



AgEcon SEARCH

RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

A281.9
Ag83E
R2

GENERAL CROPLAND RETIREMENT

ANALYSIS OF FOUR ALTERNATIVES

USDA
NATIONAL AGRICULTURE LIBRARY
1997 JUL 15 P 5:53
FBI STAMPA



SUMMARY

According to an analysis of four proposed programs for general cropland retirement, the Government can reduce agricultural production at less cost by retiring cropland with the lowest profit per bushel or bale of production (the production criterion) than by retiring cropland with the lowest profit per acre (the acreage criterion). The four programs result from analysis of part-farm retirement (in which individual crops are retired) and whole-farm retirement (in which proportionate amounts of each crop within an area are retired) with the two criteria. Under the production criterion, cropland with the lowest net return per unit of output is retired first. Under the acreage criterion, cropland with the lowest net return per acre is retired first.

With the acreage criterion, land retirement costs about the same for both part-farm and whole-farm retirement based on prices and yields projected for 1970. However, with the production criterion, land retirement costs more for part-farm retirement. For example, retiring 50 million acres costs \$1,217 million annually or \$24.34 an acre for part-farm retirement, but only \$1,099 million, or \$21.98 an acre for whole-farm retirement.

The per acre cost of retiring cropland is lower with the acreage criterion than with the production criterion. If the objective is to retire a maximum amount of cropland at a minimum cost, the acreage criterion is the better one to use. However, the cost of retiring a given amount of production (a more realistic objective) is lower both for part-farm and whole-farm retirement with the production criterion. For example, retiring 50 million acres of cropland in part farms costs \$634 million annually with the acreage criterion, compared with the \$1,217 million for the production criterion. The value of production retired on this 50 million acres is \$2,541 million, or \$2.09 per dollar of program expenditure with the production criterion, but only \$1,185 million, or \$1.87 per dollar of Treasury expenditure with the acreage criterion. Consequently, a larger reduction in production can be obtained per dollar of Treasury expenditure with the production criterion.

The location of acreage retired is about the same for both part-farm and whole-farm retirement under either criterion. With the acreage criterion, cropland retirement is concentrated in the wheat-producing areas of the Great Plains and the cotton-producing areas of the Southern Plains and Southeast. With the production criterion, land retirement shifts from the wheat-producing areas to the feed grain-producing areas of the Great Plains, Lake States, Corn Belt, and Southeast.

The remaining production potential is affected more by the type of retirement criterion used than by whether part farms or whole farms are retired. With the acreage criterion, cropland retirement is heavily concentrated in small-grain crops. But the remaining feed grain production potential, especially that of corn grain, is larger than desirable. With the production criterion, the shift of retirement from wheat to feed grains results in a production mix more nearly in line with

recent use levels.

A major policy implication is that crop production and the location of acres retired can be affected substantially depending on which criterion is used. Another policy implication is that if a general cropland retirement program is to achieve the greatest possible reduction in production per dollar of program costs, payments per acre retired should not be limited. For example, with the production criterion, which achieves the greatest amount of reduction in production per dollar of program costs, some of the retired acreage required annual program payments greater than \$50 an acre.

A program based on the production criterion may reduce the economic burden on agricultural communities. Compared with one based on the acreage criterion, a program based on the production criterion tends to shift land retirement from the Great Plains to the Corn Belt and Lake States. Agriculture provides a much larger proportion of the total economic base in the Great Plains than in other regions. Moreover, a high proportion of income other than agricultural in the Great Plains is derived from the farm supply, marketing, and service industries; their business would be curtailed by a substantial amount of land retirement. Great Plains farmers would also find it harder to shift to off-farm employment because they do not have as many such opportunities as farmers do in other regions.

GENERAL CROPLAND RETIREMENT
ANALYSIS OF FOUR ALTERNATIVES

By

Glenn A. Zepp and Jerry A. Sharples 1/

INTRODUCTION

Recent Government programs for U.S. agriculture have been designed to maintain farm income by supporting the prices of individual commodities and by direct payments to farmers. To receive direct program benefits, farmers must usually withhold some cropland from production. These programs were not designed to transfer resources out of agriculture. In fact, in some cases they have encouraged farmers (1) to use their cropland to the fullest to maintain historic bases and allotments or (2) to continue as active producers to receive program benefits.

Some people favor long-term general cropland retirement, instead of the withholding of land under annual programs as a means to maintain farm incomes and achieve desirable farm resource adjustments. They claim that diverting land to less intensive uses is more likely to be a permanent adjustment under a long-term general cropland retirement program than under the annual commodity programs.

Further, some proponents claim that such long-term retirement could lower the Government cost below that of annual land retirement programs. Under either type of program, retirement payments per acre would have to at least equal farmers' expected net returns above variable costs. Under a long-term land retirement program, farmers can reduce their stock of machinery because they can plan to discontinue their farming operation for a period of years--in some cases, permanently. If they can reduce their machinery inventory, some fixed machinery costs will become variable costs. As more costs become variable, the amount of net return that program payments must equal is lowered.

On the other hand, a long-term general cropland retirement program may not give the desired short-term adjustment in production. More land will be diverted from some crops than from others. The resulting production mix may be quite different from the desired mix, causing large price fluctuations until different use and production patterns can be established under the new program. Furthermore, any program that helps maintain farm prices provides an added incentive for farmers to

1/ The authors are Agricultural Economists, Farm Production Economics Division, Economic Research Service, U.S. Department of Agriculture. Sharples is stationed at Purdue University, West Lafayette, Ind. Zepp is stationed in Washington, D.C.

develop new cropland by clearing land, plowing grassland, and so on. These practices would reduce the program's effectiveness in controlling farm production.

This study attempts to evaluate several general cropland retirement proposals as possible programs for U.S. agriculture. It is a sequel to a 1968 study of general cropland retirement.^{2/} Only the short-run regional and national implications of the proposals are examined. The study is not an equilibrium analysis. Demand for farm products is not considered; product prices are included as farmers' expectations. The analysis simulates a first-year response to a general cropland retirement program. No corrections are made of any disequilibrium in the product market caused by the first year's land retirement.

In the first major section of this report, proposed general cropland retirement programs retiring part-farm units are considered. The second major section discusses proposed programs retiring whole farms. In the third, study results are compared with actual results of the 1969 feed grain and wheat diversion program and the 1956 conservation reserve program, and with results from other studies of general cropland retirement. Both sections 1 and 2 report estimates of land retirement patterns, Government costs, and production adjustments for proposed cropland retirement programs based on two retirement criteria.

The Conceptual Model

Cropland was assumed to be retired from a "normal" acreage defined as planted plus diverted acreage for each crop during recent years. Estimates of production were based on projections of 1970 yields.

Farmers' expected net returns per acre over variable costs were used as a proxy for the payment necessary to obtain cropland retirement. Two sets of crop enterprise net returns were estimated. For the part-farm analysis, operator and unpaid family labor were assumed not to be released from the farming operation and their value was treated as a fixed cost. Therefore, net returns above variable cash costs--excluding the value of operator and unpaid family labor--were used to estimate payment rates in part-farm retirement. For the whole-farm analysis, operator and unpaid family labor were assumed to be released from the farming operation, and their value was treated as a variable cost. Therefore, net returns above variable costs--including a charge for operator and unpaid family labor--were used to estimate payment rates for whole-farm retirement. The minimum retirement payment was assumed to be \$3 an acre per year. In addition to the retirement payment, all retired land was assumed to receive \$2 an acre annual payment to cover costs of weed control or other conservation practice. Land cost and machinery depreciation were not treated as variable costs in either analysis.

Participation in the cropland retirement programs was assumed to be voluntary. Programs were considered to operate on a national bid system;

^{2/} Vermeer, James, and Rudie W. Slaughter, Jr. Analysis of a General Cropland Retirement Program, Econ. Res. Serv., U.S. Dept. Agr., ERS-377, Wash., D.C., May 1968.

that is, each interested farmer competes with every other interested farmer for program participation. For example, bids from farmers in the Corn Belt are compared with bids from farmers in the South, the Great Plains, and so on. The Government can specify a maximum payment rate based on each farm's potential productivity. Farmers wishing to participate then indicate the largest discount below this maximum payment that they will accept for retiring their land. The Government selects for retirement that land for which the offers are most favorable as defined by the appropriate retirement criterion.

Procedures

For the study, the United States was divided into 10 geographic regions (fig. 1). Within these regions, 73 relatively homogeneous agricultural areas were defined. Some areas were further delineated, based on farm size, soil types, or other physical or cultural characteristics, for a total of 100 resource situations.

Only nonirrigated cropland available for the production of 15 major crops in 1970 was assumed to be retired.^{3/} This amounted to about 312 million acres, based on acreages used for crops planted annually (including tame hay) and land diverted under Government programs during recent years (table 1).

Irrigated cropland in some regions (Northeast, Southeast, Delta States, Corn Belt, and Lake States) amounted to an insignificant part of total cropland and was treated in the study as nonirrigated. Although eligible for retirement, irrigated cropland in other regions was assumed not to be diverted or idled in general cropland retirement.^{4/}

Product prices and input costs used in this study were considered applicable for 1970. Generally, the prices are averages of those received by farmers in 1967, 1968, and 1969 (table 2). In some cases, other prices were used if it appeared that farmers' expected 1970 prices would be different from the 1967-69 averages. Costs are estimates of average costs necessary for production of the major crops in each area. Only variable costs were used in estimating farmers' expected net returns from crop production.

