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United States Department of Agriculture
Economic Research Service

ECONOMIC BRIEF NUMBER 2



Conservation Program Design

Better Targeting, Better Outcomes

LeRoy Hansen and Daniel Hellerstein

While it is common knowledge that not all agricultural lands have the same productive capacity, it is increasingly recognized that the environmental impacts of agricultural production also differ. For example, some fields can provide much greater reductions in soil erosion than others. Similarly, some lands provide critical habitat for endangered species while other lands provide habitat for more common wildlife species. Likewise, the field that is best able to provide soil erosion reductions may provide little in the way of wildlife habitat, while some fields may provide medium levels of both attributes.

Conservation programs aim to enhance the environment across a range of attributes, such as reducing soil erosion, improving wildlife habitat, and preserving fragile ecosystems. To best achieve conservation goals, programs can target those farms and fields where conservation efforts are likely to generate the most profound or widespread environmental benefits for a given program size. Targeting mechanisms that are now in place have improved the performance of conservation programs, but more could be done. The availability of detailed, field-level information on both the cost and benefits of conservation efforts is key to realizing those potential gains. Investing in information infrastructure is one way to increase gains and reduce costs of enhanced targeting in conservation programs.

Voluntary conservation payment programs need to specify who is eligible to receive payments, how much can be received, for what actions, and the means by which applicants are selected. The achievement of program goals in a cost-effective manner hinges on the choices policymakers and program managers make when answering these questions.

This Economic Brief is one in a set of five exploring specific design options these decisionmakers face:

- (1) income support versus environmental objectives,
- (2) alternative ways to target programs,
- (3) the use of bidding in determining payment levels,
- (4) land retirement and conservation on working lands, and
- (5) payments for conservation practices versus the level of environmental performance.

Available at www.ers.usda.gov/publications/eb1, [.../eb2](http://www.ers.usda.gov/publications/eb2), [.../eb3](http://www.ers.usda.gov/publications/eb3), [.../eb4](http://www.ers.usda.gov/publications/eb4), and [.../eb5](http://www.ers.usda.gov/publications/eb5)

Targeting Is a Means of Choosing Which Offers To Accept

Whenever more farmers offer to participate in an agricultural conservation program than program size allows, a means of selecting participants is needed. Selection strategies that have been used include first-come first-served, cost minimization, and targeting. Targeting uses information on costs, operators, and resource characteristics to choose those that best meet program goals. Targeting mechanisms can be designed to achieve many types of program goals, such as maximizing reductions in soil erosion per acre, minimizing program costs while attaining a set of minimum standards, or maximizing improvements in environmental quality relative to costs.

Eligibility criteria, participant incentive schemes, and ranking mechanisms are all forms of targeting based on operator and resource characteristics.

- A program manager can target by setting *eligibility criteria*. These are standards that fields, farms, or households must meet in order to qualify as a program participant. Examples include prior cropping history, the current use of conservation practices, and location within a sensitive ecosystem or watershed.
- *Incentives* are used to selectively encourage farmers to enroll in conservation programs. These incentives base program payment levels on the farm-level cost of implementing the practice—including the opportunity costs associated with constraints on land use. (For a further discussion of setting conservation program incentives, see Economic Brief No. 3.)
- *Ranking mechanisms* prioritize applicants by assigning scores to each application. Applications with higher scores are more likely to be accepted. Scores can be based on multiple environmental criteria, such as expected reduction in soil erosion, improvement in wildlife habitat, and improvement in water quality. Scores can also incorporate costs—with higher costs decreasing scores. By including both benefits and costs, a ranking mechanism could give fields with more benefits and higher costs the same score as fields with fewer benefits but lower costs.

Targeting Helps Programs Achieve Multiple Objectives

Four of USDA's principal conservation programs address a variety of environmental objectives, and use different types of targeting to do so (table 1). (All have more farmers willing to participate than the budget and acreage limits allow.)

