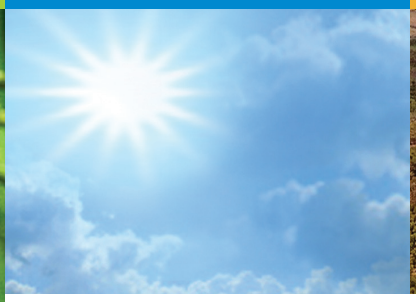
The Conservation Crossroads in Agriculture:

Insight from Leading Economists

Implications of a Reduced **Conservation Reserve Program**



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Contents

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Executive Summary

Since the Conservation Reserve Program (CRP) was established more than 25 years ago, it has successfully met the twin goals of protecting U.S. farmers' and ranchers' livelihoods and conserving the environment. The program has helped improve soil quality, support wildlife habitats, safeguard health, and provide alternative revenue and jobs for rural communities. Despite initial concerns about adverse community impacts, the local economic effects have been small and have faded over time, and the program has not resulted in population declines.

But United States lawmakers face a different world now than when the program was established. With the federal deficit and debt spiraling into dangerous territory, it is important to cut federal spending. The CRP is a program some lawmakers have targeted as an area they believe the United States can afford to cut. Providing rental payments to farmers for idled land may seem wasteful when high commodity prices for food and fuel have boosted incomes and revenues in the agricultural sectors. In fact, the past decade of increasing commodity prices has already naturally decreased total acres of land in the CRP.

The CRP, however, is more than just federal spending to keep farming land idle. The 27-year-old program has promoted economic and environmental systems that in turn support farmers and affect rural communities. While taking land out of the CRP could provide more production revenue for farmers or make more land available to young farmers and ranchers, the land could also be sold for urban development or other non-agricultural uses to the possible detriment of the rural community and environment.

Understanding the full economic and environmental impacts of reducing the CRP for farmers, rural communities, and ecosystems is salient for current discussions about the future of the program. This paper seeks to review the essential academic studies of the CRP's costs and benefits and consolidates their key findings as a tool to contribute to the policy conversation.

When collectively considered, these prominent academic studies on the CRP paint a telling picture:

- The CRP has had economic benefits that outweigh its costs to taxpayers;
- A reduction in the amount of land in the CRP would result in significant losses of the current program's environmental benefits; and,
- A reduction in the amount of land in the CRP would also result in significant reductions in the program's economic benefits. The value of the economic losses that will occur may not be as great as the economic gains that accrued from bringing land into the CRP.

The CRP is more than just federal spending to keep farming land idle. The 27-year-old program has promoted economic and environmental ecosystems that in turn support farmers and affect rural communities.

