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THE CONSERVATION RESERVE PROGRAM:

LONG-TERM BUDGETARY AND FARM SECTOR IMPACTS

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ABSTRACT

Computer simulation models of corn, wheat, cotton, and soybean markets are used to investigate the budgetary and farm income impacts of the Conservation Reserve Program (CRP) over the period 1986-2000. Results indicate that the CRP increases farm income and crop prices, and it increases Government outlays, the amount depending on assumptions about the return of land to cultivation after CRP contracts expire.

The Conservation Reserve Program: Long Term Budgetary and Farm Sector Impacts

Introduction

The Conservation Reserve Program (CRP) has been hailed as an important conservation accomplishment of the Food Security Act of 1985. The CRP is expected to remove 40 million acres of highly erodible and other environmentally sensitive cropland from production. Much has been written about the conservation and environmental benefits of the CRP (Ervin and Blase, Ribaudo, Jahn). While designed as a conservation program, removal of 40 million acres has a direct impact on the productive capacity of U.S. agriculture. This paper focuses on the impacts of the CRP on commodity supply and use, with special emphasis on the associated Government outlays. In particular, we address three issues: (1) What are the expected impacts of the CRP on Government outlays? (2) What are the expected impacts of the CRP on commodity prices and farm incomes? (3) What are the potential impacts of the CRP on Government outlays and farm income as CRP contracts begin to expire in 1996? These impacts are analyzed over the period 1986 (the first year land entered the CRP) through 2000 (the first year following the expiration of the last CRP contracts).

Background

To participate in the CRP, producers must submit bids stating an annual rental payment they would accept to convert eligible cropland to permanent vegetative cover for a period of ten years. If accepted, farmers receive annual rental

payments and a 50 percent cost share for establishing the vegetative cover. Acres enrolled in the CRP result in a reduction in base acres proportionate to the ratio of base acres to total cropland acres on the farm, hence, reducing the eligible crop acreage base for USDA commodity program participation. When CRP contracts begin to expire in 1996, acres may return to production, but will be subject to conservation compliance rules.

Establishing permanent cover on 40 million acres of highly erodible cropland will substantially reduce environmental damage caused by erosion. In addition to reducing wind and water erosion and providing income support to farmers, the CRP will also improve water quality, increase woodland resources, and create better habitat for fish and wildlife. USDA researchers are currently evaluating these benefits and have made some economic value estimates. Ribaudo projects the off-site surface water quality benefits to have a present value of $3.0 billion. Langner estimates that the dollar value to small game hunters would total $3.8 billion (present value) due primarily to additional hunting days. Preliminary estimates of on-site soil productivity benefits and the values of reduced wind erosion damage are also in the billions of dollars.

A complete evaluation of the CRP should include some attention to the potential implications for U.S. agriculture, starting in 1996 as the CRP contracts expire. Proposals for the 1990 farm bill are already being advanced (Benbrook). Insights into the impacts of CRP contract expiration may be useful in forthcoming discussions of the new farm bill.

Methodology

Our approach to investigating the farm income and budgetary aspects of the CRP involves a set of counterfactual simulations of the corn, soybean, wheat, and cotton markets. In these simulations, we compare current expectations for CRP enrollment with alternatives which assume the CRP had not been implemented. Individual models of the U.S. corn, soybean, wheat, and cotton markets, are adapted from those developed by Salathe. Each model consists of a set of equations that estimate production, use, price, Commodity Credit Corporation (CCC) loan activity, producers' gross and net income, and Government program expenditures. Each model's set of simultaneous equations is adapted to LOTUS 1-2-3 software for solution on a personal computer. The default response coefficients were derived from previous empirical studies (Ray and Richardson, Salathe and Langley).

Corn, soybean, wheat, and cotton make up over 73 percent of the program crop base reduction and soybean acreage reduction expected to occur as a result of enrollment in a 40-million-acre CRP. These four crops comprise over 53 percent of total expected CRP enrollment. To account for non-modeled program crops, total CCC outlays were derived by multiplying the four crop total by 1.1, based on CCC outlays by crop in 1986.

