Leaner Environmental Policies for Agriculture

by David E. Ervin and Elisabeth A. Graffy

Farmers and ranchers face a most troubling dilemma. Complex political forces have mapped two quite different paths to environmental management—a rollback of federal regulations or a buildup of traditional subsidies. In the words of a famous modern philosopher, "When you reach a fork in the road, take it!" But either choice poses risk for the industry and will not likely ameliorate nettlesome environmental problems. A third path could help the industry maintain competitiveness and meet environmental challenges. This path uses the latest science to identify agroenvironmental problems and emphasizes economically attractive technology to sustain environmental improvements.

Neither environmental program rollbacks nor more subsides offer long-run solutions

Down one route lie rollbacks of federal programs perceived to unnecessarily constrain producers and increased reliance on private stewardship. The rise of political conservatism reinforced by budget pressure and heightened global competition have spawned such proposals (Zinn). If enacted, the rollbacks could lessen producers' costs, enhance their competitiveness, and save taxpayer expense. Some of the proposed changes may remove burdensome rules that do not give benefits in excess of costs. However, risks of environmental degradation will rise because most of those programs have produced significant benefits (USDA, ERS). Action by the 104th Congress averted major rollbacks, but the issues will likely resurface.

If progress on environmental quality stalls, producers could suffer a reversal of fortune. Surveys show that a dominant majority of the general public have robust preferences for environmental improvement from agriculture, and expect more regulation of the sector, not less (USDA, NRCS). Thus, any vacuum left by federal rollbacks will likely be filled. The 1980s experience with devolution of federal responsibilities revealed that states enhanced their environmental management capacities (Ringquist). If that response carries over to the 1990s, what types of agroenvironmental programs might states use? Under strong state budget competition from health care, crime, and education, prospects for large expenditures appear weak. States with the administrative capability and strong agroenvironmental preferences could resort to more regulation. During the 1980s, a significant number of states enacted regulations more stringent than federal rules (Ringquist). States in which the agricultural industry is more dominant or states with weaker preferences may choose less regulation or other approaches. Because states vary so widely in their environmental programs (Lester), the responses could form a patchwork quilt of differing standards (Batie). Such diversity accommodates varying state conditions, but may complicate interstate commerce and the management of environmental issues that cross state borders, such as controlling water pollution in major river systems.

The second path, and one laid out by the 1996 farm bill, follows existing approaches—voluntary education, technical assistance, cost sharing, compliance, and land retirement programs financed by federal spending. The Conservation Reserve Program (CRP), which retires eligible cropland under ten-year contracts, was renewed and authorizes the secretary of agriculture to enroll up to about a tenth of the nation's cropland. Compliance programs, which require acceptable conservation behavior on highly erodible croplands and certain wetlands in exchange for continued eligibility for agricultural program payments, continue until those payments expire. The scope of compliance was lessened, one indication of the rollback forces at work. Some new elements and refinements were introduced, but in general the package of programs maintain traditional approaches heavily reliant on federal spend-

ing. Continuing status quo programs will preserve the industry's recent environmental gains, such as reduced soil erosion, in the short-term. However, the programs for the most part have not fostered enduring solutions, and run counter to pressures to cut the budget deficit and capture expanding global markets. If a budget crisis erupts, the path could end abruptly.

The dilemma comes into sharp focus: farmers and ranchers in many states could face more regulation if federal rollbacks diminish environmental protection, but traditional assistance programs may shrink. The unappealing choices beg the question, Is there a third policy strategy that reduces budget exposure, intrudes less in private production decisions, yet promotes low-cost, sustainable environmental improvement? Implicit in the following discussion is the presumption that agriculture prefers to take action to remedy documented problems rather than await possible increases in regulation.

Can more reliance on private markets ease the conflicts and maintain the environment?

"The era of big government is over." If this popular refrain holds, the status quo approaches to environmental protection in agriculture require rethinking. Traditional programs have mostly relied on federal subsidies and manpower spread over the entire country. Prominent examples include cost sharing to install practices (mainly for erosion control), education and technical assistance, and land retirement. Conservation and wetlands compliance provisions, regulations (as for pesticide registration), and water quality and flood control programs round out the approaches. The total federal bill for 1994 was roughly $5.5 billion (USDA, ERS), and will exceed $50 billion per decade if continued. Sustaining that level of funding will be a tremendous struggle as pressure to rein in the budget deficit grows.

