Economics).

Several suspected relationships between agricultural industrialization and environmental protection add new dimensions to intergovernmental relations and their implications for future resource allocation. First, individual producers cannot simply pick up and move their operations in response to financial pressure related to environmental regulation. However, vertically integrated operations can choose to site themselves in more hospitable states, thus encouraging an expansion of agricultural production in their vicinity and placing producers in other regions at an even greater economic disadvantage than environmental regulation may impose. A current example of this situation is provided by the case of a large hog processing firm, Smithfield, Inc., that has announced its intent to relocate from Virginia to North Carolina, purportedly because of the cost that Virginia's environmental regulations impose on its operations. (Note that by way of either coincidence or explanation, Virginia is classified as "environmentally progressive" and North Carolina as "environmentally regressive" in Table 1). Many of the Virginia hog producers that formerly contracted with Smithfield will likely lose their business in the favor of North Carolina producers.

Given both the fact that industrialization is accelerating in American agriculture, and the possibility that state-level environmental regulation will play a role in the location of highly integrated agricultural industries, decisions about how to allocate scarce federal funds for conservation and environmental protection, and technical and financial assistance require a range of new considerations. A decision to concentrate federal assistance funds in the more environmentally progressive states to complement expected regulation can be seen either as a way to slow down the disappearance of independent family farms as industrialization proceeds and favors location in the less progressive states; or an ill-fated allocation of funds to support those farms least likely to survive in an industrialized agricultural sector.

A decision to allocate federal assistance resources to the less environmentally progressive states, to increase environmental protection in the relative absence of state action, may backfire if these states are also the locus of industrialized production activity and if pro-

ducers who are vertically linked to upstream or downstream industries are less receptive to technical and educational assistance. The latter possibility is borne out by anecdotal evidence that producers contracting with large firms receive from those firms a substitute for public extension education and, thus, are less interested in the assistance offered by agencies such as the Extension and Soil Conservation Services.

Conclusions

My intent here has been to lay out some of the anticipated complexities involved in future decisions about how and where to spend what are expected to be increasingly scarce federal funds for environmental protection related to agriculture. I will not attempt to answer the questions I have posed about the implications for that allocation problem of state-level environmental regulation, with or without the compounding factor of spreading agricultural industrialization. The implications of intergovernmental relations for agroenvironmental protection and the effects of agricultural industrialization on agroenvironmental problems and their resolution are both areas that deserve considerably more study before good answers can be found. Still, I hope the following closing thoughts will have some general merit in the context of public policy education on environmental issues affecting agriculture.

- Intergovernmental relations are going to be increasingly important in determining the economic impact of a rising rate of environmental regulation affecting agriculture.
- State and federal government roles in these relations, and their impacts, should not be considered in isolation from other major economic trends affecting the agriculture sector.

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