No limit was placed on total program payments to an area. A limit was placed on the total amount of cropland that could be retired in a given county--not over 30 percent of the total cropland (irrigated and nonirrigated). A high rate of participation in cropland retirement can adversely affect the economic well-being of whole rural communities. Reduced farming activity reduces the demand for farm services, supplies, and marketing facilities--the economic mainstay of many rural communities. A restraint similar to the 30-percent limit would probably be included in

^{3/} Included was land devoted to corn grain and silage; sorghum grain and silage; winter, spring, and durum wheat; oats; barley; rye; soybeans; cotton; dry edible beans; flaxseed; and tame hay.

^{4/} Retirement of irrigated cropland without retirement of irrigation water would not affect crop production very much. Water could be diverted to other cropland, thereby increasing its production and offsetting the reduction achieved by retiring the originally irrigated cropland.

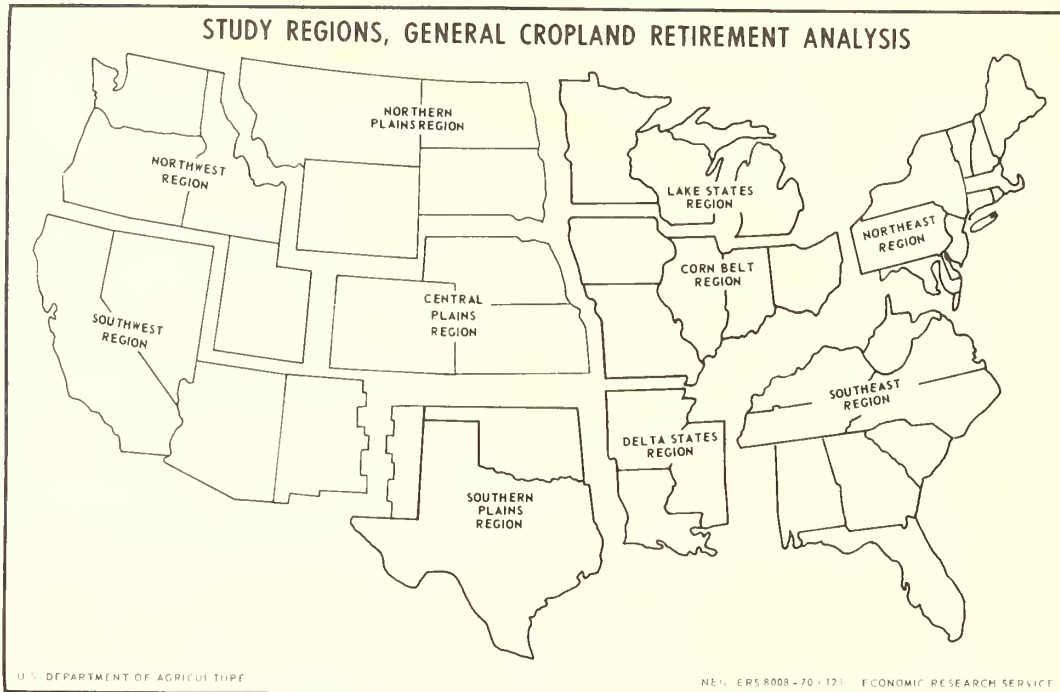


Figure 1

a general cropland retirement program to reduce its impact on areas that might have high participation rates.

An additional assumption was that not more than 50 percent of a given crop's normal acreage (projected to 1970) would be retired in any area. This restriction was added as a proxy for the collective behavior of farmers rather than as a program provision. Further it was assumed that there would be no annual commodity programs which would be competitive with a general cropland retirement program.

Two different criteria for selecting cropland to be retired were used in the study. With the acreage criterion, the Government seeks to retire cropland at the lowest retirement payment per acre; this cropland has the lowest net return per acre above variable cash cost. The result is retirement of the maximum amount of cropland for a given cost to the Government. In administering the program based on the acreage criterion, the Government would sign contracts with farmers offering their cropland for retirement at the lowest payment per acre before signing with farmers offering their cropland at higher rates.

With the production criterion, the Government seeks to retire cropland on which the greatest reduction in production per dollar of program payment can be obtained; this cropland has the highest variable cash cost per dollar of gross value of product.^{5/} The result is retirement of the

^{5/} For intercrop comparisons, \$1 of gross receipts was used as the unit of production.

Table 1.--Estimated cropland eligible for retirement, by region, United States, 1970

Region	Cropland eligible for retirement		
	Nonirrigated	Irrigated ^{1/}	Total
	-----1,000 acres-----		
United States.....	312,329	23,277	335,606
Northeast.....	13,451	---	13,451
Southeast.....	27,404	---	27,404
Delta States.....	13,853	---	13,853
Corn Belt.....	83,454	---	83,454
Lake States.....	36,535	---	36,535
Northern Plains.....	47,520	1,752	49,272
Central Plains.....	46,975	7,378	54,353
Southern Plains.....	29,358	5,947	35,305
Southwest.....	1,701	5,042	6,743
Northwest.....	12,078	3,158	15,236

^{1/} Dashes indicate that irrigated cropland in the region was treated as nonirrigated.

Table 2.--Prices used in study, projected 1970^{1/}

Crop	Unit	Price
		<u>Dollars</u>
Major crops:		
Corn grain.....	Bu.	1.06
Sorghum grain.....	do.	.99
Soybeans.....	do.	2.15
Wheat.....	do.	1.25
Oats.....	do.	.62
Barley.....	do.	.92
Cotton lint.....	Cwt.	20.00
Cotton seed.....	do.	2.10
Other crops:		
Corn silage.....	Ton	6.73
Sorghum silage.....	do.	7.35
Rye.....	Bu.	1.02
Flax.....	do.	2.83
Hay.....	Ton	23.31
Straw.....	do.	18.00
Dry edible beans.....	Cwt.	8.80

^{1/} Generally, prices are averages of those received by U.S. farmers in 1967, 1968, and 1969.

maximum amount of production for a given cost to the Government. In administering the program based on the production criterion, the Government would sign contracts first with those farmers accepting the lowest payment per acre relative to the expected production from their cropland. Payment rates are based on each farm's productivity. Selecting the land to be retired involves dividing the gross value of production per acre by the net return per acre. Cropland with the highest ratio of gross to net receipts is then chosen for retirement before cropland with lower ratios.

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

Item	Wheat	Cotton
	-----Dollars-----	
Value of production per acre...	25	150
Variable cash costs per acre...	15	100
Net return per acre.....	10	50
Value of production per dollar of net return.....	2.50	3

In this example, wheat has a net return per acre of \$10, while cotton has a net return of \$50. Using the acreage criterion, the Government would retire the wheat acre first because it has the lower net return. But the value of production per dollar of net return is \$2.50 for wheat and \$3 for cotton. Using the production criterion, the Government would retire the cotton acre first because the amount of production (in value units) retired per dollar of program payment is more than that for wheat.

PART-FARM RETIREMENT PROGRAMS

Part-farm retirement is based on retiring individual crops. The payment necessary to get cropland retired would have to equal the returns farmers could expect from planting the individual crops. The programs considered are identical except for the criteria used.

Part-Farm Retirement With the Acreage Criterion

Location of Acreage Retired

The largest concentrations of land retirement would be in the Great Plains (table 3). With only 10 million acres retired nationally, 7.7 million are located in the three Great Plains regions. As retirement increases to 50 million acres, the amount of land retired in the three Great Plains regions increases to 36.5 million, or approximately 73 percent of total retirement. This represents about 26 percent of eligible Great Plains cropland (fig. 2). Very little land retirement occurs in the Corn Belt, Lake States, and Northeast regions until at least 50 million acres are retired nationally. At this level, all eligible

Table 3.--Land retired with the acreage criterion and retiring part-farm units at seven levels of land retirement, by region, United States, 1970 1/

Region	Million acres retired nationally--						
	10	20	30	40	50	60	70
	-----Million acres <u>2/</u> -----						
Northeast.....	---	---	---	---	---	3.6	<u>3/4.0</u>
Southeast.....	1.5	1.9	2.1	3.3	4.3	5.8	7.6
Delta States.....	0.6	0.6	0.6	1.1	1.4	1.9	3.8
Corn Belt.....	---	---	---	---	2.5	3.8	6.4
Lake States.....	---	---	0.1	0.2	1.2	2.8	4.5
Northern Plains.....	2.3	6.1	10.1	12.6	13.6	13.9	14.4
Central Plains.....	2.1	6.1	9.4	12.2	13.2	13.3	14.2
Southern Plains.....	3.3	5.1	6.8	7.7	9.7	9.7	9.9
Southwest.....	0.2	0.2	0.2	0.5	<u>3/0.6</u>	0.6	0.6
Northwest.....	---	---	0.7	2.4	3.5	<u>3/4.6</u>	4.6

1/ Based on projected 1970 yields and prices.

2/ Dashes indicate no retirement.

3/ Maximum retirement.

