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Profile of Farms Benefiting from the 1982 Farm Commodity Programs

Frederick J. Nelson

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By Frederick J. Nelson. Agriculture and Trade Analysis Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 89-32.

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ABSTRACT

Participants in the 1982 commodity support programs for wheat, feed grains, cotton, and rice (the program commodities) received only 38 percent of the benefits of these programs in 1982. Most of the program benefits went to nonparticipants, because all producers of program commodities shared in the $15.1-billion income increase arising from program-induced market price increases. The participants' benefit per farm was more than double that of nonparticipants, however. About 78 percent of benefits from the programs went to the 27 percent of all farms that were in the $40,000 to $499,999 sales class. This report, based mainly on 1982 Census of Agriculture data, looks at the 1982 and 1986 commodity programs, and the characteristics of program beneficiaries.

Keywords: Commodity programs, participation, farm characteristics, program benefits, payment distributions, sales classes, acreage reduction.

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HIGHLIGHTS

Participants in the 1982 commodity support programs for wheat, feed grains, cotton, and rice (the program commodities) received only 38 percent of the benefits of these programs in 1982. Most of the program benefits went to nonparticipants, because all producers of program commodities shared in the $15.1-billion income increase arising from program-induced market price increases. The participants' benefit per farm was more than double that of nonparticipants, however. About 78 percent of benefits from the programs went to the 27 percent of all farms that were in the $40,000 to $499,999 sales class. This report, based mainly on 1982 Census of Agriculture data, looks at the 1982 and 1986 commodity programs, and the characteristics of program beneficiaries.

Only 17 percent of the 1 million farms producing program commodities participated in the voluntary 1982 acreage reduction programs (ARP). These farms received 16 percent of total gross income in 1982 and reaped 38 percent of the estimated total net income benefits related to the acreage reduction, farm commodity loan, and deficiency payment programs. Farms had to participate in the ARP to be eligible for loans and direct payments.

Nonparticipating farms received a large share (62 percent) of the estimated income benefits of the commodity support programs in 1982, because they planted about two-thirds of the acreage of program crops that year, and because the direct payment benefits (received solely by participants) were small relative to the income benefits related to the program-induced market price increases (shared by all producers). Nonparticipating farms received an estimated 71 percent of the benefits of the price increases.

Total estimated net income benefits which the programs generated, based on production and expense data from the 1982 agricultural census, were $13.4 billion, a sum made up of $1.3 billion in deficiency payments, plus $15.1 billion attributable to program-related market price increases, offset by both the opportunity cost of $0.4 billion for participating in the ARP and the increased cost of $2.6 billion for feed inputs to the livestock sector. Opportunity cost is the income given up to comply with acreage reduction requirements.

Total benefits attributable to the programs were concentrated in the $40,000 to $499,999 sales class that included 27 percent of all farms and 78 percent of the benefits. Farms with sales of $500,000 or more, which received 8 percent of total net benefits, accounted for 1 percent of all farms. The $50,000 limit on direct payments one recipient may claim reduced total benefits by 1 percent. The limit reduced the benefits of participant farms in the $1 million-and-over sales class by an estimated 20 percent.

Nonfarm landlords may have received a major share of participants' program benefits directly or indirectly through cash and share rent, because one-half of the land participants operated was rented and nearly all rented farmland in 1982 was owned by nonoperators.

A profile of 1982 ARP participants showed them to be larger, more specialized in program crops than in livestock, and more reliant on rented land than were nonparticipants. Farms participating in the ARP were also more likely to depend on borrowed capital and to be operated by a full-time farmer with 10 or more years of experience on the same farm.

Most of the doubling in average program payments to participants between 1982 and 1986 was due to temporary loan rate reductions allowed by the 1985 Food Security Act. Participants with $1 million or more in sales in 1982 received additional payments averaging $47,000 in 1986 because of the loan rate cut.

GLOSSARY

Acreage reduction programs (ARP). An annual land idling program in which farmers voluntarily take cropland out of production. The Government usually announces an ARP when stocks are high. Although participation is voluntary, producers must participate if they wish to receive price and income supports. Producers must calculate whether they can increase net returns by qualifying for Government program benefits, or whether they can earn more by using all of their base acreage cropland and selling their production at prevailing market prices. Participating producers are sometimes offered the option of idling additional land under a paid diversion program.

Deficiency payment. Government payment made to farmers participating in feed grain, wheat, rice, or cotton programs. The per bushel, bale, pound, or hundredweight payment rate is based on the difference between a target price and the higher of either the market price or the loan rate.

Loan rate. The dollar amount per unit (bushel, bale, or pound) at which the Commodity Credit Corporation will provide loans to farmers.

Market price. The average per unit price farmers receive for their crop.

Paid diversion program. The paid diversion program gives producers a specific per acre payment for each idle acre. This payment is in addition to any deficiency payment.

Target price. A price level established by law for each year since 1974 for wheat, feed grains, rice, and cotton that is used to calculate deficiency payments and that is usually greater than the established loan rate.

Total costs. Costs incurred by farmers in the production of agricultural products. One measure of costs, in this report, is labeled total specified expenses which includes the amount farmers spent for livestock feed, seed, fertilizer and other chemicals, hired farm labor, contract labor, custom work and machine hire, energy, and interest expenses. Another measure, labeled total specified costs, includes specified expenses, less actual interest, plus the imputed cost of farm asset ownership (calculated as 10 percent of the value of real estate and machinery).

Total net benefits. Estimated net income increase attributable to the commodity programs in a given year. The year used in this report is 1982. The total equals estimated amount of 1982 deficiency payments participants received, less estimated net income participants gave up to comply with the 1982 ARP, plus income benefits to crop producers due to program-induced market price increases, less increased cost of livestock feed stemming from program-induced price increases.

Profile of Farms Benefiting from the 1982 Farm Commodity Programs

Frederick J. Nelson

INTRODUCTION

Direct payments to producers of key commodities, together with supported prices, form the basis for income assistance to farmers through agricultural commodity programs. Eligibility for benefits often hinges on participation in acreage reduction programs (ARP), which help support crop prices while reducing surplus stocks. ARP participants and nonparticipants alike have shared in the benefits of program-induced market price increases. This report aims to show who benefits most and what characteristics gainers share.

Using Census of Agriculture data, this report presents estimates of the number of farms, farm characteristics, and net income benefits of farms both participating and not participating in the 1982 commodity price support programs for wheat, feed grains, cotton, and rice. The report examines farms by sales class, identifying and describing program participants, program beneficiaries, and the amount of benefits. It also sheds light on why some farms participate in commodity programs while others do not. Such an information base is helpful in studying the effectiveness of commodity programs and the consequences of possible program changes. This study updates and extends earlier work summarized by Johnson and Short (4,5).1/

Background

Since participation in acreage reduction programs is voluntary, the number of participants vary from year to year according to anticipated supply and demand and economic incentives of program provisions. Only 17 percent of all farms producing program commodities participated in the 1982 ARP. These farms planted nearly 33 percent of the program acreage, however, and they received 38 percent of the programs' net income benefits. The nonparticipants, who outnumbered participants, received the majority of the program benefits in 1982 because benefits that year were almost entirely due to the program-induced market price increases--benefits shared by all producers of program crops. Had the programs not been in place, 1982 average prices for the program crops would have been 40 percent lower.

The comparisons of characteristics of participants and nonparticipants in this report are influenced, in general, by the relatively low rate of participation in the programs in 1982, since the makeup of such groups varies over time with variations in the rate of participation. The 1982 cross section of the farm sector thus provides a unique and valuable view of the profiles of the two groups at a point in time, one that can be contrasted with results from other

1/ Underscored numbers in parentheses refer to References listed at the end of the report.

years, such as those from the 1987 census when the rate of participation was relatively high. The 1987 census data were not available when this report was written.

1982 Economic Environment

Key aspects of the economic environment of 1982 that influenced the report's findings were the increases in price support levels, implementation of a relatively small ARP, and a weakening demand for U.S. agricultural products. These forces combined to cause higher end-of-year stocks and lower market prices for wheat and rice than a year earlier. Average 1982 prices of program crops were generally low, in relation to price-support levels.

The acreage reduction program of 1982 required a 15-percent reduction in acreage of wheat, cotton, and rice and a 10-percent reduction in acreage of feed grains. Farms that did not comply were ineligible for price support loans, Government payments, or the Farmer-Owned Reserve (FOR) program. The requirements meant that, in the case of a 15-percent reduction, no more than 85 percent of a farm's assigned base acreage for a specific crop could be harvested, and that the amount of acres to be idled had to be equivalent to 17.6 percent of planted acreage of the crop.2/

Farm Characteristics and Program Benefits

Farm size and other key characteristics reported in this study help profile program participants and suggest which factors influence participation in commodity programs. These results also help us understand factors influencing the overall distribution of program benefits. Compared with nonparticipants, participants tended to be larger by any measure of size (such as assets, production, or acres), and to be more involved in producing commodities covered by the program--wheat, feed grains, cotton, and rice. Participants also tended to be less involved in raising livestock, to work at off-farm jobs less often, to rent more land, and to have a higher amount of interest expenses relative to sales. Thus, we may hypothesize that farms most likely to participate are large, specialized cash grain or cotton farms in which the operator is primarily involved in farming, has some debt, and rents some farmland.

Net program benefits in 1982 amounted to $13,354 million. Of that amount, program participants received $5,005 million, while nonparticipants received $8,349 million. The benefits, as defined in this report, included $1,263 million in deficiency payments to participants and $15,058 million worth of income resulting from program-induced market prices, less $405 million in income forgone by participants due to compliance with acreage reduction requirements. Total benefits were also offset by an estimated $2,563 million for increased livestock feed costs brought about by program-induced price increases.

An important implication of using price enhancement to support farm incomes is that program benefits tend to be distributed to specific farms in proportion to their production of program commodities. This method of support does not necessarily mean benefits are targeted to farms on the basis of need defined

2/ Fifteen percent divided by 85 percent equals 0.176.

in terms of the unique financial considerations of individual farmers. The more numerous nonparticipant farms received most of the 1982 benefits, but the average benefit of the larger sized participating farms was larger: $27,163 compared with $4,063.

Allocating program benefits in proportion to production results in an unequal distribution among producers, with large farms receiving the largest absolute benefits and the smallest farms receiving the smallest absolute benefits. Concern about the appropriateness of this distribution and the total cost of the program led Congress in 1970 to impose limitations on the total amount of payments an individual can receive in 1 year. The annual payment limit was $50,000 per person from 1981 to 1986.

Payment limitations in place in 1982 reduced the share of Government payments to the largest 9 percent of recipient farms (those with $250,000 or more in sales) from 42 percent to 36 percent. The payment cap had a negligible effect on the distribution of total 1982 program benefits among sales classes, however, because there was no limit on increases arising from program-related market price hikes. Furthermore, Government payments subject to limitations represented only 9 percent of all benefits in 1982.

This report provides information on the estimated effects of the payment limitation in 1986, as well as in 1982, for farms in several sales classes. The 1986 results are estimated effects derived from 1982 census data and 1986 program information. This information is detailed in the last section of the report and in Appendix D.

The 1982 data in this report provide unique information about census farms, but they do not necessarily match exactly with official program statistics. This mismatch occurs because of differences in data collection methods. Census data is obtained by farmers' responses to census questionnaires, while official data come from program administration records. The two data sources also use different definitions. This report explains the extent of some of the resulting statistical differences and the implications for interpreting and using the census data.

Data Sources

Research results are based on special tabulations from a sample of farms surveyed in the 1982 Census of Agriculture. Sample farms, which produced wheat, feed grains, and cotton, were each grouped according to whether or not they participated in the 1982 acreage reduction program. Farms were required to participate in the ARP to be eligible for price support loans, Government deficiency payments, and FOR program.

Because it is based mainly on census data, this report provides a unique source of information about participant and nonparticipant farms, such as total farm sales, value of assets, and operator occupation. Such data are not available from the Agricultural Stabilization and Conservation Service (ASCS), the U.S. Department of Agriculture (USDA) agency that operates farm support programs.

Characteristics tabulated from census data include number of farms producing specific commodities; number of farms by various groupings for tenure, sales class, type of farm, and form of business; and operator's age, occupation, race, sex, and number of days worked off the farm. Other characteristics

tabulated from census data were the acreage, production, and sale of specific commodities; value of real estate and machinery; interest and other farm expenses; acreage of land in farms; and acreage rented.

Based on these tabulated data, I derived estimates for potential deficiency payments, number of farms by size of potential deficiency payment, net receipts, debt/asset ratios, imputed returns to operating assets, farm production costs, and the value of net income benefits from the commodity programs.

Since the census did not provide information on Government payments, I imputed "potential deficiency payments" to each farm in the census sample based on the quantity of production of crops covered by commodity programs and the national deficiency payment rate per unit of production. These figures are the estimated payments received for the 1982/83 crop year. Totals thus differ conceptually from the calendar year Government payments published by USDA's Economic Research Service (ERS) (15).3/

Debt was computed from census data on interest expenses. Value of assets was derived from the value of real estate and machinery and number of livestock on farms. Potential deficiency payments, value of assets, and census data on cash receipts and specified expenses were used to compute returns to assets, net receipts, and total costs.

Net income benefits of the programs were derived from reported acreage, production, and feed expenses, along with the imputed potential deficiency payments. They correspond to 1982/83 crop year and differ conceptually from ERS's published calendar year net farm income estimates.

Census Sample

The special tabulations on which this report is based came from the Bureau of the Census. The bureau developed the tabulations from a sample of 500,000 farm-operator respondents to the 1982 agricultural census. To form the sample, the census surveyed all large and specialized farms, all farms in Alaska and Hawaii, and about 17 percent of all other farms except abnormal farms.4/

The sample, which was about one-fifth of all farms in 1982, provided a basis for estimating population totals of farm characteristics published by the Bureau of the Census (21). For example, total acreage of program crops harvested, as estimated from the sample, was 99.6 percent of the original census-published acreage. Total harvested acres estimated from the sample equal 93 percent of the total computed from USDA's National Agricultural Statistics Service data.

METHODOLOGY

Differences in assumptions, definitions, and collection methods between the census and USDA data bases mean that estimates of some totals and averages

3/ Crop marketing years are September 1-August 31 for corn and grain sorghum; June 1-May 31 for barley, oats, and wheat; and August 1-July 31 for rice and cotton.

4/ Abnormal farms include institutional farms, experimental and research farms, and Indian reservations.

will also differ. The major differences in methods and the statistical results they yield are examined to provide the reader with the necessary background to use and interpret the census-based data. I examine implications for acreages, the number and distribution of farms, and the amount of payments.

This study reports actual census data, unadjusted for discrepancies that may have existed between USDA and census statistics. Calculations of direct payments, however, were adjusted to conform to prior estimates of total payments saved because of payment limitations. Where large differences existed between census-based totals and USDA totals, adjustments might have been made to force consistency of characteristics through assumed "control totals." Such adjustments could not have been made very easily or accurately, so I did not make them.

Overall Comparisons

Nineteen eighty-two was a year of relatively low participation in the commodity programs. Farms that participated in the 1982 ARP had only 32 percent of total acreage planted to program crops, according to ASCS data. Participant farms idled 11.1 million acres, planted 71.7 million acres, and received deficiency payments of $1,681 million, or $23 per acre planted. The number of farms that received deficiency payments was 471,511, according to ASCS records, much larger than the number of participating farms based on the Census of Agriculture--184,252.

There are major differences between census-based and ASCS-based estimates of several program statistics. Although the census count of "participants" was 61 percent less than that of ASCS, the census-based estimate of total acreage that participants planted was only 17 percent below the ASCS total. Census-based estimates of idled acreage and potential deficiency payments were, however, 25 percent below those of ASCS. Major reasons for the larger differences in total payments compared with total acreage were the relatively high per-acre cotton and rice payments in 1982 combined with large disparities between Census Bureau and ASCS estimates of participant acreage planted to cotton and rice. The large difference in idled acreage totals is also due to disparities in cotton and rice acreage totals among participants. Discrepancies in number of participants counted by the Census Bureau and ASCS are due partly to conceptual differences in defining number of participants.

One implication of the large discrepancies is that overall averages for participants compared with nonparticipants may be distorted; however, the distribution of benefits among these two groups was little affected. Data targeted to wheat, feed grain, and cotton producers are presented as well as overall averages for all commodity producers participating and not participating in the ARP.