The models determine market prices by setting total supply equal to total use plus ending stocks and solving for the unique price that clears the market. Net income for producers of each crop is the sum of the value of production (price times production), deficiency payments, diversion payments (when

applicable), reserve storage payments, annual CRP rental payments, plus a 50 percent cost share for establishing CRP cover, less variable costs of production. We assume the cost of production for acres enrolled in annual acreage reduction programs (ARP's) and paid land diversions (PLD's) is 20 percent of the total variable cost for planted acreage. Production costs also include double the cost of establishing the CRP cover (half of which is returned as income in the form of cost share).

CCC outlays are estimated on a fiscal-year basis, determined by allocating crop-year loan activity and Government payments among fiscal years. CCC cash outlays consist of diversion, deficiency, and farmer-owned reserve storage payments. CCC price-support loan outlays are estimated by subtracting the value of loan placements (quantity times loan rates) from loan repayments. Payments made in the form of generic certificates are not included as CCC cash outlays, but affect these outlays through the feedback effect of any price-depressing impacts of increased stock release on the market through certificate redemptions, thus leading to increased deficiency payments.

CRP outlays are estimated based on annual CRP enrollment multiplied by a one-time cost share payment plus annual rental payments on the cumulative CRP enrollment. Because CRP outlays are not part of CCC outlays, we add CRP to CCC to determine a total Government outlay figure. Estimates of CRP rental and cost share payments and acreage enrollment are entered exogenously in the appropriate models. Hence, we do not directly estimate CRP cost or participation.

Acres enrolled in the CRP are added to acres endogenously enrolled in annual acreage limitation programs, and adjusted for slippage to obtain the total acres retired or diverted. The models also incorporate endogenous yield adjustments depending on the amount of acres retired and diverted to account for yield slippage.

The "With CRP" Assumptions

We establish a baseline for each commodity model that conforms to long-term USDA supply and use estimates for the years 1986-2000 in the January 1989 President's Budget. Baseline producer income, CCC loan activity, and CCC program costs are derived based on the underlying supply and use estimates. Our policy assumptions are based on the continuation of provisions of the Food Security Act of 1985 through the year 2000. Under these assumptions, target prices continue their gradual decline while loan rates are determined by formulas based on market prices. Annual acreage reduction programs are consistent with implied legislative goals pertaining to estimated ending stocks; i.e., a 15 percent maximum ARP for expected wheat stocks below 1 billion bushels; a 12.5 percent maximum ARP for expected corn stocks below 2 billion bushels; and a maximum 25 percent ARP for cotton with a goal of a 4 million bale carryover. Total accumulated base reductions due to CRP enrollment are estimated to be 25.5 million acres consisting of 12 million acres of wheat, 4.4 million acres of corn, and 1.3 million acres of cotton. Assumed non-base enrollment of 14.5 million acres, including 3.6 million soybean acres brings total CRP acres to 40 million. Annual rental rates and cost-share payments are consistent with the levels necessary to obtain the estimated CRP enrollment.

While some land entered into the CRP will likely remain permanently idled, CRP provisions allow land to return to production once the contracts expire. Our baseline assumes that as contracts expire, 50 percent of the CRP acreage will be available for cultivation and ARP levels are raised accordingly after 1996 to account for the increased crop production. However, each model determines the acres that are actually planted to each crop. Our estimate of 50 percent is believed to be conservative based on net returns above variable costs derived from USDA cost of production projections. We investigate alternative assumptions regarding the percent of CRP land returning to production.

The "Without CRP" Assumptions

CRP enrollments are set to zero in the no-CRP scenario, and ARP and PLD levels are adjusted in accordance with the implied legislative goals for ending stocks. The productive capacity of U.S. agriculture exceeds domestic and export use, often to a large degree. Annual acreage limitation programs are used to control stock accumulation. Without the CRP, program crop acreage is not reduced by CRP enrollment. Thus, larger annual acreage limitation programs would be needed to keep carry-over stocks manageable. In adjusting ARP levels after removing the CRP, we assume that program administrators select ARP's and PLD's that represent compromises between those that would minimize budget exposure, within legislated guidelines, and those that would conform to USDA baseline levels adjusted only when carryover exceeds desired levels. For the crops analyzed, the 15 year average ARP's in the no-CRP scenario averaged 2.5 percent higher than those in the CRP scenario.