Background

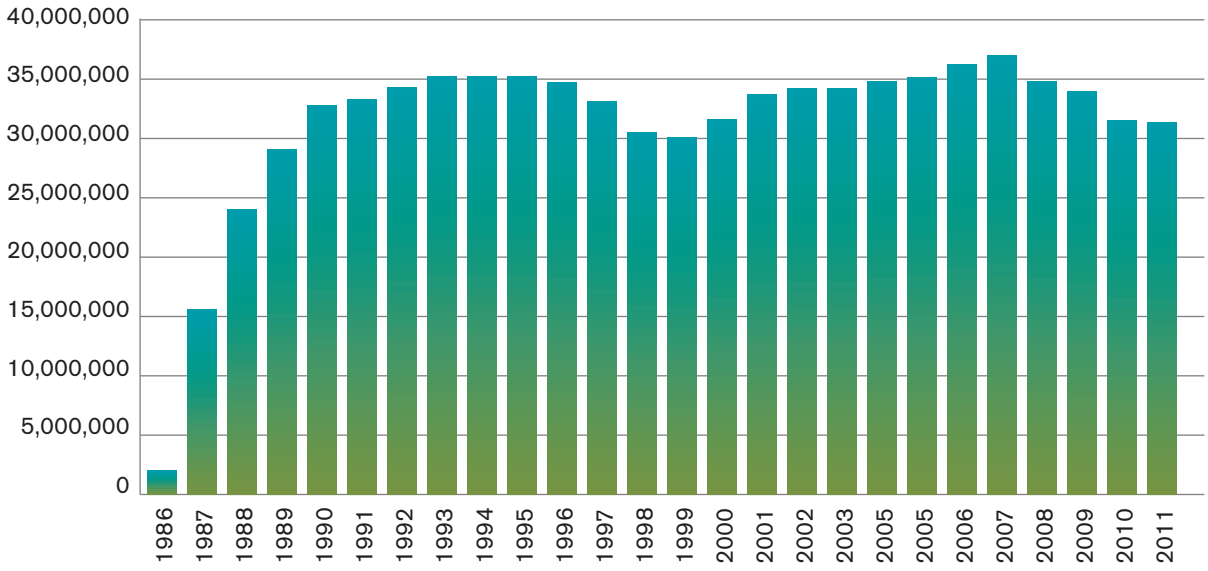
The Conservation Reserve Program (CRP), one of the largest conservation programs in U.S. history, was established by the *Food Security Act* of 1985 and was reauthorized in all subsequent farm bills. Under the CRP, farmers convert highly erodible cropland or other environmentally sensitive acreage to resource-conserving covers, such as native grasses, trees, and filterstrips. In return, they receive an annual rental payment from the government/USDA for a contract period of 10-15 years. Enrollment is generally limited to 25 percent of the cropland within each county (USDA 2012a).

Land retirement was one means of restricting commodity supply and raising prices. But the 1985 Act established that land retirement could be done in a manner that also provides environmental benefits. It directed the Department of Agriculture to enroll 40 to 45 million acres by 1990 with a primary goal of reducing soil erosion on the well defined and simply measured category of highly erodible cropland (USDA 2012a). Reducing soil erosion carries with it the additional advantages of protecting soil productivity, reducing sedimentation, improving water quality, and improving fish and wildlife habitat. Secondary objectives included curbing production of surplus commodities, which in turn would provide income support for farmers (Feather, Hellerstein, and Hansen 1999).

Enrollment

The CRP uses a bidding process to select land into the program. In the initial CRP signups, CRP bids were accepted, not to maximize the program's environmental benefits, but to enroll the maximum number of acres susceptible to soil erosion (Reichelderfer and Boggess 1988; Osborn et al. 1995). Since then, the selection criteria have been broadened to include multiple environmental benefits, including

Figure 1 **Conservation Reserve Program: Cumulative Enrollment by Year (Acres)**



Source: USDA (2012c). Shown here are acreages at the end of fiscal year (September 30).

soil erosion, water quality, air quality, wildlife habitat, and conservation priority areas, which are measured using an index known as the Environmental Benefits Index (EBI) (USDA 2012a). Bids with higher EBI are accepted first until the budget is used up.

Figure 1 shows cumulative CRP enrollment from 1986 to 2011. CRP acreage built up in the late 1980s and the early 1990s and reached its first peak (35 million acres) in 1994, at an annual rental cost paid by the USDA of over $1.74 billion. As the first group of signups began to expire, the total enrollment decreased slightly and then began to increase again. The program reached its maximum acreage of 36.77 million acres in 2007, at an annual rental cost of $1.76 billion. Since then, total CRP acreage has been decreasing gradually. As of February 2012, the CRP contained 29.77 million acres, including those enrolled in general and continuous signups and the Conservation Reserve Enhancement Programs (USDA 2012b). The 2008-2011 declines in CRP acreage coincide with the increase in agricultural commodity prices since 2007.

If the recent trend of high commodity prices continues, CRP enrollment will likely shrink even more in the future because higher commodity prices increase the opportunity cost of CRP participation.

