

Impact of High Corn Prices on Conservation Reserve Program Acreage

Silvia Secchi

ssecchi@iastate.edu
515-294-6173

Bruce A. Babcock

babcock@iastate.edu
515-294-6785

Growing demand for corn due to the expansion of ethanol has increased concerns that environmentally sensitive lands in the Conservation Reserve Program (CRP) will return to crop production. Most of the land currently in the CRP was enrolled because of the potential for environmental damage if it were farmed. A return of this land to crop production would likely lead to lower environmental quality. Iowa has a large number of CRP acres, it produces more ethanol than any other state, and it produces the most corn. Thus, an examination of the impacts of higher crop prices on Iowa land moving out of the CRP and the resulting effects on soil erosion, nutrient losses, and carbon sequestration will give insight into what we might expect nationally in the years ahead if crop prices remain high.

Estimating Environmental Impacts

The first step in estimating the environmental impacts of higher crop prices is to estimate the relationship between crop prices and the proportion of CRP land that will return to production. That is, we first need to estimate CRP supply curves for Iowa. The basis we use for estimating these curves is the land's suitability to produce corn, which we measure using the Corn Suitability Rating (CSR). We then estimate the environmental impacts of cropping CRP land through the Environmental Policy Integrated Climate (EPIC) model. EPIC provides edge-of-field

estimates of soil erosion, nutrient losses, and carbon sequestration.

Figure 1 shows where CRP land is located according to USDA's Farm Service Agency. Two million acres of Iowa cropland is enrolled in the program. The CSR of each parcel of CRP land was obtained by overlaying a CSR map (Figure 2) on the map shown in Figure 1. There are relatively few CRP acres in the Des Moines Lobe in North Central Iowa. But the land that is enrolled is productive. Because of this higher productivity, enrolling land in the CRP in North Central Iowa is more expensive than enrolling land in southern or northeastern Iowa, which is one reason why there are more acres enrolled in southern and northeastern areas of the state.

We construct the CRP land supply curves for corn prices ranging from \$2 to \$5 per bushel. We assume that soybean prices stay at \$4 above corn prices in all scenarios. Our assessment presumes that profit is the main driver of CRP enrollment decisions. However, there are many reasons why property owners decide to enroll in

the CRP program, and, in practice, profit is not always the driving force behind their choices. Therefore, our estimates have to be considered an upper-range projection of the acreage that would go back into production. It is also important to note that this is a long-term equilibrium analysis of the alternative land uses for CRP land. We are abstracting from penalties for early termination, and re-enrollment provisions such as the re-enrollment and extension offer implemented by the Farm Service Agency. Land is assumed to move out of the CRP and into production if the returns to cropping the land exceed the rental rate that the land can get in the CRP.

Figure 3 illustrates the state-wide curve. At \$3 corn, we estimate that almost a million acres would go back into production. We cannot know for certain how this land will be cropped. About 460,000 acres of this land is designated as highly erodible, so it would require use of conservation tillage, which is most easily accomplished with a corn-soybean rotation.

