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The Conservation Reserve in South-Central Iowa

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and

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The Conservation Reserve in South-Central Iowa[1]

by Walter R. Butcher, Earl O. Heady and Larry G. Rigler[2]

United States agriculture has been faced with surplus-producing capacity for several decades. The tendency of excess production to push upon demand and to result in low returns to agricultural resources began in the 1920's. In the 1930's, agricultural programs began to provide a highly elastic demand through price supports and government storage. Stocks of wheat and feed grains that accumulated under these programs, however, became unacceptably large. Acreage allotments and other supply-control measures were only partially successful.

The ability of American agriculture to produce more than the domestic market will absorb at prices favorable to agriculture (with the criterion of "favorable" being resource returns comparable to other major sectors of the economy) is predicted to continue for the next 1 or 2 decades. Studies treating the aggregate of United States agriculture indicate that between 35 million and 100 million surplus acres would have to be held out of production to bring surpluses under control by 1965.[3]

A "wholly satisfactory policy" to handle this surplus capacity has not yet been devised or publicly accepted. Hence, it is likely that numerous policy elements will be tried in the future as knowledge is accumulated from past programs and as the farm and general public move to greater agreement on action programs that are acceptable for different commodities and regions. The purpose of this study is to provide and record knowledge with respect to outcomes on individual farms in a particular region under a program that used land withdrawal in an attempt to control supply and to improve commodity prices.

The Conservation Reserve

The Soil Bank Act was adopted in 1956 to "reduce surplus production and to conserve soil and other resources." It provided for withdrawal of land from production under 1-year Acreage Reserve contracts and under longer term Conservation Reserve contracts. The Acreage Reserve, which was in force only through the 1958 crop season, was not analyzed in this study.

The Conservation Reserve portion of the Soil Bank was a "long-run" land-retirement program in which farmers who voluntarily entered into contracts to withdraw land from production for from 3 to 10 years were compensated by annual rental payments.

The Conservation Reserve had been in operation for 4 crop years when this study was initiated. What have been the effects of the Conservation Reserve on output and resource use in south-central Iowa? An answer to this question would provide a basis for comparing this land-retirement program with alternative types of programs.

Program in 1956-58

To participate in the Conservation Reserve, a farmer signed a contract, through the County Agricultural Stabilization and Conservation Committee, with the United States Department of Agriculture. In this contract, he agreed to devote specified tracts of land to semi-permanent conservation practices. Any land regularly used to produce harvested crops (with the exception of trees, fruits and nuts) was eligible for inclusion in the contract. Land used only for pasture was not eligible. Under a Conservation Reserve contract, no crop could be harvested from the land, nor could it be pastured. (Exceptions were that, in the case of emergency conditions, the Secretary of Agriculture could permit the landowner to graze his own livestock on the land, and, in 1961, grazing was permitted with reduced payments.) A protective cover crop was to be maintained on all land in the Conservation Reserve.

Annual payments were made to producers for land taken out of production. The maximum payment allowed any one producer was $5,000. An operator who agreed to place all his cropland in the Conservation Reserve could receive payments at two rates: (1) the full annual payment for that

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[1]Project 1328, Iowa Agricultural and Home Economics Experiment Station; Center for Agricultural and Economic Development and the United States Department of Agriculture, cooperating.

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[3]See: Arnold Paulsen, Earl O. Heady, Alvin C. Egbert, Ray Brokken and Melvin Skold. Retire our excess grain capacity? Iowa Farm Science 16:11-14, 1961.

part of his Conservation Reserve acreage that was equal to a Soil Bank base assigned to his farm; and (2) 30 percent of the full rate for the remaining Conservation Reserve acreage. The Soil Bank base was equal to the acreage devoted to harvested crops in the 2 years immediately before the contract began. Farmers were required to comply with all acreage allotments to be eligible for payments.

Cost sharing of up to 80 percent of the cost of establishing soil-conserving crops was available on land not already seeded to such crops. Cost-sharing payments also could be received for certain other conservation practices, such as terracing. State and county ASC committees had considerable latitude in determining approved practices and maximum payment rates.

The lengths of contracts varied from 3 to 10 years, depending primarily on the type of cover crop to be established on the land. Three-year contracts were available on land already having adequate cover. Five years was the minimum length of contract when cost-sharing payments were received for conservation practices. Ten-year contracts were required where land was planted to trees. For the purposes of establishing future allotments, the contractor's cropping history was preserved throughout the contract period.

Program in 1959-60

In 1959, a substantial revision of the schedule of annual payment rates had particular significance for the Conservation Reserve in Iowa. The national basic payment was increased from $10 per acre in 1956-58, to $13.50 per acre in 1959. Furthermore, rates were adjusted to give more variation in conjunction with differences in land productivity. In Iowa, the 1959 basic rate was 140 percent of the national average rate ($19 vs. $13.50), whereas the 1956-58 rate had been only 120 percent of the national average rate ($12 vs. $10). Rate variation also was increased among counties within states and among farms within counties to more accurately reflect productivity.

A 10-percent bonus on contracts that included all eligible land in a tract was an added feature in the 1959 Conservation Reserve. The bonus served to encourage retirement of whole farms.

The basic requirements for eligibility of land and satisfactory compliance with contracts were the same in 1959 as in the earlier period. The other important new feature was a bid and priority system which encouraged farmers to offer their land at less than the established payment rate to increase the probability of their contract being accepted in the event of a shortage of funds.

Participation in the Program

Participation in the Conservation Reserve Program was considerably increased in 1959 and 1960 as compared with 1956-58. The higher rate schedule and bonus for whole-farm contracts were important factors. The discontinuation of the Acreage Reserve after the 1958 crop year also was a factor since much land that had been in the Acreage Reserve was placed in the 1959 Conservation Reserve.

In the Corn Belt and other high-yielding areas, the increase in participation was especially noticeable. For example, Iowa acreage increased 400 percent (100,000 acres to 500,000 acres) from 1958 to 1959 as compared with an increase in the United States as whole of 125 percent (from 9.9 to 22.5 million acres). Other Corn Belt states show similar large increases in participation under the new rates.

Although a considerable amount of land from the more productive areas was placed in the 1959 Conservation Reserve, the nationwide pattern of participation still showed heaviest concentrations in so-called fringe areas—the western and northern Great Plains, the Great Lakes and northeastern cutover areas, and the old Cotton Belt of the southeastern United States.

In Iowa also, participation has been concentrated in areas having relatively uneven topography, inherent soil-conservation problems and a greater concentration of low-yielding soils. The percentage participation of each Iowa county in the 1959 Conservation Reserve is designated in fig. 1. Most counties with relatively high participation are located in the Ida-Monona, Shelby-Grundy-Haig and Shelby-Sharpsburg-Winterset soil areas of western, southwestern and south-central Iowa. The rich, level Clarion-Webster soil area in central and north-central Iowa had much lower participation.

The authority to take additional land into the Conservation Reserve terminated after the 1960 sign-up. Land now under contract will gradually

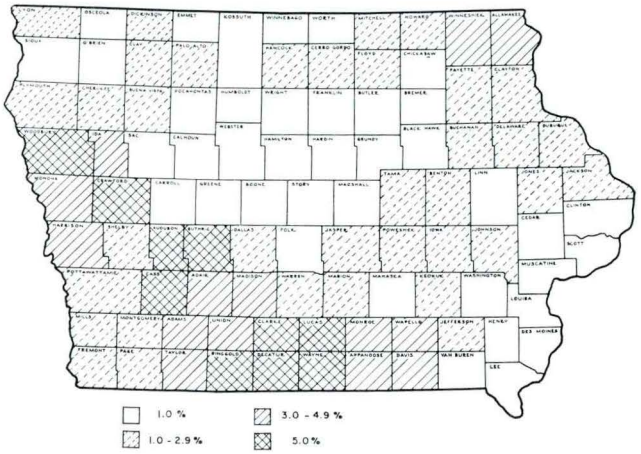

Fig. 1. Percentage of cropland in Iowa in the Conservation Reserve, 1959.