This raises an important question: What are the economic and environmental implications when the size of CRP continues to downsize? This brief paper provides important data points for the CRP discussion by reviewing the establishment, growth, and likely future reduction of the CRP to individual farmers, to the local agricultural economies and rural communities, and to the environment. Understanding the full costs and benefits of the CRP to our economic and environmental well-being is key for any future policy decisions on the program.

Individual Economic Impact

There is strong evidence that the CRP generates significant economic benefits to society. Some of these benefits go to the participating landowners directly, while others occur primarily off the farm as a result of improved environmental quality, which supports recreational activities.

- **Economic Benefits** from reduced soil erosion. Reduced soil erosion from CRP land has both on-site and off-site economic benefits.
  - The on-site economic benefits include increased soil productivity from reduced soil erosion, which was estimated at $122 million per year, with approximately 60 percent of the benefits coming from future yield increases and 40 percent from decreased input use, such as fertilizer, when CRP acres are returned to production (Sullivan et al. 2004).
  - Off-site benefits include reduced sediment in surface waters, which, in turn, precludes the need (and expense) to dredge or otherwise remove soil that blocks or threatens

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The total benefit, including both on-site and off-site benefits, from reduced soil erosion from CRP was estimated to be $500 million per year.

structures. Reduced particulate matter in the air also reduces medical and structural effects and results in cost savings for people and businesses in areas downwind from CRP land (Hansen and Claassen 2001). The economic values of these benefits were estimated in 2000 to be $61 million per year from reduced off-site damages from dust and $317 million per year from reduced sediment-related damage caused by sheet and rill erosion.

- The total benefit, including both on-site and off-site benefits, from reduced soil erosion from CRP was estimated to be $500 million per year, or $15 per CRP acre per year, based on the 1997 enrollment (Sullivan et al. 2004).

- **Recreational benefits.** The CRP improves environmental quality, which leads to enhanced ecosystem health in general and increased public enjoyment of recreational activities in particular. Sullivan et al. (2004) estimated selected wildlife-related benefits attributable to CRP enrollments, including wildlife viewing and pheasant hunting, at approximately $737 million per year, or

Table 1 **Selected Economic Benefits from the Conservation Reserve Program**

Benefits	Total[a] ($ Million/Year)	Per CRP Acre[a] ($/Acre/Year)
Benefits from reduced soil erosion[b]	653	20
Recreational benefits[b]	963	29
Annualized benefits from increased agricultural land value[c]	1,108	34
Annualized benefits from increased developed land value[c]	786	24

a All benefits estimates are adjusted for inflation to represent 2011 dollars and total benefits are rounded to the nearest million dollars.

b Source: Sullivan et al. (2004)

c Wu and Lin (2011) estimated that the CRP increased farmland value by between $18-25 per acre (with an average of $21.5) and increased developed land value by between $6-274 per acre (with an average of $140/acre) in 1997. Multiplying the averages by the total acreages of agricultural land and developed land in 1997, we obtain the total increases in agricultural land value and developed land value, respectively. Assume a discount rate of 5%, annualized benefits from increased land values are calculated by multiplying the total increases by 5%. Dividing the annual benefits by the total CRP acreage in 1997 gives the per acre benefits, which are adjusted by the Consumer Price Index (CPI) to represent the 2011 dollars.

$22 per CRP acre per year. Sullivan et al. (2004) pointed out that this represents a lower-bound estimate of wildlife benefits because it does not include improved hunting for many species and the increased protection CRP land affords to threatened and endangered species.

- **Benefits from increased land values.** With about 8 percent of the nation's cropland enrolled into the CRP, up to 25 percent in some counties, the CRP was found to have a significant impact on land values. Wu and Lin (2011) estimate that the CRP increased the average farmland value nationwide by between $18 and $25 per acre in 1997. The effects were largest in the mountains, southern plains, and northern plains, where it increased the average farmland value by between 5-14 percent, 4-6 percent, and 2-5 percent, respectively. The CRP also had a statistically significant effect on developed land's prices.