Acreage

Census totals of both acres harvested and acres participating in the 1982 ARP are smaller than corresponding ASCS totals. The overall rate of participation of acreage, however, is about the same: 31 percent based on census data and 32 percent based on ASCS data. The participation rates for wheat and corn acreage are about the same, but census-based rates for cotton and rice acreage are much lower than ASCS rates (table 1).

Although the acreage differences resulted in large differences in amount of total deficiency payments, they caused little change in the estimate of the

Table 1--Rate of participation of acreage in the 1982 ARP

Commodity	Census 1/	ASCS 2/	Census as share of ASCS
		Percent	
Wheat	36	37	99
Corn	22	23	95
Sorghum	41	36	113
Barley	40	33	122
Oats	21	7	297
Rice	46	72	64
Cotton	53	78	67
Total	31	32	97

1/ This measure is acreage harvested on participating farms as a percentage of total acres harvested, from the 1982 Census of Agriculture.

2/ This measure is acreage planted for harvest on farms that complied with the 1982 ARP, as reported by ASCS (12,16), divided by total acres planted as reported by the Statistical Reporting Service, USDA (19).

overall distribution of total program benefits among participants and nonparticipants. The reason is that larger benefits caused by program-induced price increases were concentrated in wheat and corn farms. The program participants' share of total benefits was estimated at 38 percent for census-based data and 40 percent for ASCS-based data.

Number of Payment Recipients

Different approaches to counting the number of program payment recipients can cause a mismatch of totals. There were, for example, 61 percent fewer farms and 68 percent fewer payment recipients counted by the census than tabulated by ASCS. The actual total number of individuals receiving deficiency payments in 1982 was 580,606, according to ASCS records. The corresponding number of "farms" these persons operated, however, was 471,511. These two numbers can differ because of ASCS concepts used to implement the deficiency payment program. More than one person or "producer" can receive payments for a single farm because of rental arrangements and partnerships, for example. And, with multifarm ownership, it is possible for an individual to operate more than one ASCS farm.

Comparisons of farms based on ASCS payments records with those based on census counts are difficult to make mainly because the basic units of observation are different. The census, for instance, defines a farm as an operating unit (including all land whether owned or rented) on which agricultural operations were conducted under the day-to-day control of an individual manager or operator which generated $1,000 or more in sales of agricultural products (21). ASCS, on the other hand, may count rented tracts as separate farms, especially when the landlord shares in the payments. Overall, the number of

census farms may differ from the ASCS number of persons receiving payments because of census net undercounting (which was 9 percent in the 1982 census (20)), because of rented land being counted as a separate farm, and because of other financial arrangements such as partnerships resulting in more than one recipient per farm (6).

Because of the different approaches used in counting program payment recipients, the average amount of payments per census farm could exceed $50,000 in actuality, while persons associated with a census farm under ASCS's program rules each had less than $50,000 in payments. There were 3,836 participating farms in the census which had imputed potential deficiency payments of $50,000 or more in 1982, for example, even though the maximum amount one person could receive under payment limitations was $50,000. This count is 11 percent greater than the potential number of recipients receiving $50,000 or more in payments, based on a study by the U.S. Senate Committee on the Budget (23). Not all of these census farms with $50,000 or more in imputed payments can be assumed to have been actually affected by payment limitations, because there may have been more than one ASCS "person" per census farm in the $50,000-and-over imputed payment class.5/

Total Payments

The census-based estimate of deficiency payments--$1,399 million before adjustments--was computed by multiplying the production of all program commodities raised on participating farms by the national deficiency payment rate per unit of production. The census-based estimate thus depends on total acreage of cropland harvested and actual yields per acre harvested. On the other hand, the ASCS calculation of gross payment is based on total planted acreage and official program yields per acre established for each farm.

Census tabulations are premised on the assumption that all program crop acreage on a farm participated in the ARP if any one program crop participated. Because of this underlying assumption (called the cross-compliance assumption), this report's estimates of amounts of participant acres and payments for some farms may have been overstated by as much as 3.6 percent in the aggregate. Total deficiency payments using the census tabulations, however, were understated in relation to ASCS totals.

Sales Class Distributions

Census-based distributions of the number of farms, value of farm sales, and Government payments according to sales class nearly match those published by ERS in Economic Indicators of the Farm Sector: National Financial Summary (15), although there are some differences between certain census-based totals and USDA totals. This similarity is due partly to the fact that ERS bases its distributions on census distributions of farms and sales. The 1982 census did not report payments.

PARTICIPATION RATES

The 1982 Census of Agriculture reported that 184,252 census farms participated in the 1982 ARP, amounting to 8.2 percent of all farms. Nonparticipant farms numbered 2,055,188. But only 876,705 of these reported growing wheat, feed

5/ For further explanation, see (6).

grains, cotton, or rice, commodities covered by the 1982 ARP. Out of 1,060,957 farms producing program commodities, 17.4 percent participated in the ARP while 82.6 percent did not (table 2). The census determined the number of participating farms by identifying farms which reported any acres "diverted (or set-aside) under Federal commodity acreage reduction programs in 1982" (21). Among any particular farm group, the proportion of farms that participate are referred to in this report as the "rate of participation for farms." The proportion of acres, or other characteristics, on a participating farm for any group of farms is the "rate of participation for acres," or for other characteristic.6/

Farms Grouped According to Commodities Produced

Of all farms participating in the 1982 ARP, 57 percent produced wheat, 56 percent produced cattle and calves, and 51 percent produced corn. These commodities were the most popular commodities among reporting farms. Among nonparticipants, cattle and calves, corn, and soybeans were the most popular commodities (see table 2). Among farms producing specific commodities ranked by the rate of participation for farms, the top three commodities were sunflower seeds (53 percent), cotton (49 percent), and rice (43 percent).

The ranking for sunflower seed, a commodity not covered by the ARP, reflects the fact that cultivation of this commodity is highly concentrated on wheat farms in North Dakota, where the rate of participation for wheat is among the highest in the Nation.

Although more than half of all participants were cattle producers, only a small share (8 percent) of all cattle producers operated a farm that participated in ARP. A low participation rate is typical for livestock and livestock products producers.

Farms Grouped by Primary Enterprise

Sixty percent of all participant farms were classified as specialized cash grain farms based on the Standard Industrial Classification (SIC) procedure. And 27 percent were classified as livestock farms (table 3). Under the SIC, farms are grouped according to their primary source of gross sales. A cash grain farm, for example, is one that derives at least 50 percent of gross sales from wheat, feed grains, rice, soybeans, or other grains (21).

Nearly three-fifths of all nonparticipant farms were classified as livestock farms. Twenty-three percent were cash grain farms. After cash grain farms, the most numerous type of nonparticipating crop farms were, in order of importance, tobacco farms, other field crop farms (primary sales from sugar crops, potatoes, hay, peanuts, and other field crops), fruit and nut farms, general crop farms, vegetable farms, horticultural specialty farms, and cotton farms.

6/ Participation by farms producing specific commodities does not imply that the acreage or production of the specific commodity was reduced in 1982, only that the acreage of some program commodity was reduced on the farm. In estimating potential payments, however, I assumed that all program crops on a participating farm were part of the 1982 program because there was no way to determine which crops participated.

Table 2--Farms producing specified commodities 1/

Item	Participant	Nonparticipant	Participant	Nonparticipant
	---- Number ----		---- Percent ----	
Farms producing:				
Specified program commodities of--				
Wheat	103,597	342,122	23.2	76.8
Feed grains	141,590	751,801	15.8	84.2
Cotton	18,696	19,383	49.1	50.9
Rice	4,841	6,326	43.4	56.6
Any program commodity	184,252	876,705	17.4	82.6
No program commodities	0	1,178,483	0	100.0
All farms	184,252	2,055,188	8.2	91.8
Farms producing agricultural commodities ranked by rate of participation 1/:				
Sunflower seeds	10,006	8,723	53.4	46.6
Cotton	18,096	19,383	49.1	50.9
Rice	4,841	6,326	43.4	56.6
Sorghum	30,760	63,048	32.8	67.2
Barley	22,604	56,522	28.6	71.4
Wheat	103,597	342,122	23.2	76.8
Soybeans	82,185	427,507	16.1	83.9
Oats	43,120	273,101	13.6	86.4
Corn	93,859	619,801	13.2	86.8
Hogs and pigs	35,478	291,336	10.9	89.1
Sheep (wool)	8,457	76,459	10.0	90.0
Cattle and calves	102,522	1,250,147	7.6	92.4
Dairy (cows)	16,841	259,715	6.1	93.9
Chicken	11,494	202,547	5.4	94.6
Turkeys	574	13,485	4.1	95.9

1/ Calculations cover farms both participating and not participating in the 1982 acreage reduction programs. "Participation" means that farms producing the commodity specified participated in one or more of the acreage reduction programs for wheat, feed grains, cotton, or rice in 1982.

Farms classified under SIC which had the highest percentage rate of participation in the 1982 ARP were cotton farms (51 percent), cash grain farms (19 percent), and general crop farms (11 percent).. All other SIC farm groups had a lower participation rate than the average rate of 8 percent for all farms. Those least involved with the program included farms specializing in horticulture, fruits and nuts, animal specialties, poultry, and tobacco. For all crop farms, the participation rate was 13 percent, compared with a 4.1 percent participation rate for all livestock farms.

Farm groups with the lowest participation rates are usually those having relatively few farms that produce program crops (table 3). These farm groups are identified in table 3 as those showing a large increase in the participation rate when the rate is recomputed only for farms raising some program commodities. For example, the participation rate for fruit and nut farms was 0.4 percent of all farms in this SIC group, but it was 9 percent of such farms raising program commodities. Only 3 percent of nonparticipant fruit and nut farms produced any program crops. The participation rate for cash grain farms, however, changed little as a result of the recomputation, because 88 percent of the nonparticipant cash grain farms produced some program commodity.

Farms Grouped by Type of Organization, Tenure, and Demographic Characteristics

Participating farms are more likely than nonparticipating ones to include some rented farmland, are slightly more likely to be organized as a family corporation or partnership, and are more likely to be operated by a full-time, experienced, young, white male (table 4).

Form of Farm Organization and Ownership

Individual- and family-operated noncorporate farms were the most prevalent forms of organization for both participants and nonparticipants. A larger share of participants than nonparticipants (17 percent versus 12 percent) were organized as partnerships or family corporations. Nonfamily corporations and other farms accounted for less than 1 percent of total participants and of total nonparticipants, but they received 8 percent of all farm sales of nonparticipants and 2 percent of all farm sales of participants.

Family-held corporations had a much higher participation rate in the 1982 ARP than other organization types. The participation rate for all family-held corporations was 16 percent. When recomputed for those that produced any program commodities, the rate was 29 percent.

More than half of all nonparticipants, or 62 percent, reported being full owners of their farmland, compared with slightly over a fourth, or 27 percent, of participants. Fifty-six percent of participants were part owners who rented some land and owned the rest, compared with only 27 percent of nonparticipants who had part ownership. Full owners had the lowest participation rate. Part owners had the highest participation rate.

Characteristics of the Farm Operator

Of all participants, 84 percent had a principal occupation of farming. Of nonparticipants, 53 percent had a principal occupation of farming. Farmers

Table 3--1982 acreage reduction programs: Farms grouped by Standard Industrial Classifications (SIC's)

SIC groups	Participant	Nonparticipant	Farms participating as a share of--	
			All farms in the SIC group	Farms producing program commodities
	---- Number ----		---- Percent ----	
All farms	184,252	2,055,188	8.2	17.4
Standard Industrial Classification:				
Cash grain	111,302	464,853	19.3	21.3
Cotton	10,571	10,213	50.9	50.9
Tobacco	1,974	132,003	1.5	4.1
Other field crop	3,478	97,124	3.5	11.0
Vegetables	670	29,733	2.2	8.4
Fruit and nut	346	84,764	.4	9.0
Horticultural specialties	51	28,845	.2	5.0
General crop	6,102	52,093	10.5	18.5
All crop farms	134,494	899,628	13.0	20.4
Dairy	8,608	154,798	5.3	7.5
Poultry	545	39,555	1.4	6.4
Animal specialties	287	65,177	.4	6.3
Beef and other specialized livestock	38,011	868,663	4.2	13.9
General livestock	2,307	27,367	7.8	16.3
All livestock	49,758	1,155,560	4.1	12.0

whose main occupation was farming had a 13-percent rate of participation, compared with a 3-percent rate for those with nonfarm occupations.

All but 1 percent of the participant operators and 3 percent of the nonparticipant operators were classified as belonging to the white race. The rates of participation for nonwhite races and for those of Spanish origin were less than half that of white operators.

Nearly two-thirds of participant operators, or 64 percent, had 10 years or more of work experience on the farm they operated in 1982, compared with about a half, or 48 percent, in the case of nonparticipant operators. The more experienced operators had the highest rate of participation in the 1982 ARP.

The average age of participants was 48 years and of nonparticipants was 51 years. The participation rate was lowest among the oldest farmers and highest among the youngest farmers.

Table 4--Farms in specified groups which participated or opted out of the 1982 ARP

Specified group	Participant	Nonparticipant	Farms participating as a share of--	
			All farms in the specified group	Farms producing program commodities
	----- Number -----		----- Percent -----	
All farms	184,252	2,055,188	8.2	17.4
Type of organization:				
Individual or family	152,080	1,796,541	7.8	16.9
Partnerships	22,814	198,357	10.3	17.9
Family-held corporation	8,396	43,980	16.0	29.4
Other corporation	417	6,377	6.1	18.4
Other farms	545	9,933	5.2	11.5
Tenure:				
Full owner	49,231	1,268,828	3.7	10.6
Part owner	102,365	555,848	15.6	23.0
Tenant	32,656	230,512	12.4	19.9
Principal occupation:				
Farming	154,736	1,086,142	12.5	20.2
Other	29,516	969,046	3.0	9.8
Race or ethnic origin:				
White	182,463	2,002,647	8.4	NA
Other	1,789	52,541	3.3	NA
Spanish origin	634	15,644	3.9	NA
Sex:				
Male	180,626	1,939,070	8.5	NA
Female	3,626	116,118	3.0	NA
Years on present farm:				
2 years or less	7,608	121,882	5.9	NA
3 or 4 years	12,022	182,730	6.2	NA
5 to 9 years	28,784	336,628	7.9	NA
10 years or more	118,672	992,104	10.7	NA
Operator age:				
Under 25 years	6,181	53,815	10.3	NA
25 to 34 years	30,782	262,126	10.5	NA
35 to 44 years	36,748	405,054	8.3	NA
45 to 54 years	43,839	462,122	8.7	NA
55 to 64 years	46,132	489,358	8.6	NA
65 years or more	20,520	382,713	5.1	NA
Average age	48	51	--	--

NA = Not available.
-- = Not applicable.

Farms Grouped by Sales Class

Participant farms were twice as large as nonparticipant farms in terms of 1982 gross farm sales. In general, the participation rate of farms tends to be higher in the higher sales classes and lower in the lower classes. Farms with the largest sales, however, were not top participants. The rate for all farms, for example, increased from 0.8 percent in the smallest sales class up to a top rate of 20.6 percent in the third largest class (tables 5 and 6).

Participating farms were more concentrated in $20,000-and-over sales classes than nonparticipating farms. The top six sales classes contained 80 percent of all participants, compared with only 36 percent of all nonparticipants. Of all nonparticipants that produced program commodities, only 60 percent ranked in the top six sales classes.

Farms in the below-$20,000 sales classes contained 20 percent of participants, 64 percent of nonparticipants, and 41 percent of nonparticipants that grew program crops.

Producers of program crops, whether or not they were participants, tended to cluster in the midrange sales classes. The largest proportion of participant farms in one class was 31 percent for farms with sales of $40,000-$99,999. Over half of all participants were in the two classes ranging from $40,000-$249,999 in sales. The $40,000-$99,999 sales class also had the largest proportion of nonparticipants producing program crops, but their share amounted to only 24 percent.

The distribution, by sales classes, of nonparticipants that did not produce program commodities differed quite radically from that of farms producing program commodities. The largest proportion of nonparticipant farms (26 percent) was in the under-$2,500 sales class.