Table 1. Characteristics of southern Iowa agriculture in 1959 as compared with 1954 and 1944 and with northern Iowa agriculture in 1959.[a]

Items	Unit	Southern Iowa 1944	Southern Iowa 1954	Southern Iowa 1959	Northern Iowa 1959
Land resources					
Land in farms	Acres	2,340,000	2,314,000	2,262,000	2,392,000
Cropland harvested	Acres	995,875	1,075,734	1,035,000	1,967,723
Cropland in corn	Percentage	42	40	30	52
Cropland in row crops	Percentage	49	49	40	68
Corn yield	Bu./acre	37	31	48	57
Value of land	$/acre	57	96	114	299
Mechanization					
Corn farms with pickers	Percentage	3	51	69	83
Acres of corn/picker	Acres	825	80	68	110
Acres of cropland/tractor	Acres	160	116	71	82
Livestock					
Milk cows	Number	85,117	52,312	40,056	42,423
Beef cows	Number	66,532	101,934	120,451	42,196
Other cattle	Number	124,965	16,147	188,100	273,018
Hogs sold	Number	471,800	296,991	639,373	1,104,365
Human resources and farm organization					
Full-time farmers	Number	11,220	7,410	6,654	8,497
Farm operators working off farm					
1-99 days	Number	1,132	1,984	1,690	2,122
100 or more days	Number	956	2,319	1,810	848
Regular hired workers	Number	867	1,032	388	946

[a] Counties included were: southern Iowa—Appanoose, Clarke, Decatur, Lucas, Monroe, Ringgold, Union and Wayne; northern Iowa—Clay, Dickinson, Emmett, Hancock, Kossuth, Osceola and Palo Alto.

be released as the term of the contract expires unless recontracting is permitted. Fifty-two percent will be released by January 1966; virtually all by 1970.

STUDY PROCEDURE

Objectives

This study of the Conservation Reserve Program was made to determine effects of a particular type of land-retirement program. Specifically, the study was made to evaluate: (1) the characteristics of farms and farmers that were most often associated with participation in the program and (2) the effects of the program on production and resource use.

Area Studied

Eight contiguous south-central Iowa counties (Union, Ringgold, Clarke, Decatur, Lucas, Wayne, Monroe and Appanoose) were selected in 1959 for a detailed study of the Conservation Reserve. These counties were selected because of their relatively high rate of participation and their homogeneity with respect to land resources and type of farming. Table 1 contains summary data that indicate the nature and trends of southern Iowa agriculture.

Farm incomes have been lower in this region than in other parts of Iowa. Comparison with the northern Iowa area indicates some of the reasons for low incomes. Land in southern Iowa is not highly productive, and serious erosion problems restrict row cropping on much of the land. Even though farms are relatively large in total acres and have been increasing in size, they still are relatively "small" in productive capacity. As a result, machinery and farm operators' labor tends to be underemployed in comparison with other areas. A movement of people to nonfarm jobs in search of better incomes has led to a declining and

residual population and an increasing proportion of part-time farmers.

Sources of Data

Data for this study were obtained from a sample survey of Conservation Reserve participants in June 1959. A systematic sample of one-fifth of the participants was drawn from county ASC office lists of contracts in effect on June 15, 1959. The contract lists were ordered by sign-up date, beginning with the first contract signed in 1956. Sampling was begun from a random start in each of the eight counties to avoid bias due to correlations between the order of listing and characteristics of the respondents. A total of 163 contracts were drawn in the sample, and interviews were completed with 153 contract holders.

Interviewees provided biographical information, data on their basic farm operations before entry into the Conservation Reserve and on changes made since entering the program. Some information also was obtained regarding participants' future plans. Since some farms entered the program in each of the years 1956 to 1959, the year used to establish the participants' basic farm operation before entering the program was not the same in every case. Table 2 gives the distribution of sample contracts by year of initiation.

Table 2. Distribution of sample contracts by year of initiation and by type of contract.

Type of contract	Year of initiation				Total
	1956	1957	1958	1959	
Whole farm	2	8	5	88	103
Part farm	1	26	5	18	50
Total	3	34	10	106	153

The number of contracts, participants sampled and interviews completed are shown in table 3. Information regarding the 10 participants who could not be contacted was obtained from ASC personnel and records, from the managers of the farms and from neighbors or relatives of the participants. This information was used to indicate the nature of the observations missing from the sample but was not included in summaries of participants' characteristics. The small group of nonrespondents did not differ from contract holders interviewed except in location of residence. Hence, it was presumed that no important bias arises due to excluding the group of 10 nonrespondents from the summaries.

Six of the respondents held two contracts. This is a common occurrence because of the ASC definition of a farm as a tract of land owned and operated by the same individual or individuals. Two separate tracts of land owned by the same individual but operated by two different individuals

Table 3. Number of contracts, participants in sample and interviews completed by county for the eight-county area, 1959.

County	Contracts	Participants in sample	Interviews completed	Effective sampling rate[a]
	(No.)	(No.)	(No.)	(Percentage)
Appanoose	61	13	13	21.2
Clarke	110	21	21	19.1
Decatur	145	29	27	20.0
Lucas	134	27	27	20.2
Monroe	85	17	14	20.0
Ringgold	97	20	18	20.6
Union	59	12	12	20.3
Wayne	129	24	21	18.6
TOTAL	820	163	153	19.9

[a] Includes a correction for double-contract respondents.

may be considered as two different farms. Similarly, two tracts farmed by the same person but owned by two different individuals may be considered to be two different farms. Care was taken in the selection of the sample and in the interviews to ascertain all cases in which participants who were included in the sample held more than one contract.

Participants with more than one contract introduce a potential source of bias into estimates based on the sample data. First a bias may be introduced if the sampling rate is not properly determined. The true sampling rate of contracts is the number of contracts held by interviewees divided by the number of contracts in the county. Using the incorrect value, number of interviews divided by number of contracts, would lead to a downward bias of the sampling rate and, thence, to an upward bias of estimates of population values derived from sample means.

Another source of bias can result from the fact that individuals holding two contracts have twice as great a probability of being included in the sample as do individuals who hold only one contract. One method of eliminating this possible bias is to weight each double-contract response by half as much as responses from other participants. However, this may not be necessary. If observations entering the sample with double probability are not different from other observations, sample means, weighting all observations equally, will give unbiased estimates of population values. An examination of the characteristics of the six participants who each held two contracts did not disclose any significant differences between this group and the group of participants who had only one contract. On this basis, observations taken from participants with two contracts were not separated from other observations in the computation of statistics reported.

To provide data for comparisons between participants and nonparticipants, 107 interviews were completed with a random sample of nonparticipating farm operators who owned at least part

of the land that they operated. The sample was drawn on an area-segment basis, excluding all land in cities and towns. Interviews were completed during June and July 1959.

Method of Analysis

The method of analysis used was one of grouped comparisons—participants with nonparticipants, participants' before-program situation with after-program situation, and participants who quit farming with those who continued and with participating landlords. The methods of calculating particular quantities to be compared are described in the sections where those quantities are used. A statistical t-test or F-test of significance was applied to each comparison.

A particularly important step in the analysis was the subdivision procedure. The first subdivision was made on the basis of whether the participant was a farm operator or a nonoperating landlord. Nonoperating landlords would be primarily concerned with a return on investment, whereas an owner-operator would have to consider returns to his labor, machinery and livestock as well. Participants who operated 10 or more acres of land in the year before they entered the Conservation Reserve were classified as farmers. Participants who had not operated at least 10 acres were classified as nonoperating landlords. In the sample, the subdivision of the 163 participants was: farmers, 116 (72 percent); nonoperating landlords, 47 (28 percent).

A further subdivision of the respondents who were participating farmers was made on the basis of whether or not the participant quit farming **(in the sense of no longer raising crops)** upon entering the Conservation Reserve. A participant who quits farming cropland is faced with a need for somewhat different adjustments than is the participant who continues to crop some land. Thus, these two groups are summarized separately and compared to reveal these differences and to help determine the underlying factors predisposing each group to enter the program.

FACTORS AFFECTING PARTICIPATION BY FARM OPERATORS

Active farm operators who consider participating in a program such as the Conservation Reserve must compare the returns to their resources with participation with the returns that could be expected without participation. In addition to returns to land, a farmer must consider alternative returns to labor and to capital investments. These nonland resources, especially capital in such forms as machinery and equipment, may earn some return while being used in the farm operation but are mostly unneeded when the cropland is put in the Conservation Reserve. Some capital items may be sold; it may be possible to re-employ labor in a nonfarm job; or, both capital and labor may be used in farming other land. In any case, the returns to these nonland resources are an important determinant of the profitability of participation in a program of the Conservation Reserve type. If nonland resources remain unemployed, are sold at a loss or earn less after re-employment than they would have earned under continued farm operation, any decrease in their earning power must be charged as an opportunity cost against possible increased returns from land because of participation in the program.

Division of the sample of participants into two groups—those who continued to farm some land after entering the Conservation Reserve and those who quit operating cropland—focuses attention upon adjustment opportunities. The former group's adjustments are to a change in size of farm operations. The participants who quit operating cropland, on the other hand, have a change in occupation and an end to opportunities for farm use of nonland resource. This latter group, therefore, is faced with the more demanding problems of resource adjustments. Ease of re-employment or smallness of loss from unemployment of resources is decisive to participation by the latter group.

For this study, **a farmer was considered to have "quit farming" if he no longer was actively farming cropland.** This definition did not preclude continued "operation" of Conservation Reserve land or production of livestock on noncropland pasture.