Table 1 summarizes selected economic benefits provided by the CRP. The annual benefits from the reduced soil erosion and increased recreational opportunities amount to roughly $49 per acre (2011 dollars). Only about 10 percent of these benefits accrue to the enrollee as on-site benefits, and the remaining 90 percent accrues to the rest of society (Sullivan et al. 2004). The most important on-site or local benefits are increased land values, at $58 per CRP acre per year (combined value of agricultural and developed lands). The average CRP rental costs were only $52 per acre in 2011. These results provide evidence that CRP's benefits outweigh its costs to taxpayers, although the performance of the CRP could be improved (Babcock et al. 1996; Cooper and Osborn 1998; Wu, 2000; Wu, Zilberman and Babcock 2001).

Impacts on Rural Economies and Communities

Since its inception in 1985, there has been concern that retirement of farmland from production will adversely affect at least some sectors in nearby communities as demand for local agricultural inputs and marketing services declines. Congress attempted to address this concern by limiting enrollment in the program to 25 percent of a county's cropland. Yet, particularly in farm-dependent counties, many have wondered whether such

Table 2 **Summary of Selected Case Studies of Rural Community Impacts of the Conservation Reserve Program**

Scope of study	Number of studies	Impacts on jobs/ output/income	Impact on migration	Impact on retail sector
Case studies of counties and multi-county regions	8	Five (of six) studies show negative economic impacts	Two (of two) studies show negative effect on population	–
Case studies of sub-county areas	2	One econometric study finds a negative relationship between CRP enrollment and median household income at the zip code level	One econometric study finds a negative relationship between CRP and population at the zip code level	One ex ante analysis concludes that there is a positive effect on retail in larger trade centers and a negative effect on retail sales in smallest communities

limits can cushion the negative impacts of the CRP on rural businesses, civic organizations, community services (education, public safety, roads and other infrastructure), and, ultimately, on community viability.

Much economic research was conducted to look at effects on local communities when the program was first introduced. Most of the early research on economic impacts in the late 1980s and early 1990s was done at the county, multi-county regional, or state level. We review this literature first. Then we review the large-scale econometric analysis of countrywide impacts completed by the USDA's Economic Research Service in 2004. The effects of the CRP on local economies vary over time—initial negative impacts are diminished as the community economy adjusts—and across different places. Most studies of local economic impacts of CRP enrollment were done in the late 1980s and early 1990s. Martin et al. (1988), Broomhall and Johnson (1991), Hyberg et al. (1991), Mortenson et al. (1989), and Devino et al. (1988) all found that CRP enrollment had negative economic impacts on the local economy. In contrast, Myers and Sutherland (1989) found local economic gains in the short run.

Concerns that the CRP would lead to out-migration in places with high CRP enrollment led to studies during the same time period of the impact of land diversion on population. Van der Sluis (1993) examined rural nonfarm populations in 100 agriculturally dependent counties in the United States and found that cropland diversion programs reduced population. Roberts (1987) found in a study in the southern plains that programs that idled crops had a negative effect on population.

Two studies have looked at CRP economic impacts at the sub-county level. In their study of 22 Oklahoma communities, Henderson, Tweeten and Woods (1992) estimated changes in county income shares as government payments at the local level replaced former crop income. They concluded that the CRP would likely benefit retail businesses in the larger communities and hurt retail businesses in the smaller communities.

In a study in southwest Minnesota, Hamilton and Levins (1998) examined the impact of CRP enrollment on median household income, poverty and population. They selected for analysis the 18 zip codes in 19 counties with at least 15 percent of their land enrolled in the CRP. These zip codes, on average, had smaller populations and fewer manufacturing jobs than the other 162 zip codes in those counties. The econometric results suggest that, all other things equal, CRP enrollment is associated with lower median household incomes and lower populations in farming-dependent counties. These findings are consistent with interviews the authors conducted with farm households in the 19 counties.