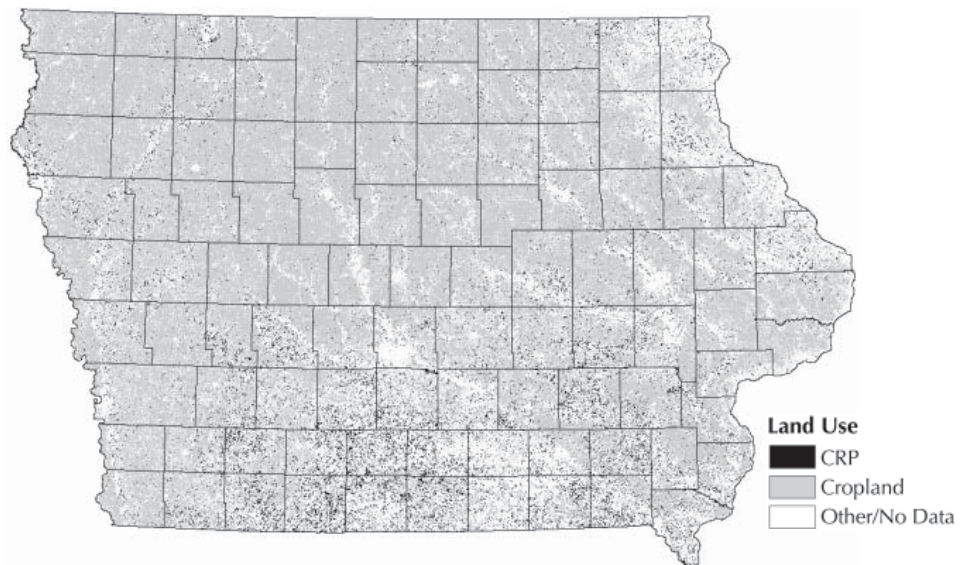


Figure 1. Location of CRP acreage in 2004

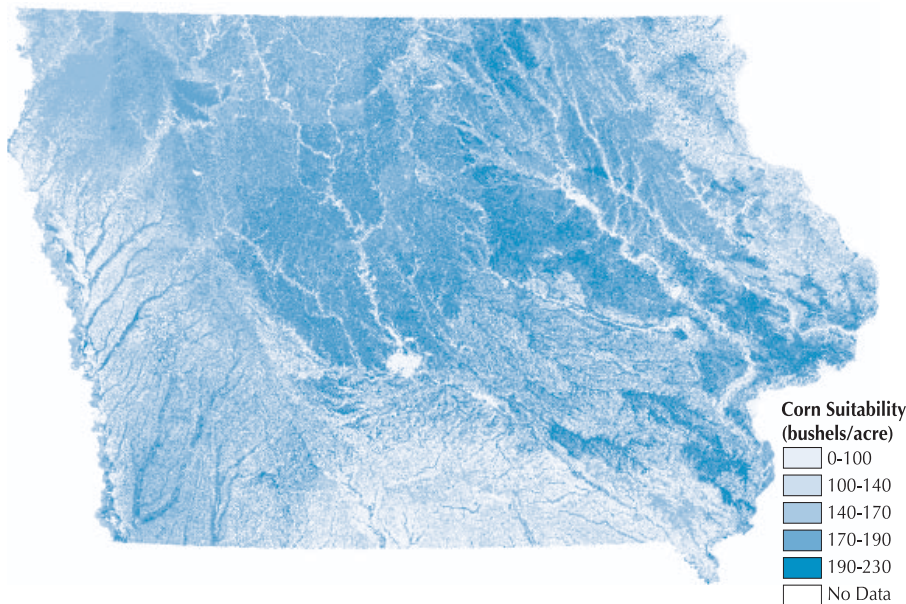


Figure 2. Corn suitability

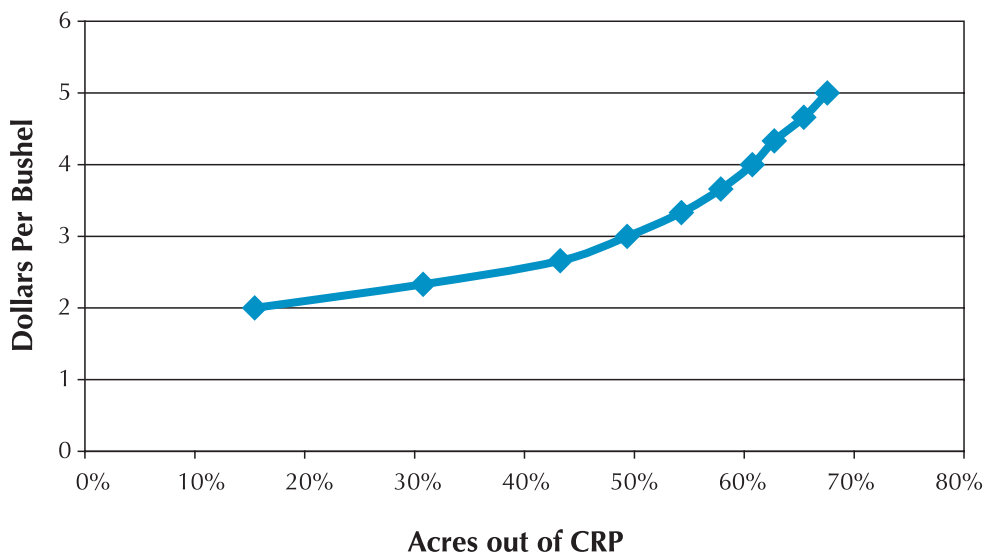


Figure 3. Acreage taken out of CRP as a function of corn prices

Costs of Retaining and Losing CRP Acres

Currently, CRP annual payments total about \$200 million. One way to limit land coming out of the CRP is to increase CRP rental payments. At \$3-per-bushel corn, we estimate that USDA would have to pay \$314 million to reduce the loss of CRP acreage to less than 200,000 acres. For higher corn prices, even doubling the payments becomes a relatively

ineffective policy. For example, we estimate that for corn prices of \$3.66 per bushel, doubling the rental rate paid to farmers would hold program costs constant, but only 675,000 Iowa acres would be enrolled.

To estimate the environmental impact of cropping land previously set aside from production, we used the EPIC model to estimate 30-year averages for soil erosion, nitrogen and phosphorous loss, and carbon

sequestration. For simplicity, we assume a uniform fertilizer rate application of 133 pounds per acre for nitrogen and 30 pounds per acre for phosphorous for corn acres. Fertilizer applications occur in the spring.