The participation rate of farms tended to increase with the gross value of sales in 1982, although the largest farms in terms of sales did not have the highest rate of participation. The participation rate for all farms as a percentage of total farms in each class, for example, increased from a low of 0.8 percent for farms in the less than $2,500 sales class and peaked at 20.6 percent in the $250,000-$499,999 sales class. Similarly, the participation rate for farms that produced program crops increased to a maximum rate of 28.3 percent for farms with $500,000-$999,999 in sales, and then dropped slightly to a rate of 25 percent for farms with $1 million or more in sales (see table 6).

In general, the same relationship between the rate of participation of farms and sales classes held for specific commodities. However, the maximum rates could occur in different sales classes (table 7).

FARM CHARACTERISTICS

Measured against farms not participating in the 1982 acreage reduction programs, participating farms tended to be larger, more specialized in producing program commodities, less specialized in livestock production, and more dependent on borrowed capital and rented land. Operators of

Table 5--Comparison of farms not participating in the 1982 ARP with all U.S. farms, by value of sales class

Farm sales class	All farms		Nonparticipants producing--					
			Any product		Program crops		No program crops	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
$1 million and over	9,190	0.4	8,085	0.4	3,322	0.4	4,763	0.4
$500,000-$999,999	18,610	.8	15,147	.7	8,778	1.0	6,369	.5
$250,000-$499,999	57,431	2.6	45,607	2.2	31,202	3.6	14,405	1.2
$100,000-$249,999	211,305	9.4	169,716	8.3	129,955	14.8	39,761	3.4
$40,000-$99,999	336,156	15.0	278,410	13.5	206,836	23.6	71,574	6.1
$20,000-$39,999	249,648	11.1	218,790	10.6	142,199	16.2	76,591	6.5
$10,000-$19,999	260,302	11.6	241,416	11.7	121,829	13.9	119,587	10.1
$5,000-$9,999	281,115	12.6	271,093	13.2	95,182	10.9	175,911	14.9
$2,500-$4,999	280,181	12.5	275,559	13.4	64,162	7.3	211,397	17.9
Less than $2,500	535,502	23.9	531,365	25.9	73,240	8.4	458,125	38.9
All farms	2,239,440	100.0	2,055,188	100.0	876,705	100.0	1,178,483	100.0

Table 6--Farms participating in the 1982 ARP, by value of sales class

Farm sales class	All farms participating	Farms participating as a share of--	
		All farms	Farms producing program commodities
	Number	Percent	
$1 million and over	1,105	0.6	12.0	25.0
$500,000-$999,999	3,463	1.9	18.6	28.3
$250,000-$499,999	11,824	6.4	20.6	27.5
$100,000-$249,999	41,589	22.6	19.7	24.2
$40,000-$99,999	57,746	31.3	17.2	21.8
$20,000-$39,999	30,858	16.7	12.4	17.8
$10,000-$19,999	18,886	10.3	7.3	13.4
$5,000-$9,999	10,022	5.4	3.6	9.5
$2,500-$4,999	4,622	2.5	1.6	6.7
Less than $2,500	4,137	2.2	.8	.6
All farms	184,252	100.0	8.2	17.4

participating farms worked off the farm less often than did nonparticipants. Small participating farms received a larger share of their income from deficiency payments than did large farms, although average payments per farm were much larger for large farms.

Participants in the programs are generally those farms with the most to gain from participation: farmers whose production of program crops is large in absolute terms, who are financially extended, whose main occupation is farming, and who specialize in raising program crops.

Table 7--Participation rates for selected commodities, by value of sales class 1/

Item	Wheat	Corn	Sorghum	Barley	Oats	Cotton	Rice
				Percent			
Farms producing each commodity, by sales class							
$1 million and over	28.8	23.3	34.6	25.2	25.5	38.7	48.4
$500,000-$999,999	31.6	25.7	38.9	26.4	24.4	49.4	50.0
$250,000-$499,999	31.2	24.7	39.7	30.7	25.7	47.8	49.9
$100,000-$249,999	29.9	20.9	40.4	33.2	21.2	50.9	45.4
$40,000-$99,999	28.3	16.9	38.5	34.1	18.2	55.3	44.3
$20,000-$39,999	23.3	12.2	32.8	29.6	15.8	54.9	34.4
$10,000-$19,999	17.3	8.3	24.7	22.4	11.5	46.8	35.2
$5,000-$9,999	12.7	5.5	18.8	16.3	8.3	36.4	18.4
$2,500-$4,999	10.0	3.5	9.8	7.9	4.8	33.4	5.3
Less than $2,500	6.3	1.9	8.4	5.4	2.9	20.9	0
All farms	23.2	13.2	32.8	28.6	15.4	49.1	43.4
Acres harvested, by sales class:							
$1 million and over	33.9	28.9	46.7	31.4	26.1	39.0	48.6
$500,000-$999,999	38.1	32.1	40.7	31.8	24.5	52.3	49.0
$250,000-$499,999	40.3	29.3	43.1	41.6	26.1	49.9	48.1
$100,000-$249,999	39.6	24.9	42.8	42.5	25.2	54.5	44.2
$40,000-$99,999	37.4	20.5	43.8	44.0	22.5	60.4	43.6
$20,000-$39,999	32.6	14.2	37.3	38.5	17.7	62.1	33.8
$10,000-$19,999	25.2	9.7	30.0	27.7	13.9	51.9	27.3
$5,000-$9,999	19.1	7.0	19.5	20.3	9.7	50.3	18.6
$2,500-$4,999	13.9	4.1	12.3	9.1	5.1	43.2	7.9
Less than $2,500	10.7	2.3	13.6	7.5	4.0	26.0	0
All farms	36.4	22.8	41.1	40.0	20.8	52.8	46.0
Amount of production, by sales class:							
$1 million and over	33.0	29.7	46.8	30.7	27.2	37.4	47.2
$500,000-$999,999	37.6	33.1	41.9	31.2	25.4	53.3	48.9
$250,000-$499,999	40.0	29.8	44.3	40.6	26.6	50.3	48.6
$100,000-$249,999	38.8	25.3	42.9	41.2	24.4	52.3	45.1
$40,000-$99,999	36.6	20.6	43.8	42.2	22.2	57.7	43.8
$20,000-$39,999	30.0	13.6	35.1	34.2	16.4	56.6	33.4
$10,000-$19,999	22.6	8.9	26.5	23.4	12.3	47.0	31.2
$5,000-$9,999	15.5	6.0	17.6	15.9	9.0	41.8	18.0
$2,500-$4,999	12.1	3.5	8.7	8.0	4.5	33.6	10.5
Less than $2,500	8.4	2.0	9.8	6.3	3.6	23.1	0
All farms	35.9	23.7	41.5	38.4	20.6	48.8	46.5

1/ For farms producing, the participation rate is the share of all farms producing that participated in any 1982 acreage reduction program. For other variables, the participation rate is the share of the total for all farms that was reported on a participating farm.

The program's potential benefits are greater for farms that grow large amounts of program crops because of the program's design. Unit payments and price support loans, for example, are the same for all farms, subject to payment limitations on the largest farms. Thus, the larger farms receive the larger amounts of benefits.

Highly indebted farmers who specialize in program crops and who have little off-farm income stand to gain more from the program's price and income stabilization features than do farmers with diversified or debt-free operations. Their net income from all sources is more sensitive to sudden drops in prices of program crops than to drops in other prices. Renters are also more vulnerable to price decreases than are full owners. The program reduces the risk of large down swings in net income and severe cash flow difficulties (3).

Landlords received roughly half of participant program benefits in 1982. This estimate is based on an examination of the proportion of farmland acres rented in that year.

Size of Farms

Farms participating in the 1982 ARP generally tended to be larger than nonparticipating ones regardless of the measure of farm size used: acres, sales, imputed potential deficiency payments, or value of assets (table 8). The comparison does not hold, however, for average sales of some specific commodities or for cotton-producing farms. For all producers combined, the participant size measure as a percentage of the nonparticipant size was 235 percent for acres of land in farms, 206 percent for value of farm products sold, 633 percent for imputed amount of potential deficiency payments, and 225 percent for the estimated value of assets.

Alternative Size Measures

Regardless of which measure of farm size is used, participant farms are larger than nonparticipant farms.

Average Sales Value. How do the two groups compare in terms of average sales? The overall average value of sales for all participants was $110,700, twice that for all nonparticipants ($53,700). The participant advantage, however, was much smaller for specific commodities. Nonparticipants outranked participants in average per-farm sales of cotton, sheep, dairy, poultry, and other livestock. The average cotton sales for farms that actually sold cotton was $82,300 for participants, only slightly less than the $86,500 for nonparticipants. Participants' commodity sales of wheat, corn, barley, cattle and calves, and hogs and pigs outranked those of nonparticipants by 50 percent or more (table 9).

The overall sales average for all farm products sold is a good general indicator of the absolute size of the typical farm business in a group of farms. Another useful size indicator is the "average per farm reporting," which is the total amount of sales of a commodity by farms in a group (participants or nonparticipants, for example) divided by the number of farms that actually had any sales. The average per farm reporting program crops sold, for example, provides a good way to examine the potential or actual

Table 8--Alternative measures of average size of farm for participants and nonparticipants in the 1982 acreage reduction programs

Producers of specified commodity	Per-farm measures of size			
	Land in farms	Value of sales	Imputed payments 1/	Value of assets 2/
	Acres		1,000 dollars	
All producers:				
Participant	882	110.7	7.6	823.3
Nonparticipant	375	53.7	1.2	366.5
Wheat producers:				
Participant	1,127	113.5	8.6	865.6
Nonparticipant	655	85.5	4.3	631.7
Feed grain producers:				
Participant	864	116.2	6.3	849.3
Nonparticipant	415	73.2	2.3	501.9
Cotton producers:				
Participant	1,033	165.6	23.6	1,069.1
Nonparticipant	928	201.6	24.0	1,186.9

1/ National deficiency payment rate per unit times actual production reported in the census.

2/ Includes the reported value of land and buildings, the value of machinery and equipment, and the imputed value of reported livestock inventory on the farm as of December 31, 1982.

average amount of commodity program benefits that may be received.7/ For example, since the typical wheat producer who is not participating in the ARP had only about half as much wheat ($14,600) as the typical participant ($28,000), the average annual benefit from program-induced market price increases for wheat would also have been only about half the amount that participants received. Such average benefits for cotton and rice producers would be much more equal for the participants and nonparticipants identified in this report.

Imputed Potential Deficiency Payments. The statistics reveal a major trend: participants had equal or greater average potential deficiency payments than did nonparticipants, before adjusting for payment limitation. This principle was true overall and for nearly every sales class. The average payments of cotton producers in the two groups tended to be nearly equal, while participant farms producing wheat or feed grains tended to have larger average

7/ The overall average for a group of farms is derived by dividing the specified characteristic by the total number of farms in the group, even though the characteristic does not apply to all of the farms in the group. The "average per farm reporting" is equal to the characteristic divided by the number of farms in the group that actually had the characteristic, such as sales of a particular commodity divided by farms with sales.

Table 9--Average value of sales by participants and nonparticipants in the 1982 ARP 1/

Commodity	Average per farm		Average per farm reporting--		
	Participant	Nonparticipant	Participant	Nonparticipant	Participant sales as a share of nonparticipant sales
	1,000 dollars				Percent
Wheat	15.6	2.4	28.0	14.6	191
Corn	19.6	4.8	44.7	23.2	192
Sorghum	3.3	.4	22.8	16.1	141
Barley 2/	1.7	.2	13.6	8.7	155
Oats	.4	.1	3.5	2.7	133
Cotton	8.3	.8	82.3	86.5	95
Rice 2/	3.8	.4	143.4	126.4	113
Total program crops	52.8	9.1	52.8	21.4	246
All crops	75.2	23.5	NA	NA	NA
Cattle and calves	19.6	13.5	35.3	23.5	150
Hogs and pigs	9.0	3.9	44.8	29.3	153
Sheep, lamb, and wool	.3	.3	6.0	6.2	97
Dairy	5.4	7.4	77.2	82.0	94
Poultry	1.0	4.5	30.8	87.3	35
Other livestock	.2	.7	8.4	11.8	71
All livestock	35.5	30.2	NA	NA	NA
Total sales	110.7	53.7	110.7	53.7	206

NA = Not available.

1/ Two different averages are shown. The "average per farm reporting" is computed by dividing by the number of farms reporting sales of the specific commodities. The "average per farm" is computed by dividing by the total number of participants (184,752) or nonparticipants (2,055,188).

2/ Barley and rice sales were estimated from production data because no sales data were reported in the census.

potential payments (table 10). These are comparisons of "potential" payments based on production, not actual payments. Nonparticipants did not receive payments unless they were landlords of share renters.

These comparisons of potential payment before adjustment for payment limitations provide an overall measure of the importance of the program commodities within various sales classes. Potential payments to wheat producers, for example, range from about $200 for both nonparticipant and participant farms with less than $2,500 in sales to $92,600 for nonparticipant farms and $140,500 for participant farms, respectively, with $1 million or more in sales.

Value of Assets. Average farm assets are a conventional measure of farm size. When examined by sales class, participant farms emerge as larger than their nonparticipant counterparts. The estimated average value of assets for

Table 10--Average assets, potential deficiency payments, and net receipts per farm by value of sales class

Item	Farms producing specified commodities							
	All		Wheat		Feed grains		Cotton	
	Participant	Nonparticipant	Participant	Nonparticipant	Participant	Nonparticipant	Participant	Nonparticipant
	1,000 dollars							
Average asset per farm by sales class 1/:								
$1 million and over	8,238.0	6,018.5	8,930.8	7,680.9	8,067.1	6,247.9	10,765.3	10,948.9
$500,000-$999,999	3,549.1	2,593.2	3,639.3	3,338.3	3,438.2	2,838.9	3,657.0	3,839.2
$250,000-$499,999	2,126.9	1,681.6	2,164.8	1,983.0	2,105.4	1,775.8	2,116.9	2,262.7
$100,000-$249,999	1,172.1	961.2	1,217.6	1,148.1	1,162.2	985.8	1,158.4	1,362.5
$40,000-$99,999	643.0	539.3	665.7	628.0	637.6	533.5	655.7	685.1
$20,000-$39,999	373.2	343.9	388.5	363.1	366.6	323.6	397.3	369.3
$10,000-$19,999	250.9	233.8	253.8	235.7	243.8	215.9	232.3	214.6
$5,000-$9,999	178.3	170.2	185.1	159.4	172.8	151.6	171.1	127.5
$2,500-$4,999	138.0	134.0	128.0	125.1	143.5	119.2	108.6	107.6
Less than $2,500	142.9	113.9	118.1	94.6	128.0	92.4	85.8	89.5
All farms	823.3	366.5	865.6	631.7	849.3	501.9	1,069.1	1,186.9
Average amount of potential deficiency payment per farm by sales class 2/:								
$1 million and over	123.3	29.2	140.5	92.6	99.7	51.6	258.3	264.9
$500,000-$999,999	49.3	14.8	50.5	29.7	33.1	19.0	99.1	87.5
$250,000-$499,999	23.6	9.0	25.1	15.9	17.4	10.5	52.7	48.6
$100,000-$249,999	10.2	4.4	11.7	7.7	8.3	4.9	25.7	24.6
$40,000-$99,999	4.9	2.0	5.6	3.8	4.1	2.3	11.6	10.9
$20,000-$39,999	2.4	.9	2.8	1.9	2.0	1.1	5.8	5.5
$10,000-$19,999	1.2	.4	1.4	1.0	1.0	.6	2.9	2.8
$5,000-$9,999	.6	.1	.8	.6	.5	.3	1.8	1.4
$2,500-$4,999	.3	0	.4	.3	.3	.2	.9	.9
Less than$ 2,500	.1	0	.2	.2	.1	.1	.4	.4
All farms	7.6	1.2	8.6	4.3	6.3	2.3	23.6	24.0
Average net receipts per farm by sales class 3/:								
$1 million and over	832.6	981.9	952.3	935.2	801.1	794.0	1,318.6	1,490.8
$500,000-$999,999	299.1	242.6	301.1	263.7	273.4	242.9	396.6	313.2
$250,000-$499,999	159.1	129.7	161.7	139.6	151.8	136.8	195.9	155.0
$100,000-$249,999	74.3	62.6	75.7	65.1	72.4	66.0	86.8	61.4
$40,000-$99,999	32.2	27.7	33.2	28.3	31.7	29.6	34.9	25.6
$20,000-$39,999	13.5	11.5	14.3	12.2	13.2	12.6	14.6	11.7
$10,000-$19,999	5.6	5.0	6.3	5.5	5.4	5.5	6.7	5.2
$5,000-$9,999	2.0	2.0	2.4	2.3	1.8	2.2	2.7	2.0
$2,500-$4,999	.3	.3	.6	.6	.2	.4	1.0	.3
Less than $2,500	-1.5	-1.2	.9	.5	-1.1	.7	-1.1	.1
All farms	50.6	19.3	53.6	34.6	51.3	29.8	89.6	89.2

1/ Value of land, buildings, machinery, and equipment, plus imputed value of livestock inventory. Excludes value of crops and financial and other assets. 2/ Deficiency payments were calculated as the product of the amount of production of commodities and the national average deficiency payment rate per unit. 3/ Net receipts equal gross receipts less specified expenses. Gross receipts include value of sales, value of Commodity Credit Corporation (CCC) loans made, custom work done for others, and imputed potential deficiency payments if the farm participated in the 1982 acreage reduction programs. Specified expenses exclude those for repairing and maintaining of capital items, miscellaneous operating costs, dwelling expenses, depreciation, rent, or taxes.

participants ($823,300) was 125 percent greater than the average for nonparticipants ($366,500). Participants also had higher averages in almost every sales class. Among cotton producers, however, participants and nonparticipants had approximately equal averages (see table 10). Nonparticipant cotton farms with $1 million or more in sales had highest average assets, or $10,948,900 per farm (see table 10).8/

Sources of Income

Compared with nonparticipants, participants in the 1982 ARP worked off the farm less often, derived a larger share of sales from program crops, and obtained a smaller share of sales from livestock and livestock products. These results hold when the comparison is made by commodity and these results hold for comparisons within individual sales classes. Small farms tended to obtain a greater share of total income from off-farm sources than did large farms, but those small farms that participated in the programs also derived a major share of farm income from program crop sales and payments.