To illustrate how targeting is implemented, we highlight a few features of the two largest conservation payment programs: the Conservation Reserve Program (CRP) and the Environmental Quality Incentives Program (EQIP). Since 2002, the CRP has accepted about two-thirds of the acres offered, while the proportion of applications funded by EQIP ranges between 15 and 30 percent per year.

Targeting based on eligibility criteria

- The CRP generally requires fields to have been in crop production for 4 of the 6 years prior to 2002. This ensures that land moves out of crop production and into permanent cover.
- Cropland having characteristics that are deemed to be of particularly high environmental value can be enrolled in the CRP without meeting other criteria or competing in the CRP's selection process. For example, the CRP's preferential treatment of permanent cover on land within 600 feet of a stream stops erosion that is likely to reach the stream, filters sediment from waters moving toward the stream, and provides excellent wildlife habitat.

Targeting based on incentive schemes

- The CRP payment formula allows higher payments for higher quality acreage.
- Part of the EQIP payment formula bases payments on the farmer's cost of an acceptable conservation practice.

Table 1—USDA Conservation Programs and Targeting

Program	Targeting Filter	Targeting Impacts
Conservation Reserve Program (CRP)*	Eligibility	Only highly erodible lands, or lands in regions with special conservation needs (Conservation Priority Areas), can be accepted.
	Ranking Mechanism	All offers are awarded points based on several different environmental factors. Offers that receive more points (summed across all factors) receive higher ranks.
	Cost	Less expensive acres receive more points in the ranking index.
	National/Local	Only a national ranking is used.
Environmental Quality Incentives Program (EQIP)	Eligibility	All farmers can apply, though 60% of all funding is dedicated to livestock producers.
	Ranking Mechanism	Allocation of money to States is based on an aggregate ranking index. The index considers a wide variety of State-level resource measures and measures of agricultural activity. States allocate funds using their own ranking mechanism.
	Cost	Cost can be considered as a factor, with certain restrictions imposed administratively and by Congress. In particular, “bidding down” (requesting a lower cost share for a practice) cannot be used as a deciding factor.
	National/Local	States devise their own ranking mechanisms, which can incorporate cost.
Wetlands Reserve Program (WRP)	Eligibility	Land that can be restored to wetlands and can provide wildlife benefits.
	Ranking Mechanism	Allocation of money to States is based on an aggregate ranking index using four factors: ecological concerns (such as the rate of wetland loss), landowner interest, State-level program delivery performance, and cost.
	Cost	Cost is the least important of the four factors.
	National/Local	States can devise their own ranking mechanisms, which can include cost.
Farm and Ranchlands Protection Program (FRPP)	Eligibility	Farms with prime soils, or with historical/archaeological significance.
	Ranking Mechanism	Allocation of money to States, based on an aggregate ranking index. Factors include agricultural trends (such as the rate of farmland loss), and measures of State-level program performance.
	Cost	Cost is used as a minor factor in the allocation to States.
	National/Local	State programs can use their own ranking mechanisms when choosing which farms to enroll. Note that FRPP is a cost-share program, so farms in States (or other local entities) that are not interested in cost sharing will never receive FRPP offers.

*The targeting impacts are those for competitive signups. Some lands deemed to have particularly important environmental attributes (for example, cropland within 600 feet of a stream) need not meet other eligibility criteria.

Targeting based on ranking mechanisms

- When initiated in 1985, the CRP targeted highly erodible land. The 1990 farm bill broadened the program’s environmental objectives. In response, program managers developed the Environmental Benefits Index (EBI) to rank applicants. The EBI has six factors, five of which deal with environmental and resource concerns. Scores are based on the estimated size of expected resource quality change, and the importance of these changes to the public.
 - Wildlife benefit scores are greater when the farmer plants wildlife-friendly native grasses instead of non-native grasses.
 - The soil erosion score is higher on fields where potential erodibility is higher.

The EBI also includes CRP contract costs, which include annual rental payments and cost-share payments. Farmers who propose contracts with lower per acre costs are awarded more points.

