

GENERAL CROPLAND RETIREMENT: EFFECTS ON THE SOUTH OF RETIRING LOW-NET-RETURN ACREAGE VS. RETIRING HIGH-COST PRODUCTION

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Recently renewed interest has been shown in new programs for United States Agriculture. Long-term cropland retirement is one of the proposals that has received serious consideration.

This report presents for consideration some insight gained on only one facet of general cropland retirement. Selecting which cropland to retire and its effect on the South in particular, have been considered under two different criteria. Both criteria retire cropland and production but the emphases differ. The two criteria are:

(1) Retire the low-net-return acreage, hereafter referred to as the "acreage criterion." With this criterion, cropland with the lowest net return per acre is assumed to be retired before any cropland with higher net returns. It retires the maximum amount of cropland for a given program expenditure (assuming net receipts as a proxy for payments required to retire the cropland from production).

(2) Retire the high-cost production, hereafter referred to as the "production criterion". With this criterion, cropland which has the highest production costs per unit of output is retired before any cropland having lower unit production costs. In order to make inter-crop comparisons, the unit of production used was a dollar of gross receipts. This criterion retires the maximum amount of production for a given program expenditure.

The following example of a wheat and cotton budget illustrates the difference between the two criteria:

Item	Wheat	Cotton
Gross receipts per acre	\$25.00	\$150.00

Variable cash costs per acre	15.00	100.00
Net returns per acre	10.00	50.00
Production cost per dollar of gross receipts	.60	.67

In this example, wheat has a net return per acre of \$10, while cotton has a net return per acre of \$50, but the cost of producing \$1. worth of wheat is \$0.60 while the cost of producing \$1. worth of cotton is \$0.67. Using acreage criterion, the wheat acreage would be retired before the cotton acreage, because it has the lower net return. However, using production criterion, the cotton acreage would be retired first, because its production costs per dollar of gross value is higher than that for wheat.

Effects of general cropland retirement programs on the South, based on the above criteria, are evaluated by comparing estimates of (1) the amount and location of cropland retired, (2) acreage of crops retired, (3) cost of the program, and (4) farmers' expenditures for supplies and production services.

PROGRAM ASSUMPTIONS AND THE ANALYTIC MODEL

A general cropland retirement program which permitted part-farm (individual crop) retirement was assumed to be offered to farmers on a national bid system where each farmer competed with every other farmer in the country for participation in the program. Cropland retirement in a given area was limited to 30 percent of the total cropland (irrigated and nonirrigated) in that area, with the assumption no annual commodity programs would be competitive with the general cropland retirement program.

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The United States was divided into 100 production areas and budgets were prepared (by field personnel of the Farm Production Economics Division, Economic Research Service, USDA) for the major crops included in each production area, giving a total of 568 crop budgets.

A simple accounting model selected the cropland to be retired using the appropriate criterion, (1) or (2), and accumulated the quantity of cropland that would be retired by regions and by crops at various levels of national retirement. Assuming farmers would retire cropland for payment equal to expected net returns above variable cash costs, plus a \$2.00 annual payment to cover costs of conservation practices, estimates of net returns were based on 1970 expected prices, costs, and yields. The national averages of farmers' expected market prices for major crops in 1970 were assumed to be: corn, \$1.06 per bu.; wheat, \$1.25 per bu.; oats, \$0.62 per bu.; barley, \$0.92 per bu.; sorghum, \$0.99 per bu.; soybeans, \$2.15 per bu.; and cotton, \$0.20 per pound.

The analysis was based on the nonirrigated cropland planted to 15 major crops (cotton, corn grain, corn silage, sorghum grain, sorghum silage, soybeans, barley, oats, winter wheat, durum wheat, other spring wheat, rye, flax, edible beans and hay). Cropland planted to fruits, vegetables, other specialty crops and irrigated cropland were not included in the program. Net returns above variable costs for these specialty crops and for most irrigated land were assumed to be sufficiently high that it would not be retired by either criteria. Further, retirement of irrigated cropland without retirement of irrigation water may not have very much impact on crop production. Water could be diverted to other cropland, thereby increasing its production and offsetting the reduction in production from retiring the irrigated land.