Our results indicate that, on average, land that would leave the program first would have relatively small environmental impacts. However, incremental impacts would increase dramatically as higher corn prices bring into production more and more environmentally fragile land. For example, sediment losses increase from less than 5 million tons at \$3 corn to over 30 million tons at \$5 corn, when over 1.35 million acres would go back into production. We estimate that if all CRP land in Iowa were put back into a continuous corn rotation, the sediment losses would exceed 78 million tons.

Nitrogen losses follow a similar pattern. Losses increase from around 62,000 tons to over 294,000 tons at \$5 corn. If all CRP land in Iowa were put back into a continuous corn rotation, the nitrogen losses would exceed 438,000 tons.

At \$3 corn, there is over a 400 percent increase in sediment losses, almost a 500 percent increase in phosphorous losses, and a 270 percent increase in nitrogen losses. Changes in carbon losses in percentage terms are much smaller, ranging from a decrease of 2 percent for \$2 corn to a decrease of 9 percent for \$5 corn. Note that as prices increase, there is progressively less and less acreage put into production. However, environmental damages per acre become progressively higher, as corn prices increase and bring additional, more environmentally sensitive land into production. The marginal impacts increase rather steeply, reflecting the increasing environmental sensitivity of the land brought back into production.

It is also interesting to note that if all the CRP land were returned to

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levels that justify higher rents. Of course, price is only one side of the revenue equation. There is also the risk that farmers may not be able to produce a crop. But the probability of a crop loss is no greater under high prices than under low prices, and so this risk should not really influence farmers' willingness to pay more for land. The one uncontrollable part of the future profit equation is production costs. If seed, fertilizer, fuel, and pesticide costs continue to rise, as they have over the past few years, then future margins will be lower than anticipated.

Impacts of Higher Land Rents

Higher land rents, and the inevitable increase in land prices that follow, will have little impact on the competitiveness of Iowa agriculture. Because the value of Iowa farmland is determined primarily by the value it generates in current and anticipated future production, higher property

values are a reflection, rather than a determinant, of the competitiveness of Iowa agriculture.

It might seem intuitive that higher land rent would hurt farmers who rent land. But if higher land rents simply reflect higher expected returns over variable costs, then farmers who rent their land will be largely unaffected by changes in rent. On average, the extra they make from the marketplace will just be handed over to land owners in the form of higher rental payments.

The clear beneficiaries of higher crop returns would be existing land owners because the returns to owning land would increase. Because farmland is a major financial asset, the net worth of Iowa would grow significantly. To the extent that this increase in net worth is leveraged into productive investments, income growth in Iowa should also eventually increase.

Higher land rents could significantly reduce the amount of Iowa cropland that is enrolled in the Conservation Reserve Program (CRP) and the Wetland Reserve Program. Past experience has demonstrated that farmers will remove land from CRP if the land can earn significantly more in crop production than it can earn in the program. Reductions in CRP land will likely increase soil and nutrient losses and reduce wildlife habitat.

One option that USDA will be considering to offset the negative impacts of land coming out of conserving uses is to use the money saved from expiring contracts to increase bid rates for the most environmentally sensitive land. If USDA follows this path, conservation programs may be smaller but the per acre environmental benefits that they provide could be much greater. ♦

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production of continuous corn, the environmental damages would be much higher than what we estimate with corn prices as high as \$5 per bushel, as we noted earlier for sediment and nitrogen losses. In the case of carbon sequestration, losses would increase from over 87 million tons at \$5 corn and 1,350,000 acres back in production to 133 million tons for the almost two million acres currently in CRP. This suggests that no matter how high corn prices ever get, some land in CRP is simply too fragile to be cropped.

Change in Strategies

The results of our work carry implications for large parts of the

United States but are particularly relevant for the Corn Belt. Our results indicate that land currently enrolled in the CRP offers significant environmental benefits that could be lost under higher commodity prices. Maintaining current levels of environmental quality will require substantially higher spending levels. Even allowing for the cost savings that would accrue as CRP land leaves the program, a change in targeting strategies will likely be required to ensure that the most sensitive land does not leave the program. In particular, high corn prices may accelerate the trend that started with the 2002 farm bill in which CRP targeting has shifted from the idling of whole fields for conservation purposes to implementing in-field practices, such as

filter strips and grassed waterways that are seen as supporting working lands by reducing environmental impacts. (To preserve whole fields in the CRP, higher payments would have to be considered.) Because this will keep only part of the land out of production, it is not certain that more money will have to be devoted to CRP payments. For example, at \$4-per-bushel corn, doubling soil rental rates would keep over a million acres in the program, as opposed to less than 700,000 acres with current payment levels, and the program costs would be over \$26 million lower than they are now. ♦