- A national formula is used to allocate EQIP funds to States. Rankings are based on the acreage of land in different kinds of agricultural production, the extent of livestock production, measures of land quality, and measures of environmental conditions.
 - EQIP allows each State to develop its own allocation mechanism to distribute funds to local units (such as counties and conservation districts). Each unit then develops a ranking mechanism based on local resource concerns. For example, some units give more credit for water quality improvements and others give more credit for erosion reductions. States can consider costs in their EQIP targeting schemes.

Both the CRP and EQIP approaches give farmers flexibility to decide their most cost-effective strategy for obtaining CRP and EQIP contracts. For example, when offering CRP contracts, farmers choose the field they offer, cover type, program payment rate, and other factors that affect the offer's EBI. When offering an EQIP contract, farmers choose the conservation practices they will implement (and thus the environmental impacts that they will address) and other factors that determine the likelihood of obtaining EQIP funding.

Targeting Relies on Data, Models, and Opinions

Ranking mechanisms can account for the size of the physical change in environmental quality and the public's value of the change—and account for these differences on a very localized (i.e., field-by-field) basis. Although precise measures of these changes are often unavailable, ranking mechanisms have been able to account for some variations in the overall benefit of conservation practices by taking advantage of the opinions of experts (e.g., biologists, agronomists, and program managers) and biophysical and economic models and data. Examples of these include:

- *Opinions of local personnel.* The EQIP ranking mechanism attempts to address localized program impacts by allowing States to make the enrollment decisions—assuming that State program managers can better identify those fields or regions where environmental benefits tend to be greater.
- *Economic models.* The CRP ranking mechanism attempts to address some local concerns by incorporating estimates of impacts on the affected population. For example, the water-quality benefit score gives preferential rankings to fields where more people are likely to be affected by changes in groundwater quality.
- *Biophysical models.* The CRP uses two models to calculate field-level estimates of erosion—the Revised Universal Soil Loss Equation for estimates of sheet and rill erosion and the Wind Erosion Equation for estimates of wind erosion.

Targeting for Environmental Benefits May Involve Geography

The benefits from accepting a farm into a program will depend on the environmental and physical features of an offer, and may be heavily influenced by land and resource attributes prevalent in and around the offer's location. However, these kinds of detailed data are not available for a variety of environmental impacts, even though benefits may be very large.

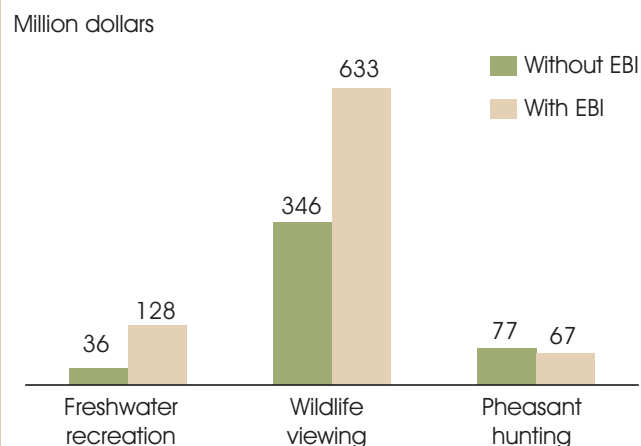
As an alternative, targeting schemes can define the geographic regions where benefits are likely to be high and use those regions as proxies for more specific information. However, targeting to geographic regions without considering environmental criteria can reduce cost-effectiveness in achieving environmental goals. Although geographic regions are not a dominant factor in shaping the distribution of conservation expenditures, they are a part of current targeting schemes:

- The CRP uses Conservation Priority Areas (CPA) as one means of determining eligibility. CPAs are ecological regions and do not follow county or State boundaries. In essence, retired agricultural lands in these areas are assumed to provide an array of regionally important ecological benefits. For example, sediment and nutrients from the Chesapeake Bay watershed are known to affect the health of fisheries and quality of recreation throughout the Chesapeake Bay. To account for these benefits, the watershed is designated a CPA.