Classification of participants on the basis of whether they quit or continued to farm cropland closely parallels the ASC classification of contracts as either "whole-farm" or "part-farm" contracts. Some difference does arise because tracts within operating units were sometimes considered as "whole farms" for program purposes. Other differences arise where "whole-farm" participants begin, after participation, to operate another unit of land.

Of the 115 sample farms, 78 had contracts classified as whole-farm, and 37 had contracts classified as part-farm. By operating status as used in this study, 68 of the 115 participants were classified as having quit farming cropland, and 47 were classified as continuing to farm. Of the 78 whole-farm contracts in the sample, 62 of the participants were classed as having quit farming, and 16 were classed as continuing to farm. Of the 37 part-farm contracts, 6 of the participants were classed as having quit farming, and 31 were classed as continuing to farm.

Two major hypotheses were formulated as possible explanations for participation. The first

was that participation would be more likely among farmers receiving payments that were relatively large in comparison with their expected net returns from land. The second was that participation would be more likely among farmers having relatively small amounts of nonland resources that would be disemployed by the program and among farmers whose nonland resources were most readily re-employable.

Payment Level and Net Crop Returns

Conservation Reserve annual payment rates in 1959 and 1960 were made proportional to productivity ratings based upon historical average yields. Thus, payments are roughly proportional to gross productivity. Net returns from farming, on the other hand, vary much more widely than do gross returns. The reason lies in the relatively constant operating cost of farming an acre of land, whether it yields 30 or 60 bushels of corn. On the poorest land, operating costs may be approximately equal to the value of the crop, and returns to land and profits are quite small. On the good land, operating costs usually are not much higher, even though yields are perhaps twice as great as on poor land, and returns to land and profits may be several times as large as on the poor land. But Conservation Reserve payments on good land exceed those on the poor land only by the ratio of gross outputs. These relationships are illustrated schematically in fig. 2.

In the illustration, we suppose land quality to be measured on the horizontal axis; costs and returns, on the vertical axis. (Although the relationships illustrated are linear, nonlinear relationships would lead to the same conclusions.) We suppose fixed costs of **oc** and operating costs, which vary slightly with yield, as represented by the slope of line **TC**. Hence, **TC** is taken as the curve of total costs as related to quality or yield level of land. The total or gross revenue is line **TR** for land of different quality. Subtracting total costs, **TC**, from total or gross revenue, **TR**, gives net return for land quality—the line **N**. Net return is zero where land is of quality **om**, is negative for lower qualities and is positive for land of high quality. Land at quality **on** has a net return per acre of **ab** (equals **en**).

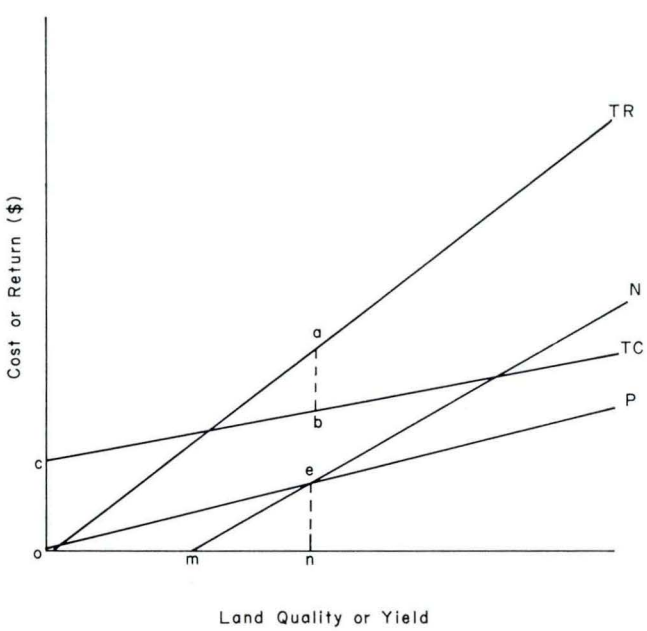

Fig. 2. Relation of land quality to return under farming or program payments (hypothetical).

Now suppose that Conservation Reserve payments are made a function of gross revenue or land quality and are approximately equal to one-third of the gross productivity (revenue) of land. Hence, the payment rate, in relation to land quality, is represented by line **P**. Leaving aside fixed costs for the moment, the net return from participation, thus, also is represented by line **P**. Land of quality **on** has a payment rate, **en**, that is just equal to net profit, **ab**, from operation. Land of quality lower than **on** has a payment rate greater than the net profit rate (line **P** lays above line **N**), while land of quality greater than **on** has a net return from farming that exceeds the payment rate. These same general relationships hold true for any payment geared to gross productivity, as long as costs increase less rapidly than productivity.

Adequate data for estimating productivity were available on 47 of the participating owner-operated farms. On these units, productivity, measured in feed units of grain and forage produced per crop acre, was only 80 percent as great as on 107 nonparticipating farms. The difference is statistically significant at the 95-percent level of confidence. The hypothesis that there is no difference in productivity between participating and nonparticipating units is not accepted. Apparently, the Conservation Reserve is a more attractive alternative to operators of below-average land who, thus, are more likely to enter the program.

The assumption of constant operating costs fails to take account of differences in operating costs which may be an important consideration in participation. An important determinant of cost is size of operation.[4] Those participants who quit farming and placed all their land in the Conservation Reserve generally operated small units averaging only 75 crop acres per farm. By comparison, nonparticipants operated an average of 141 acres of cropland, and participants who

[4]Ronald D. Krenz. Farm size and costs in relation to farm machinery technology. Unpublished Ph. D. thesis. Iowa State University Library, Ames, Iowa. 1959. Krenz has shown by budgeting analysis that the cost of producing a given output falls rapidly as acres of cropland operated increase. About 160 acres of cropland are needed to realize most of the economies of scale for the smallest size of machinery unit studied (a two-row tractor and two-row equipment). At 75 acres of cropland, budgeted costs were approximately equal to returns.

continued farming operated an average of 162 acres of cropland. Relatively high costs (regardless of productivity) also may have encouraged operators of small units to participate.

Labor Adjustment Opportunities

Participants in the Conservation Reserve will have reduced on-farm use for their labor. The participant who does not retire must find alternative employment for the labor he formerly used to farm the land placed in the Reserve. The extent to which this adjustment is a restraint on participation depends on the amount of labor involved, the alternative employment opportunities open to the farmer and his position regarding retirement.

Labor supply. It was hypothesized that one factor encouraging participants to put all their land into the Conservation Reserve was a low labor input in crop production before they entered the Conservation Reserve. With a relatively small amount of labor disemployed by placing all land into the Conservation Reserve, these farmers would be less deterred from participating by consideration of possible difficulties in re-employing their labor. Two measures of on-farm labor use were used to test this hypothesis.

Direct labor required for crop production was calculated for participating and nonparticipating farmers on the assumption that all used the same amount of labor per acre of crop harvested.[5] Average crop labor needs per farm were: 400 hours per year for particiants who quit farming; 850 hours per year for participants who continued; and 800 hours per year for nonparticipants. The amount of labor used by participants who subsequently quit farming was small in comparison with both nonparticipants and with participants who continued farming. Furthermore, it was quite small in comparison with the normally accepted 2,000 hours per year of a full-time job.

Another indication of the amount of labor that would need to be re-employed after participation in the Conservation Reserve is given by the amount of off-farm work before participating. Farmers with a large amount of off-farm work would, conversely, have a small amount of labor devoted to farming. In table 4, off-farm employment averaging 4.8 months annually per participant who quit farming indicates that less than two-thirds of a year of labor remained for farm work. Twenty-five percent of the participants who quit farming were working 9 months or more per year at off-farm jobs. To these part-time farmers, participating in the Conservation Reserve to the extent of quitting farming did not involve as great an adjustment in labor use as it would have for the average nonparticipating farmer. The nonparticipating farmers worked an average of only 1.6 months per year at off-farm jobs. Only 8.4 percent of the nonparticipants were employed for 9 months or more at off-farm jobs. The participants who continued to farm were intermediate to the other two groups but were more nearly similar to nonparticipants than to participating farmers who quit farming.

Table 4. Off-farm employment: distribution and average off-farm employment of (a) participating farmers before they entered the Conservation Reserve and (b) nonparticipating farmers.

Distribution by off-farm employment extent per year	Participating farmers who: Quit farming (N = 68)	Continued farming (N = 47)	Non-participating farmers (N = 107)
	(percentage)	(percentage)	(percentage)
Less than 2 months (including none)	58.8*	74.4	80.4
2-9 months (part time)	16.2	12.8	11.2
9-12 months (full time)	25.0*	12.8	8.4
Total	100.0	100.0	100.0
Average off-farm employment (months)	4.8*	2.1	1.6

* Significantly different from nonparticipating farmers at the 95-percent level.