Results

Government Outlays

Table 1 shows the projected impacts of the CRP on Government outlays over the 15 year period. While outlays associated with the CCC's deficiency, diversion, and loan programs are decreased by 12 percent, total Government outlays are increased by 14.2 percent because of CRP costs. That is, CRP costs are only partially offset by commodity program savings. CRP expenditures are nearly offset when only the major crops are considered (a 3 percent increase in total outlays). However, non-program and minor program crops, accounting for about half the CRP acreage, have very little CCC savings to offset their CRP costs.

The large total outlay increase for soybeans is a reflection of the low CCC savings relative to CRP costs because soybeans are not included in CCC deficiency and diversion programs. Corn, wheat, and cotton are covered by these programs and, as a result, CRP expenditures are nearly offset by reduced commodity program outlays. The CCC budgetary impacts are due primarily to two factors: (1) the price enhancing effect of enrolling in the CRP land that would have been used to produce these commodities, thus reducing associated deficiency and diversion payments, and (2) CRP enrollment reduces the acreage available for enrollment in annual programs which decreases outlays. CRP impacts on annual acreage reduction program participation, crop production, and crop prices are shown in table 2. Participation impacts are mixed and slight but production is reduced for all four commodities and prices are higher due to the CRP, both outcomes contributing to reduced CCC outlays.

Farm Sector Impacts

Impacts of the CRP on selected measures of commodity markets are also projected using the crop models (table 2). Unsurprisingly, acres planted decrease while acres idled increase due to the CRP. Idled wheat acreage increases a projected 62% due to the relatively large wheat base enrolled in the CRP. It is estimated that 12 of the 40 million acres enrolled will be wheat base, compared to 4.4 million acres of corn base. As noted, production is decreased, as are both exports and ending stocks, all outcomes consistent with acreage reduction program impacts.

Crop prices and net farm incomes are increased for all crops analyzed. Coupled with increased Government outlays, this result implies that the CRP will cause higher food prices and higher taxes. Of course, environmental and other non-market impacts of the program provide many offsetting benefits. (The large impact of the CRP on soybean income is due to the price impacts, an 8.8% increase, and Government payment impacts. There are virtually no Government payments associated with soybean production, so CRP payments have a large percentage impact.)

When Contracts Expire

In 1996 and beyond, as CRP contracts expire, farmers will be able to return enrolled cropland to production. Base acreage will be restored and even highly erodible land can be planted with full commodity program benefits under conservation compliance rules if approved conservation plans are implemented.

How much CRP land will return to production is unclear; however, projected market forces indicate that it would be profitable to cultivate this land. Figure 1 shows the income effects of different assumptions concerning the amount of corn and wheat base returning to production. Projected incomes decrease as more land is returned, a result of price reductions. Assuming they also choose to implement conservation plans, Government outlays will also be affected (Figure 2). As more land is returned, CCC outlays increase, especially for wheat due to the relatively large CRP enrollment for wheat. Much lower impacts are observed if the different assumptions are compared over the entire 15-year period. In our crop models we allowed 50 percent of CRP land to return. The models projected that about one half of this 50 percent actually will be planted. The ARP's were not adjusted in these senarios to account for the increased supply of land and we expect that ARP increases would dampen the high CCC cost changes noted in the figure.

SUMMARY

The crop market simulations indicate that significant commodity program savings are achieved by a 40 million acre CRP, reducing CCC outlays by 12 percent, with the amount of savings a function of how much land returns to production when contracts expire. Projected CRP costs more than offset this savings, however, as total USDA outlays increase by 14.2 percent. The CRP is projected to increase farm income and crop prices. The net effect on the U.S. as a whole cannot be predicted from these results, because the environmental benefits were not considered in this study.

Table 1. Estimated percentage changes in CCC and CCC+CRP outlays due to CRP. 1/

Crop	Outlays	
	CCC	CCC+CRP
Wheat	-26.0	5.6
Corn	-6.7	-0.2
Soybeans	-10.1	88.1
Cotton	-10.4	-6.5
Other	-12.0	127.3
Total	-12.0	14.2