Both the CRP and EQIP approaches give farmers flexibility to decide their most cost-effective strategy for obtaining CRP and EQIP contracts.

Figure 1

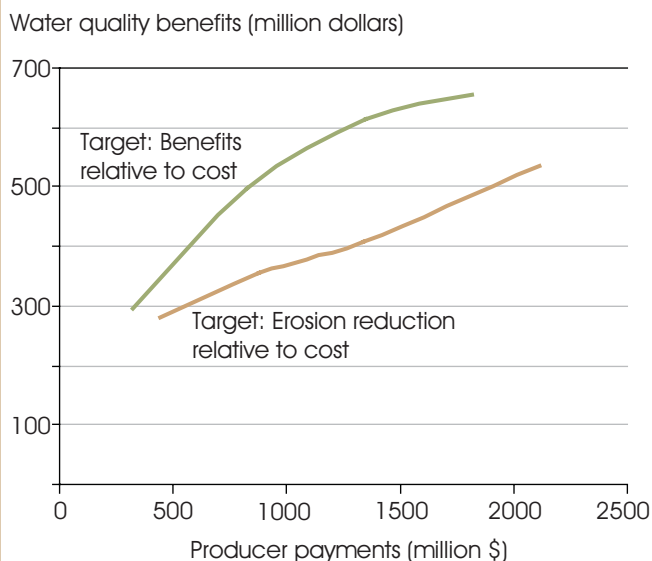
The Environmental Benefits Index substantially increased the benefits of the CRP for two of the three types of outdoor recreational activities evaluated by ERS.



Source: *Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP*, ERS AER-778, April 1999.

Figure 2

Targeting provides more benefits when addressing multiple environmental impacts than when targeting erosion alone.



Source: *Agri-Environmental Policy at the Crossroads: Guideposts on a Changing Landscape*, ERS, AER-794, January 2001.

- EQIP allocates funds across States rather than ecological regions, but the allocation scheme is designed to direct funds to States where the program's environmental goals are most likely to be met.

Targeting Can Increase Benefits and Reduce Costs

Conservation programs have generally had positive environmental outcomes. For example, ERS estimates that, without the CRP, erosion would be 240 million tons per year (12 percent) higher than the current level of agricultural erosion. Although complete information on the gains from targeting is not available, recent research illustrates the contribution of targeting:

- For programs that establish permanent cover, targeting land around wetlands can benefit wildlife. Studies have shown that duck nesting success can double when land surrounding wetlands is placed in permanent cover.
- An ERS study estimated that targeting based on the EBI (rather than on soil erosion alone) may have increased CRP benefits associated with freshwater recreation, wildlife viewing, and pheasant hunting from \$459 million to \$828 million per year (fig. 1).
- An ERS study that simulated targeting scenarios found that, by targeting to increase the multiple benefits of soil conservation (values of improvement in the recreational quality of water, reduced flood damages, savings in municipal filtration costs, etc.) relative to costs, benefits could be 20 to 50 percent higher than when targeting only to reduce erosion relative to costs (fig. 2).

Although targeting can affect which fields are enrolled in a program, targeting need not affect the regional distribution of program acres, as evidenced by the intraregional shifts in CRP land following adoption of the EBI (fig. 3). Instead targeting can allow a program to enroll the lands within a region that are more likely to meet environmental goals.

Targeting Has Improved Program Performance, But Could Do More

Targeting mechanisms have helped conservation programs deliver greater environmental benefits by choosing program participants based on criteria that reflect program goals. Since 1990, when targeting schemes were initiated in the CRP and EQIP, program managers have become more sophisticated in designing targeting schemes that achieve a wide variety of environmental and social goals.