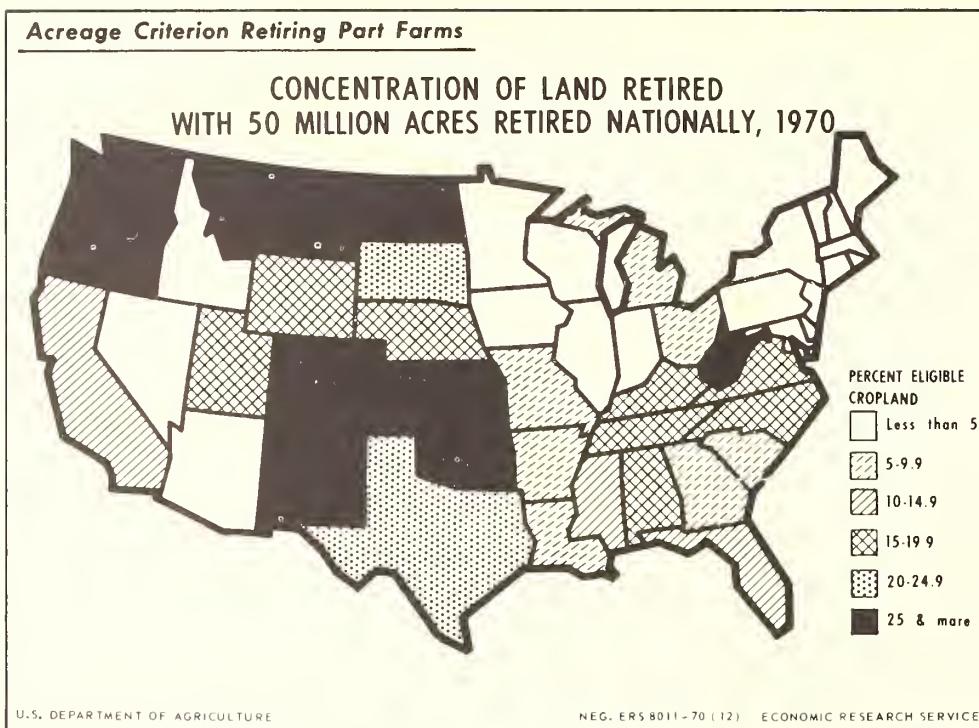


Figure 2

nonirrigated cropland in the Southwest is retired. When 60 million acres are retired, the 30-percent restriction on land retirement within a given county limits additional retirement in the Northwest region; and when 70 million acres are retired, the restriction also applies in the Northeast.

Program Costs

Average cost of land retirement per acre increases as the amount of land retired nationally increases (table 4). With 30 million acres retired, the average cost is \$9.87 per acre. As retirement increases to 70 million acres, the average cost increases to \$16.87. There are substantial regional differences in this cost, even though the marginal acres retired in all regions receive the same payment. Average retirement payments are highest in the Corn Belt, Lake States, and Northeast regions; they are lowest in the three Great Plains regions and Southwest.

For the levels of land retirement above 30 million acres, the amount of reduction in production per dollar of program expenditure tends to be fairly constant at about \$1.80. There are substantial differences among regions in the average value of production retired per dollar of program cost. With 70 million acres retired, the average value is \$2.98 in the Southeast, \$2.27 in the Delta States, and \$2.36 in the Southern Plains. On the other hand, production worth only \$1.31 is retired in the Central Plains because of the different crops on the lands that are retired in each region. For example, land retired in the Southeast, Delta States, and Southern Plains is primarily used for corn, cotton, and sorghum, all crops with high values relative to retirement payments. On the other hand, land retired in the Northern and Central Plains is primarily wheat-land, which has low value relative to retirement payments.

Table 4.--Estimated total cost, average cost, value of production retired, and production retired per dollar of Government payment with the acreage criterion and retiring part-farm units at three levels of land retirement, by region, United States, 1970 1/

Region	30 million acres retired nationally						50 million acres retired nationally						70 million acres retired nationally					
	Total cost	Average cost per acre	Value of production retired	Production retired per dollar of cost	Total cost	Average cost per acre	Value of production retired	Production retired per dollar of cost	Total cost	Average cost per acre	Value of production retired	Production retired per dollar of cost	Total cost	Average cost per acre	Value of production retired	Production retired per dollar of cost		
	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.		
United States.....	296	9.87	545	1.84	634	12.68	1,185	1.87	1,181	16.87	2,118	1.79	1,181	16.87	2,118	1.79		
Northeast.....	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		
Southeast.....	17	8.10	70	4.12	51	11.86	195	3.82	137	18.03	408	2.98	137	18.03	408	2.98		
Delta States.....	3	5.00	20	6.67	15	10.71	59	3.93	84	22.11	191	2.27	84	22.11	191	2.27		
Corn Belt.....	---	---	---	---	49	19.60	99	2.02	161	25.16	275	1.71	161	25.16	275	1.71		
Lake States.....	1	10.00	3	3.00	23	19.17	49	2.13	116	25.78	184	1.59	116	25.78	184	1.59		
Northern Plains.....	111	10.99	154	1.39	169	12.43	233	1.38	187	12.99	254	1.36	187	12.99	254	1.36		
Central Plains.....	98	10.43	113	1.15	158	11.97	205	1.30	189	13.31	247	1.31	189	13.31	247	1.31		
Southern Plains.....	57	8.38	171	3.00	108	11.13	258	2.39	115	11.62	271	2.36	115	11.62	271	2.36		
Southwest.....	1	5.00	2	2.00	7	11.67	11	1.57	7	11.67	11	1.57	7	11.67	11	1.57		
Northwest.....	8	11.43	12	1.50	54	15.43	76	1.41	80	17.39	117	1.46	80	17.39	117	1.46		

1/ Based on projected 1970 yields and prices. Assumes that no acreage would be retired for a payment less than \$3 an acre per year. All retired land received a payment of \$2 a year above the retirement payment to cover the costs of conservation practices.

Production Adjustment

This report gives a rough indication of the acreage and production of crops that might be expected on the unretired land. However, the figures must be used with caution. In the study, acreage and production potentials after retiring cropland were estimated by subtracting estimates of retired acres and production potentials from normal acreage and production potentials for 1970. It was assumed that no crop substitution occurred on the unretired land. The crop production figures are useful, however, to indicate some maladjustment problems that might arise if large quantities of cropland are retired.

Estimates of 1970 production potential after 50 million and 70 million acres of cropland are retired nationally indicate a major imbalance among the principal crops compared with their 1969 use levels (table 5). There would be a surplus of feed grains, especially corn, and a shortage of wheat and soybeans. Even with 70 million acres retired, estimated total feed grain production is 208 million tons, or about 19 percent above the estimated 1969 use level. About 168 million of this is corn grain production. Estimated wheat and soybean production potentials are lower than 1969 use levels, but cotton output would be higher than its 1969 use level.^{6/}

These production estimates and the imbalance in the remaining production are based on the set of product prices assumed for the study. Price relationships existing between crops during recent years would change somewhat. For example, the price of corn would be lower relative to that for soybeans. The price of wheat might be higher because of the shorter supply, but with the lower corn price, some feed grains might be substituted for feed wheat, thereby reducing use of wheat. A further uncertainty about the demand for wheat lies in the export demand. If wheat exports were substantially reduced, much of the wheat production in some areas of the country could become available for feed use, with a resulting wheat price determined by the value of wheat for feed grain use. The production imbalance with the acreage criterion would tend to be corrected over time as price relationships changed.

Part-Farm Retirement With the Production Criterion

Location of Acreage Retired

At levels of land retirement below 30 million acres, cropland retirement is concentrated in the Southeast, Delta States, and Southern Plains. When 50 million acres or more are retired, retired acreage is distributed

^{6/} The estimate of cotton production may be high. It was assumed that with no land retirement, all land planted to cotton in 1968 plus land diverted from cotton that year would be devoted to cotton in 1970. However, during 1968, farmers planted some cotton just to receive cotton price-support payments. Some of this induced cotton had production costs high enough so that it would not have been profitable to grow cotton at current market prices. Under a program that did not include large price-support payments, this acreage probably would not be planted to cotton in 1970.

Table 5.--Estimated production potential of major crops with the acreage criterion and retiring part-farm units, at two levels of land retirement, 1970, and use level of these crops, United States, 1969 1/

Crop	Unit	1969 use level <u>2/</u>	Estimated production potential after retirement of--	
			50 million acres	70 million acres
Feed grains.....	Mil. ton	175	214	208
Corn (for grain)....	Mil. bu.	4,667	6,152	5,998
Sorghum (for grain)..	do.	761	842	828
Barley.....	do.	401	311	311
Oats.....	do.	852	690	552
Wheat.....	Mil. bu.	1,380	1,029	946
Soybeans.....	do.	1,201	1,034	932
Cotton.....	Mil. bale	10.7	14.2	13.9

1/ Based on projected 1970 yields and prices.

2/ Preliminary Econ. Research Serv. estimates of domestic use plus exports.

fairly uniformly throughout the major agricultural areas (table 6 and fig. 3). With 30 million acres retired nationally, 8.2 million retired acres are located in the Southeast. This represents the 30-percent upper limit on retirement within this region. The Delta States region reaches the 30-percent limit on retirement--4.2 million acres--when 40 million acres are retired nationally. At levels of land retirement above 50 million acres nationally, substantial amounts of cropland are retired in all major agricultural areas including the Corn Belt States.

Program Costs

The average cost of land retirement per acre increases as the level of land retirement increases nationally (table 7). With 30 million acres retired, the average cost is \$19.23. As land retirement increases to 70 million acres, the average cost increases to \$29.44. At all levels of retirement, payments tend to be highest in the Corn Belt, Delta States, Lake States, and Northeast.