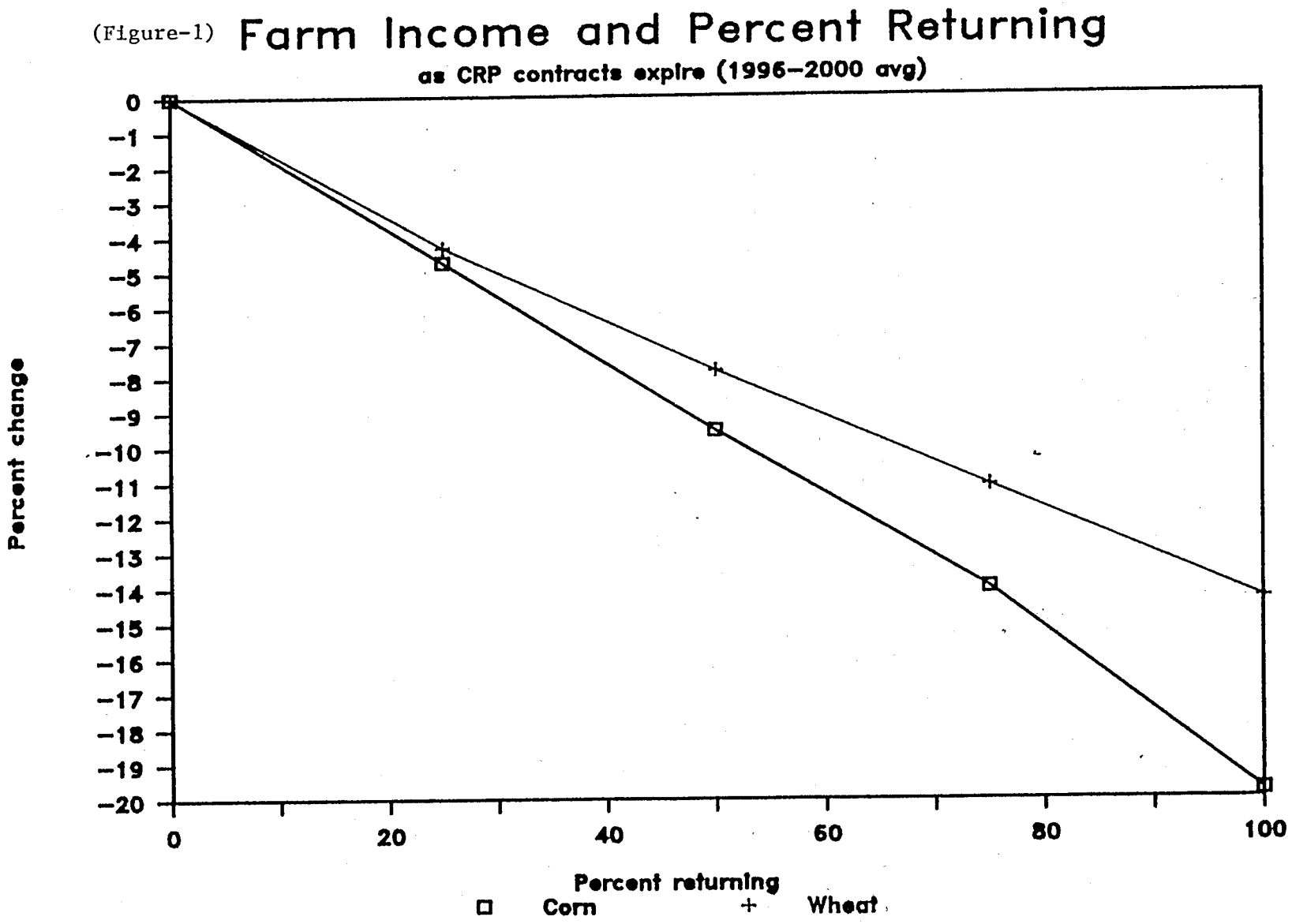
1/ Calculated as (100*(with-without)/without).

Table 2. Estimated percentage changes in agricultural sector measures due to CRP. 1/