Photo courtesy USDA/NRCS

Conservation tillage can promote both greater profitability and higher stream quality, but is not an appropriate technology choice in all agroenvironmental settings. In the search for "complimentary technologies," there are likely to be no silver bullets.

Current political trends favor increased reliance on private stewardship directed by market signals. A first step is agricultural program reform. Some analyses forecast sizable environmental gains if commodity program payments are decoupled from planting decisions, much as provided for by the 1996 farm bill. Other estimates show slight effects with reduced pollution loadings in some areas but increased chemical use and soil erosion in other regions. In the end, removing commodity program distortions is necessary but insufficient to ensure environmental protection through better functioning markets.

The root causes of agriculture's environmental problems lie deeper than agricultural programs. Many environmental costs and benefits of production practices remain uncounted by farmers and ranchers because of ill-defined or unenforced property rights. For example, downstream users suffer water pollution costs without a feasible means to alter offending upstream practices. Also, producers cannot capture full benefits from providing habitat for migratory wildlife. These environmental "externalities" can be remedied by defining clear private property rights in the natural resource. New legislation could grant downstream parties the right to a given quality of water and permit compensation from the offending parties if the quality falls below that level. Or public programs, such as subsidies, can be used. Until now, public approaches have prevailed, perhaps because of social, technical, and economic challenges in property rights approaches for large-scale, complex environmental systems in agriculture. But rollback proposals favor more reliance on private stewardship.

Farmers and ranchers understandably favor voluntary private approaches. Most also support public education and technical assistance to identify problems and help with practice selection and implementation. But they generally oppose specific technology requirements (best management practices) or compulsory performance on the grounds that they are inflexible, costly, and unnecessary. How much can a shift toward private initiative be expected to accomplish?

Private stewardship works when market incentives encourage practices that also improve envi-

ronmental quality. The adoption of conservation tillage by operators expecting labor, fuel, and machinery cost savings plus soil conservation benefits exemplifies this case. Logically, private initiatives focus on farm conservation problems with profit consequences, and not on off-farm effects except as the two are directly linked. The need for some form of public action to count external effects, from establishing property rights to regulation, remains. Old program approaches to accelerate voluntary private efforts, such as education and technical assistance to foster erosion control, should not be expected to play a significant role (OTA 1995a). And, the momentum behind private property rights solutions seems to have slowed because of difficult social and technical problems. More likely, a new generation of approaches will emerge in tune with budget, political, and competitiveness pressures that enhance private flexibility and lower private and public costs.

Underutilized science and technology outline the third path

Science can help devise new policy options that work with and not against the fundamental forces reshaping agriculture's future. Three central findings from recent assessments of agriculture and the environment are relevant (NRC 1993; OTA 1995b; ERS 1994):

- Serious water quality, wildlife, and soil quality problems associated with agriculture occur unevenly across the country, with pockets of severe stress where production pressure concentrates and/or resources are vulnerable.
- Federal conservation and environmental programs, as a rule, have not targeted problem areas with the highest potential benefits to receive concentrated program attention.
- These programs emphasize set aside and do not generally seek low-cost approaches to keep lands in production and resolve environmental problems.

Together, the three lessons help form an integrated tripartite strategy to lower costs and sustain agroenvironmental progress. Widely varying problems reward local and state knowledge in environmental management and fit nicely with the government decentralization trend. But science does not support full decentralization. For example, Corn Belt agrichemicals degrade drinking water in the lower Mississippi River and aquatic habitat in the Gulf of Mexico. Such complex transboundary problems likely require federal mediation and oversight to balance individual state actions (or inaction) and forge solutions. Other federal roles include research and technology development with multistate public good benefits, and regulatory backup for recalcitrant states (Ringquist). The different roles reveal the balance and constructive tension that needs to exist among governmental units in environmental problem-solving.

Target environmental problem areas with high potential payoffs

Focusing agroenvironmental programs on priorities rather than blanketing the countryside conserves budget resources and lessens unnecessary restrictions on production. It also improves the chance of building a critical mass of program effort in areas where meeting environmental objectives requires extensive practice changes. Clear agroenvironmental objectives are prerequisite to effective targeting of problem areas for concentrated program attention. To endure, the objectives should emerge from open decision processes with representation by all significantly affected parties.