Perhaps the most comprehensive effort to understand the economic and social impact of the CRP on rural counties is the 2004 Economic Research Service (ERS) study completed in response to a congressional mandate for the research (Sullivan et al. 2004). ERS analyzed 1,481 counties in the contiguous United States with more than 5 percent of county employment in farming and an urban population of less than 20,000 as the counties most likely to be affected by the CRP. These counties were concentrated heavily in the Great Plains and contained 79 percent of CRP-enrolled land. For its analysis, ERS attempted to match high-CRP counties with low-CRP counties that were otherwise identical in terms of percentage of land in farms, predominant farm type, region, and a range of other characteristics. By controlling for the effects of these other factors, a comparison of the economic performance of these two groups yields inferences about the effects of the CRP.

The ERS report concluded that "the adverse impacts of CRP are generally small and fade over time." It reached four specific conclusions: (1) "high CRP enrollment was associated with a net loss

of jobs in some rural counties between 1986 [when the first land was enrolled] and 1992, but this relationship did not persist throughout the 1990s"; (2) "farm related businesses, such as input suppliers and grain elevators, continued contracting throughout the 1990s"; (3) "other business expansions [such as increased outdoor recreation businesses] moderated CRP's impact on total employment"; and (4) "we found no statistically significant evidence to support the commonly held belief that CRP encourages rural outmigration [or] absentee ownership."

In other words, the negative impacts on rural communities anticipated in the early reports appear to have been moderated as community economies have adjusted. If the CRP program decreases or is downsized, there would, of course, be some business in rural communities that would be negatively affected. The size of these impacts is expected to vary across different types of businesses and communities.

The Value of the CRP's Environmental Impacts

By converting highly erodible cropland or other environmentally sensitive acreage to long-term, resource-conserving covers, the CRP offers many environmental benefits, including reduced soil erosion, improved air and water quality, and improved wildlife habitat. Conversely, many of these environmental benefits will be lost when CRP acres are converted back into crop production. The major environmental benefits from the CRP are summarized as follows:

- **Reduced soil erosion.** By converting highly erodible cropland to native grasses and trees, the CRP reduces wind- and water-induced soil erosion. Nationwide, the CRP was credited with reducing soil erosion by nearly 224 million tons a year, or approximately 6.8 tons per CRP acre, based on 1997 enrollments (Sullivan et al. 2004). Enrolling land in the CRP also has a positive effect on soil *quality* (Karlen, Gardner and Rosek 1998). Reducing soil erosion and improving soil quality is key to improving the surrounding environment and production yields.

- **Improved water quality.** Suspended sediment and nutrient run-off from agriculture have been cited as the most damaging nonpoint-source pollution to the U.S. environment (Smith, Alexander, and Wolman 1987). By reducing soil erosion and nutrient runoff, the CRP offers significant water quality benefits (Ribaudo et al. 1990; Feather, Hellerstein, and Hansen 1999). Weitman (1994) estimated that nitrate loadings declined by 90 percent, sediment and herbicide loadings by 50 percent, and phosphorous loadings by as much as 30 percent in some U.S. agricultural regions as a result of the CRP.

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Improved water quality helps support healthy wildlife habitats and cuts costs on water filtration systems for drinking water, among other ecosystem services.

- **Wildlife habitat.** By converting row cropland into native grasslands and trees, the CRP benefits many wildlife species by providing nesting cover, wintering habitat, and plant and insect feed. Many wildlife species have benefited from improved habitat, including ring-necked pheasants, elk and deer, neotropical migrant land birds, and eastern cottontail rabbits (see Box 4 in Feather, Hellerstein, and Hansen 1999). For example, Reynolds et al. (1994) found that CRP acres in the northern plains have significantly increased duck populations, which require dense vegetative cover within 3 miles of wetlands for successful nesting.

What Would Happen…

…if the size of or authorized budget for the CRP was reduced in the 2012 farm bill? In an environment of federal fiscal restraint, the CRP is among dozens of conservation programs for which funding could be cut. The maximum number of acres that can be enrolled also could drop. Another way size could be reduced is by allowing CRP participants to break their contract by opting out early—before the full contract term of 10-15 years has been met.