Without retirement, normal land utilization among the various crops in 1970 was assumed to follow recent trends, with one exception — land diverted from feed grains, cotton, and wheat production in the past would be planted to these crops in 1970. An additional assumption, that not more than 50 percent of a given crop's normal acreage, projected to 1970, could be retired in each area, acted as a curb for the collective behavior of farmers rather than as a program provision.

RESULTS

The regional distribution of retired acres, using the acreage criterion, is shown in Table 1. A major share of the total U.S. land retirement occurs in the South. With 10 million acres retired nationally, about half are in the three Southern regions. As retired acreage is increased nationally, retirement increases in all areas

but especially in the Southern and Great Plains regions. At all levels of retirement below 70 million acres nationally, the North Central and regions designated as "Other" account for only a small proportion of the total land retirement.

The results are strikingly different for the analysis that uses the production criterion (Table 2). In contrast with Table 1, there is a major shift in the concentration of land retirement away from the Great Plains to the Southern and North Central regions at all levels. With as little as 30 million acres retired nationally, some Southern areas have 30 percent of their cropland retired — an upper limit on retirement set by the program's provisions. However, with 70 million acres retired nationally, only about 14 percent of the Great Plains' cropland would be retired.

The shift in the regional location of retired land is due to a shift in crops retired. By using the production criterion, less wheat but more corn and cotton acres were retired in both the South and the United States (Table 3). By using the acreage criterion rather than the production criterion, and again retiring 50 million acres nationally, the retired wheat acreage decreases from 20.1 million acres to 11.0 million for the United States, and from 4.7 million acres to 3.3 million in the South. Correspondingly, retired corn acreage increased from 0.7 million to 12.6 million acres nationally, and from 0.4 million to 3.0 million acres in the South. Retired cotton acreage increased from 2.9 million to 5.5 million nationally and from 2.6 million to 5.4 million acres in the South.

The reason for this shift of retirement among crops is that, relative to other crops, wheat grown in the Plains has a low net return per acre. In the analysis using the acreage criterion, wheat land was some of the first to be retired, but, our data show that Great Plains wheat also has a low production cost per dollar of gross value relative to the other crops. In the analysis using the production criterion, the acreage which had the highest production cost per dollar of gross value was retired first. Using this criterion, Great Plains wheat tended to be selected for retirement after corn and cotton acreage. For example, our data show that, in general, it would take a higher payment to retire a dollar's worth of wheat in the Great Plains than it would to retire a dollar's worth of corn in the Corn Belt or a dollar's worth of cotton in the Cotton Belt.

The distribution of cropland retirement among crops and the distribution among regions would be shifted somewhat by using different feed grain-cotton-wheat-soybean price ratios in the analysis. For example, by lowering the expected feed grain price, there is some shift of diverted acres toward the corn and grain sorghum producing areas. This occurs under both criteria because a lower feed grain price reduces

TABLE 2. REGIONAL DISTRIBUTION OF CROPLAND RETIRED AT SELECTED NATIONAL LEVELS OF LAND RETIREMENT USING THE "PRODUCTION" CRITERION (BASED ON EXPECTED 1970 YIELDS AND PRICES)

Region ^a	Million acres retired, United States			
	10	30	50	70
South	9.6 (12.5) ^b	19.8 (25.9)	21.5 (28.1)	21.7 (28.3)
Southeast	4.3 (15.7)	8.2 (30.0)	8.2 (30.0)	8.2 (30.0)
Delta	1.1 (7.9)	3.7 (26.7)	4.2 (30.0)	4.2 (30.0)
Southern Plains	4.2 (11.9)	7.9 (22.4)	9.1 (25.8)	9.3 (26.3)
Great Plains	0.2 (0.2)	5.2 (5.0)	11.0 (10.6)	14.3 (13.8)
North Central	0.1 (0.1)	4.2 (3.5)	12.9 (10.7)	25.9 (21.6)
Other	0.1 (0.3)	0.8 (2.3)	4.6 (13.0)	8.1(22.9)
Total	10.0 (3.0)	30.0 (8.9)	50.0 (14.9)	70.0 (20.9)

^aThe regional boundaries are shown in Figure 1.

^bNumber in parentheses is cropland retired as a percentage of total eligible cropland in the region.