The average value of production retired per dollar of program expenditure decreases as the level of land retirement increases. With 30 million acres retired nationally, the average value of production retired is \$2.59. As retirement increases to 70 million acres, the average value of production retired decreases to \$1.87. A dollar spent on land retirement obtains the greatest reduction in value of production in the Southeast, Delta States, and Southern Plains regions and the smallest reduction in the Northeast, Northern Plains, Southwest, and Northwest.

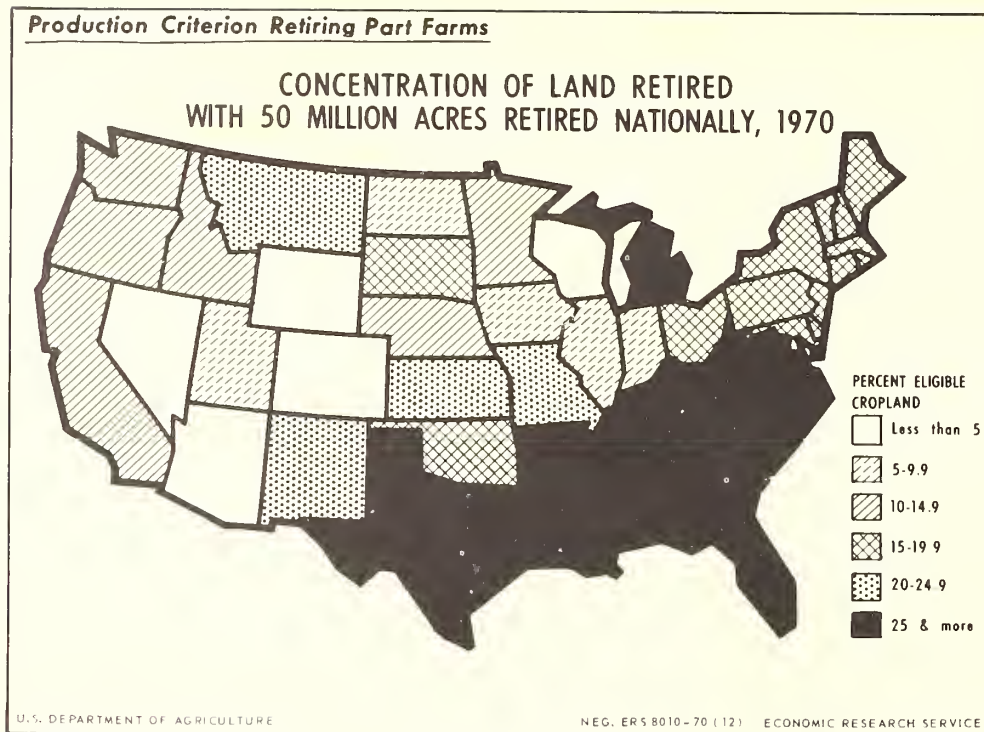


Figure 3

Production Adjustment

The production mix of the major crops with the production criterion is more in line with recent use levels than it was with the acreage criterion. With 50 million acres retired nationally, total feed grain production is estimated at 189 million tons, or about 8 percent above the estimate of the 1969 use level (table 8). When 70 million acres are retired, total feed grain production is only 159 million tons, or about 9 percent below the estimate of the 1969 use level. At both the 50-million and 70-million-acre levels, wheat and soybean production estimates are lower than 1969 use. For a feed grain production potential about equal to recent feed grain use levels, more than 50 million but less than 70 million acres would have to be retired under the production criterion. However, soybean production would be short of recent use levels at either the 50- or 70-million level. For soybean production to equal recent use levels, a higher soybean price than that used in this study would be needed.

Comparison of Part-Farm Retirement Programs Based on the Acreage and Production Criteria

With the production criterion, there is a major shift of land retirement from the wheat-producing regions of the Northern and Central Great Plains to the feed grain-producing regions of the Corn Belt and the Central and Southern Great Plains and the cotton-producing regions of the South. The shift occurs because wheat, the major crop grown in the Great Plains, has a low net return per acre relative to that of the other crops. With the acreage criterion, wheatland is some of the first land to be retired. But Great Plains wheat also has a low production cost per dollar of gross value compared with that of the other crops. With the production criterion, acreage having the highest gross value of production

Table 6.--Land retirement with the production criterion and retiring part-farm units at seven levels of land retirement, by region, United States, 1970 ^{1/}

Region	Million acres retired nationally--						
	10	20	30	40	50	60	70
	-----Million Acres ^{2/} -----						
Northeast.....	---	---	---	0.9	2.2	3.1	<u>3/4.0</u>
Southeast.....	4.3	7.8	<u>3/8.2</u>	8.2	8.2	8.2	8.2
Delta States.....	1.1	2.7	3.7	<u>3/4.2</u>	4.2	4.2	4.2
Corn Belt.....	---	1.6	2.6	5.6	8.7	13.6	18.1
Lake States.....	0.1	0.8	1.6	3.1	4.2	7.8	7.8
Northern Plains.....	---	0.8	3.2	4.6	5.8	6.4	8.2
Central Plains.....	0.1	0.3	2.0	3.6	5.2	5.2	6.1
Southern Plains.....	4.2	5.8	7.9	8.1	9.1	9.1	9.3
Southwest.....	0.2	0.2	0.2	<u>3/0.6</u>	0.6	0.6	0.6
Northwest.....	---	---	0.6	1.1	1.8	1.8	3.5

1/ Based on projected 1970 yields and prices.
2/ Dashes indicate no retirement.
3/ Maximum retirement.

Table 7.--Estimated total cost, average cost, value of production retired, and production retired per dollar of Government payment with the production criterion and retiring part-farm units at three levels of land retirement, by region, United States, 1970 1/

Region	30 million acres retired nationally				50 million acres retired nationally				70 million acres retired nationally			
	Mil. dol.	Dol.	Average cost per acre	Value of production retired	Production retired per dollar of cost	Total cost	Average cost per acre	Value of production retired	Production retired per dollar of cost	Total cost	Average cost per acre	Value of production retired
United States.....	577	19.23	1,494	2.59	1,217	24.34	2,541	2.09	2,061	29.44	3,856	1.87
Northeast.....	---	---	---	---	93	42.27	151	1.62	139	34.75	221	1.59
Southeast.....	166	20.24	503	3.03	166	20.24	503	3.03	166	20.24	503	3.03
Delta States.....	134	36.22	334	2.49	150	35.71	362	2.41	150	35.71	362	2.41
Corn Belt.....	67	25.77	141	2.10	343	39.43	605	1.76	893	49.34	1,473	1.65
Lake States.....	40	25.00	82	2.05	125	29.76	223	1.78	297	38.08	493	1.66
Northern Plains.....	31	9.69	51	1.65	66	11.38	103	1.56	95	11.59	143	1.51
Central Plains.....	42	21.00	74	1.76	134	25.77	221	1.65	148	24.26	241	1.63
Southern Plains.....	81	10.25	279	3.44	102	11.21	312	3.06	106	11.40	318	3.00
Southwest.....	2	10.00	5	2.50	7	11.67	11	1.57	7	11.67	11	1.57
Northwest.....	14	23.33	25	1.79	31	17.22	50	1.61	60	17.14	91	1.52

1/ Based on projected 1970 yields and prices. Assumes that no acreage would be retired for a payment less than \$3 an acre per year. All retired land received a payment of \$2 a year above the retirement payment to cover the costs of conservation practices. Dashes indicate no retirement.

Table 8.--Estimated production potential of major crops with the production criterion and retiring part-farm units, at two levels of land retirement, 1970, and use level of these crops, United States, 1969 ^{1/}

Crop	Unit	1969 use level ^{2/}	Estimated production potential after retirement of--	
			50 million acres	70 million acres
Feed grains.....	Mil. ton	175	189	159
Corn (for grain)....	Mil. bu.	4,667	5,305	4,290
Sorghum (for grain)..	do.	761	816	809
Barley.....	do.	401	297	297
Oats.....	do.	852	661	587
Wheat.....	Mil. bu.	1,380	1,206	1,117
Soybeans.....	do.	1,201	988	987
Cotton.....	Mil. bale	10.7	11.6	11.6

^{1/} Based on projected 1970 yields and prices.

^{2/} Preliminary Econ. Research Serv. estimates of domestic use plus exports.

per dollar of net returns is retired first. Thus, Great Plains wheat will tend to be selected for retirement after large amounts of corn and cotton acreage have been retired. Generally, it takes a higher payment to retire a dollar's worth of wheat in the Great Plains than to retire either a dollar's worth of corn in the Corn Belt or a dollar's worth of cotton in the Cotton Belt.

The total cost to the Government for retiring 50 million acres nationally with the production criterion is almost twice as much as that with the acreage criterion--\$1,217 million versus only \$634 million. However, the value of production retired with the production criterion is even more than proportionately greater than the costs. Therefore, the cost of production adjustment is lower than it is with the acreage criterion. For example, with 50 million acres retired nationally, the gross value of production retired per dollar of program cost is \$2.09 with the production criterion and \$1.87 with the acreage criterion.

Retiring 50 million acres of cropland with the production criterion is equivalent to retiring more than \$2.5 billion of production potential. To retire \$2.5 billion with the acreage criterion, about 77.6 million acres would need to be retired nationally. With the latter criterion, the estimated Treasury cost for retiring \$2.5 billion of production potential is \$1,444, or \$0.58 per dollar retired. For the production criterion, the Treasury cost is \$1,190, or \$0.48 per dollar of production potential.