Source of Farm Sales

Participants derived a larger share of their sales from program crops (47.6 percent) and a smaller share of their sales from livestock (32.1 percent) than nonparticipants (table 11). This overall comparison reflects the participation patterns discussed earlier. For participants, the most frequent type of farm in terms of the SIC was cash grain farms, while for nonparticipants, the beef and other livestock farms were most important.

Cash Grain Farms. Participant and nonparticipant cash grain farms were very similar in share of sales generated from crops and livestock. Both obtained nearly 90 percent of sales from crops. Participants derived a larger share of sales from all program crops but corn. Contrasted with participants, nonparticipant cash grain farms derived a larger share of sales from corn and nonprogram crops, but they derived a smaller share of sales from cattle and calves.

Livestock Farms. Participant and nonparticipant livestock farms other than dairy and poultry differed widely from one another in farm sales origin. Nonparticipant livestock farms, for instance, obtained 91 percent of sales from livestock products, compared with participant livestock farms which obtained 77.8 percent of sales from livestock products. Participants also derived a larger share of sales from each of the program crops, from other crops, and from hogs and pigs.

Specialization and Size of Farm. The share of sales derived from specific program commodities was largest on small farms and smallest on the largest farms. The share of sales participant farms derived from wheat, for example, decreased from a high of 64.8 percent for those in the under $2,500 sales group to a low of 9 percent for those in the $1 million or more sales group.

8/ The measure of assets used in this report excludes the value of crop inventory and financial assets. Adding in these missing assets might change the comparison of participants and nonparticipants to some extent. Total farm assets on December 31, 1982 were (in billions): $745.6 in real estate, $103.7 in machinery and equipment, $53 in livestock inventory, $40.6 in crop inventory, and $34.9 in financial assets (15). Thus, real estate, machinery, and livestock constituted 92 percent of total assets.

Nonparticipant wheat producers ranged from 55.1 percent for the small farm group to 6.2 percent for the large farm group. A similar pattern of decreases was evident for sales shares derived from feed grains and cotton (table 12).

The relationship between farm size and specialization based on the share of sales earned from livestock was similar for both participants and nonparticipants. Midsized farms captured the smallest share. Shares of sales from livestock were higher in all other sales classes.

Deficiency Payments

How important program commodities are as a source of participant income is shown by imputed potential deficiency payments as share of sales and as a share of estimated net receipts.

Table 11--Total farm sale shares derived from specified sources

Commodity	Participant			Nonparticipant		
	All	Cash grain farms 1/	Livestock farms 2/	All	Cash grain farms 1/	Livestock farms 2/
			Percent			
Wheat	14.1	22.3	5.5	4.4	15.7	1.6
Corn	17.7	28.7	7.5	9.0	34.0	2.6
Sorghum	3.0	4.7	1.1	.7	2.8	.2
Barley	1.5	2.3	.4	.4	1.2	.2
Oats	.4	.5	.3	.2	.6	.1
Cotton	7.5	1.4	.3	1.5	.6	.1
Rice	3.4	6.2	.1	.7	3.3	.0
Total program crops	47.6	66.1	15.2	16.9	58.2	4.9
Nonprogram crops	20.3	22.4	7.1	26.8	31.7	4.1
All crops	67.9	88.5	22.3	43.8	89.9	9.0
Cattle and calves	17.7	7.3	51.7	25.1	5.9	68.9
Hogs and pigs	8.2	3.5	24.8	7.3	3.4	19.5
Sheep and lamb	.3	.1	.7	.5	.1	1.4
Dairy	4.9	.5	.4	13.7	.5	.7
Poultry	.9	.1	.1	8.4	.1	.2
Other livestock	.2	.1	.1	1.3	.1	.3
All livestock	32.1	11.6	77.8	56.2	10.1	91.0
Total sales	100.0	100.0	100.0	100.0	100.0	100.0

1/ This type of farm is classified under SIC as 011.
2/ This type of farm is classified under SIC as 021.

Payments as a Share of Sales. Imputed payments averaged 7 percent of total farm sales for all participants, peaking at 8 percent in the lowest sales class and leveling off at 5 percent in the highest sales class (table 13).

Cotton-producing participants derived the highest percentage of sales from payments, 14 percent overall. The lowest sales class derived 30 percent of sales from payments, while the highest sales class derived 10 percent of sales from payments. Cotton producers tended to specialize more highly in program commodities. Also, the deficiency payment rate for cotton was higher relative to market price than that for wheat or corn in 1982. As a result, 64 percent of sales generated by participating cotton farms came from program commodities, 50 percent of which originated from cotton.

Payments as a Share of Net Receipts. This measure shows the decreasing importance of the payments as farm sales increase. Among all participants, for example, imputed potential deficiency payments made up 90 percent of net receipts of farms having $2,500-$4,999 in sales (see table 13). Payments accounted for 14-17 percent of net receipts for farms in the $40,000 and over sales classes. Farms with less than $2,500 in sales, however, had negative net receipts despite the estimated deficiency payments.

Farms producing cotton obtained 26 percent of their estimated net receipts from payments, compared with 12 percent for feed grain producers and 16 percent for wheat producers.

"Net receipts," as used in this report, amounted to $48.9 billion, compared with the ERS estimate of operators' net farm income of $24.6 billion. The disparity in amounts is explained by two factors. First, the census excludes certain conceptual items of income and expenses needed to measure net farm income, thus increasing the estimate of net income by $34.6 billion using ERS data. Second, the census reports lower receipts and expenditures than ERS, thereby reducing the net income measurement by $10.3 billion (see app. table 1).

Off-Farm Work

Income from off-farm sources may have provided more than half of all income of farm operator families in 1982 (15). No measure of income from off-farm sources was available from the census, but the number of days worked off the farm was documented. Census data show that the higher the sales class, the lower the percentage of days worked off-farm (see table 12). Forty-five percent of all nonparticipants worked off-farm 100 days or more in 1982, compared with only 21 percent of all participants. These data reflect the fact that participants tended to specialize more than nonparticipants in activities related to producing program commodities. They also show that participants, as a group, tended to operate larger farms requiring more of the operator's time.

Input Composition

Findings show that participants had lower expense/sales ratios for livestock expenses, higher expense/sales ratios for fertilizer and energy inputs, higher interest expense/sales ratios, and a larger percentage of rented farmland than did nonparticipants. The composition of inputs for the two groups indicates participants specialized more highly in program crops than in livestock. Participants appear to be slightly more financially extended than nonparticipants, based on interest expenses. Landlords owned 50 percent of

Table 12--Income sources for participants and nonparticipants in 1982 acreage reduction programs

Item	Farms producing specified commodities							
	All		Wheat		Feed grains		Cotton	
	Participant	Nonparticipant	Participant	Nonparticipant	Participant	Nonparticipant	Participant	Nonparticipant
	Percent							
Percentage of total sales derived from specified commodities by sales class: 1/								
$1 million and over	35.0	6.0	9.0	6.2	11.7	7.2	39.4	35.1
$500,000-$999,999	56.9	19.3	16.9	12.5	25.0	15.5	53.8	45.4
$250,000-$499,999	62.1	28.0	21.4	14.0	29.5	20.9	52.7	47.9
$100,000-$249,999	64.8	33.7	26.9	17.3	31.2	22.6	52.9	50.2
$40,000-$99,999	68.2	35.8	34.4	22.6	31.6	23.3	55.0	48.7
$20,000-$39,999	68.6	37.2	39.5	26.9	31.0	27.7	59.3	55.2
$10,000-$19,999	66.6	31.8	42.5	30.3	33.6	30.6	60.1	61.3
$5,000-$9,999	63.0	23.9	44.8	35.0	34.7	32.1	70.5	63.6
$2,500-$4,999	54.7	16.6	50.9	42.4	32.2	33.6	69.7	74.2
Less than $2,500	46.0	12.1	64.8	55.1	38.7	37.0	85.8	82.5
All farms	60.4	24.7	24.5	16.7	28.0	20.8	49.7	42.7
Percentage of sales derived from livestock/ livestock products by sales class:								
$1 million and over	45.5	66.6	37.5	47.4	51.8	64.2	12.7	13.9
$500,000-$999,999	33.2	56.9	29.0	39.2	39.6	56.4	7.5	9.9
$250,000-$499,999	30.9	54.7	26.6	7.3	34.5	51.2	6.1	9.4
$100,000-$249,999	30.6	53.3	25.7	35.8	32.9	50.4	6.8	7.5
$40,000-$99,999	28.0	50.9	25.1	31.5	29.5	48.3	D	7.4
$20,000-$39,999	25.8	44.8	23.8	28.4	27.3	38.9	8.4	8.6
$10,000-$19,999	26.3	46.8	23.1	24.9	26.3	34.4	11.7	10.6
$5,000-$9,999	29.3	52.7	21.4	23.4	27.4	34.2	11.5	13.8
$2,500-$4,999	37.7	61.0	23.7	23.5	36.1	39.3	11.9	8.3
Less than $2,500	45.7	69.3	D	18.6	40.3	44.8	6.7	D
All farms	32.1	56.2	27.6	36.5	35.2	50.8	8.7	11.0
Percentage of operators working off-farm 100+ days by sales class: 2/								
$1 million and over	6.8	11.8	6.6	7.5	5.9	7.6	7.0	9.0
$500,000-$999,999	5.8	10.9	5.6	7.1	5.5	6.6	6.3	7.9
$250,000-$499,999	5.1	10.3	4.9	6.4	4.8	6.3	6.4	7.6
$100,000-$249,999	6.7	10.5	6.4	7.6	6.4	7.0	8.2	7.3
$40,000-$99,999	14.9	17.7	14.0	16.0	14.1	14.1	13.6	13.0
$20,000-$39,999	28.5	34.6	24.8	31.8	28.0	31.0	23.6	24.5
$10,000-$19,999	42.3	45.8	40.1	42.2	42.9	43.2	30.4	37.7
$5,000-$9,999	49.8	54.2	48.2	50.6	49.6	52.4	45.8	40.6
$2,500-$4,999	52.3	59.5	54.8	54.8	54.7	59.1	42.4	47.2
Less than $2,500	53.6	65.7	59.0	61.1	54.3	62.8	48.4	45.1
All farms	21.0	44.8	19.1	28.7	18.7	30.7	17.7	20.8

D = Information unable to be disclosed by the census because it would reveal proprietary information.

1/ This measure is the percentage of sales derived from grain plus cotton for both all participants and all nonparticipants.

2/ This measure is based on the total census farms, including nonrespondents to questions about off-farm employment.

all land that participants operated in the 1982 program, and nonoperator landlords likely received a large share of those producers' 1982 program benefits.

Materials, Services, and Labor

The total specified expenditures that participants made for materials, services, and labor equaled 49.8 percent of total farm sales, compared with 56.1 percent for their nonparticipant counterparts. Participants spent a greater share on seed, fertilizer, chemicals, custom work, and energy, while nonparticipants spent more, in relation to their sales, for livestock and feed purchases, hired labor, and contract labor (table 14). The differences in

Table 13 --Estimated deficiency payments as a share of farm sales and net receipts 1/

Item	Participant farms producing--			
	All crops	Wheat	Feed grains	Cotton
		Percent		
Payments as a share of sales by sales class:				
$1 million and over	5	6	4	10
$500,000-$999,999	7	8	5	15
$250,000-$499,999	7	7	5	15
$100,000-$249,999	7	8	5	16
$40,000-$99,999	7	8	6	18
$20,000-$39,999	8	9	7	20
$10,000-$19,999	8	10	7	20
$5,000-$9,999	8	10	7	23
$2,500-$4,999	8	12	7	24
Less than $2,500	8	15	8	30
All farms	7	8	5	14
Payments as a share of net receipts by sales class:				
$1 million and over	15	15	13	20
$500,000-$999,999	17	17	12	25
$250,000-$499,999	15	16	12	27
$100,000-$249,999	14	15	12	30
$40,000-$99,999	15	17	13	33
$20,000-$39,999	18	19	15	40
$10,000-$19,999	22	23	19	43
$5,000-$9,999	32	32	28	65
$2,500-$4,999	90	72	115	86
Less than $2,500	*	*	*	*
All farms	15	16	12	26

* = Net returns were negative for this group.

1/ Estimates apply only to farms participating in the acreage reduction programs.

total amounts and composition of inputs reflect the different commodity mix of the two groups, with participants less involved in livestock production than nonparticipants.

Cash Grain and Livestock Farms Compared. Expenditures of participants per dollar of sales were nearly identical to those of nonparticipants among only cash grain farms. Per-dollar expenditures of participants and nonparticipants who operated livestock farms (except dairy and poultry farms) were also similar. Total expenditures of nonparticipant livestock farms were slightly larger per dollar of sales, reflecting the much higher degree of specialization in livestock production.

Sales Classes Compared. Nonparticipating farms with less than $20,000 in sales had somewhat lower expenses per dollar of sales than participating farms (table 15). In all higher sales classes, nonparticipant farms had larger expenses per sales dollar than participants.

Total Costs Compared. I computed a broader estimate of total costs to help compare cost structures of participants and nonparticipants. "Total cost" was defined as the specified expenses denoted in the census (excluding interest) plus a computed return on assets that assumes a 10-percent rate of return for opportunity cost of capital.

On a total cost basis, nonparticipants had a lower cost per sales dollar in every sales class even though assets were defined to include imputed values of farm livestock inventory, real estate, and machinery. The total cost gauge shows scale economies that both participants and nonparticipants realized, and reflects livestock producers' lesser dependence on land and machinery. Farms with at least $100,000 in sales have much lower average costs than farms with sales under $100,000, but the rate of decrease is relatively small as sales exceed $100,000. The result is consistent with Tweeten's study of average costs, which indicates that costs decline very little as sales rise from $100,000 to $150,000 (11). Miller and others' 1981 study of farm costs showed that the most efficient farms producing wheat, feed grains, and cotton would have gross sales of $133,000 and that average costs would be reduced very little by increasing sales from $41,000 to $76,000 (7).

Interest Expenses and Imputed Debt

Participants were more likely than nonparticipants to report some interest expenses, and the amount of interest they reported per dollar of sales was slightly larger. This finding led to a hypothesis that financially extended farms may participate in commodity programs as a form of insurance. I tested the finding by comparing debt/asset ratios.