TABLE 3. ACREAGE RETIRED OF SEVEN MAJOR CROPS WITH 50 MILLION ACRES RETIRED NATIONALLY, USING EACH OF TWO RETIREMENT CRITERIA, IN THREE SOUTHERN REGIONS AND THE UNITED STATES (BASED ON EXPECTED 1970 YIELDS AND PRICES)

Crop	Acreage criterion		Production criterion	
	South	United States	South	United States
	Million Acres			
Cotton	2.6	2.9	5.4	5.5
Soybeans	0.7	1.0	2.4	2.6
Wheat	4.7	20.1	3.3	11.0
Corn, grain	0.4	0.7	3.0	12.6
Sorghum, grain	1.6	1.6	2.2	2.2
Oats	0.4	3.0	0.4	3.2
Barley	0.2	1.6	0.2	2.0

both the net return per acre and the gross receipts per dollar of production costs for feed grains relative to other crops. The same logic applies for changes in other commodity prices.

The total cost for retiring 50 million acres nationally is much lower using the acreage criterion. In our analysis, it was only about half the cost of retiring 50 million acres using the production criterion (Table 4), but, with the production criterion, the gross value of production retired was more than proportionately higher than its cost. With 50 million acres retired nationally, the average gross value of production retired per dollar of program cost is \$2.08 with the production criterion and \$1.87 with the acreage criterion. When enough land is retired with the acreage criterion to raise the gross value of production retired to \$2.5 billion (about 77 million acres nationally), the ratio of gross value retired to program payment decreases to \$1.73.

With both criteria, the average gross value of production retired per dollar of program payment was higher in the South than at the national level. With 50 million acres retired nationally, the ratio of gross value retired to program cost in the South was \$2.94 and \$2.82, respectively, for the acreage criterion and the production criterion. When \$2.5 billion gross value was retired nationally with the acreage criterion, the ratio of gross value of produc-

tion retired to program cost in the South fell to \$2.45.

The average gross value to program cost ratio and the total program cost figure can be used to appraise, in a gross way, the effect of cropland retirement on the nonfarm sector of a region. A high ratio of gross value retired to program cost corresponds to a high reduction in farmers' expenditures per dollar of program payment. With 50 million acres retired nationally, a general cropland retirement program, based on the production criterion, has the greater effect on cash farm expenditures in the South and nationally. Although the ratio of gross value retired to program cost in the South is nearly the same between the two criteria, the program payments are more than twice as large with the production criterion. The net effect of cropland retirement on farmers' production expenditures, however, depends on the extent reductions in expenditures associated with retired crops are offset by increased expenditures on remaining cropland and for maintenance of the retired acreage.

CONCLUSIONS

Major concentrations of land retirement would occur in the South with a general cropland retirement program based on either of the criteria considered. However, a greater concentration of land retirement occurs in the South and the North Central States and

TABLE 4. COST, GROSS VALUE OF PRODUCTION RETIRED, AND RATIO OF GROSS VALUE RETIRED TO PROGRAM COST, USING TWO RETIREMENT CRITERIA, UNITED STATES (BASED ON EXPECTED 1970 YIELDS AND PRICES)

Item	Unit	50 million acres retired nationally				\$2.5 billion gross value retired nationally, acreage criterion	
		Acreage criterion		Production criterion			
		United States	South	United States	South	United States	South
Total retirement payment	Million Dollars	630	174	1,220	417	1,444	368
Gross value of production retired	Million Dollars	1,180	513	2,540	1,117	2,500	902
Ratio of gross value retired to program payment	Dollars	1.87	2.94	2.08	2.82	1.73	2.45

less in the Great Plains with a general cropland retirement program based on retiring high-cost production than with a program based on retiring low net return acreage. There also would be a shift in the crops retired. In both the South and the United States, less wheat acreage would be retired, but retirement of corn and cotton would increase as the retirement criterion is changed from retiring low net return acreage to retiring high-cost production.

The cost of retiring 50 million acres of cropland nationally, with a program based on the production

criterion, would be larger nationally and for the South than it would be with the acreage criterion, but the gross value of production retired would be more than proportionately larger than cost.

The land retirement program based on retiring production would have the greater effect on farmers' expenditures for nonfarm inputs. The net effect on farmers' purchases with either program, however, depends on the extent farmers increase expenditures for production on non-retired acreage and for maintenance of retired cropland.