The amount of production adjustment achieved with the production criterion at a given level of land retirement is considerably greater than that with the acreage criterion. Further, the resulting mix of crops

after a given amount of cropland is retired is more nearly like recent use levels than it would be with the acreage criterion.

For a general cropland retirement program to achieve the greatest possible reduction in production potential per dollar of cost, there can be no very restrictive limit on per acre payment rates. In this study, use of the production criterion gave the greater amount of reduction in production per dollar of program cost. Yet, some of the acreage involved required payments greater than \$50 an acre.

WHOLE-FARM RETIREMENT PROGRAMS

Whole-farm retirement is based on retiring composite acres. Each acre retired is assumed to consist of proportionate amounts of the major crops from the area. The payment necessary to get cropland retired was assumed to be a composite net return for the area. This payment is the average of net returns per acre for individual crops weighted by the proportion that each crop accounts for of total cropland in the area. The programs considered are identical except for the criteria used.

A whole-farm retirement program may include retirement of some land not included in this study, such as permanent pasture. If such land is retired along with tillable cropland, the total Treasury outlay for retiring a given amount of cropland with this program would be higher than the estimates reported here.

Whole-Farm Retirement With the Acreage Criterion

For whole-farm retirement with the acreage criterion, cropland from areas with the lowest composite net return per acre is retired first. The Government could administer such a program by computing a composite gross value of crop production per acre for each farm from its production and crop acreage history, and selecting for retirement first those farms on which the retirement payment relative to the composite gross value is the smallest.

Location of Acreage Retired

As with part-farm retirement based on the acreage criterion, retired acreage for whole farms is heavily concentrated in the Great Plains (table 9 and fig. 4). Practically all of the first 10 million acres retired--9.3 million--would be in the three Great Plains regions. When land retirement increases to 50 million acres, the Great Plains still account for 35.2 million acres (70 percent) of the total retirement. The Northeast, Corn Belt, and Lake States regions are not affected very much by the program until at least 60 million acres are retired nationally.

Program Costs

The average cost of land retirement increases as the acreage retired increases (table 10). For example, with 30 million acres retired nationally, the average Treasury cost is \$10.07 an acre. This average increases to \$13 with 50 million acres retired, and \$17.41 with 70 million acres retired. Average payments are highest in the Lake States, Corn Belt, and Northeast regions.

The average reduction in production potential per dollar of program expenditure is about \$2.10 at levels of land retirement above 30 million

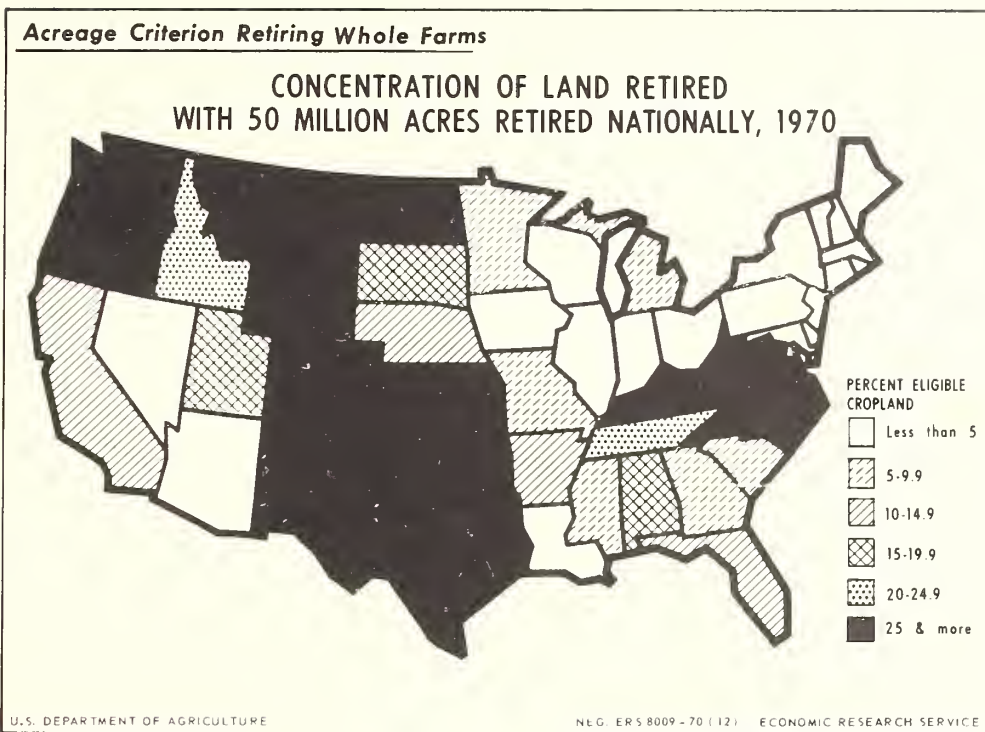


Figure 4

acres nationally. Reductions are largest in the Southeast, Delta States, and Southern Plains, and smallest in the Central and Northern Great Plains.

Production Adjustment

With 50 million acres retired, 1970 production estimates for major crops show feed grain and cotton production as higher than recent use levels, but soybean and wheat production as short of recent use levels (table 11). Even with 70 million acres retired, estimated total feed grain production for 1970 is 192 million tons, or about 10 percent above the 1969 use level of all feed grains. Corn grain production would be about 5.6 billion bushels, or 20 percent above the 1969 use level. Estimated cotton production is 14.4 million bales or 35 percent above the 1969 use level. Estimated soybean production is 927 million bushels, or 23 percent lower than 1969 use levels. By reducing retirement to 50 million acres, estimated soybean production during 1970 is increased but is still 16 percent short of the record 1969 disappearance. At prices used in this study, the program based on the acreage criterion cannot provide a balanced mix of remaining crop production potentials. At levels of land retirement below 50 million acres, feed grain production would be much higher than the recent feed grain use level. But, at higher levels of land retirement, estimated wheat and soybean production are substantially below recent use levels. For a more balanced production mix, a whole-farm retirement program based on the acreage criterion would have to be accompanied by a higher soybean-to-feed grain price ratio.

Table 10.--Estimated total cost, average cost, value of production retired, and production retired per dollar of Government payment with the acreage criterion and retiring whole-farm units at three levels of land retirement, by region, United States, 1970 ^{1/}

Region	30 million acres retired nationally				50 million acres retired nationally				70 million acres retired nationally			
	Total cost	Average cost per acre	Value of produc- tion retired	Produc- tion retired per dol- lar of cost	Total cost	Average cost per acre	Value of produc- tion retired	Produc- tion retired per dol- lar of cost	Total cost	Average cost per acre	Value of produc- tion retired	Produc- tion retired per dol- lar of cost
	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.
United States.....	302	10.07	617	2.04	650	13.00	1,390	2.14	1,219	17.41	2,521	2.07
Northeast.....	---	---	---	---	---	---	---	---	114	28.50	215	1.89
Southeast.....	15	11.54	73	4.87	93	16.91	330	3.55	163	19.88	516	3.17
Delta States.....	4	8.00	15	3.75	13	13.00	44	3.38	50	21.74	141	2.82
Corn Belt.....	---	---	---	---	8	10.00	17	2.13	125	25.51	250	2.00
Lake States.....	---	---	---	---	42	18.26	91	2.17	96	24.62	197	2.05
Northern Plains.....	94	10.22	146	1.55	157	11.89	240	1.53	197	13.31	302	1.53
Central Plains.....	84	9.23	116	1.38	131	11.29	191	1.46	268	16.44	423	1.58
Southern Plains.....	69	9.45	206	2.99	121	11.63	335	2.77	121	11.63	335	2.77
Southwest.....	11	18.33	23	2.09	11	18.33	23	2.09	11	18.33	23	2.09
Northwest.....	25	12.50	38	1.52	74	16.09	119	1.61	74	16.09	119	1.61

^{1/} Based on projected 1970 yields and prices. Assumes that no acreage will be retired for a payment less than \$3 an acre per year. All retired land received a payment of \$2 a year above the retirement payment to cover the costs of conservation practices. Dashes indicate no retirement.

Table 11.--Estimated production potential of major crops with the acreage criterion and retiring whole-farm units, at two levels of land retirement, 1970, and use level of these crops, United States, 1969 1/

Crop	Unit	1969 use level <u>2/</u>	Estimated production potential after retirement of--	
			50 million acres	70 million acres
Feed grains.....	Mil. ton	175	206	192
Corn (for grain)....	Mil. bu.	4,667	5,969	5,582
Sorghum (for grain)..	do.	761	729	658
Barley.....	do.	401	289	283
Oats.....	do.	852	726	682
Wheat.....	Mil. bu.	1,380	1,116	1,104
Soybeans.....	do.	1,201	1,009	927
Cotton.....	Mil. bale	10.7	15.0	14.4

1/ Based on projected 1970 yields and prices.

2/ Preliminary Econ. Research Serv. estimates of domestic use plus exports.

Whole-Farm Retirement With the Production Criterion

Location of Acreage Retired

As with part-farm retirement based on the production criterion, retired acreage is concentrated in the Southeast, Delta States, and Southern Plains regions (table 12 and fig. 5). With only 30 million acres retired nationally, 11.7 million are located in the Southeast and Delta States regions, and an additional 9.8 million in the Southern Plains. At higher levels of retirement, large amounts of cropland are also retired in the Corn Belt, Lake States, and Northeast regions.