Politics has constrained targeting. Historically, federal programs have spread resources to each state or a region, for example, the Great Plains. The region in turn parcels out resources to states, and the states to their counties. This tradition was born in attacking "Dust Bowl" conservation problems via the Depression philosophy of infusing federal assistance into economically strapped local areas. No doubt, the broad distribution of assistance generated wide political support. However, such broad allocations will come under increasing pressure with tighter budgets and the robust public sentiment for environmental progress in many states. A window of opportunity is opening for targeting.

Slow scientific progress has also tempered appeals for targeting. But the large body of knowledge about agriculture's environmental linkages assembled over the last few years paints a clearer picture of the geography and concentration of problems. Although the portrait is still incomplete, sufficient information exists to help pick priority targets and improve program performance.

What constitutes an ideal targeting process ultimately depends on the agroenvironmental management program's objectives. Nevertheless, a few common-sense rules apply. Use the best science available but don't wait on perfect information because it will never exist. Science is in a constant state of refinement as new theories and evidence emerge. When the data are judged relatively weak, avoid costly irreversible actions. But don't delay action on large environmental risks if the production adjustments are judged feasible and modest. Applying these rules requires judgment, but current programs do as well.

The selection of CRP enrollments after the 1990 farm bill demonstrated the usefulness of targeting.

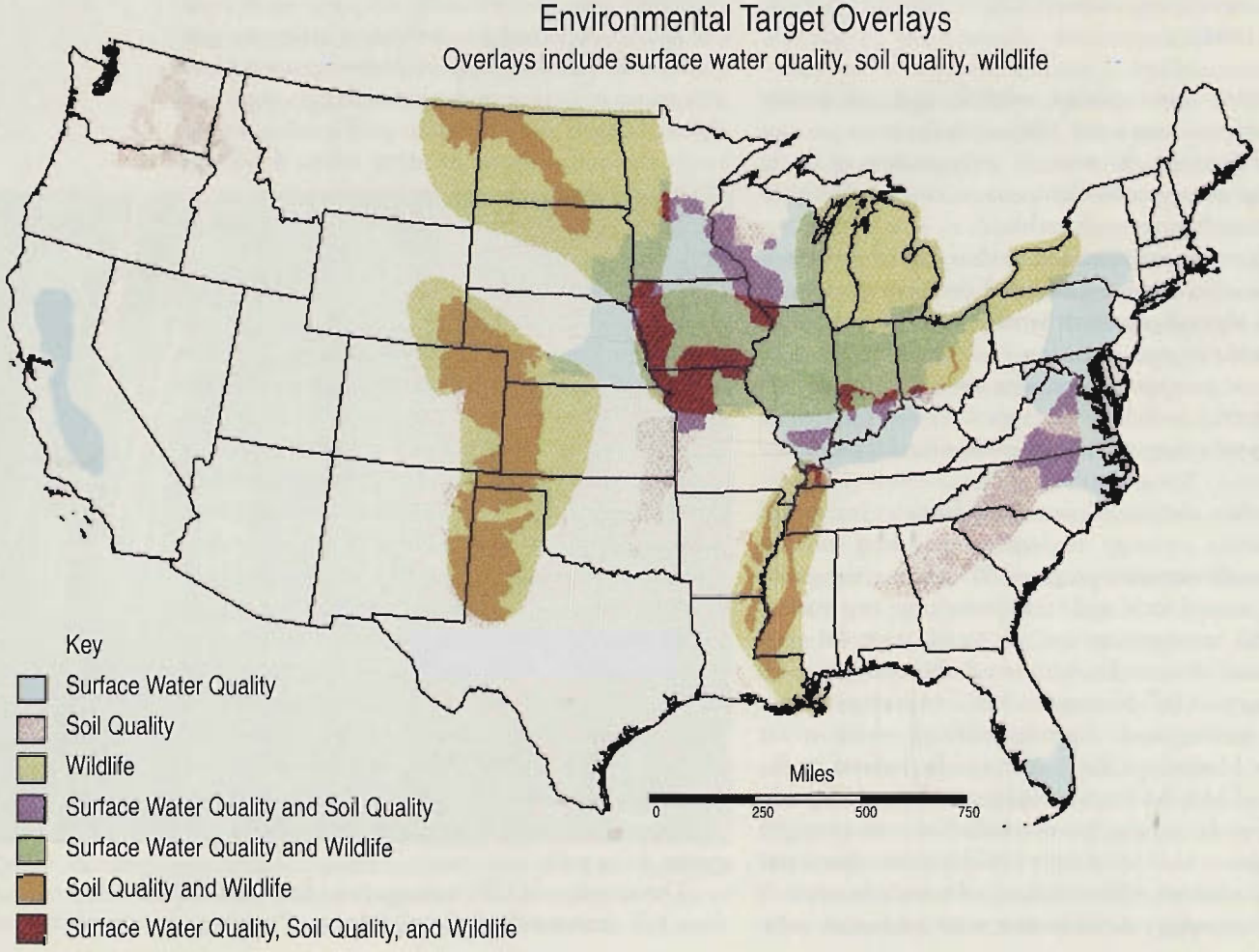
A rudimentary environmental benefit index guided parcel selection, and substantially improved estimated program performance per tax dollar (Osborn). But the targeting protocol applied to only about 10 percent of the CRP's 36.4 million acre total, and omitted wildlife benefits. A revised procedure that includes wildlife, water quality, erosion, tree planting, and cost-ranking factors is now available for new enrollments.