Re-employment possibilities. The prevalence of off-farm work among participants who quit farming also may indicate the ease with which additional labor may be shifted from farm to off-farm employment. Individuals with experience and contacts in nonfarm industries are likely to find it easier to increase off-farm work than will individuals without experience or contacts. In table 5, all participants and nonparticipants are classified on the basis of whether they were employed at nonfarm work either at the time they entered the Conservation Reserve or at any time during the preceding 10 years. Among participants who quit farming, 44 percent were employed or had previous off-farm work experience. The corresponding rate for nonparticipating farmers was only 26 percent.

Another indication of the outlook for re-employment in off-farm work was provided by

Table 5. Present employment or past experience at nonfarm work for participants and nonparticipants.

Nonfarm work experience	Participating farmers who: Quit farming (N = 68)	Continued farming (N = 47)	Non-participating farmers (N = 107)
	(percentage)	(percentage)	(percentage)
Employed when contract signed	41*	34	24
Previously employed	3	2	2
No work experience	56	64	74

* Significantly different from nonparticipants at the 95-percent level.

[5]Estimated to be: corn, 7 hours per year; soybeans, 6 hours per year; oats, 4 hours per year; hay, 5 hours per year.

farmers' own estimates of the annual earnings that they would most likely receive if they transferred from farming to full time off-farm work. The percentage distribution of farms by expected possible earnings and the average expected earnings are shown in table 6. Respondents who gave no estimate usually were those who had reached the age at which they no longer considered employment in any type of an off-farm job. The average of farmers reporting thus provides an estimate of the earning outlook of farmers in the employable age groups. The average expected earnings of the participants who quit farming is $4,800, approximately one-third greater than the $3,650 average of the nonparticipants.

Table 6. Percentage distribution and average of respondents' estimates of their potential earnings in off-farm employment.

Expected annual earnings	Participating farmers who: Quit farming (N = 68)	Continued farming (N = 47)	Non-participating farmers (N = 107)
	(percentage)	(percentage)	(percentage)
No estimate	59	51	24
$0-1,999	1	2	2
$2,000-3,999	16	15	48
$4,000-5,999	15	26	19
$6,000 and above	9	6	6
Average of farmers reporting	$4,800	$4,500	$3,650

Age is another important factor bearing on possibilities for re-employment of labor. As a general rule, younger persons have few ties to farming and reasonable opportunities for nonfarm employment. Participation in a land-retirement program would be expected to appeal to young farmers with good prospects for successful nonfarm employment. The distribution of sample farmers by age (table 7) indicates a slightly higher rate of participation by farmers who were younger than 35 years of age. Of the participants, 9.6 percent were less than 35 years of age (8.8 percent who quit farming and 10.6 percent who continued) as compared with 7.3 percent of nonparticipants. Many of these younger participants were already working at nonfarm jobs before they put land into the Conservation Reserve. All had off-farm jobs after retiring their land.

Table 7. Age distribution and average age of participating and nonparticipating farmers in eight south-central Iowa counties.

Age of farmer	Participating farmers who: Quit farming (N = 68)	Continued farming (N = 47)	Non-participating farmers (N = 107)
	(percentage)	(percentage)	(percentage)
20-34	8.8	10.6	7.3
35-59	36.8*	66.0	65.6
60 and over	54.4*	23.4	27.1
Total	100.0	100.0	100.0
Average age	57.7*	49.6	51.9*

* Significantly different from nonparticipating farmers at the 95-percent level.

Farmers in the intermediate age group—35 to 59 years of age—have less chance of finding attractive re-employment and, therefore, are less likely than younger men to enter a program that reduces possibilities for using labor on the farm. Table 7 shows that only 36.8 percent of the participants who quit farming were in this intermediate age group as compared with 65.6 percent of the nonparticipants. Thus, farmers in the intermediate age groups were only about half as likely to participate in the whole-farm land-retirement program as would be expected if age were not a factor. A partial offset to this low rate of participation by middle-aged farmers is found in the participation of young farmers. However, most of the above-average rate of participation came from older farmers who were approaching retirement age.

Retirement. Twice the number of farmers 60 years of age or older, were among the participants who quite farming than would be expected from a random sample. The distributions by age in table 7 show that 54.4 percent of the participants who quit farming were 60 years old or older, whereas only 27.1 percent of the nonparticipants were in the same age group. The difference is statistically significant. We conclude that a Conservation Reserve type of program is more likely to gain participation with whole-farm units from among farmers who are nearing retirement (i.e., 60 years of age or older) than from among younger farmers. In a later section on the effects of the Conservation Reserve, it will be shown that participants generally did not take up other employment after putting their farms in the Conservation Reserve. The high rate of participation by the older farmers apparently was in anticipation of using the Conservation Reserve as a means to retirement.

The Conservation Reserve has several aspects that fit well into retirement plans. The income is certain, there is opportunity to continue to live on the farm, and there is an opportunity to make limited use of labor, equipment and buildings. At the same time, there is no necessity to maintain buildings and equipment, and, thus, no hindrance to orderly liquidation as assets are junked or as an opportunity arises to sell at favorable prices.

Capital Adjustment Opportunities

A farmer who places land in the Conservation Reserve normally incurs a reduction in opportunities to profitably use capital assets in the form

of machinery, buildings and livestock breeding herds. If these assets are sold, some loss may be realized—particularly if the time of sale is governed by the opportunity to obtain a Conservation Reserve contract rather than by the opportunity to sell at a favorable price. If the assets are not sold, annual fixed costs of depreciation and interest on investment will continue, even though limited opportunities for use mean limited returns to defray these fixed costs. The loss in value or return to these fixed assets is an opportunity cost chargeable against expected increased returns to land in the Conservation Reserve. The loss would tend to be proportional to the value invested. It was hypothesized that, other things being equal, participation would be most profitable and most attractive to farmers having relatively few nonland assets.

The data in table 8 on machinery investment of participants and nonparticipants support this hypothesis. Participants who quit farming had a much lower machinery investment than those who continued to farm or did not participate. It is significant that a large proportion of participants who quit farming had machinery investment of less than $1,000 before they entered the program. Such a low investment implies that they had, at most, only a few machines, and these were largely depreciated.

Table 8. Distribution and average value of machinery inventories on participating farms before they were put in the Conservation Reserve and of nonparticipating farms, in 1959, for eight south-central Iowa counties.

Inventory value of machinery	Participating farmers who: Quit farming (N = 68)	Continued farming (N = 47)	Non-participating farmers (N = 107)
	(percentage)	(percentage)	(percentage)
$0-999	53.0*	12.8	15.9
$1,000-2,999	31.2	42.6*	23.4
$3,000-4,999	9.8*	17.0	28.0
$5,000-9,999	4.5	21.3	20.6
$10,000 & over	1.5	6.3	12.1
Total	100.0	100.0	100.0
Average value	$1,448*	$3,739*	$4,708

* Significantly different from nonparticipating farmers at the 95-percent level.

The livestock enterprises of farmers who placed all their cropland in the Conservation Reserve averaged only about one-fourth as large as those of nonparticipants. The distribution of farms by size of livestock enterprise is given in table 9 (where size is measured by the number of feed units fed annually to livestock).

Among the participants who quit farming cropland, the percentage who fed less than 1,000 feed units was significantly greater than among either participants who continued to farm or nonparticipants. Farmers feeding so few livestock would realize only small reductions in net income through liquidation of livestock enterprises. In some cases, it was possible for operators to continue small livestock enterprises through use of available permanent pasture and purchased grain and hay.

Table 9. Distribution and average size[a] of livestock enterprises of participating farmers before they entered the Conservation Reserve and of nonparticipating farmers in 1959.

Size of livestock enterprise (feed units fed)	Participating farmers who: Quit farming (N = 68)	Continued farming (N = 47)	Non-participating farmers (N = 107)
	(percentage)	(percentage)	(percentage)
None	36.8	10.6	0
1-999	22.1	8.5	2.8
1,000-2,999	23.5	25.6	24.3
3,000-9,999	14.7	48.9	58.9
Over 9,999	2.9	6.4	14.0
Total	100.0	100.0	100.0
Average bushels (corn equivalent)	1,698*	3,936	6,130

[a] Size is measured in terms of feed units fed to livestock. One feed unit is equal in feeding value to 1 bushel of corn or 133 pounds of hay.

* Significantly different from nonparticipants at the 95-percent level of confidence.

The usefulness and, consequently, the value of farm buildings usually decline when a farm is placed in the Conservation Reserve. When a whole farm is placed in the Conservation Reserve, the farm business is largely eliminated and, with it, the need for a headquarters on the farm. The rural location of the buildings may well become a liability instead of the asset it was when buildings were conveniently located at the site of a going business. The prospect of possibly declining value might deter some farmers with heavy investment in buildings from entering the Conservation Reserve. On the other hand, farms being operated with no buildings in use would not be affected by termination of the farm business.

As might be expected, owners of farms without buildings or with abandoned buildings made up a large proportion of the participants. Farms

Table 10. Farm building and dwelling use on farms before they were placed in the Conservation Reserve by participating farmers.