If the current trend of increasing agricultural commodity prices continues, the size of the CRP will likely decrease regardless of any legislative or budget changes. With high commodity prices, the opportunity cost of CRP participation will be high, and a large portion of expiring CRP land may return to crop production even if CRP rental rates stay the same.

Based on a national survey of farm owners and operators, ERS analysts estimated that if existing CRP contracts were allowed to expire in 2001, about half the enrolled land would stay in conservation uses or go into pasture, and the rest would go into farm production (Osborn et al. 1994). Given that the current prices of major crops, such as corn and wheat, are almost three times as high as in 2001, the percent of CRP land that would return to crop production would be much higher. As such, many environmental benefits offered by CRP lands will be lost, and many of the economic benefits from improved environmental quality will also disappear even if, for example, appropriations for the CRP stay at the same level.

However, the impacts of reducing or eliminating the CRP are not necessarily symmetrical with the benefits and costs that accrued during its expansion. Farm operators may not return all of the land put into reserve back into farm production, and some may sell it for non-agricultural uses (especially development in areas with high

competition for land). This would mean that the resultant, additional farm production could have a smaller nonsymmetrical impact on lowering commodity prices than studies found for price hikes attributable to land going out of production.

To the extent that the quality of recreational opportunities is affected by changes in land use with CRP acreage reductions, the amount of recreational expenditures associated with hunting, fishing and wildlife viewing in a locality could change. Those households receiving reduced CRP payments might not return to their pre-CRP spending patterns as local shopping opportunities may have changed and new relationships developed with more distant retailers. Local community economies will have adapted and businesses that failed under CRP expansion may not reopen.

In order to provide a benchmark case of CRP reduction, USDA's ERS simulated what the impact would be if all CRP contracts in 2000 were terminated immediately. Under economic conditions for the year 2000, ERS analysts estimated that expanded production would have generated $3.02 billion in additional revenue to farm households nationally, assuming no change in farm prices. The loss of wildlife habitat and other amenities would reduce recreational revenues in the three regions by $7-$293 million dollars, depending on the method used to estimate recreational impacts. The $1.6 billion loss in CRP payments would offset some of the increases in farm revenues from expanded production.

The direct revenue changes outlined above would generate indirect and induced economic impacts. The partial return of CRP land to crop production would increase demand for farm inputs and agricultural services, generating job growth in these industry sectors. Loss of CRP payments to farm households would reduce farm household income. With an economy-wide Social Accounting Matrix multiplier model, analysts estimated that termination of CRP would—in the short run—increase national output (by 0.04 percent), value-added (by 0.03 percent), household income (by 0.002 percent), and employment (by 0.12 percent). If one allows for farm prices to decline due to increases in farm production and includes the loss of outdoor recreational expenditures, gains in output and income would be reduced and losses increased.

The study also analyzed how CRP termination would affect revenue in three multi-county regions that have extensive CRP participation: the northern Great Plains, the southern Great Plains and the southwestern Corn Belt. Even though CRP enrollment was high in all regions, termination of the CRP had widely divergent impacts on the different regions due, in part, to differences in agricultural dependence, labor productivity, and reliance on imported goods and services.

Conclusions

Many landowners may find their private interests and personal stewardship goals are well matched by the CRP and won't be likely to change how they use their land without a CRP. However, they may be in the minority. A larger pool of CRP participants will likely rely on land prices, commodity prices, and other market signals to determine how they will use their CRP land.

What all of the cited studies suggest is that (1) the CRP has had economic benefits that outweigh its costs to taxpayers; (2) the economic losses occurring when net acres in the CRP decrease may not be as great as the economic gains that accrued from bringing land into the CRP; but (3) a major reduction in the CRP would result in significant losses of the economic and environmental benefits of the current program. Although CRP reduction would have relatively small aggregate effects on rural income and employment, the impacts on particular communities in regions with large CRP enrollment could be sizable.

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Acknowledgements

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