Incomplete science and data still hinder targeting efficacy. To lessen those obstacles, an expert panel was convened to identify national priority areas (OTA 1995b). The process, a modified Delphi exercise relying on scientific judgment and extensive peer input, proved feasible for surface water quality, wildlife, and soil quality priorities. Preliminary designations of priorities for rangelands, water conservation, ground water, wetlands, and rural landscapes await further development. Priority designations for plant and insect diversity were not possible, reflecting the immaturity of science and incomplete data for those subjects. Ultimately, all subject areas should be included.

The extensive geographic overlap of priorities for surface water quality, wildlife, and soil quality shown in the map below emerged as a central finding. Such overlap suggests areas of multiple types of stress from high production pressure or resource vulnerability. It also illustrates that multiple environmental dimensions are affected. State and local inputs could zero in on specific sites and resources within the larger priority areas. But the national exercise helps discover transboundary problems of particular relevance to federal programs, such as Prairie Pothole migratory wildlife habitat. Target problem areas should be refined as science improves. The expert panel process can complement other approaches like that used in the CRP to give more confidence when published data are deficient.

Emphasize "complementary technologies" and de-emphasize land retirement

Growing evidence points to an emerging suite of "complementary" technologies that increase long-run profit and simultaneously hold potential to improve environmental conditions (OTA 1995b). Prominent examples include conservation tillage, soil nutrient testing and other precision farming techniques, integrated pest management, rotational



grazing, and organic farming. Biotechnologies that reduce pesticide or other pollution and improve profit also qualify. The reasons pushing their combined emergence are not clear, but they likely stem from the unending cost-profit squeeze that propels the technology treadmill and actual or anticipated environmental restrictions on production practices. Importantly, these technologies promote private stewardship and require little (if any) government assistance to implement.

The conservation tillage success story has become a central argument in politically conservative appeals for more private stewardship. Its economic advantages are powerful in many areas, as evidenced by the growing acreage planted with the technology, even by operators not subject to conservation compliance. The increased crop residue retards erosion, reduces agrichemical runoff to streams, and benefits certain wildlife species. However, a recent review of evidence reveals that reduced tillage can also lead to more leaching of pesticides if application rates are not reduced (Barbash and Resek). Soil nutrient testing to reduce excess applications that pollute water appears to be the next big complementary technology based on evidence from several states (Tractenberg and Ogg).

Progress in spreading complementary technologies is encouraging, but serious challenges remain. Improved management skills appear to be the critical ingredient to successfully adapt the technology to the farm's unique production and natural resource conditions. Yet, government program staff have not built economic and environmental expertise about such technologies. Their time has been understandably spent building farm conservation plans for largely untargeted compliance and land set-aside programs. Consequently, current education and technical assistance programs should not be expected to greatly accelerate the use of such technologies through management training. The private farm advisory sector is likely in a better position to assist producers with complementary technologies.