Item	Participating farmers who: Quit farming (N = 68)	Continued farming (N = 47)
	(percentage)	(percentage)
Farm dwelling use		
No dwelling on farm	4.4	10.6
Dwelling vacant	14.7	6.4
Dwelling used	79.4	80.9
Farm building use		
No buildings on farm	2.9	6.4
Buildings vacant	8.8	6.4
Buildings used	88.2	87.2

with no occupied dwelling accounted for 19 percent of the contracts by participants who quit farming and 17 percent by participants who continued to farm (table 10). Incidence of unused farm buildings was slightly less common (12 percent) but still important. In contrast, only 2 percent of nonparticipants were not residing on the farm that they operated. While the problem of multiple units mentioned earlier precludes exact comparison of participants with nonparticipants, the wide disparity indicates a tendency for the Conservation Reserve to attract owners of farms without buildings.

FACTORS AFFECTING PARTICIPATION BY NONOPERATING LANDLORDS

For nonoperating landlords, participation in the Conservation Reserve involved fewer adjustments in resource use than for the typical participating farmer who owns and operates his own land. Ordinarily the landlord does not provide much labor, machinery or livestock in the farm operation. Thus, he does not have to face the problem of re-employing nonland resources after retiring cropland. With the exception of a need for profitable use of buildings, the choice between renting to a tenant or to the Conservation Reserve could be based primarily on comparative annual returns to land.

The apparent ease with which landlords could adjust to the Conservation Reserve leads to two hypotheses regarding participation by landlords. First, landlords would be more likely to participate than would active farm operators. Second, the Conservation Reserve payment per acre relative to expected productivity would be a more important factor, and flexibility of resource use a less important factor, for landlords than for active farm operators.

Although these hypotheses seem well founded, they could not be tested on the basis of observed participation in the Conservation Reserve. Actual participation by landlords was strongly governed by another factor—a program regulation that virtually excluded participation by landlords except for special cases in which a tenant voluntarily left the farm. Apparently, this regulation was the primary consideration in participation by landlords.

According to the regulation, a tenant who had been farming land up to the time that a Conservation Reserve contract was entered had to be given a share of the annual payment. Exceptions were made, freeing the landlord from the obligation to share payments with the tenant only if the tenant voluntarily left the farm to take other employment or to operate another farm. All 47 landlords in the sample had qualified under this exception rule. There was no case in which a payment was being shared by landlord and tenant.

The degree to which the regulation protecting tenants was a deterrent to participation by landlords may be indicated by the low rate of participation by nonoperating landlords in contrast to the very high rate of participation among operator-landlords.[6] Because of multiple-unit ownership, part operated by themselves and part operated by a tenant, operator-landlords would have more opportunity to qualify for an unshared contract by placing land that they had been operating in the program and moving their farm operations to land that had been tenant operated. In table 11, 19.8 percent of operator-landlords are shown as participating in the Conservation Reserve, whereas only 4.6 percent of nonoperating landlords participated. Most probably, if nonoperating landlords had had the same opportunity, they too would have participated in greater numbers.

Reasons Given for Participating

The most frequently mentioned reason for participation in the Conservation Reserve was a desire to conserve the soil and to build up the land (see table 12). Forty percent of the participating landlords mentioned this reason. A portion of these responses may have resulted from a feeling that "building up the land" is a good reason to give an interviewer.

[6]Owning some land that they operate themselves and some land operated by a tenant.

Table 11. Conservation Reserve participants by operating class in eight south-central Iowa counties, 1959.

Operating class	Sample distribution: Number	Sample distribution: Percentage	Percentage of all owners participating[a]
Farm operators	117	71.6	6.6
Owner-operator	77	40.8	6.3
Operating-landlord	18	11.1	19.8
Part-owner-operator	22	19.7	4.9
Nonoperating-landlord	46	28.4	4.6
Total	163	100.0	5.8

[a] Calculated by ratio of number of participants by operating class as estimated from sample values and number of land owners by tenure class as estimated by: Roger Wallace Strohbein. Ownership structure of Iowa farm land. Unpublished M.S. thesis. Iowa State University Library. Ames, Iowa. 1959.

Table 12. Reasons for placing land in the Conservation Reserve as reported by participating nonoperating landlords in eight south-central Iowa counties, 1959.

Reason	Percentage[a]
Build up the land	39.5
Better income alternative	26.3
Dislike of renting	10.5
Other employment	5.2
Steadier income	2.6
Other	21.0

[a] Total is greater than 100 percent because some participants gave more than one reason.

Twenty-six percent of the landlords stated that participation in the Conservation Reserve provided a better income than did renting. Participating landlords received an average annual payment of $16 per acre. Net return probably would be about $12 per acre after subtracting taxes of about $3 per acre and a $1-per-acre expense of clipping weeds. The average value of land in the study area is $114 per acre. Only 56 percent of the land is cropland. Therefore, average investment per acre of cropland is $204. A $12 return on a $204 investment yields an annual earning rate of approximately 6 percent.

Ten percent of the landlords stated that they preferred to put their land into the Conservation Reserve because of a general dislike for rental arrangements. Typically, this group was concerned about tenants' other competing interests or general lack of interest leading to a less than optimum use of the land and, thus, to a reduction in land earnings. The "headaches of renting" and the difficulty of finding and keeping a good tenant also were given as reasons for choosing the "comparatively settled situation" of a Conservation Reserve contract.

About 5 percent of the landlords mentioned that nonfarm work required too much of their time to permit continued farm operation. Actually, this is as much a reason for renting out, rather than operating land, and not especially a reason for entering the Conservation Reserve in preference to renting. Their real reasons for entering the Conservation Reserve may have been better reflected in further comments that they had adequate machinery for establishing and maintaining a cover crop. Hence, in these cases, the Conservation Reserve allowed a more complete use of other fixed assets than did renting out land. The opportunity cost of income lost because of idle resources was undoubtedly lower, for some, than under the alternative of renting.

Three percent of the landlords mentioned that they preferred the stability of income from a Conservation Reserve contract. Twenty-one percent mentioned a variety of other reasons for participating in the program. A number of the respondents in this group were widows of former farm operators who especially preferred the Conservation Reserve to problems of dealing with a tenant.

Size of Land Holdings

Nonoperating landlords who entered the Conservation Reserve had an average of 186 acres of land. Landlords who did not enter the program owned an average of 228 acres. The difference of 42 acres appears large but is not statistically significant at the 95-percent confidence level. More than three-fourths of the participating landlords had total holdings that were smaller in terms of acres of cropland than the average tenant farm operation in this area of Iowa. These smaller units are often forced, in terms of scale economies and competitive position, to become a part in the consolidated operation of a farmer who has other land that he owns himself or is renting from other landlords. Some landlords expressed the behalf that this arrangement invites careless tenant farming. This may have caused the Conservation Reserve to appear relatively more favorable to owners of small tracts than it did to owners with large holdings who may rent out their farm as an economic unit.

Farm House and Farm Buildings

Buildings are the primary, and often the only, nonland asset held by landlords. Placing the land in the Conservation Reserve may lessen the opportunity for a return to be realized from buildings. Therefore, it might be expected that those landlords with relatively low investments in buildings would be more likely than others to enter the program. Among participating landlords, 29 percent of the farms placed in the Conservation Reserve had no buildings (see table 13). An additional 10 percent had buildings that were already vacant before the land was placed in the program. Of the remaining 60 percent that had buildings in use, 26 percent had buildings being used only by the landlord and that would presumably have been unaffected by whether the land was rented to a tenant or placed in the Conservation Reserve. On balance, then, only about 34 percent of the landlords who participated in the program had the problem of idling or finding an alternative use for buildings formerly used by a tenant.

Table 13. Building use on farms placed in the Conservation Reserve by nonoperating landlords in eight south-central Iowa counties, 1959.

Use	Dwelling	Farm buildings
	(percentage)	(percentage)
No buildings on farm	29.0	29.0
Vacant before entering Conservation Reserve	10.5	10.5
Used before entering Conservation Reserve	57.9	60.5
No response	2.6	0

Occupation and Residence

Considerable fear has been expressed that the Conservation Reserve would prove a boon to city residents who wanted land only for investment and who would put it into the Conservation Reserve because that required less supervision than a tenant operation. Analysis of the sample data indicates that nonfarm investing did not occur to any extent in south-central Iowa.

Table 14. Occupations of participating nonoperating landlords in eight south-central Iowa counties, 1959.

Occupation	Percentage	Percentage having previous farming experience
Retired farmers	18.4	18.4
Business and professional	36.9	23.9
Labor	26.3	23.3
Homemakers and others	18.4	18.4
Total	100.0	84.0

Table 15. Residence of participating nonoperating landlords in eight south-central Iowa counties, 1959.