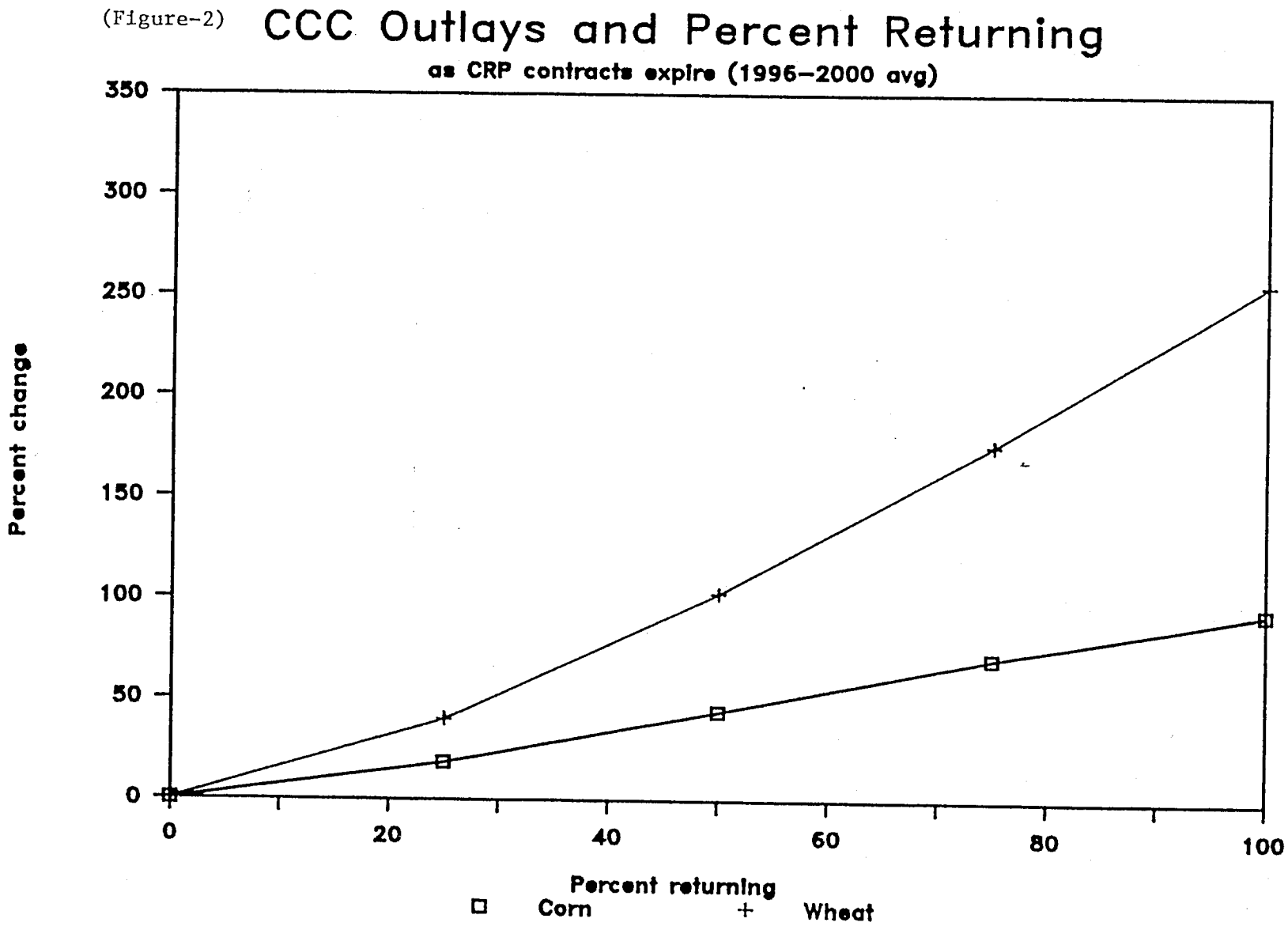
Item	Average for 1986-2000 Marketing Years			
	Wheat	Corn	Soybeans	Cotton
Participation 2/	-1.9	1.7	n.a.	1.6
Acres planted	-3.6	-0.8	-2.0	-1.1
Acres idled 3/	62.0	8.0	n.a.	14.2
Production	-2.1	-0.5	-1.9	-0.8
Exports	-3.3	-0.7	-2.6	-0.5
Ending stocks	-1.3	-10.0	-8.3	-30.5
Farm price	2.9	2.0	8.8	0.6
Net farm income	1.7	4.3	13.6	1.1

1/ Calculated as (100*(with-without)/without).
2/ In annual acreage reduction programs.
3/ Includes ARP, PLD, and CRP.
n.a. -- not applicable.

(Figure-1)


Farm Income and Percent Returning
as CRP contracts expire (1996–2000 avg)
Percent change
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
0
20
40
60
80
100
Percent returning
Corn
Wheat

(Figure-2)


CCC Outlays and Percent Returning
as CRP contracts expire (1996–2000 avg)
Percent change
350
300
250
200
150
100
50
0
0
20
40
60
80
100
Percent returning
Corn
Wheat

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