Program Costs

The average cost of land retirement increases as the level of land retirement increases (table 13). With 30 million acres retired nationally, the average cost of land retirement is \$17.37. As the amount of retired land increases to 70 million acres, the average cost increases to \$25.26. Per acre retirement costs are highest in the Corn Belt, Lake States, Delta States, and Southeast--regions producing a lot of high-value crops, such as corn and cotton. Retirement costs are lowest in the three Great Plains regions and the Southwest--regions in which wheat and other low-value crops are important.

The average value of the reduction in production potential per dollar of program expenditure decreases as the level of land retirement increases. With 30 million acres retired nationally, the average value is \$2.69. This decreases to \$2.27 and \$2.07 as land retirement increases to 50 million and 70 million acres, respectively. The greatest amount

Table 12.--Land retirement with the production criterion and retiring whole-farm units at seven levels of land retirement, by region, United States, 1970 ^{1/}

Region	Million acres retired nationally--						
	10	20	30	40	50	60	70
	-----Million acres ^{2/} -----						
Northeast.....	---	---	---	3.7	4.0	4.0	4.0
Southeast.....	4.6	<u>3</u> /8.2	8.2	8.2	8.2	8.2	8.2
Delta States.....	0.7	2.4	3.5	<u>3</u> /4.2	4.2	4.2	4.2
Corn Belt.....	---	---	3.0	5.5	10.9	13.0	18.1
Lake States.....	0.1	1.7	2.8	4.0	4.0	8.8	<u>3</u> /11.0
Northern Plains.....	---	---	---	1.9	1.9	5.0	5.8
Central Plains.....	---	2.1	2.1	2.1	5.3	5.3	5.3
Southern Plains.....	4.6	5.0	9.8	9.8	9.8	9.8	9.8
Southwest.....	---	<u>3</u> /0.6	0.6	0.6	0.6	0.6	0.6
Northwest.....	---	---	---	---	1.1	1.1	3.0

^{1/} Based on projected 1970 yields and prices.

^{2/} Dashes indicate no retirement.

^{3/} Maximum retirement.

Table 13.--Estimated total cost, average cost, value of production retired, and production retired per dollar of Government payment under the production criterion and retiring whole-farm units, at three levels of land retirement, by region, United States, 1970 1/

Region	30 million acres retired nationally				50 million acres retired nationally				70 million acres retired nationally			
	Total cost	Average cost per acre	Value of produc- tion retired	Produc- tion retired per dol- lar of cost	Total cost	Average cost per acre	Value of produc- tion retired	Produc- tion retired per dol- lar of cost	Total cost	Average cost per acre	Value of produc- tion retired	Produc- tion retired per dol- lar of cost
	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.	Mil. dol.	Dol.
United States.....	521	17.37	1,402	2.69	1,099	21.98	2,494	2.27	1,768	25.26	3,659	2.07
Northeast.....	---	---	---	---	114	28.50	215	1.89	114	28.50	215	1.89
Southeast.....	163	19.88	516	3.17	163	19.88	516	3.17	163	19.88	516	3.17
Delta States.....	106	30.29	263	2.48	135	32.14	324	2.40	135	32.14	324	2.40
Corn Belt.....	67	22.33	137	2.04	351	32.20	674	1.92	705	38.95	1,299	1.84
Lake States.....	53	18.93	115	2.17	96	24.00	197	2.05	346	31.45	636	1.84
Northern Plains.....	---	---	---	---	25	13.16	50	2.00	65	11.21	113	1.74
Central Plains.....	13	6.19	27	2.08	73	13.77	132	1.81	73	13.77	132	1.81
Southern Plains.....	108	11.02	321	2.97	108	11.02	321	2.97	108	11.02	321	2.97
Southwest.....	11	18.33	23	2.09	11	18.33	23	2.09	11	18.33	23	2.09
Northwest.....	---	---	---	---	23	20.91	42	1.83	48	16.00	80	1.67

1/ Based on projected 1970 yields and prices. Assumes that no acreage will be retired for a payment less than \$3 an acre per year. All retired land receives a payment of \$2 a year above the retirement payment to cover the costs of conservation practices. Dashes indicate no retirement.

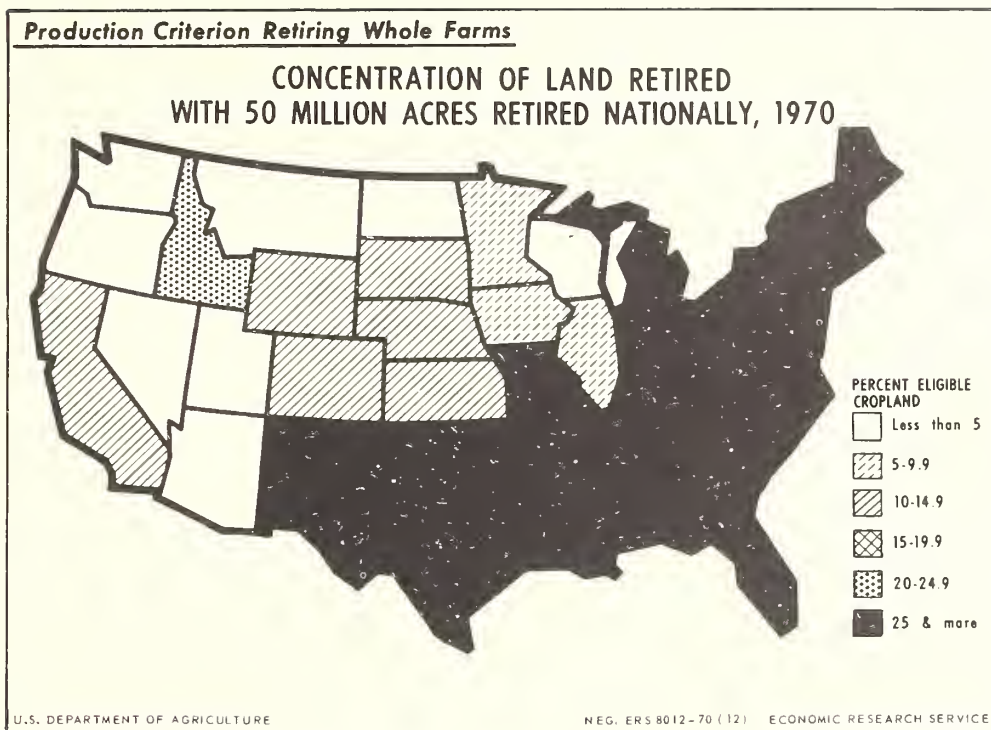


Figure 5

of production potential can be retired per dollar of program cost in the Southeast and Southern Plains; the least in the Northern and Central Plains.

Production Adjustment

The production of feed grains and wheat tends to be near recent use levels with the production criterion (table 14). With 50 million acres retired, total production of feed grains is somewhat higher than the total 1969 use level of feed grains, while wheat production would be lower than its 1969 use level. When retirement is increased to 70 million acres, total feed grain production is approximately the same as the 1969 use level of feed grains, but wheat production is still lower than its 1969 use level. At both the 50-million- and 70-million-acre levels, soybean production is substantially lower than the recent use level of this crop would indicate is desirable. Price adjustments after the first year of any cropland retirement would probably cause shifts in land use from feed grains and cotton to soybeans.

Comparison of Whole-Farm Retirement Programs Based on the Acreage and Production Criteria

For whole-farm retirement, the major differences between programs based on the two criteria parallel those found for part-farm retirement. Under the acreage criterion, acreage retired with both part-farm and whole-farm retirement tends to be concentrated in the wheat-producing areas of the Great Plains. The major concentrations of land retirement shift to other areas--especially to the cotton areas of the Southeast, Delta States, and Southern Plains--with the production criterion. And, at

Table 14.--Estimated production potential of major crops with the production criterion and retiring whole-farm units at two levels of land retirement, 1970, and use level of these crops, United States, 1969 1/

Crop	Unit	1969 use level <u>2/</u>	Estimated production potential after retirement of--	
			50 million acres	70 million acres
Feed grains.....	Mil. ton	175	194	175
Corn (for grain)....	Mil. bu.	4,667	5,475	4,869
Sorghum (for grain)..	do.	761	739	737
Barley.....	do.	401	320	301
Oats.....	do.	852	705	615
Wheat.....	Mil. bu.	1,380	1,274	1,203
Soybeans.....	do.	1,201	877	799
Cotton.....	Mil. bale	10.7	13.3	13.3

1/ Based on projected 1970 yields and prices.

2/ Preliminary Econ. Research Serv. estimates of domestic use plus exports.

higher levels of land retirement with this criterion, a large amount of retirement shifts to the Corn Belt and the Lake States regions.

The total cost of retiring a given amount of cropland is substantially higher with the production criterion than with the acreage criterion. However, the value of the production potential retired with the production criterion at any level of land retirement is more than proportionately higher than the cost. Therefore, the average cost of retiring \$1 of production potential is lower with the production criterion. For example, with 50 million acres retired, the gross value of production retired per dollar of program cost is \$2.27 with the production criterion, but only \$2.14 with the acreage criterion.