Place of residence	Percentage
On Conservation Reserve land	26.3
On other land near Conservation Reserve land (less than 10 miles)	5.3
In town near Conservation Reserve land (less than 10 miles)	47.4
More than 10 miles from Conservation Reserve land	21.0
Out of state	5.0

Tables 14 and 15 suggest that a typical landlord participant might be described as a local resident who was a retired farmer, a farmer's widow, or a former farmer now working at a nonfarm job. Only 21 percent of the participating landlords were not living within 10 miles of the land that they put into the Conservation Reserve, and only 5 percent were living in states other than Iowa. Only 16 percent of the landlords had not, at some time, operated a farm.

Despite close ties with the land, a majority of these landlords now have important nonfarm sources of income; all but about 8 percent of the landlord participants had some other source of income (table 16). For most, the nonfarm income was from a job. For those with part-time or low-paying jobs or with only Social Security income, the return from farmland continued to be an important source of family income.

Table 16. Income other than income from the farm received by participating nonoperating landlords in eight south-central Iowa counties, 1959.

Type of income	Percentage
Off-farm employment	
Part-time job only	5.2
Full-time job only	52.7
Full-time job and property income	5.2
Social Security	21.1
Real estate, securities and other investments	7.9
No income other than from the farm	7.9

EFFECTS OF THE CONSERVATION RESERVE ON PRODUCTION AND RESOURCE USE

The impact of the Conservation Reserve was estimated by comparing the situation of participants in 1959 (after entering the program) with their situation before entering the program. The difference between the two time periods is ascribed to impact of the program. Actually, other changes that were not due to the program were occurring during the time span considered. Generally, it is difficult to separate these from program effects. Where possible, corrections are made for changes due to the "normal" processes of time and economic change. Where extraneous (not due to the program) changes are known to exist but cannot be quantified, they are pointed out.

Land

The initial and most apparent impact of the Conservation Reserve is a reduction in the acreage of cropland farmed. Since only cropland may be placed under Conservation Reserve contract, the total reduction in acreage farmed is approximately equal to the acreage placed under contract. There are conceivable exceptions, such as cases in which noncropland is erroneously accepted into the reserve or in which noncropland is brought into cultivation as a substitute for land placed in the reserve. The wide variety of land quality and usage on farms in the study area makes a rigid classification of land as either cropland or noncropland difficult and subject to error. However, this study did not discover any obvious cases in which land idled under contract had not been cropland.

Changes in land use on participating farms are shown in table 17. Participants who quit farming placed an average of 93.4 acres of cropland in the Conservation Reserve. Participants who quit farming reduced corn and sorghum acreage by an average of 16.7 acres per farm. Acreage Reserve land that was transferred to the Conser-

Table 17. Estimated changes in crops grown and in farm size since participating farmers entered the Conservation Reserve.

Land use	Average change in acreage (per participant) for participants who: Quit farming		Continued farming	
	(acres)		(acres)	
Corn and sorghum	−16.7		+ 7.7	
Soybeans	−11.7		− 9.4	
Oats	−11.9		−10.9	
Hay and meadow	−32.0		−11.7	
Land used for crops		−72.3		−24.3
Idle and corrections	− 2.5		+ 4.2	
Acreage Reserve	−14.5		−16.5	
Conservation Reserve	+93.4		+70.3	
Cropland operated		+ 4.1		+33.3
Permanent pasture	−24.6		+15.5	
Waste, farmstead, etc.	0.0		− 3.3	
Total land operated		−20.5		+45.5

vation Reserve represented another 14.5 acres of potential corn production. Forty-five precent of the 72.3-acre decline in land used for crops consisted of a 32-acre decrease in land used for hay and meadow. Total cropland operated (consisting entirely of land in the Conservation Reserve) increased by an average of 4.1 acres per farm. Two farms that took control of slightly more cropland when they entered the Conservation Reserve accounted for the slight increase.

Participants who continued to farm placed an average of 70.3 acres in the Conservation Reserve (table 17). Acreage Reserve land accounted for 16.5 acres of the change. A 33.3-acre increase in cropland operated per farm offset much of the effect on these farms of the idling of land in the Conservation Reserve. Land used for crops decreased by only 24.3 acres. Acreage of corn and sorghums actually increased to more than had been raised prior to the program. The 33.3-acre increase in cropland and the 45.5-acre increase in farmland, however, is reflected by a compensating reduction in acreage on some nonparticipants' farms. Therefore, in the area as a whole, crop reduction will be greater than shown on participating farms.

Aggregate estimates of acreage changes within the eight-county southern Iowa area were made by expanding sample results. The aggregate estimates are shown in table 18. An adjustment was made for changes in the total amount of land under the operational control of the participants by assuming that land added to the farming operation had the same distribution of crops as did the land of all participants in the year before they entered the program. Land transferred from the Acreage Reserve to the Conservation Reserve was assumed to be equivalent to a reduction in corn acreage. Because of "slippage" in the Acreage Reserve, this method probably overestimated corn acreage changes due to the Conservation Reserve.

Table 18. Estimated net change in land use in the south-central Iowa area, as a result of the Conservation Reserve, and actual change in land use from 1954 to 1959.

Land use	Sample estimate of change due to the Conservation Reserve		Actual change: 1954-59[a]	
	(acres)		(acres)	
Corn and sorghum	−21,551[b]		−27,639	
Soybeans	−10,218		+30,029	
Oats	−10,745		−94,919	
Rotation forage crops	−23,198		+39,031	
Total cropland used for crops		−65,712		−53,498
Idle	−288		−9,197	
Acreage Reserve	(−13,643)[b]		———[c]	
Conservation Reserve	+66,000		+66,000	
Total cropland operated		0		+ 3,305
Permanent pasture	0		−52,939	
Waste, farmsteads, etc.	0		− 1,473	
Total land operated		0		−51,107

[a] Source: U.S. Bureau of Census. U.S. Census of Agriculture. 1954 and 1959.

[b] Acreage Reserve acreage has been added to corn acreage in the table.

[c] The Acreage Reserve was not in effect in 1954 or 1959.

As a point of comparison, the actual changes from 1954 to 1959 in crop acreages on farms in the southern Iowa area are shown in table 18. These data were taken from the 1954 and 1959 censuses of agriculture and represent a slightly longer span of time than is involved in acreage changes estimated as due to the Conservation Reserve.

The 66,000 acres of Conservation Reserve land are 5.1 percent of all cropland in the area. The actual change in land used for crops was 53,498 acres; 19 percent less than total acreage in the Conservation Reserve. Some "slippage" is to be expected. It is reflected in a decline in idle cropland and an increase in total cropland (including Conservation Reserve). Among individual crops, the actual change in acreage harvested varies considerably from the estimated change due to the Conservation Reserve. Changes over time, because of technological changes and other factors, are reflected as well as changes due to the Conservation Reserve. Soybeans and rotation forage crops both showed increased acreages in 1959 over 1954. Oats acreage shows a large decline, and corn shows a decline slightly greater than the estimated 21,551-acre decline due to the Conservation Reserve.

As a side effect of the Conservation Reserve, some noncropland pasture was idled. Participants who put cropland into the Conservation Reserve were free to use noncropland pasture as they pleased. In practice, however, the cost and inconvenience of keeping livestock or renting the pasture often exceeded the value that could be gained. Sample farms with all their cropland in the Conservation Reserve had an average of 75 acres of noncropland pasture. No participant was renting out pasture; therefore, all production obtained had to be by grazing of participants' livestock. But, following entry into the program, participants' livestock enterprises were reduced to the point where annual feed consumption averaged only 640 feed units per farm. If all this feed came from pasture, it would be equivalent to only 0.57 ton of forage per acre of pasture—less than the average yield of 0.75 ton per acre of pasture in the south-central Iowa area. In practice, some of the 640 feed units would have to be from hay or grain, and the use of pasture would probably be at no more than half of capacity. At least part of this reduced use can be credited as a production-control effect of the Conservation Reserve.

Crop Production

Change in crop production was computed only

for participants who did not continue to farm. It is generally believed that farmers who retired only some of their land and continued to farm may have put land into the Conservation Reserve that was below the average productivity of their farm. To estimate change in production on the farms where the farmer continued to operate some land, it would have been necessary to separate yields on the Conservation Reserve land from yields on the other land. In most cases, it was impossible to make those estimates with reasonable accuracy.

For 47 farm operators, whose acreage operated before entering the program was equal to the land that they put in the Conservation Reserve and who did not add any more land, average production per acre amounted to 23 bushels of feed grain, measured in corn equivalents, and 0.5 ton of hay and pasture in hay equivalents. Hence, our estimates are that the reduction in feed production amounted to 23 bushels of corn equivalent and 0.5 ton of hay (including pasture) for each acre of cropland placed in the Conservation Reserve by operators who quit farming. The reduction in feed production amounted to 29,445 feed units per farm.