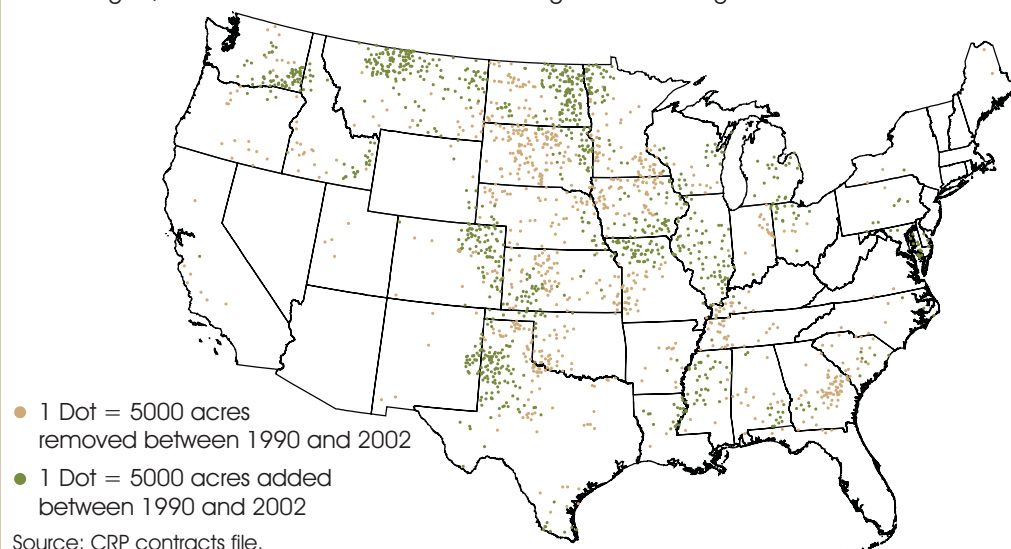
An increased understanding of ecological/societal impacts of conservation actions and the availability of data, especially GIS resources, strengthen USDA's ability to target. Some possible means of improving targeting include:

- (1) **New index formulations.** Current indices, such as the EBI, use a simple additive equation. More sophisticated formulae might better capture the interactions of economic and environmental concerns. For example, with accurate data, the use of benefit-cost ratios would provide the greatest benefits per dollar spent.

Figure 3

The EBI changed the intra-regional distribution of CRP acreage.

When first initiated, the CRP was designed to meet a single environmental objective: to reduce soil erosion. The 1990 Farm Bill broadened the environmental goals of the CRP. As a result, by 2002, newly enrolled acres have replaced approximately 14 percent of the land that had been enrolled. Although the distribution of CRP acreage across major regions has not changed, the distribution of acres within the regions has changed.



- The CRP targets contracts based on the sum of the benefits and cost scores, rather than on benefits divided by costs. Adopting a benefit/cost rule could increase net program benefits. However, because of inaccuracies in the measure of the full value of the CRP's benefits, a benefit-cost approach will not be without error.

(2) Accounting for variations in biophysical responses and public preferences across regions and environmental impacts. This could be accomplished through reliance on the knowledge of local stakeholders, or through the use of regionally disaggregated studies and surveys of both public preferences and the local biophysical effects of agriculture.

- Available studies suggest that water quality benefits from reductions in erosion vary by ten-fold across the country. However, current targeting mechanisms (such as the EBI) do not account for regional differences in the impacts of erosion on the quality of surface water.
- A targeting mechanism could reflect the number of people who will see subsequent changes in the diversity and health of wildlife populations. This may mean favoring the retirement of some lands with moderate wildlife responses but near dense populations of people.

(3) More accurate biophysical and socioeconomic information. Targeting relies on effective use of good information. This includes accurate measures of a policy's impacts on farm production practices, the changes in environmental quality that are likely to follow, and the public value of changes in environmental quality. In addition, information can help farmers better choose and implement desirable practices. But information is costly and could require more employee time, funds, and administrative resources per program contract.

Targeting relies on effective use of good information.

This brief is drawn from . . .

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