Debt/asset ratios derived from the census provided very little support to the contention that financially extended farms are the ones most likely to participate in acreage reduction programs. The imputed debt/asset ratios for participants and nonparticipants were about equal for all farms combined, but the ratio for participants was slightly higher among program participant groups that raised wheat and feed grains. When the ratios differed by sales class, they were sometimes smaller and sometimes larger for participant than nonparticipants (table 16). Except for the top sales class, participant farms producing wheat, feed grains, and cotton with at least $20,000 in sales had somewhat larger imputed debt/asset ratios than their nonparticipant counterparts. In all subgroups, the percentage of farms having any interest

Table 14--Production expenses as a share of farm sales 1/

Input	Participants			Nonparticipants		
	All	Cash grain farms 2/	Livestock farms 3/	All	Cash grain farms 2/	Livestock farms 3/
			---- Percent ----			
Livestock purchased	8.8	3.0	27.2	13.9	2.4	34.5
Feed purchased	6.4	2.2	14.7	15.6	1.9	19.9
Seed purchased	3.5	4.5	2.0	2.2	4.9	1.1
Commercial fertilizer	8.3	10.5	4.7	5.4	11.9	3.0
Other chemicals	5.1	5.9	2.2	2.9	6.2	1.1
Hired farm labor	5.2	4.2	3.2	6.6	3.6	3.2
Contract labor	.5	.2	.2	.9	3.2	.2
Custom work and machine hire	2.2	2.5	1.4	1.4	2.2	1.0
Energy	9.8	11.2	6.7	7.2	10.6	5.7
Subtotal	49.8	44.2	62.3	56.1	43.9	69.7
Interest expense	12.3	13.4	11.5	8.3	11.1	8.1
Total specified expenses	62.1	57.6	73.8	64.4	55.0	77.8

1/ Data apply to both participants and nonparticipants in the 1982 acreage reduction programs. 2/ SIC 011. 3/ SIC 021.

Table 15--Costs per dollar of farm sales 1/

Farm sales class	All participants			All nonparticipants		
	Specified expenses, excluding interest	Return to assets	Total specified costs	Specified expenses, excluding interest	Return to assests	Total specified costs
			Percent			
Costs as a share of sales by sales class:						
$1 million and over	61.4	35.3	96.8	67.3	17.6	84.9
$500,000-$999,999	51.5	53.3	104.8	56.2	38.6	94.8
$250,000-$499,999	48.7	62.6	111.4	54.1	49.7	103.8
$100,000-$249,999	46.2	76.1	122.3	49.6	63.3	113.0
$40,000-$99,999	47.0	97.3	144.3	48.4	83.0	131.4
$20,000-$39,999	49.8	126.7	176.6	50.4	120.1	170.5
$10,000-$19,999	57.3	170.2	227.5	54.0	164.3	218.3
$5,000-$9,999	65.5	238.5	304.0	59.8	239.6	299.4
$2,500-$4,999	82.0	367.9	449.9	76.2	373.1	449.3
Less than $2,500	175.8	1,173.6	1,349.4	163.9	1,090.4	1,254.3
All farms	49.8	74.3	124.2	56.3	68.3	124.5

1/ Total specified costs equal specified expenses (excluding interest) plus a 10-percent return to value of assets used on the farm.

Table 16--Interest and imputed debt

Item	Farms producing specified commodities							
	All		Wheat		Feed grains		Cotton	
	Participants	Nonparticipants	Participants	Nonparticipants	Participants	Nonparticipants	Participants	Nonparticipants
	Percent							
Percentage of farms with interest expenses by sales classes:								
$1 million and over	93.8	82.7	93.1	90.2	95.3	90.6	93.0	86.0
$500,000-$999,999	94.7	86.5	94.8	91.6	95.4	91.7	90.9	89.3
$250,000-$499,999	92.9	82.4	92.8	87.0	93.7	86.7	90.6	83.9
$100,000-$249,999	90.8	79.4	90.3	81.8	91.1	82.7	89.4	82.1
$40,000-$99,999	82.6	70.0	81.7	71.2	83.4	72.1	80.2	69.0
$20,000-$39,999	71.2	56.6	70.9	58.4	72.2	57.8	69.9	57.4
$10,000-$19,999	60.1	44.6	57.8	45.2	61.9	46.6	63.0	46.4
$5,000-$9,999	47.2	34.5	45.2	35.2	48.4	36.7	48.1	35.8
$2,500-$4,999	37.3	27.7	36.2	28.1	38.0	29.4	29.4	33.2
Less than $2,500	32.7	22.5	26.5	23.8	32.6	21.7	49.5	15.6
All farms	77.0	44.2	79.8	59.5	79.8	57.6	76.9	63.4
Interest expense/sales ratio by sales class: 1/								
$1 million and over	9.0	5.2	8.8	7.5	8.8	6.9	8.4	7.8
$500,000-$999,999	12.2	9.2	12.1	10.7	12.5	10.4	10.5	10.2
$250,000-$499,999	13.0	9.6	12.8	10.8	13.3	10.4	10.3	9.2
$100,000-$249,999	14.5	12.1	14.3	12.9	14.7	12.4	11.8	12.4
$40,000-$99,999	15.6	13.7	15.7	14.4	15.6	13.3	14.4	13.9
$20,000-$39,999	19.9	18.0	19.4	17.5	19.6	16.7	19.7	15.8
$10,000-$19,999	23.9	25.4	22.5	23.5	24.1	22.4	20.0	21.1
$5,000-$9,999	39.4	37.1	38.2	33.9	36.5	31.7	32.3	33.2
$2,500-$4,999	51.0	62.3	49.4	50.3	45.2	51.4	61.1	45.5
Less than $2,500	163.8	209.4	160.9	125.7	124.0	137.2	104.0	77.1
All farms	13.7	11.0	13.5	12.1	13.9	11.9	10.8	9.8
Imputed debt/asset ratio by sales class: 2/								
$1 million and over	25.3	30.5	22.8	25.1	26.5	29.3	18.9	19.6
$500,000-$999,999	21.7	23.3	21.2	20.6	23.1	23.7	17.7	16.8
$250,000-$499,999	19.6	18.7	19.1	17.4	20.3	18.9	15.6	12.8
$100,000-$249,999	18.0	18.3	17.0	16.4	18.5	18.2	15.0	13.5
$40,000-$99,999	15.3	16.0	14.7	14.1	15.5	15.7	13.5	12.7
$20,000-$39,999	14.6	14.2	13.8	13.1	14.8	14.2	12.8	10.9
$10,000-$19,999	13.1	14.7	12.3	13.2	13.8	14.0	11.9	13.4
$5,000-$9,999	15.2	14.1	14.3	13.9	14.8	14.0	13.0	15.7
$2,500-$4,999	12.6	15.2	12.0	13.8	11.1	14.4	21.6	18.1
Less than $2,500	12.3	16.4	22.5	17.0	10.8	16.6	10.4	9.9
All farms	18.1	18.3	17.3	16.5	18.6	17.9	15.9	15.3

1/ This measure equals the amount of interest expense divided by value of sales for farms who had interest expenses.

2/ This ratio equals imputed debt divided by assets for farms who had interest expenses. Debt was derived by dividing interest expenses by the average interest rate for outstanding debt on farms in 1982 (11 percent).

expenses tended to increase as the value of sales increased, the interest expense/sales ratio tended to decrease as the value of sales increased, and the debt/asset ratio tended to increase as the value of sales increased.

Conversely, General Accounting Office (GAO) study of ERS survey data supported the hypothesis that financially extended farms are more likely to participate. The data show that 1984 program participants had a debt/asset ratio of 31 percent, compared with nonparticipants who had a debt/asset ratio of 24 percent. The survey data also show that the program participation rate was higher than average for farms with debt/asset ratios over 40 percent. However, participant farms with debt/asset ratios under 40 percent received 63 percent of the Government payments in 1984 (1). ERS analysts judged farms with debt/asset ratios of more than 40 percent in 1984 to be most likely to have serious cash flow difficulties (13). Thus, while the majority of payments went to farms that had no cash flow problems in 1984, participant farms in the moderate to large sales classes that produced program commodities were more financially extended, on average, than nonparticipant farms.

Land Rental Arrangements

Acreage operated by renters (as opposed to fullowner operators) was enrolled in the 1982 ARP at a higher rate than acreage operated by owners. Fullowners, by definition, rent no land. Table 17 shows that most participant farms and most nonparticipant farms rent some land they operate from others. The share of land in farms operated by renters is larger for participants than for nonparticipants (83.8 percent versus 64.6 percent). This same pattern is evident when wheat, feed grain, or cotton producers are examined, or when acreage is examined by sales class.

Nonfarmer Landlords Receive Program Benefits. One implication of particpants' use of rented land is that many of the commodity programs' direct benefits, such as deficiency payments and reduced price risk, accrue to landlords. Most of the landlords are not farm operators. Tenants, who rent all the land they work, accounted for 13.5 percent of participant operated land. Partowners, who both rent and own land, accounted for 70.3 percent of participant-operated land, and 53 percent of their land was rented. Fullowners constituted only 16.2 percent of land in farms in 1982 (table 18). Overall, 50 percent of all land that participants operated was rented. Consequently, nearly half of participant program benefits may accrue to landlords, most of whom do not operate a farm. (Cash rents are assumed to reflect the benefits of program participation.)

Operator-Landlords Receive Few Program Benefits. Less than 13 percent of total land in farms rented from others was rented from a farm operator-landlord. (This statistic applies to all farms, participating and nonparticipating combined.) Since 50 percent of all land operated by participants was rented, the operator-landlords' share of direct program benefits is estimated to have equaled 7 percent.9/ If 87 percent of total land in farms that participants rented was rented from nonoperator-landlords (100 percent less 13 percent rented from operator landlords = 87 percent), such landlords may have received nearly 44 percent of the 1982 program benefits.

9/ This estimate is the product of the percentage of land in farms rented from farm operator-landlords and the percentage of rented land that is farmed by participants. It should be noted that I assumed that the distribution of rent and program benefits are exactly proportional to acreage.

Table 17--Importance of rental arrangements

Item	Farms producing specified commodities							
	All		Wheat		Feed grains		Cotton	
	Participants	Nonparticipants	Participants	Nonparticipants	Participants	Nonparticipants	Participants	Nonparticipants
	Percent							
Share of land owned by operator-landlords that is rented to others by farm sales class: 1/								
$1 million and over	16.3	15.2	22.8	14.5	14.0	11.2	14.0	13.7
$500,000-$999,999	19.1	24.6	19.8	24.3	18.6	24.5	19.4	37.5
$250,000-$499,999	21.7	23.3	19.9	18.6	20.8	19.1	29.0	30.9
$100,000-$249,999	24.3	29.3	23.2	27.5	22.8	26.7	29.2	36.9
$40,000-$99,999	35.7	36.2	30.1	33.5	31.7	31.1	44.5	44.6
$20,000-$39,999	41.6	41.2	40.3	37.5	35.9	36.2	67.8	40.4
$10,000-$19,999	43.2	47.6	44.8	48.3	41.7	38.6	56.0	37.1
$5,000-$9,999	49.5	48.1	55.8	48.9	46.4	38.8	51.6	51.7
$2,500-$4,999	43.1	50.4	47.6	51.6	27.6	40.2	58.7	50.4
Less than $2,500	56.4	61.9	52.3	54.3	29.3	38.1	62.9	59.4
All farms	29.4	39.7	27.9	32.2	24.9	29.5	27.3	33.2
Share of land operated by partowners that is rented from others, by farm sales class: 2/								
$1 million and over	41.9	43.5	38.9	46.0	41.5	45.6	52.5	54.4
$500,000-$999,999	52.2	48.2	52.1	49.9	53.0	50.5	57.2	61.5
$250,000-$499,999	54.7	50.3	54.0	52.8	54.2	51.0	61.3	63.1
$100,000-$249,999	54.0	51.2	53.3	53.1	53.3	52.8	66.4	65.2
$40,000-$99,999	52.8	51.3	52.0	52.2	52.2	49.6	68.5	62.8
$20,000-$39,999	49.7	51.8	49.4	50.6	49.2	48.4	59.2	67.5
$10,000-$19,999	48.7	51.9	48.4	50.3	47.9	49.7	54.1	57.3
$5,000-$9,999	50.9	53.1	53.1	49.6	49.8	48.2	56.8	57.4
$2,500-$4,999	45.2	56.8	45.1	55.1	43.2	49.4	41.4	45.8
Less than $ 2,500	62.8	57.0	48.7	56.9	36.2	50.2	67.0	59.0
All farms	52.6	50.8	51.8	51.8	52.2	50.6	62.4	61.7
Share of land in farms operated by fullowners, by farm sales class: 2/								
$1 million and over	24.0	26.3	14.3	22.0	24.0	23.3	39.2	19.5
$500,000-$999,999	11.7	22.2	12.0	23.4	11.3	22.2	12.2	28.8
$250,000-$499,999	8.5	24.9	7.8	23.0	7.9	23.0	9.6	30.0
$100,000-$249,999	11.0	26.0	10.3	22.4	10.7	24.5	6.9	33.0
$40,000-$99,999	16.1	28.7	14.5	24.0	16.2	27.3	10.9	25.2
$20,000-$39,999	25.8	38.1	23.7	32.4	26.4	38.8	14.0	22.1
$10,000-$19,999	38.7	49.2	36.9	46.4	40.8	50.0	23.2	41.1
$5,000-$9,999	49.8	59.5	44.5	57.4	54.4	61.5	33.3	49.9
$2,500-$4,999	59.6	65.4	54.1	62.0	63.4	69.6	45.7	56.3
Less than $2,500	51.4	71.3	62.5	70.9	59.0	75.4	24.8	64.6
All farms	16.2	35.4	14.4	26.9	15.5	30.6	14.8	28.4

1/ This measure is a tabulation of farm operators who reported renting out any owned land. 2/ Some, but not all, of the land operated by part-owners is rented from someone else, by definition. Tenants are defined as those who operate only rented land. Full owners operate no land rented from others.

Table 18--Distribution of land operated by renters and fullowners

Item	Participants	Nonparticipants
	Percent	
Share of land in farms operated by:		
Tenants	13.5	11.8
Partowners	70.3	52.8
Fullowners	16.2	35.4
Share of:		
Owned land rented to others by operator-landlords	29.4	39.7
Operated land rented from others by partowners	52.6	50.8
Operated land rented from others by all renters	60.2	59.8
Total land in farms rented from others	50.5	38.6

DISTRIBUTION OF DEFICIENCY PAYMENTS AND EFFECTS OF PAYMENT LIMITATIONS

When farms were ranked by the amount of deficiency payments they received, 30 percent of participant farms with the largest payments got 80 percent of all payments before adjusting for payment limitations. About 2 percent of all farms receiving payments were estimated to have been affected by the program's $50,000 payment limitation. These limitations reduced total deficiency payments by an estimated 10 percent, or $738 per farm, across all farms. Payment limitations reduced the deficiency payments of 3,836 farms, and the amount of the reduction was at least $40,755 per farm.

Distributions of Farms Compared by Size of Potential Payment

A comparison of the distribution of farms by amount of potential deficiency payments, termed "payment distribution," shows that the proportion of farms in the larger payment classes is greater for participants than for nonparticipants in all cases (table 19). This finding is reflected in the comparison of average potential payments in both tables 10 and 19. Overall, average potential payments for participants were more than double that of nonparticipants, except in the case of cotton, whose average was the same for participants and nonparticipants.