As with part-farm retirement, whole-farm retirement is more heavily concentrated in the areas producing corn, cotton, and soybeans with the production criterion, and the resulting production mix contains smaller amounts of these crops than it does with the acreage criterion. On the other hand, wheat production is higher with the production criterion because of the shift of land retirement out of wheat-producing areas. After retiring a given amount of cropland with the production criterion, the resulting mix of crops is more like recent use levels than it is with the acreage criterion.

Cost Comparisons for Achieving a Specific Objective

The four programs were further evaluated by comparing Government costs of achieving three different objectives: (1) retiring 50 million acres, (2) retiring \$2.5 billion of gross value, and (3) limiting Treasury

expenditure to \$1.25 billion (see table 15).

As pointed out earlier, the total cost for retiring 50 million acres with a part-farm retirement program versus a whole-farm retirement program was about the same with either criterion. There were major differences in the total cost of land retirement between programs based on the acreage and on the production criterion. Suppose a general cropland retirement program is designed to retire \$2.5 billion of production. When 50 million acres are retired with the production criterion, production potential is reduced by approximately \$2.5 billion. More than 70 million acres of cropland would need to be retired with the acreage criterion to get an equal amount of reduction. For both part-farm and whole-farm retirement, the total Treasury cost for obtaining a \$2.5 billion reduction is higher with the acreage criterion than it is with the production criterion. Thus, the cost per dollar of gross value retired also is higher with the acreage criterion.

Suppose an upper limit of \$1.25 billion is placed on expenditures for a general cropland retirement program. With the acreage criterion, about 72 million acres of cropland could be retired, which represents about \$2.2 billion of gross value when retiring part-farm units, and about \$2.5 billion when retiring whole farms. For the production criterion, only 50.7 million acres of cropland, or about \$2.6 billion of production potential can be retired in part-farm retirement; 55 million acres, or \$2.7 billion of production potential, can be retired in whole-farm retirement.

COMPARISON OF RESULTS WITH RECENT GOVERNMENT PROGRAMS AND WITH OTHER LAND RETIREMENT STUDIES

The costs and impacts of any land retirement program depend on the provisions of the program. For example, in this study, the average cost of retiring 50 million acres of cropland ranged from \$12.68 to \$24.34 an acre. But the two programs represented by these costs are quite different. They represent retirement of different cropland located in different regions of the country and producing different crops. The purpose of the following section is to compare cost estimates developed in this study with the actual cost of cropland retirement under other programs and with cost estimates from other cropland retirement studies. Cost differences between programs are explained in terms of the different provisions in each program.

1969 Feed Grain and Wheat Programs

During 1969, the Government made direct payments to wheat and feed grain producers for diverting cropland from grain production. These programs were similar in many respects to that based on the production criterion and retiring part-farm units. There was substantial diversion in the corn- and grain sorghum-producing regions under both the 1969 programs and the part-farm retirement program based on the production criterion. The Government paid \$988 million, or \$33.95 an acre, in direct diversion payments to participating farmers under the 1969 feed grain and wheat programs to divert 29.1 million acres from grain production.^{7/} The cost

^{7/} Based on data from 1969 Feed Grain and Wheat Programs Summary. Agr. Stabiliz. and Conserv. Serv., U.S. Dept. Agr., Wash., D.C., Jan. 1970, p. 2.

Table 15.--Estimated acres retired, total annual cost, gross value retired, and cost per dollar of gross value retired under four land retirement programs at three levels of land retirement, United States, 1970 ^{1/}

Program and criterion	50 million acres retired nationally				\$2.5 billion gross value retired				\$1.25 billion program expenditure			
	Total cost	Gross value retired	Cost per acre	Cost per dollar gross value retired	Acres retired	Total cost	Cost per acre	Cost per dollar gross value retired	Acres retired	Gross value retired	Cost per acre	Cost per dollar gross value retired
	Mil. dol.	Mil. dol.	Dol.	Dol.	Mil. acres	Mil. dol.	Dol.	Dol.	Mil. acres	Mil. dol.	Dol.	Dol.
Part-farm retirement:												
Acreage criterion.....	634	1,185	12.68	.53	77.6	1,444	18.61	.58	72.0	2,219	17.36	.56
Production criterion.....	1,217	2,541	24.34	.48	49.3	1,190	24.14	.48	50.7	2,596	24.65	.48
Whole-farm retirement:												
Acreage criterion.....	650	1,390	13.00	.47	70.8	1,230	17.37	.49	71.9	2,537	17.38	.49
Production criterion.....	1,099	2,494	21.98	.44	50.4	1,111	22.04	.44	55.0	2,743	22.73	.46

^{1/} Based on projected 1970 yields and prices.

of retiring 30 million acres in part-farm units with the production criterion was \$19.23 an acre.

One reason for the higher 1969 diversion cost under the feed grain and wheat programs was that it covered payment for diversion of cropland mainly from corn and sorghum production, which have relatively high net returns per acre. Payment for general cropland retirement, as estimated in this study, was for retiring some other crops, such as wheat, oats, and tame hay, which tend to have lower net returns per acre. A further reason for the higher 1969 cost is that in this study it was assumed that each participant would be paid just the amount necessary to get his participation. In the actual operation of any program, some participants get payments more than sufficient to enlist their participation, thereby resulting in costs somewhat higher than those originally estimated.

Programs Under the Agricultural Act of 1970

The Agricultural Act of 1970 provides for annual retirement of cropland under its "set-aside" programs for feed grains, wheat, and cotton. These programs can be operated more nearly like general cropland retirement programs than like the 1969 feed grain and wheat programs because farmers have greater freedom in planting on remaining cropland. Of the four alternatives considered in this study, the set-aside programs are the most similar to the part-farm retirement program based on the acreage criterion.

A major difference between the set-aside programs and the four alternatives is the procedure used in selecting cropland for retirement. With the general cropland retirement analysis, cropland was selected for retirement using a criterion in which farmers were assumed to receive the minimum payment necessary to get their land retired. However, under the set-aside programs, the Government offers a payment to all farmers according to their acres of feed grain base or wheat or cotton allotments and their expected yields. Some farmers receive payments larger than the minimum required to get their land retired. Therefore, cost estimates for the part-farm retirement program based on the production criterion will be lower than the likely payments under the set-aside programs.

Conservation Reserve Program

During 1960, the Government had about 28.7 million acres of cropland under conservation reserve contracts at a cost of \$367 million, or \$12.75 an acre.^{8/} The conservation reserve program had many similarities to the whole-farm retirement program based on the acreage criterion. The estimated cost of retiring 30 million acres with the acreage criterion was about \$302 million, or \$10.07 an acre. With both the conservation reserve program and the program based on the acreage criterion for whole-farm units, a large amount of land retirement was located in the Great Plains regions, and it was concentrated in relatively low-value crops. Each dollar of Government payment under the conservation reserve program

^{8/} Agricultural Stabilization and Conservation Service. Conservation Reserve Program and Land Use Adjustment Program, Statistical Summary 1963, U.S. Dept. Agr., Wash., D.C., April 1964.

resulted in an estimated reduction in production potential of \$2.92. ^{9/} Each dollar spent on retiring an equal amount of cropland in whole-farm units with the acreage criterion would retire about \$2.04 of gross value. The general cropland retirement figure is lower because it represents retirement of more wheat and less corn than does the conservation reserve program figure. For any program, the ratio of the value of production retired to program payments tends to be lower for wheat than for corn.

Comparison with Other Cropland Retirement Studies

In a study of alternative land retirement programs conducted at Purdue University, a voluntary general cropland retirement program was considered that permitted annual part-farm retirement.^{10/} Two retirement criteria were used for the analysis. With the marginal-land criterion, the poorest acres and the least profitable crops were retired, wherever they were located. This criterion was most comparable in effects to the acreage criterion when part-farm units were retired. With the uniform retirement criterion, the least profitable crops on the poorest land were also retired, but the same percentage of land was retired from each of 80 sample areas. This second criterion was most similar in effects to the production criterion when part-farm units were retired.

The heaviest concentration of land retirement under the marginal-land criterion tended to be in the Cotton Belt. With the uniform-land retirement criterion, the greatest concentration tended to be in the Corn Belt.

In both the Purdue study and this report, payments necessary to retire land were estimated as the net return over variable costs that farmers would normally expect on the retired land. However, cost estimates in the Purdue study did not include a payment for conservation practice cost sharing. A \$2 an acre payment for conservation practices was added to the Purdue study estimates to make them more comparable with those derived in this present study.

The Treasury cost of retiring a given amount of cropland was higher with the uniform-retirement criterion than with the marginal-land criterion. For example, the estimated cost for retiring 42.5 million acres under the uniform-retirement criterion was \$449 million, or \$10.56 an acre, but only \$323 million, or \$7.60 an acre, with the marginal-land criterion. The cost estimates from the Purdue study were substantially lower than estimates from the study for this report. The estimated costs of retiring 30 million acres were \$19.23 and \$9.87, respectively, for the production and acreage criteria, when part-farm units were retired. The value of production potential retired with the uniform-retirement criterion was \$781 million, or \$1.74 per dollar of program cost, while the value retired with the marginal-land criterion was \$677 million, or \$2.09 per dollar of Government expenditure. The values of reduced production potential with 30 million acres retired in the study for this report were \$1.84 and \$2.59 per dollar of Government expenditures with the acreage and the production criteria, respectively.

^{9/} Christensen, Raymond P., and Ronald O. Aines. Economic Effects of Acreage Control Programs in the 1950's, Econ. Res. Serv., U.S. Dept. Agr., Agr. Econ. Rpt. 18, Wash., D.C., Oct. 1962, p. 27.