Regardless of the availability of trained staff, the current technology path will likely fall far short of its environmental potential. The research, development, and implementation process is being driven largely by economic forces without companion environmental objectives and incentives. Agriculture is generally not subject to comprehensive environmental performance standards, such as air and water quality emission levels for other industries. For example, guidelines for crop residue to reduce erosion apply under conservation compliance, but only for agricultural program participants and only until the programs expire. Waters returning to streams and rivers from irrigation ditches are often not subject to emission standards. Several reasons inhibit the establishment of such standards, including the technical difficulties in tracing agroenvironmental pollution to its diverse sources and the industry's special environmental policy history. But the result is incomplete incentives to drive induced complementary technology innovation. To illustrate, numerous biotechnologies with profound implications for agricultural production are under development without clear environmental objectives. Until market forces and agroenvironmental performance standards are interwoven from the outset, combined economic-environmental progress will be largely accidental good luck.

Rotational grazing, as an alternative to confined livestock operations, depends on new kinds of management strategies. Here, farmers fix a paddock fence used to move animals around the pasture. Photo courtesy USDA/NRCS

Emphasizing complementary technologies follows the "pick the low-hanging fruit first" strategy. Where complementary technologies do not exist, subsidies, regulation, pollution trading schemes, or

private property rights systems will be necessary. Land retirement, the most expensive option, can be reserved for situations in which production is fundamentally incompatible with environmental objectives, and would likely fall well below current levels. Perhaps as much as one-half of current enrollment may fail such a test.

Increase targeted investment in science and technology development

Future returns require current investment. Managing agriculture's environmental problems is no exception to that economic dictum. Better integration of environmental issues into agricultural research is necessary to keep pace with the food and fiber needs of an exponentially growing world population in an environmentally sustainable manner (Crosson and Anderson). The record shows, however, that public agricultural research concentrates about 60 percent of its funding on production enhancement. Only slightly more than 10 percent is allocated to natural resource issues. That allocation may have been appropriate in earlier agricultural development phases. However, the rise in public environmental values suggests a reconsideration.

Low historical investment has slowed the growth in scientific knowledge of agriculture's environmental linkages. Low investment has slowed targeting and the development of complementary technology. The diffuse and insidious nature of many agricultural pollution processes likely has not helped public demand for such research. That may change with industrialized livestock operations which will inevitably suffer large waste spills and galvanize public opinion. Farming and ranching spread out over nearly half the nation's land base also makes for complex and expensive measurement and monitoring. For example, tracing the origins of sediment, fertilizer, and pesticide pollution in the Lower Mississippi River is virtually impossible with current science. Yet, there is growing concern that the pollution is helping cause a "dead zone" in the Gulf of Mexico. Encouraging progress in targeting and complementary technologies suggests the returns from more investment should be positive and perhaps quite large.

A generic call for more environmental research will likely fall on deaf political ears. Public expectations of improved government suggest more accountability, such as work on targeted priorities.

Runoff containing livestock waste transports nutrients, like nitrogen, to streams. Too much nitrogen can cause eutrophication and other water quality problems.

Photo courtesy USDA/NRCS

Also, it is not enough to just increase investment in environmental science related to agriculture. Indeed, such a strategy would make the same mistake that traditional production research committed by leaving out environmental factors. We increasingly appreciate that the long-term economic and environmental health of agricultural systems depend critically on each other. It should be no surprise, therefore, that research institutions that do not firmly interweave production and environmental components will miss opportunities to improve agriculture and the environment.

The responsibility for increased investment in complementary technologies has been implied for the public sector because in the presence of environmental externalities there are insufficient incentives for private action. But there is every reason to expect the private sector to make a significant contribution if agriculture is challenged to resolve external environmental problems via performance standards, as has happened in other industries.

Making the transition

The tripartite strategy of targeting, complementary technologies, and focused research investment is a significant departure from current approaches, but well grounded in science. It also works *with* rather than *against* budget, political, and economic forces and public environmental sentiment that show no signs of abating. Neither the rollback of current programs nor the extension of status quo approaches conform to all of those pressures. Indeed, scaling back programs without a new strategy to meet public environmental expectations risks more environmental regulations for agriculture in many areas. ◘

■ For more information

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David E. Ervin is director of the Policy Studies Program at the Henry A. Wallace Institute. Elisabeth A. Graffy is a policy advisor to the National Water Quality Assessment Program of the U.S. Geological Survey.