Table 19--Distribution of farms by amount of imputed potential deficiency payment 1/

Item	Farms producing specified commodities							
	All		Wheat		Feed grain		Cotton	
	Participant	Nonparticipant	Participant	Nonparticipant	Participant	Nonparticipant	Participant	Nonparticipant
Number of farms grouped by amount of payment:				1,000 farms 2/				
$75,000 or more	1.9	2.2	1.0	1.1	0.7	0.8	1.1	1.2
$50,000-$74,999	1.9	1.9	1.1	1.1	3.7	4.2	.9	.8
$25,000-$49,999	6.3	7.7	4.2	5.0	3.7	4.2	2.5	2.4
$10,000-$24,999	21.9	31.7	16.0	22.9	16.0	22.4	4.8	4.2
$5,000-$9,999	30.3	60.7	20.7	39.6	24.4	48.9	3.9	3.1
$2,500-$4,999	38.5	101.7	23.1	55.5	32.1	86.0	2.8	2.9
Less than $2,500	76.0	635.6	37.3	216.9	62.9	550.8	2.7	4.8
All farms	176.9	841.7	103.6	342.1	140.5	714.1	18.7	19.4
Percentage of farms grouped by amount of payment:				Percentage of all farms				
$75,000 or more	1.1	.3	1.0	.3	.5	.1	6.1	6.1
$50,000-$74,999	1.1	.2	1.1	.3	.6	.1	4.9	4.1
$25,000-$49,999	3.6	.9	4.1	1.5	2.6	.6	13.2	12.2
$10,000-$24,999	12.4	3.8	15.4	6.7	11.4	3.1	25.5	21.5
$5,000-$9,999	17.1	7.2	20.0	11.6	17.4	6.8	20.8	16.1
$2,500-$4,999	21.7	12.1	22.3	16.2	22.8	12.0	15.2	15.0
Less than $2,500	43.0	75.5	36.0	63.4	44.7	77.1	14.4	24.9
All farms	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Average amount of imputed payment per farm among producers of target price commodities:				1,000 dollars 2/				
Wheat	2.4	.9	4.1	2.2	2.1	.6	1.7	1.9
Corn	1.5	1.0	.9	.8	1.9	1.2	.3	.3
Sorghum	.3	.1	.4	.2	.4	.1	.6	.5
Barley	.4	.1	.6	.2	.5	.2	.1	.2
Cotton	2.1	.5	1.7	.5	1.0	.2	20.0	20.3
Rice	1.1	.3	.8	.2	.3	.1	.9	.8
Total	7.8	2.9	8.5	4.2	6.2	2.3	23.6	24.0

1/ Deficiency payments were calculated for each farm as the product of production and the national average deficiency payment rate. This imputation ignores actual variation in "program yields" and it assumes participant compliance with all acreage reduction programs.

2/ Number of farms and average payments differ slightly from those in tables 5, 6, and 10 because minor revisions were made after the payment distribution was determined and because the number of farms for all nonparticipants used in table 10 includes producers of nonprogram commodities, so it is larger: 2,055,188.

Payment Size

Participants outranked nonparticipants in terms of the share of farms in the classes with $2,500 or more in potential payments. Farms with less than $2,500 in payments represented only 43 percent of all participants and 75.5 percent of all nonparticipants.

Top Beneficiaries. Analysis of payment distributions shows that the proportion of farms with potential payments of $50,000 or more is larger for participants than for nonparticipants. This finding is important because if the $50,000 payment limitation is really effective in reducing payments to large farms, the limitation might be a negative factor in a farmer's analysis of what net returns can be gained from participating in or opting out of the programs. A major reason why the payment limitations might not affect the decision to participate is that, under the farm law, acreage reduction requirements are to be reduced for farms affected by the limitation in order to be fair. There may be other explanations too.

Many of the 3,836 participant farms with potential payments of $50,000 or more might have been larger farms with more than one legal recipient per farm for payment limitation purposes, and, therefore, the limit might not have been much of a potential deterrent to participation. The statistic 3,836 could be influenced by the upward bias in the number of such farms that occurs from the cross-compliance assumption discussed earlier. For example, participants may be more likely than nonparticipants to produce more than one program crop, thereby making it possible to be counted as a participant for one commodity while also growing some program crops outside the restrictions of ARP.

Except for cotton-producing farms, the payment limitation appears to have had very little effect on the decisions of actual nonparticipants to opt out of the ARP. Cotton-producing farms had the highest share of farms with $50,000 or more in payments, while those producing one or more of the feed grains had the smallest share.

Concentration Ratio

An alternate way to study the payment distribution is to compute a "concentration ratio," which is the share of payments that farms with the largest payments received. This gauge provides one measure of the extent of inequality that arises from commodity programs, in which the largest farms get the largest payments and the smallest farms get the smallest payments.

Concentration ratios were obtained by first ranking farms by amount of payment and then calculating for each group the share of total payments the top 20 or 30 percent of the farms (those with the largest payments) received. The concentration ratios (table 20) show that:

- Potential payments for farms producing cotton were somewhat more concentrated than those for farms producing wheat or feed grains.
- The ratio for all participants was higher than for all nonparticipants, but the reverse was true when comparisons were made for wheat and cotton.
- The ratios were equal for feed grains.

Table 20--Concentration ratios for participants and nonparticipants

Farms producing specified commodities	Proportion of payments among the largest 1/--	
	20 percent of farms	30 percent of farms
	Percent	
All farms:		
Participants	70	80
Nonparticipants	67	76
Wheat:		
Participants	65	75
Nonparticipants	69	77
Feed grains:		
Participants	65	75
Nonparticipants	65	74
Cotton:		
Participants	66	78
Nonparticipants	73	82

1/ "Largest" farms means farms with the largest potential deficiency payments. Total payments reported by the census were distributed by payment classes using a percentage distribution derived by multiplying farm numbers by the class midpoints for each payment class.

Estimated Effects of Payment Limitations on Farms

The legal limit of $50,000 placed on the total amount of payments that one person may receive affected fewer than 3,836 census farms. It resulted in an estimated average payment reduction for affected farms in the top three sales classes of: $124,498 for farms with $1 million or more in sales, $40,541 for farms with $500,000-$999,999 in sales, and $13,530 for farms with $250,000-$499,999 in sales. The results of estimating payment limitation effects by sales class, detailed below (see also table 21), provide the basis to compare the potential relative effect of such limitations on the income and program benefits of different-sized farms. These comparisons occur later in the report. Keep in mind what assumptions these estimates are based upon. Actual limitations apply to persons, while these estimates use payment data for census farms.10/

Farms with $1 Million or More in Sales

About half the total reductions in payments affected farms with $1 million or more in gross farm sales. Average payments for this group of farms were reduced an estimated 49 percent, or $60,841 per farm because of the payment

10/ See Appendix B for a full description of estimation methodology.

Table 21--Estimated effects of the $50,000 payment limitation on deficiency payments received, 1982 1/

Item	Unit	Sales class of participating farms					
		$1 million and over	$500,000-$999,999	$250,000-$499,999	$100,000-$249,999	Less than $100,000	All farms
Total participating farms	Number	1,105	3,463	11,824	41,589	126,271	184,252
Farms receiving payments of $50,000 or more:							
Total	Do.	540	1,145	1,652	495	4.7	3,836
Share of all farms	Percent	14.1	29.8	43.1	12.9	.1	100.0
Share of farms in each class	Do.	48.9	33.1	14.0	1.2	--	2.1
Amount of deficiency payments:							
Gross payments	1,000 dol.	136,230	170,644	278,678	424,690	388,965	1,399,207
Adjustment for limitations	Do.	67,229	46,420	22,351	2/	2/	136,000
Net payment	Do.	69,001	124,224	256,327	424,690	388,965	1,263,207
Change due to adjustment	Percent	-49.3	-27.2	-8.0	--	--	-9.7
Average payment per all farms:							
Gross payments	Dollars	123,285	49,276	23,569	10,212	3,080	7,594
Adjustments for limitations	Do.	60,841	13,404	1,890	--	--	738
Net payments	Do.	62,444	35,872	21,679	10,212	3,080	6,856
Average adjustment per farm 3/ with $50,000 or more in payments	Do.	124,498	40,541	13,530	--	--	40,755

-- = Zero or not available.

1/ See Appendix B for details on the methodology.

2/ Although there were farms with $50,000 or more in potential payments in these classes, it was not possible to estimate the effect of payment limitations (see appendix table 3).

3/ Total adjustment for payment limitations divided by all farms with potential payments of $50,000 or more. The all-farms total includes only the top three sales classes.

limitations. This reduction cut the overall average payment from $123,285 per farm, before the adjustment for payment limitations, to $62,444. Less than half of the farms in this sales class were actually affected by the limitations, however. The average payment reduction for those farms affected would have been at least $124,498, assuming the number of farms actually affected was less than the number estimated to have had $50,000 or more in potential payments.

Farms with $500,000 to $999,999 in Sales

About one-third of the total reduction in payments due to payment limitations affected farms in this sales catagory in 1982. Average payments for all farms in this group were reduced an estimated 27 percent, or $13,404 per farm. Less than one-third of these farms actually were affected by the limitations. The average reduction in payments for farms in this class actually affected was more than $40,541.

Farms with $250,000 to $499,999 in Sales

The estimated payment reduction for farms in this sales class was 16 percent of the total reduction for all farms. Average payments for all farms in this sales class were reduced 8 percent, or $1,890 per farm. Less than 14 percent of the farms in the class actually were affected by the limitation. The average payment reduction for farms actually affected was at least $13,530 per farm.

Farms with Less than $250,000 in Sales

There were 499 farms with potential payments of $50,000 or more and sales of $40,000 to $249,999, but it was not possible to estimate from the census tabulations the amount of reduction in payments for this group of farms (see app. table 4). If the average limitation adjustment for the 495 farms receiving $50,000 or more in payments and $100,000 to $249,999 in sales was $4,500 (one-third of that in the next highest class), total payments for this class would have been reduced by $2,227,500. Because only 1.2 percent of farms in this class actually had $50,000 or more in payments, the average reduction would have been only $54 per farm (0.5 percent).

While the overall average payment reduction for all farms with less than $250,000 in sales was likely insignificant, the limitation reduction could have been as much as $33,000 for some rice farms and as much as $83,000 for some cotton farms. This estimate would hold true, assuming some of the cotton and rice farmers actually realized at least $249,000 in sales (the upper limit of this sales class) from either 1982 cotton or rice crop. This estimate is based on 1982 crop prices and deficiency payment rates (table 22).

It is unlikely that the lack of information for the estimated payment reduction in the $100,000-$249,999 sales class results in a very large error in the estimates for larger classes. The estimated payment reductions for the top three classes depend on the assumed estimate for farms with $100,000-$249,999 in sales, because it was assumed in this study that the total cut in payments due to the limitation was $136,000,000. If the total reduction for the smaller class was $2,227,500 (as assumed above for illustrative purposes), the estimate of the reduction for the larger three classes would be lowered by only 1.6 percent.

Table 22--Potential payments for farms with assumed sales of $249,000

Commodity	Unit	Season average price	Quantity sold 1/	Potential payments	
				Per unit	Total 2/
		Dollars	Number	Dollars	
Wheat	Bushels	3.55	70,141	0.50	35,070
Corn	Do.	2.68	92,910	.15	13,937
Cotton	Pounds	.591	421,320	.139	58,563
Rice	Hundredweight	8.11	30,703	2.71	83,205

1/ $249,000 divided by season average price.
2/ Quantity sold multiplied by actual payment rate per unit.

NET INCOME EFFECTS OF THE 1982 COMMODITY PROGRAMS

Net income effects of the commodity programs for the 1982 marketing year, referred to as "total net benefits," represent a key portion of net cash farm income. They amounted to $13.4 billion, using estimates based on the 1982 agricultural census data on acreage and production. Thus, the programs analyzed in this report generated nearly 33 percent of the net cash farm income in 1982/83, which was $38.3 billion (15).

The estimated total net benefits provide a useful way to assess what share of benefits accrued to farms of different sizes, whether or not the farms participated in the 1982 programs. Actual commodity program participants, for example, received 100 percent of the Government payment benefits but only 38 percent of the total net benefits. Nonparticipants as well as participants shared in the substantial benefits attributable to the program-induced market price increases during the 1982 marketing year, but the more numerous nonparticipants received more revenue from the price increase because they planted more acreage to supported commodities.

Twenty-seven percent of all farms--those with sales ranging from $40,000-$499,999--received about 78 percent of total net benefits. Farms with sales of $500,000 or more, which accounted for 1 percent of all farms, received 8 percent of the benefits.

The $50,000 limitation on the amount of direct payments a single recipient may receive did not affect the overall distribution of total net benefits very much because the limitation only reduced the total amount of benefits in 1982 by $136 million, or 1 percent.

Payment limitations reduced net benefits to farms with $250,000-plus sales by 4 percent, but they lowered the net benefits of farms with $1 million or more in sales by 20 percent.

Total Estimated Benefits

Total net program benefits in 1982, as defined in this report, amounted to $13,354 million. Of the total net benefit, participants received $5,005 million (38 percent) and nonparticipants received $8,349 million (62 percent), (table 23). Total net program benefits constituted $1,263 million in

deficiency payments to participants plus $15,058 million worth of income resulting from program-induced market prices (shared by all producers), less $405 million in income forgone by participants to comply with acreage reduction requirements. There was also an offset of $2,563 million for increased livestock feed costs (shared by all livestock producers) brought about by program-induced price increases.

While the participating farms received less than half of the total program benefits, their average benefits per farm were more than double that of nonparticipants who actually produced program commodities. A more specific comparison of averages cannot be made without additional information on the average feed cost increase for nonparticipant producers of program crops. The average revenue increase from the price changes for participants was twice that of nonparticipants ($23,500 compared with $12,200, as shown in table 26). Because participants were sole recipients of payments, and also probably had lower average feed cost increases due to the price changes (per farm that actually had program commodities), one can be fairly sure that participants' average benefits were at least twice as large as those of nonparticipants.

The estimated total net benefits, by component parts, are detailed below, along with implications.11/

Potential Deficiency Payments

Potential deficiency payments to participants for crop year 1982/83, in this report, amounted to $1,399 million before adjusting for payment limitations. The $50,000 limitation on the amount of payments to a single recipient reduced total potential payments by $136 million, or by 10 percent. It reduced total net benefits of participants by 3 percent.

Forgone Income

Forgone income is an estimate of how much revenue participants gave up to comply with acreage reduction requirements. Participants gave up an estimated $405 million in crop year 1982/83 by reducing their acreage under the 1982 ARP. That sum equaled one-third of the amount of potential payments of these same farms, after adjusting for payment limitations.

A farmer must comply with ARP requirements in order to be eligible for payments, farm loans, and other benefits. Forgone income was calculated for each commodity as the forgone sales receipts attributed to reduced acreage, plus additional conservation costs associated with caring for the idled acres, offset by the lowered variable expenses. The calculations were based on actual 1982 prices and per-acre costs, calculated ARP requirements, and 1982 census data for yields, production, and acreage of each program commodity.

Increased Receipts

Program-induced market price rises in crop year 1982/83 were estimated at $15,058 million (table 23). Participants' share equaled 28.7 percent, or $4,327 million. This amount was 3.4 times as great as the estimated potential deficiency payments participants received. Receipts of nonparticipants increased $10,732 million, or 2.5 times the amount program participants

11/ See Appendix C for more detail on the calculations.

Table 23--Estimated total net benefits of commodity programs in 1982 1/

Item	All farms	Participants	Nonparticipants
		Million dollars	
Amount of benefit:			
Potential deficiency payments	1,399	1,399	0
Payment limitation adjustments	-136	-136	0
Income forgone by reducing acreage	-405	-405	0
Increased receipts derived from market price increases	15,058	4,327	10,732
Increased cost of purchased livestock feed	-2,563	-181	-2,382
Total net benefits	13,354	5,005	8,349
		Percent	
Share of total benefits:			
Potential deficiency payments	100.0	100.0	0
Payment limitation adjustment	100.0	100.0	0
Income forgone by reducing acreage	100.0	100.0	0
Increased receipts derived from market price increases	100.0	22.7	71.3
Increased cost of purchased livestock feed	100.0	7.0	93.0
Total net benefits	100.0	37.5	62.5
		Dollars	
Average benefit per farm:			
Potential deficiency payments	2/ 625	7,594	0
Payment limitations adjustment	2/ -61	-738	0
Income forgone by reducing acreage	2/ -181	-2,197	0
Increased receipts from market price increases	2/ 6,724	23,483	2/ 5,222
Increased cost of purchased livestock feed	-1,144	-980	-1,159
Total net benefits	5,963	27,163	4,063

1/ See text for explanation of total net benefits concept.

2/ These averages can be multiplied by 2.111 to get the average per farm of all farms producing program commodities. Multiply by 2.344 to adjust the average for nonparticipants.

received. The average amount of this benefit was nearly twice as large for participants as for those nonparticipants who produced program commodities: $23,500 per farm versus $12,200 per farm.