Annual payments averaging $15.77 per acre in the Conservation Reserve were received by the 47 farms for which yield estimates were made. The annual payment per bushel reduction in grain output was:

$$\frac{\$15.77}{23 \text{ bu.}} = \$0.69/\text{bu.}$$

This can be compared with an average 1959 market price for corn in Iowa of $1 per bushel. The 95-percent statistical confidence limit on the estimated cost was from $0.60 per bushel to $0.77 per bushel.

Hay and pasture also are important livestock feeds, and a reduction in production of forages is an important contribution to output control efforts. The average reduction in hay production of 0.5 ton per acre of Conservation Reserve land was translated to feed units (where a bushel of corn equals 1 feed unit and a ton of hay equals 15 units). Total feed reduction per Conservation Reserve acre is thus: $23 + 0.5(15) = 30.5$. The annual payment per reduction measured in feed units was:

$$\frac{\$15.77}{30.5 \text{ feed units}} = \$0.51 \text{ per feed unit.}$$

Livestock

The impact of the Conservation Reserve on livestock production was a secondary effect derived largely from its impact upon feed production. The program did not directly control livestock production. Participants who continued to farm changed their livestock enterprises very little. Participants who quit farming cropland reduced livestock production by 62 percent to adjust to their reduced feed supplies or to allow further reductions in farm work. As shown in table 19, more than half of the participants who quit farming kept no livestock after entering the program.

Table 19. Changes in livestock production by Conservation Reserve participants as measured in feed units fed.

Item	Participating farmers who: Quit farming	Continued farming	All participants
Livestock production			
Percentage raising no livestock after signing contract	52	0	31
Average change per participant (feed units fed)	−1,043	−143	−677
Total change in area (feed units fed)	−363,000	−34,000	−397,000

Nonparticipants may also change their livestock production if the local feed-livestock market and price situation is measurably altered by the actions of participants. If the reduction in livestock on participating farms is less than the reduction in feed production, then the local feed market will have a relative shortage. Feed will be more difficult to obtain, and the price of feed will tend to rise. As a consequence, nonparticipants will tend to reduce their livestock production.

Participants in the study area reduced livestock enterprises by an amount estimated to reduce feed consumption by 397,000 feed units annually. Grain and forage production was reduced, however, by about 2,000,000 feed units on 66,000 acres of Conservation Reserve land. Participants were thus either selling less (or buying more) feed, and nonparticipants could be expected to find a somewhat shorter feed supply—forcing nonparticipants also to reduce livestock production or to buy grain from outside the area. The estimated net change in feed supply to nonparticipants amounted to 1.6 feed units per acre of cropland harvested—only a small percentage of the total feed supply available in the area. Sampling error, changes in government storage operations, and usual but unexplained year-to-year changes in crop yields and livestock production would obscure, in aggregate data, any such small program effect. Hence, empirical estimation of the changes induced in livestock production in the area as a whole (both participating and nonparticipating farms) was not attempted.

Some additional adjustment in livestock production might be expected on participating farms after more time elapsed. In many cases, less than a year had passed since the participants had entered the program. The planned change in live-

stock production most commonly mentioned by participants was an expansion in beef-cow herd size. Nearly half of those participants who continued to farm and 16 percent of those who quit farming cropland planned to add to their beef herd.

Labor

The decrease in crop and livestock production induced by the Conservation Reserve resulted in reduced requirements for agricultural labor. On the basis of crop acreage changes on participating farms and average labor requirements for crops in the study area,[7] it was estimated that the Conservation Reserve reduced labor requirements by an average of 5.3 hours per acre of land retired from production. On 66,000 acres of Conservation Reserve land in the study area, labor requirements were reduced by 350,000 hours or about 175 man-years of labor (figuring 2,000 hours per year).

All adjustments in farm employment of labor were not made by the participants. Part of the adjustment was borne by the former operators[8] of land put in the Conservation Reserve by nonoperating landlords and by participating farmers who expanded the size of their farm. The total change in labor requirements was divided into effect on participants and "passed-on effect" on nonparticipants by assuming that the land taken over by participants had the same distribution of crops as did the land that the participants were already operating. In the area as a whole (66,000 Conservation Reserve acres, 820 contracts), the estimated reduction in total labor requirements was 350,000 hours—including 161,000 fewer hours for participants who quit farming cropland, 50,000 fewer hours for participants who continued to farm and 139,000 fewer hours for former operators (nonparticipants) of land either now operated by participants or in the Conservation Reserve.

Changes in livestock labor requirements could not be as readily estimated. On participating farms, livestock labor needs were estimated to have been reduced 25 hours for each decrease of 100 feed units fed. For all participants in the area (not just the sample), the estimated reduction was 98,000 hours—including 91,000 fewer hours for participants who quit farming cropland and 7,000 fewer hours for participants who continued to farm. "Passed on" changes in the livestock labor requirements of nonparticipants might eventually cause reduced livestock production by nonparticipants. The changes, however, were too diffuse to estimate.

The change in amount of labor required for farming is not great in proportion to the total labor supply of participants. The estimated reduction in labor needs for both crop and livestock production was 448,000 hours on all 820 contracts in the study area. The reduction per contract was only 546 hours—slightly more than one-fourth of a 2,000-hour work year. For participants alone (excluding former tenant operators of Conservation Reserve land) the change in labor requirements was 209,000 hours—only 377 hours per contract. However, although the change was small relative to total time available for work, it was not small relative to total time employed in farming as is evidenced by the fact that many participants retired.

Participants who were nonoperating landlords supplied very little labor to the farming operation. The reduced opportunities for using labor on their land in the Conservation Reserve affected not them but, rather, the former tenant operator of the land. As would be expected, no changes were found in employment by landlords as a consequence of their entry into the Conservation Reserve. On the tenants' side, the changes may have been very diverse. Some may have moved to another farm, leaving, in turn, the operator of that land to face re-employment. No attempt was made to follow the chain reaction.

Participants who continued to farm usually had only small changes in the amount of labor used on the farm. Adding land to maintain the size of the farm operation gave direct re-employment to some labor released from crop production on Conservation Reserve land. The continued existence of an active farm operation also provided opportunities to use additional labor by more intensive farming of the remaining land. Only 8 percent of the sample participants who continued to farm increased nonfarm work after entering the program. The average increase among these 8 percent amounted to about 4 months per year. Counteracting this increase was decreased off-farm work by 6 percent of the participants in this category. The average change of those decreasing employment was 2 months per year.

Participants who quit farming cropland had the largest changes in crop and livestock production and, thus, the largest amount of labor that could not be used on the farm after they entered the Conservation Reserve. This group had no opportunity to employ labor more intensively in a continuing farm operation. The adjustments open to this group were either increased off-farm work

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[7]Corn, 7 hours per acre; soybeans, 6 hours per acre; oats, 4 hours per acre; hay, 6 hours per acre; Conservation Reserve land, 1 hour per acre; as estimated from: Suggested costs and returns for use with a budgeting procedure in farm and home management. (Mimeo.) Iowa State University Extension Service, Ames, Iowa. 1960.

[8]Although the former operators left voluntarily, apart from the program, the reduction in labor needs on the farm that they farmed can be considered a program effect since these operators would have been replaced by some other farmer if the land had not been put into the program. It might be more accurate to say that the program effect falls on the potential operator who is not able to rent land.

or increased leisure. Most chose the latter. Only 9 percent, with all persons represented being under 40 years of age, increased the amount of off-farm work performed. The remaining 91 percent used a reduced farm work load as an opportunity for increased leisure. Twelve percent also decreased off-farm work at the same time that farm work was being virtually eliminated.

Machinery

The need for machinery is greatly reduced on a farm that is placed in the Conservation Reserve. An active farming operation normally requires a full line of tillage and harvesting equipment, but a tractor and mower usually are enough for necessary operations on Conservation Reserve land. In fact, custom hiring of the small amount of weed-control operations would make it possible for an operator to handle Conservation Reserve land without machinery of his own. Participants thus are enabled to sell either part or all of their machinery.

Most machinery sales were by participants who quit farming after they entered the Conservation Reserve (see table 20). No landlord participants reported sales of machinery since most had none before entering the reserve. Only 13 percent of the participating farmers who continued to farm reported some machinery sold and not replaced. An active farm operation usually gave participants in that class opportunity to continue to use the machinery.

Table 20. Machinery sold and not replaced by participating farmers since entering the Conservation Reserve.

	Participating farmers who:	
	Quit farming (N = 68)	Continued farming (N = 47)
Percentage selling some machinery	34.0	13.0
Average amount sold by each participant selling some machinery	$1,327	$1,083
Average amount sold per participant	$ 441	$ 138
Percentage of machinery inventory sold	30.4	3.7

A majority of the participants who sold machinery sold out completely. Among participants who continued to farm, 10 percent sold part of their machinery and 24 percent sold all, making a total of 34 percent selling machinery. Even more sales of machinery might have been expected among the participants who quit farming since they had little or no need for keeping their machinery. However, the average inventory value of their machinery was quite low at the time that they entered the program—indicating old, depreciated machines and, perhaps, an incomplete line of machinery. Apparently, the known fixed costs of keeping the unused machines were low relative to the possible costs of replacing them with more expensive machines should the participant begin again to farm the land.