^{10/} Bottum, J. Carroll, et. al. Land Retirement and Farm Policy, Purdue Univ. Agr. Expt. Sta. Research Bul. 704, Sept. 1961.

As a variation, only soil-depleting crops were retired in one of the Purdue study analyses. Other program provisions were assumed to be unchanged. With this variation, the cost of retiring 42.5 million acres of cropland from soil-depleting crops was estimated at \$10.20 an acre with the marginal-land criterion and \$13.06 an acre with the uniform-retirement criterion. These cost estimates are still substantially lower than those for the acreage and production criteria.

Several other studies have considered various land retirement proposals. In a 1963 study of farm programs conducted at Iowa State University, an estimate was made for the cost of expanding the conservation reserve program.^{11/} Three levels of land retirement were considered:

Million acres retired	Program cost	Cost per acre
	Million dollars	Dollars
38.....	603	15.87
55.....	906	16.47
80.....	2,038	25.48

In a more recent Iowa State University study, the least productive farms in each area were assumed to be retired.^{12/} This analysis was similar to the present analyses based on the acreage criterion and retiring whole-farm units. One difference was that in the Iowa State study not more than 50 percent of any area's cropland was assumed to be retired, while only 30 percent of an area's cropland was considered eligible for retirement in the study for this report. The target year for both studies was 1970. The greatest concentration of retired acreage in the 1968 Iowa State analysis was in the Great Plains and the Corn Belt regions. The average cost of land retirement was \$17.14 an acre for retiring 50 million acres and \$23.30 an acre for retiring 60 million acres.

The estimated Treasury cost for retiring 50 million acres, with the acreage criterion and retiring whole farms, was \$13 an acre. One reason that the average cost of land retirement in the Iowa State studies was higher was that more Corn Belt land with higher net returns per acre was assumed to be retired than was assumed to be retired in the study for this report. Another reason was that in the Iowa study, costs of land retirement were estimated as farmers' expected annual net returns per acre from crop production plus a \$5 an acre allowance for mowing or other weed control practice. In the study for this report, land retirement costs were assumed to equal farmers' expected annual net returns plus

^{11/} Tweeten, Luther G., Earl O. Heady, and Leo V. Mayer. Farm Program Alternatives, Iowa State Univ., CAED Rpt. 18, May 1963.

^{12/} Mayer, Leo V., Earl O. Heady, and Howard C. Madsen. Farm Programs for the 1970's, Iowa State Univ., CAED Rpt. 32, Oct. 1968.

only a \$2 an acre allowance for weed control and other conservation practices.

In a study by Schnittker, 59 million acres of cropland were assumed to be retired in a voluntary land retirement program.^{13/} Cost estimates were based on the assumption that to get voluntary participation, program payments would have to amount to 60 percent of the gross value of production retired. This analysis was most similar to that based on the acreage criterion. The burden of land use adjustment under both programs fell heavily on the wheat-producing areas of the Northern and Southern Plains and on the cotton-producing areas of the Southern Plains. In Schnittker's study, the estimated cost of retiring 59 million acres of cropland was about \$1,250 million, or \$21.18 an acre. The estimated cost of retiring an equal amount of cropland with the acreage criterion was about \$880 million, or \$14.90 an acre, for retiring part-farm units; and \$906 million, or about \$15.35 an acre, for retiring whole-farm units.

EVALUATION OF GENERAL CROPLAND RETIREMENT AS A PROGRAM FOR AMERICAN AGRICULTURE

The questions of which general cropland retirement program is the better program, or if general cropland retirement is the best program for American agriculture are not answered by this study. These are political questions; they require public discussion, and deliberation and decisions by legislative policymakers who formulate programs designed to achieve additional objectives to those considered here. The study does provide some insights into the likely impacts of different cropland retirement programs on agriculture and on the related agricultural industries. Four areas of influence for policymakers to consider are: (1) impact on farmers' incomes, (2) cost of the program to the Government, (3) long-term resource adjustment that would be achieved with the program, and (4) social and economic impact of the program on farming communities. The likely impact of general cropland retirement programs on these four areas is discussed below.

Impact on Farmers' Income

Programs based on the production criterion give the greatest amount of reduction in production for a given Treasury expenditure. Consequently, the largest boost to farm prices and farm income per dollar of Treasury cost can be obtained under these programs.

Retiring part-farm units leaves open to farmers the possibility of offsetting reduced acreage by increasing fertilizer and other resource use per acre on farms where capital had been limiting. Retiring entire farms would remove more labor and capital from agricultural production than retiring part-farm units. Thus, the opportunities for farmers to maintain production by using more intensive practices on remaining cropland are reduced. Other things being equal, retiring entire farms instead of part-farm units would give the greater reduction in production and

^{13/} Schnittker, John A. Voluntary Land Retirement, U.S. Cong., Economic Policies for Agriculture in the 1960's, Joint Econ. Comm., 86th Cong., 2d Sess., Govt. Print. Off., Wash., D.C., 1960, pp. 21-32.

consequently the greater boost to farm prices and income.

Government Program Cost

Use of the acreage criterion minimizes the Government cost of retiring a given amount of cropland. Use of the production criterion maximizes the amount of production that can be retired for a given Government expenditure. If a program objective is to achieve the maximum amount of production adjustment, a program based on the production criterion would achieve the objective at a lower cost than would one based on the acreage criterion.

Resource Adjustment

If general cropland retirement were to be the only method of achieving production adjustment, a program based on the production criterion would give a short-term mix for remaining production that would be more in line with recent use levels than would a program based on the acreage criterion. The latter program results in production of more corn and smaller amounts of soybeans and small grain crops than appears desirable. Such production imbalances would, however, tend to be corrected over time as prices changed to reflect the imbalance between production and use.

Any program that helps maintain farm prices provides an incentive to farmers to develop new cropland by clearing swampland or woodland, irrigating arid lands, plowing meadows, and so on. As new cropland is brought into production, farm prices would tend to be lower. To maintain farm prices over time, the Government would need to increase the amount of cropland retired to offset the increase in production resulting from (1) the development of new cropland and (2) the increasing yields over time on already developed cropland.

A general cropland retirement program provides more incentive to bring new cropland under cultivation than does a program that diverts crop production from a given base or allotment. With general cropland retirement, the incentive for farmers to bring new land into crop production is provided by the net returns they can earn by growing their most profitable crop on that new land. With a program diverting from allotments or bases, program participants usually are restricted in the acreage they can plant to their most profitable crop. Thus, their incentive to cultivate new cropland is given by the net return they can earn with crops not restricted by allotment or base limits. Usually these are not farmers' most profitable crops.

Impacts on Farm Families and Rural Communities

A long-term cropland retirement program can help some farmers adjust to a changing situation. For some older farmers, it can enable them to retire from farming, receive a return from their land investment, and remain on the farm. For some other farmers, such a program can provide the economic cushion needed to make the transition from farm to nonfarm employment.

A general cropland retirement program could impose a hardship on tenant farmers. Unless the program provided restrictions on participation, nonoperating landowners would also participate, at the expense of their tenant farmers. The program would provide each landowner with another tenant, the Government, which would bid for his land in competition with

operating tenants. This problem could be avoided by limiting eligibility for participation to persons actively engaged in farming. With such a restriction, a tenant farmer would have some control over whether the landlord would participate in the Government program. He could also share in the land retirement payment.

The nonfarm sector of a community may have to bear the greatest adjustment burden of a general cropland retirement program. Generally, landowners would be completely compensated for retiring cropland and giving up the income they would normally expect from their fixed investments. Agricultural supply, marketing, and service firms would not be reimbursed in the same manner. If a general cropland retirement program substantially reduced farming activity in a given community, income to the nonfarm segments of the local economies would be reduced. This reduction would be particularly significant if farming is a major part of the community's economic base, which it tends to be in some large areas, particularly in the Northern Plains.

Any adverse effects of general cropland retirement on rural communities must be minimized if such retirement is to be politically acceptable. The programs differ in their effects on these communities. For example, a program based on the production criterion could reduce the adjustment burden of cropland retirement. Compared with one based on the acreage criterion, a program based on the production criterion tends to shift land retirement from the Great Plains to the Corn Belt and Great Lake States. Thus, use of the program based on the production criterion could reduce the social and economic disruption of general cropland retirement; agriculture provides a much larger portion of the total economic base in the Great Plains than in other regions. For example, in 1968, personal income from farming was 10.1 percent of total income in the Great Plains, but only 2.6 percent in the Corn Belt and 2.5 percent in the Lake States.^{14/} Moreover, a high proportion of other income in the Great Plains is derived from the farm supply, marketing, and service industries whose businesses would be curtailed by a substantial amount of land retirement. It also would be harder for Great Plains farmers to shift to off-farm employment because they do not have as many opportunities for such work as farmers in other areas do. A much higher proportion of the total income of farm families in the Great Plains is from farming compared with that in other major regions, such as the Lake States and the Corn Belt, and in the United States as a whole.^{15/}

^{14/} Survey of Current Business. Off. of Bus. Econ., U.S. Dept. Commerce, Vol. 49, no. 8, Aug. 1969.

^{15/} Based on a special tabulation by the Internal Revenue Service for the Economic Research Service.



UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, \$300



POSTAGE & FEES PAID
United States Department of Agriculture