The estimate of increased receipts was based on an estimate of the extent to which each program commodity's market price increased during crop year 1982/83 due to the combined effect of the ARP, commodity loan program, and FOR program. The Food and Agricultural Policy Simulator (FAPSIM), an econometric

model (9), was used to estimate shortrun price increases, which averaged 66 percent for all the program commodities combined, excluding rice. No estimate was made of the price increase for rice. The price effects were calculated by first estimating wheat, feed grain, and cotton prices as they actually turned out in 1982, assuming the commodity programs as they actually were. Price estimates were then obtained by assuming that in 1982 there were no deficiency payments, commodity loans, FOR program, or ARP, and that existing Government stocks were isolated from the market. The differences between these second, "free market" prices and the estimated actual historical prices were assumed to be the price change effects of the 1982 commodity programs. The aggregate value of increased receipts was calculated as the product of the estimated price change and 1982 production as reported in the census.

Increased Purchased Feed Costs

Program-induced market price increases for purchased livestock feed were estimated at $2,563 million. Nonparticipants incurred 93 percent of the total cost, or $2,382 million. Participants' share was $181 million, or 7 percent of the total increased cost. Participants produced only 10 percent of total livestock reported in the 1982 census.

How Program Benefits Are Distributed by Sales Class

Sales are a good overall measure of farm size. Hence, examining the distribution of 1982 benefits and how the amount of benefits varied among farms in different sales classes shows a great deal about who the program helped most: large, medium, or small farms. For example, farms with sales of $40,000-$499,999 received 78.4 percent of total net benefits in 1982, large farms with sales of $500,000 or more received 7.5 percent of the benefits, and the smaller farms with under $40,000 in sales received 14.1 percent of the benefits (table 24). Payment limitations had little effect on the distribution of total benefits to these farm classes.

The average amount of per-farm benefit varied from $1,000 for nonparticipant farms with under $40,000 in sales to $243,600 for participant farms with $1 million or more in sales. Payment limitations reduced total benefits of the largest participant farm group by 20 percent. Among nonparticipants with over $1 million in sales, feed cost increases exceeded increased crop receipt increases, which means the average benefit was negative.

Distribution of Benefits Among Sales Classes

Three distinct farm groups, based on sales class, were identified by examining the shares of all farms, all sales, and all program benefits in each of the 10 sales classes used to group census farms. Although the middle-sized group of farms with $40,000-$499,999 in sales constituted only 27.1 percent of all U.S. farms, they received a large share of sales (56.2 percent). This group had an even larger share of total net program benefits (78.4 percent). The second distinct group of farms has $500,000 or more in sales. This group of larger farms constituted only 1.2 percent of all U.S. farms, captured 32.7 percent of all sales, but received a relatively small share of total net program benefits (7.5 percent) compared with their share of total sales. The third distinct farm group has under $40,000 in sales. These smaller farms constituted 71.7 percent of all U.S. farms, but received a much lower share of all sales (11.1 percent) and total net program benefits (14.1 percent) (see tables 24 and 25). Middle-sized farms captured a relatively large share of benefits because they tended to specialize more in program commodities and less in livestock.

Table 24--Percentage of all farms, sales, and program benefits, by sales class, 1982

Item	Share of total-- Farms	Sales	Benefits
		Percent	
Participants and nonparticipants, by sales class:			
$500,000 and over	1.2	32.7	7.5
$40,000-$499,999	27.1	56.2	78.4
Less than $40,000	71.7	11.1	14.1
All farms	100.0	100.0	100.0
Participants, by sales class:			
$500,000 and over	2.5	23.9	14.6
$40,000-$499,999	60.4	69.7	76.9
Less than $40,000	37.1	6.4	8.5
All farms	100.0	100.0	100.0
Nonparticipants, by sales class:			
$500,000 and over	1.1	34.3	3.2
$40,000-$499,999	24.1	53.8	79.5
Less than $40,000	74.8	11.9	17.3
All farms	100.0	100.0	100.0

A much larger percentage of participant than nonparticipant farms have more than $40,000 in sales, and participants' average sales are much larger too. Nonparticipants in the $500,000-and-over class have a higher share of sales than participants in this class, but they have a lower share of program benefits. Nonparticipants' smaller share of benefits in the $500,000-and-over class reflects the high concentration of program-related feed cost increases on farms with $1 million or more in sales. That is, the unique characteristics for farms with $1 million plus in sales strongly influenced the average results for the combined class--those with $500,000 plus in sales.

Payment limitations had little effect on the overall distribution of program benefits since direct payments represented such a small share of total benefits in 1982. The limitations reduced total program benefits for farms with $500,000 or more in sales by only 0.8 percent, from 8.3 percent to 7.5 percent of the total. The limitations reduced the share of participants' benefits for farms in the $500,000-and-over sales class from 16.4 percent to 14.6 percent. The share of deficiency payments in this sales class was reduced by 6.6 percent: from 21.9 percent of the total benefits before adjustment for limitations to 15.3 percent after adjustment (see table 25).

Table 25--Distribution of farms, value of sales, and program benefits, by value of sales class, 1982

Item	Unit	All farms	Farm sales					
			$1 million and more	$500,000-$999,999	$250,000-$499,999	$100,000-$249,999	$40,000-$99,999	Less than $40,000
Participants and nonparticipants combined:								
Total farms	Number	2,239,440	9,190	18,610	57,431	211,305	336,156	1,606,748
Farms with program crops	Do.	1,060,957	4,427	12,241	43,026	171,544	264,582	565,137
Farms without program crops	Do.	1,178,483	4,763	6,369	14,405	39,761	71,574	1,041,611
Amount of sales and benefits:								
Value of farm sales	Mil.dol.	130,738	30,281	12,484	19,443	32,171	21,904	14,455
Direct payments	Do.	1,263	69	124	256	425	282	107
Total net benefits	Do.	13,354	76	922	2,209	4,720	3,560	1,865
Share of all farms:								
Total number	Percent	100.0	.4	.8	2.6	9.4	15.0	71.7
Farms with program crops	Do.	100.0	.4	1.2	4.1	16.2	24.9	53.3
Farms without program crops	Do.	100.0	.4	.5	1.2	3.4	6.1	88.4
Share of sales and benefits:								
Value of farm sales	Percent	100.0	23.2	9.5	14.9	24.6	16.8	11.1
Direct payments	Do.	100.0	5.5	9.8	20.3	33.6	22.3	8.5
Total net benefits	Do.	100.0	.6	6.9	16.5	35.3	26.7	14.1
Total net benefits before adjustment for payment limitations	Do.	100.0	1.1	7.2	16.5	35.0	26.4	13.8
Participants in ARP:								
Total farms	Number	184,252	1,105	3,463	11,824	41,589	57,746	68,525
Amount of sales and benefits:								
Value of farms sales	Mil.dol.	20,404	2,577	2,305	4,015	6,406	3,816	1,284
Direct payments	Do.	1,263	69	124	256	425	282	107
Total net benefits	Do.	5,005	269	462	961	1,724	1,166	423
Share of all farms (Pct)	Percent	100.0	.6	1.9	6.4	22.6	31.3	37.1
Share of sales and benefits:								
Value of farm sales	Do.	100.0	12.6	11.3	19.7	31.4	18.7	6.4
Direct payments	Do.	100.0	5.5	9.8	20.3	33.6	22.3	8.5
Payments before adjustment for payment limitations	Do.	100.0	9.7	12.2	19.9	30.4	20.2	7.6
Total net benefits	Do.	100.0	5.4	9.2	19.2	34.4	23.7	8.5
Total benefits before adjustment for payment limitation	Do.	100.0	6.5	9.9	19.1	33.5	22.7	8.3
Nonparticipants in ARP:								
Total farms	Number	2,055,188	8,085	15,147	45,607	169,716	278,410	1,538,223
Farms with program crops	Do.	876,705	3,322	8,778	31,202	129,955	206,836	496,612
Farms without program crops	Do.	1,178,483	4,763	6,369	14,405	39,761	71,574	1,041,611
Amount of sales and benefits:								
Value of farm sales	Mil.dol.	110,333	27,703	10,178	15,428	25,765	18,089	13,170
Total net benefits	Do.	8,349	-193	460	1,249	2,996	2,394	1,443
Share of all farms:								
Total number	Percent	100.0	.4	.7	2.2	8.3	13.5	74.8
Farms with program crops	Do.	100.0	.4	1.0	3.6	14.8	23.6	56.7
Farms without program crops	Do.	100.0	.4	.5	1.2	3.4	6.1	88.4
Share of sales and benefits:								
Value of farm sales	Do.	100.0	25.1	9.2	14.0	23.4	16.4	11.9
Total net benefits	Do.	100.0	-2.3	5.5	15.0	35.9	28.7	17.3
Total benefits before adjustment for livestock expense	Do.	100.0	5.2	6.7	15.0	32.5	25.2	15.4

Average Benefits per Farm by Sales Classes

The average benefit per farm for participants exceeded the average for nonparticipants in every sales class. Average participant benefits ranged from $6,200 per farm for farms with less than $40,000 in sales to $243,600 per farm for farms with $1 million or more in sales. The average for nonparticipants ranged from a low of $900 for farms with less than $40,000 in sales to a high of $30,400 for farms with $500,000-$999,999 in sales. Nonparticipant farms with $1 million-plus sales incurred an average loss of $23,800 as a result of the program. The reason is they purchased more feed, which raised production costs (table 26).

Total Net Benefits Relative to Net Receipts. I calculated a rough estimate of net receipts from available census data to compare the relative importance of estimated net benefits by sales class. Although total net benefits of small farms were typically smaller in absolute amounts than those of large farms, net benefits constituted a larger share of net receipts on smaller farms. Total net benefits represented 78 percent of net receipts for the small farm participant group, for example, compared with 32 percent for the large farm participant group.

Effects of Payment Limitations. The estimated effect of the $50,000 payment limitation for farms with $1 million or more in sales was to reduce payments, benefits, and net receipts by $60,800 per farm. This sum represents a 49-percent decrease in payments, a 7-percent decrease in net receipts, and a 20-percent decrease in total net benefits.

Payment limitations are estimated to have reduced average income of farms with $500,000 to $1 million in sales by $13,400. This amount represents a 27-percent decrease in payments, a 4-percent decrease in net receipts, and a 9-percent decrease in total net program benefits.

The payment limit reduced income for farms with sales of $250,000-$499,999 by $1,900 on average. This amount represents an 8-percent decrease in payments, a 1-percent decrease in net receipts, and a 2-percent decrease in total net benefits.

Average Deficiency Payments. The imputed potential deficiency payment, after adjusting for payment limitation, ranged from $1,600 per farm for the smallest sized farms (see table 26) to $62,400 for the largest sized farms. The latter estimated average exceeds the $50,000 payment limit, probably because the payment limitation applies to "individuals" and these averages are per-farm measures. Note that, as discussed earlier, more than one individual can receive payments on a single farm. Hence, the average per farm can exceed $50,000 after payment limitations are substracted.

Average Increase in Crop Receipts Due to Price Rises. The increase in receipts due to program-related price increases was the single largest component of total net benefits. The average amount participants realized ranges from $5,200 for the small farm group to $239,800 for farms with $1 million and over in sales. The averages for nonparticipants are much lower because many nonparticipants produce no program crops. Average increases in program crop receipts among nonparticipants who produced program crops ranged from $3,300 in the small sales group to $167,300 per farm for the $1 million-and-over sales group. The average receipts increase among participants exceeds that of nonparticipants in every sales class even when

Table 26--Average amount of benefits per farm, 1982 1/

Item	Deficiency payments 2/ (col. 1)	Price increase 3/ (col. 2)	Forgone income (col. 3)	Feed cost increase (col. 4)	Total net benefits 4/ (col. 5)	Net receipts 5/ (col. 6)
			1,000 dollars			
Participants by sales class:						
$1 million and over	62.4 (123.3)	239.8	24.5	34.2	243.6 (304.4)	770.3 (831.1)
$500,000-$999,999	35.9 (49.3)	115.8	11.8	6.5	133.4 (146.8)	285.2 (298.6)
$250,000-$499,999	21.7 (23.6)	69.0	6.6	2.8	81.3 (83.2)	156.9 (158.8)
$100,000-$249,999	10.2	35.7	3.2	1.3	41.4	74.1
$40,000-$99,999	4.9	17.4	1.6	.5	20.2	32.1
Less than $40,000	1.6	5.2	.5	.1	6.2	7.9
All farms	6.9 (7.6)	23.5	2.2	1.0	27.2 (27.9)	49.8 (50.0)
Nonparticipants by sales class:						
$1 million and over	NA	68.7 (167.3)	NA	92.6	-23.8	981.9
$500,000-$999,999	NA	47.5 (82.0)	NA	17.2	30.4	242.6
$250,000-$499,999	NA	35.4 (51.7)	NA	8.0	27.4	129.7
$100,000-$249,999	NA	20.6 (26.9)	NA	2.9	17.7	62.6
$40,000-$99,999	NA	9.7 (13.0)	NA	1.1	8.6	27.7
Less than $40,000	NA	1.1 (3.3)	NA	.1	.9	2.8
All farms	NA	5.2 (12.2)	NA	1.2	4.1	19.3

NA = Not applicable.

1/ See text and Appendix A, B, and C for detailed explanation of concept and methods.

2/ Numbers in parentheses in column 1 are imputed potential payments before adjusting for payment limitations. All other numbers in the column are values adjusted for payment limitations.

3/ For nonparticipants, the numbers in parentheses in column 2 are averages per farm that actually produced program crops in 1982. The nonparticipants' averages that are not in parentheses are the overall averages for all nonparticipants.

4/ Total net benefits are equal to columns (1) + (2) - (3) - (4). Numbers in parentheses are values before adjustments for payment limitation.

5/ Net receipts are the gross receipts less specific expenses as calculated from census data. Net receipts include potential payments adjusted for payment limitations for participants. Numbers in parentheses in column 6 are values before adjustment for payment limitations.

the average is restricted to producers of program crops. This trend illustrates the fact that nonparticipants in every class earn a smaller share of total sales from program commodities than do participants.

ARP Opportunity Costs. The estimated reduction in total net benefits from participating in ARP, termed forgone income, is equal to nearly one-third of the estimated potential deficiency payment in all but one sales class. Farms with $1 million or more in sales had an average reduction of $24,500 per farm, or 39 percent of their average payments.

Feed Cost Increases. Among nonparticipants, the estimated reduction in net benefits due to increased feed expenditures ranges in value from $100 per farm in the small classes to $92,600 per farm for the top sales class. Among participants, the reduction amounted to $34,200 for the top sales class. Averages are larger for nonparticipants in every sales class, reflecting the much larger share of sales they derive from livestock.

HOW THE FOOD SECURITY ACT OF 1985 MAY AFFECT PROGRAM PAYMENTS

Using the analysis developed in this report, I estimated how the Food Security Act of 1985 might have affected the distribution of program payments according to sales classes. Temporary loan rate reductions under the new law were estimated to have been responsible for one-third of estimated 1986 deficiency and diversion payments of $12.4 billion and for most of the doubling in average payments since 1982. Participating farms with $250,000 or more in 1982 sales received an additional average $23,000 in payments in 1986 because of the loan rate reductions. An additional $47,000 in payments per farm went to participating farms with $1 million or more in 1982 sales because of the loan reduction.

Four provisions of The Food Security Act of 1985 (22) analyzed in this report influenced the amount and distribution of program payments in 1986. The provisions are (1) the freeze of target prices at their 1985 levels, (2) the discretionary power of the Secretary of the U.S. Department of Agriculture to temporarily reduce loan rates established under the act by up to 20 percent, (3) the continuation of the $50,000 payment limitation, excluding from the limitation those payments received as a result of the temporary reduction of the loan rates, and (4) the continuation of voluntary acreage reduction to adjust production.

Farm acreage and production data for 1982 were statistically allocated from the nonparticipant to participant category to be consistent with an assumed 1986 acreage participation rate of 90 percent. This procedure enabled one to estimate the effect of the four provisions. The distributions within each sales class were then used with production and program provision data to estimate 1986 payments for census farms. The 1982 census data had to be used to study 1986 programs by sales class because they are the latest available census data and because USDA's ASCS does not summarize the needed program data by sales class. Agricultural census data for 1987 were collected in 1988 but this data will not be available until later in 1989.