There are two possible sources, not estimated in this study, of additional machinery sales arising as a direct result of the Conservation Reserve. First, as time passes, more of the participants who quit farming may sell machinery. Opportunities to make favorable sales may arise, and the possibility of beginning again to farm may become more remote. Second, some former tenant operators of land placed in the Conservation Reserve by a landlord may have sold machinery after they moved from the land.

In the study area as a whole (as estimated from the sample), sales of machinery by participants amounted to about $182,000. In 1959, there were 10,154 farms in south-central Iowa with an average machinery inventory of $4,708 (table 8). A total machinery investment of $47,805,032 is implied, and sales by Conservation Reserve participants amount to less than 0.5 percent of total machinery inventory. It is not likely that such a small amount of sales would noticeably affect the market for used machinery.

Buildings

As reported earlier, owners of farms with no buildings or with vacant buildings were more likely to enter the Conservation Reserve than were owners of farms with buildings that were in use. It was hypothesized that anticipation of fewer opportunities for useful employment of buildings on a Conservation Reserve farm was the reason for the low rate of participation by owners of farms having usable buildings. Additional vacating of buildings after participation further indicates that that factor was an important consideration. Table 21 shows that 6 percent of all participants had vacated the dwelling and that 5.2 percent had vacated farm buildings after they entered the Conservation Reserve. The rate of vacating was highest among nonoperating landlords and lowest among the participants who continued to farm with the participants who quit farming being intermediate. Additional buildings may be vacated as the contracts run their course.

Table 21. Proportion of farms in Conservation Reserve with buildings vacated since farm was placed in program, by participating class.

Participating class	Dwelling	Farm buildings
	(percentage)	(percentage)
Nonoperating landlords	13.2	10.5
Participating farmers who quit farming	5.9	4.4
Participating farmers who continued farming	——	2.1
All participants	6.0	5.2

Most contracts had 4 years remaining after the 1959 interviews.

FUTURE PLANS FOR CONSERVATION RESERVE LAND

A long-term shift of land from grain crops to permanent pasture was one of the goals of the Conservation Reserve. A possibility was that land seeded to forage crops while in the Conservation Reserve would not be plowed at the end of the contract. If this occurred, continued use of land for forage would both conserve soil and reduce the production of surplus grains.

The extent to which Conservation Reserve land will remain in forage crops is not yet known.[9] It appears that, in areas such as the Great Plains where net returns from forages and grains are comparable, the Conservation Reserve may facilitate adjustment to forage crops by defraying part of the costs of establishing a stand and providing a source of income during the establishment period.

In the south-central Iowa study area, however, it does not appear likely that much land will be shifted to permanent pasture as a result of the Conservation Reserve. In Iowa, net returns from corn are higher than net returns from forages on most of the land that is eligible for inclusion in the Conservation Reserve. Furthermore, establishing a stand of pasture usually is not difficult or expensive, and occasional plowing for a grain crop and then reseeding increases forage yields. Therefore, a well-established stand of forage crops on Conservation Reserve land is not a strong deterrent to returning the land to a cropping cycle when the contract expires.

Among sample participants, none indicated a definite intention of keeping all Conservation Reserve land in permanent pasture. Some steep land that had been cropped may be kept in permanent pasture after Conservation Reserve contracts expire. However, the general case will undoubtedly be to return land to crop production. Thirty-nine percent of the participants were intending to farm the land themselves, and another 16 percent were intending to rent it to other farmers. A sizable group of the participants—31 percent—indicated that they would renew their Conservation Reserve contract, if the opportunity was available, when the present contract expired. Since the time of the interviews however, authority for new or renewed contracts has expired, and, apparently, most participants who had hoped to renew contracts will have to make other plans.

[9] A study of that question is now being made by the Farm Economics Division of the Economic Research Service, USDA.

SUMMARY

The Conservation Reserve land-retirement program used the retirement of whole-farm units under long-term contracts to achieve the goals of production control, soil conservation and furtherance of adjustments in agriculture. Land was accepted into the Conservation Reserve during the period 1956 to 1960. Some contracts will continue in force until as late as 1970.

This study was designed to evaluate the achievements of the Conservation Reserve in south-central Iowa where about 5 percent of the farms had land in the program. The study was begun in 1959, immediately after the large increase in participation during that year. The analysis was divided into two parts: (1) determination of the characteristics of the participants and of the factors that were conducive to participation and (2) estimation of the effect of the program on participants and on the agriculture of the region. Interviews with a sample of 153 participants in the program and with 107 nonparticipants provided data for the analysis.

The survey results indicated that owners of farms with below-average yields were more likely to participate in the Conservation Reserve than were owners of farms with average or above-average yields. Heavy participation among owners of farms with relatively low yields is explained by the fact that the payment rate tends to be highest relative to net returns from farming on land of low productivity.

A resource structure that could easily be transferred from farm to nonfarm use also was commonly found among participants, especially among those who retired whole farms. Participants in that group had been using, on the average, only about half as much labor for crop production when they were farming as had nonparticipating farmers or participants who continued to farm some cropland. Furthermore, those who put all their land into the Conservation Reserve tended to be farmers with close alternative uses for their labor. Twenty-five percent of the participants (three times as many as among nonparticipants) already had full-time off-farm jobs before they entered the program; 54 percent (twice as many as nonparticipants) were 60 years of age or older and, thus, nearing retirement.

Participants who entered all their farmland in the program also typically had small investments in livestock, machinery and buildings. Fifty-three percent had less than $1,000 worth of machinery. Thirty-seven percent had no livestock. Nineteen percent had no occupied dwelling on the farm.

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Participants who continued to farm after entering the Conservation Reserve generally had opportunity to continue to use resources in their farming operation. Therefore, they were not as likely to consider re-employment ability of resources to be of particular concern. As a result, the participants who continued to crop some land tended to be drawn from the entire range of farmers in the study area. The only statistically significant difference between participants who continued to farm and nonparticipants was a slightly smaller machinery inventory among the participants.

Nonoperating landlords were in an unusually good position to benefit from the Conservation Reserve. Since they furnished few nonland resources, with the exception of farm buildings, the idling of cropland had little effect on the possibility of continued returns from other resources. The primary resource adjustments on farms put into the Conservation Reserve by nonoperating landlords had to be made by the tenants. However, a provision that was designed to prevent widespread eviction of tenants by landlords who wanted to put land into the Conservation Reserve apparently deterred participation by landlords.

The direct effect of the Conservation Reserve was an immediate reduction in the acreage of land cultivated. The change in acreage of individual crops that resulted was estimated from records of crops previously harvested by participating farmers. On 66,000 Conservation Reserve acres, the estimated reductions were: corn, 22,000 acres; soybeans, 10,000 acres; oats, 11,000 acres; forages, 23,000 acres. (The reduction in corn acreage includes allowance for 13,600 acres transferred directly from the Acreage Reserve to the Conservation Reserve.)

The actual decrease in land used for crops from 1954 to 1959 (as reported in the Census of Agriculture) is about 20 percent less than the acreage in the Conservation Reserve. An increase in the total acreage of cropland and Conservation Reserve land combined and a decrease in the acreage of idle cropland both served to partially compensate for the land taken out of production by the program. Among crops, the long-run shift out of oats production has made it possible for total soybean and hay acreages in the area to increase, even though harvested acreages of those crops were considerably reduced on Conservation Reserve farms.

Only part of the impact of the Conservation Reserve on livestock production could be estimated. Participating farmers reduced livestock production by an amount, requiring annually, about 397,000 feed units (grain and forage in units of feed-value equivalent to a bushel of corn). Feed production, on the other hand, was reduced by about 2,000,000 units, or five times as much. Some additional reduction in livestock production probably was made by former tenant operators of Conservation Reserve land and by nonparticipants.

Farm labor needs in the area were reduced by an estimated 350,000 hours or 175 man-years (at 2,000 hours per year) through the effect of retiring 66,000 acres of cropland in 820 Conservation Reserve contracts. Despite the large amounts of labor released by the Conservation Reserve, there was little switching from farm to nonfarm work by those who signed up in the Conservation Reserve. Participants who continued to farm apparently used released labor elsewhere on the farm, and participants who quit farming typically either retired or devoted full time to an off-farm job that they already held.

Most participants kept their machinery and continued to occupy farm buildings. Reported sales of machinery averaged about $300 per participant and only about 0.5 percent of the total value of machinery on farms in the study area. Only 5.2 percent of the participants reported buildings vacated since they put land into the Conservation Reserve.

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