Aggregate Payments Under Alternative Program Assumptions

Direct payments for 1986 were estimated at $12,398 million contrasted with $1,263 million for 1982. The 1986 total is one-third larger than the record $9,295 million for 1983. The estimate includes diversion payments, deficiency

Table 27--Estimated deficiency and diversion payments under alternative program assumptions

Item	Before payment limit	Payment limit savings	After payment limits
		Million dollars	
1982 payments	1,399	136	1,263
1986 payments with:			
Temporary loan rate reduction and 1/--			
Maximum payment limit	13,278	1,819	11,458
Loan payment exclusion	13,278	880	12,398
No temporary loan rate reduction	8,684	880	7,804
Increase in 1986 payments due to temporary loan rate reduction with 1/:			
Maximum payment limit	4,594	939	3,654
Loan payment exclusion	4,594	0	4,594

1/ The U.S. Secretary of Agriculture, under the Food Security Act of 1985, has discretionary power to temporarily reduce wheat and feed grain loan rates by an additional 20 percent. The maximum payment limitation effect assumes no loan payment exclusion. The Food Security Act of 1985 mandates such an exclusion if there is an additional loan rate reduction.

payments, and loan deficiency payments, consistent with the program announced in January 1986 (17,18). These estimates assume that maximum deficiency payment rates were used in 1986 because of low prices. The estimates also reflect estimated Government savings from the $50,000 payment limitation amounting to $136 million in 1982 and $880 million in 1986, assuming no reorganization of 1982 farms between 1982 and 1986 (table 27).

Loan deficiency payments arise from the provision of the law requiring additional compensatory payments to be made to wheat and feed grain producers whenever the Secretary uses his discretionary power to reduce loan rates by up to 20 percent (10). The 1986 program reduced loan rates by the maximum 20 percent. This report estimated that such loan rate reductions resulted in an increase in 1986 payments of $4,594 million. Exempting loan payments from payment limits (which the 1985 act mandated) increases the estimated total payments by $939 million. See Appendix D for a discussion of the methods and assumptions underlying the estimates of direct payments.

Average Direct Payments by Sales Class

Provisions of the Food Security Act of 1985 were estimated to have had a significant affect on the average payments of farms by sales class. Average 1986 payments for most sales classes are more than double their level in 1982 under assumptions used in this report. Most of the increase is due to the

temporary loan rate reduction combined with the special exemption from payment limits for the associated "loan payments." The share of total payments for farms with $250,000 or more in sales is estimated to have declined from 1982 to 1986.

Comparison of 1986 with 1982. Average payments per participating farm increase from $6,856 in 1982 to $13,901 in 1986 (tables 28 and 29) under the assumptions used in this report. Average payments for farms with at least $250,000 in sales rose from $27,425 in 1982 to $60,278 in 1986. The share of all payments these large farms received dropped from 36 percent in 1982 to 26 percent in 1986. This decline in share is caused largely by a decline from 9 percent in 1982 to 6 percent in 1986 in the proportion of all participants in the $250,000-and-above sales categories. The higher participation rate in 1986 brings in more small farms than large farms (see table 29).

Average 1986 payments for farms with $1 million or more in 1982 sales were estimated to be $121,200, up $58,800 (94 percent) from the 1982 level. As in 1982, the calculated average for this class exceeds the $50,000 payment limitation because it is the average per participating farm as defined and counted by the 1982 census.

Effect of Payment Limitations. The estimated reduction in average payments resulting from the $50,000 payment limitation were similar in 1982 and 1986 (table 30). The absolute amount of decrease in the average payment in 1986 was about double the 1982 amount for all farms with 1982 sales of $250,000 and more. The decrease for farms with $1 million or more in 1982 sales was $86,000 per farm in 1986, 41 percent larger than in 1982.

Effect of Loan Payment Exemption. The provision of the 1985 Food Security Act that excludes loan payments from the $50,000 payment limitation increased average payments by an estimated $1,054 in 1986. It also increased the average payment of the farms with at least $250,000 in sales by $10,705. The share of payments these large farms received in 1986 rose from 23 percent to 26 percent because of the loan payment exemption (see table 29).

Effect of Additional Loan Rate Reduction. Average payments for all participants increases $5,151 because of the additional 20-percent loan rate reduction in 1986 (see tables 28 and 29). Farms with at least $250,000 in sales in 1982 had their payments increase by $22,883 from 1982 to 1986. Farms with $1 million or more in 1982 sales received $47,200 more in 1986 payments as a result of the loan rate reduction. With the loan payment exemption in force, the reduced loan rates had little effect on the share of payments that any sales class received.

Table 28--Imputed payments for 1982 and 1986, adjusted for payment limitations

1982 farm sales class	1982 payments		1986 payments with 1/--			
			No loan reductions		Added loan reduction	
	Average per farm 2/	Share of total	Average per farm 2/	Share of total	Average per farm 2/	Share of total
	Dollars	Percent	Dollars	Percent	Dollars	Percent
$1 million and over	62,444	5.5	74,093	3.8	121,246	3.9
$500,000-$999,999	35,872	9.8	45,911	6.6	74,243	6.7
$250,000-$499,999	21,679	20.3	31,166	15.5	49,986	15.7
$100,000-$249,999	10,212	33.6	17,888	35.6	27,999	35.0
$40,000-$99,999	4,883	22.3	8,536	25.5	13,570	25.5
$20,000-$39,999	2,447	6.0	4,240	8.1	6,755	8.1
$10,000-$19,999	1,234	1.8	2,191	3.2	3,522	3.3
$5,000-$9,999	627	.5	1,143	1.2	1,859	1.2
$2,500-$4,999	314	.1	618	.4	1,026	.4
Less than $2,500	101	0	276	.2	474	.2
All farms	6,856	100.0	8,750	100.0	13,901	100.0
$250,000 and over	27,425	35.6	37,395	25.9	60,278	26.3
Less than $250,000	4,847	64.4	6,899	74.1	10,904	73.7

1/ The announced 1986 loan rates have been reduced by 20 percent under a provision of the Food Security Act of 1985 which allows temporary reductions of up to 20 percent.

2/ This value is the average per farm among farms receiving payments. The average for 1982 was $3,566 per farm, based on ASCS records, compared with $6,856 based on the census. The large difference between these two averages is mainly due to a different definition of a "farm" in which there were 61 percent fewer census farms than ASCS farms.

Table 29--Imputed payments for 1982 and 1986 under alternative assumptions, by 1982 sales class

Item	Unit	All farms	Farms with 1982 sales of-- $250,000 and over	Less than $250,000
1982 participants:				
Total	Number	184,252	16,392	167,860
Share of all farms	Percent	100.0	8.9	91.1
1982 payments:				
Share of all farms	Do.	100.0	35.6	64.4
Average per farm	Dollars	6,856	27,425	4,847
1986 participants:				
Total	Number	891,860	54,127	837,732
Share of all farms	Percent	100.0	6.1	93.9
1986 payments with:				
Temporary loan rate reduction:				
Maximum payment limitation--				
Average per farm	Dollars	12,847	49,573	10,475
Share of total	Percent	100.0	23.4	76.6
Loan payment exclusion--				
Average per farm	Dollars	13,901	60,278	10,904
Share of total	Percent	100.0	26.3	73.7
No loan rate reduction:				
Average per farm	Dollars	8,750	37,395	6,899
Share of total	Percent	100.0	26.9	74.1
Increase in average payments due to loan rate reduction with:				
Maximum payment limitation--				
Average per farm	Dollars	4,097	12,178	3,576
Percentage change	Percent	46.8	32.6	51.8
Loan payment exclusion--				
Average per farm	Dollars	5,151	22,883	4,005
Percentage change	Percent	58.9	61.1	58.1
Average farmer benefits from loan rate exclusion	Dollars	1,054	10,705	429

Table 30--Decrease in average payments caused by payment limitations

1982 farm sales class	1982		1986	
	Dollars	Percent	Dollars	Percent
$1 million and over	60,800	49	86,000	41
$500,000-$999,999	13,400	27	23,500	24
$250,000-$499,999	1,900	8	7,000	12

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APPENDIX A--METHODOLOGY FOR MEASURING DIFFERENCES BETWEEN NET FARM RECEIPTS AND NET FARM INCOME

The amount of net receipts, as calculated in this report, differs from the amount that ERS tabulates as its comparable indicator termed "net farm income." The difference in amounts is explained by: (1) the fact that the census, upon which this report bases its estimates, excludes certain conceptual items of income and expenses that are needed to measure net farm income, and (2) the fact that the census reported lower farm receipts and expenditures for computed items included in the census survey than did ERS (app. table 1).

Appendix table 1--Measurement of net farm income or net receipts

Item	ERS data used to measure--		
	ERS concept	Census concept	Census measurement
	Billion dollars		
Gross farm income	161.5	146.0	132.8
Production expenses	136.9	86.8	83.9
Net income or net receipts 1/	24.6	59.2	48.9

1/ Net receipts equal gross receipts less specified expenses. Gross receipts in this report exclude the value of farm products consumed directly in farm households (home consumption), gross rental value of farm dwellings, direct payments other than deficiency payments, value of inventory change, and other farm-related receipts. These excluded gross receipts items totaled $15,565 million, or 10.7 percent of gross income in 1982, according to ERS (15). The specified expenses used in this report exclude expenses for repairing and maintaining capital items, marketing expenses, miscellaneous other operating expenses, dwelling expenses, depreciation, rent, and taxes. These exceeded expenses amounted to $50,103 million, or 36.6 percent of all production expenses in 1982 (15).

APPENDIX B--METHODOLOGY FOR ESTIMATING EFFECTS OF PAYMENT LIMITATION ON FARMS

This appendix presents the method used to estimate the effects of payment limitation on farms. I estimated the effect of the payment limitation by examining the distribution of farms by size of potential payments within each of the sales classes. The payment distributions and total potential payments for each sales class were used to compute the amount by which potential payments for farms with $50,000 or more in payments exceeded the amount they would have been allowed under an assumed $50,000 per farm limitation. 12/ This excess of potential payments calculated as a residual was positive in the top three sales classes, farms with $250,000 or more in sales. The sum for these top three classes was $194.05 million. It was assumed that the limitations only affected these three classes because the residuals were

12/ See appendix table 4 for details.

negative amounts in other classes. The excess payments for the top three classes were adjusted downward by 30 percent to be consistent with the $136 million dollar excess payment total that the U.S. Senate Budget Committee estimated from ASCS records (23). These amounts were subtracted from the total potential deficiency payments in the census tabulations.

The number of farms with $50,000 or more in imputed potential payments overstates the number of farms affected by the payment limitations because there likely was more than one legal deficiency payment recipient per census farm. By definition, no individual would have received more than $50,000 in 1982. Some of the 540 farms with sales in excess of $1 million and total payments of $50,000 or more likely did not have one person associated with the farm whose potential payment exceeded $50,000. The probability of this being true is high, in view of the fact that total ASCS payment recipients (580,606) greatly outnumber census farms (184,252).

The number of census farms with $50,000 or more in payments (3,836) exceeds by 11 percent the U.S. Senate Budget Committee's estimate of persons affected by the payment limitation in 1982 (3,450). The census-based estimate of excess payments ($194 million) exceeds by 43 percent the U.S. Senate Budget Committee's estimate of excess payments ($136 million).

The assumption of cross-compliance may be responsible for some of the relatively large excess payments and large number of farms with high census-based payments. The extent of this bias, however, is likely to be small. The small amount of bias is shown by a comparison of acres idled (as reported in the census) with those computed from census crop acreage on farms participating in the ARP. The computed idled acres exceeded the reported idled acres by only 3.6 percent.

APPENDIX C--METHODOLOGY FOR CALCULATING TOTAL NET BENEFITS OF 1982 FARM COMMODITY PROGRAMS

This appendix presents underlying assumptions, data, and methods used to calculate "total net benefits" of commodity programs for 1982, which amounted to an estimated total of $13,354 million.

Approach and Assumptions Underlying Estimates of Total Net Benefits

The total net benefits of the programs in this report are estimated shortrun changes in net cash farm income attributable to deficiency payments, acreage reduction requirements, and program-induced market price increases for program crops. The estimates are "shortrun" because they correspond approximately to changes in net returns that would have occurred during crop year 1982 if the programs had been eliminated for the 1982 crops. Effects spread out over several years could be quite different because substantial supply, resource, and demand adjustments would occur over time. The estimates are only approximations of this shortrun effect, however, because certain variables in the census data base were held fixed in the analysis, given estimated changes payments, harvested acreage, and prices. The variables held fixed at their actual 1982 level, which would have actually changed in the first year (had the programs been eliminated) were total livestock production, livestock feed input, livestock prices, total crop acres (the sum of harvested acres and acres idled under the program), and crop yields. Ignoring these changes likely results in understated total net benefits.

Effects of the program on the livestock sector are measured in this report only in terms of the increased feed expenditures that occurred because of higher prices for program crops. Implications of changes in the quantities of livestock production and feed inputs for all farms grouped by sales classes and for farms grouped by participation and nonparticipation were not examined. In general, livestock production decreases and livestock product prices increase in response to program-induced higher feed prices attributable to the programs. Dairy prices were held constant in the study, however, because the dairy price support program was assumed to continue with or without the crop programs.

An econometric model, FAPSIM, used to estimate effects of the programs indicated the following changes in livestock net returns in calendar year 1983 in response to a 71-percent program-induced increase in the price of feed: increased cash receipts of $1,222 million (1.8 percent), reduced expenditures for replacement animals of $1,110 million (-9.7 percent), and increased feed costs of $3,494 million (21.7 percent).13/ Modeling results suggest a net income effect for the livestock sector of -$1,162 million, compared with the effect used in this study of -$2,563 million. Thus, the method used in this report may understate the shortrun total net benefits by overstating the livestock income reductions.

The increased cost of feed was computed as the change in the farm value of feed consumed by livestock. The FAPSIM model indicated that the price received for feed grains increased 70.9 percent because of the programs. The I982 feed expenses in the census amounted to $18,535 million. An estimate of the farmers share of prices paid for feed was 33 percent. Thus, the farm value of feed was $6,178 million. The farm value of feed with no programs in effect would have been $3,615 million ($6,128/1.709 = $3,615). The change in value, therefore, was $2,563 million ($6,178 - $3,615 = $2,563).

Program effects on the crop sector were determined by estimating changes in the production and variable expenses of participants and by estimating changes in prices and value of production of all producers of program commodities. No attempt was made to estimate the program-related changes in total acreage or to estimate changes in yield or cost per acre separately for participant and nonparticipant producers of program commodities. Participating in the program actually has increased participants' average yields because the lowest yielding acres on each farm likely have been idled. Nonparticipants may have increased their total acreage and production of program crops in anticipation of program-induced market price rises (2).

Ignoring the above hypothesized changes for crops would tend to understate the net benefits of the crop sector. Analysis of FAPSIM results showing changes in total acres, production, prices, and yields indicates that the total net understatement of benefits for crops in this study was $1,250 million. Virtually all of this understatement, however, is due to differences between the number of census-based acres and the number of acres used in USDA's FAPSIM model rather than to restrictive assumptions used in the analysis.

13/ The assumed price changes were derived from the Food and Agricultural Policy Simulator (FAPSIM). FAPSIM is an econometric model developed in USDA's Economic Research Service (9). See (6,23) for similar calculations for 1978 and 1982.

Estimated net benefits of the programs exclude estimated costs and benefits to consumers or to the Nation as a whole. Also excluded from the calculation of farmers' benefits are estimates of the net returns to farmers for storing grain in the FOR and of disaster payments totals. The census provides no basis for analyzing the distribution of these benefits by sales class.14/ Also excluded are any estimates of the implicit value to farmers of the guaranteed minimum price and minimum return to storage inherent in the target price, commodity loan, and FOR programs.

Methodology

The following discussion presents an algebraic model with variables whose values are shown (app. tables 2, 3, and 4). Appendix tables 2 and 3 show how the total benefits, summarized in table 23, were calculated for each commodity. Appendix table 4 shows how the adjustments for payment limitations were estimated for each sales class. Total benefits for each commodity, excluding payment limitation adjustments and feed cost increases, were distributed by sales classes in proportion to the production of each commodity. The cost of feed price increases by sales classes was based on the distribution of 1982 feed expenditures by sales classes. Total net benefits by sales classes, shown in tables 24, 25, and 26, were then computed as the total of the commodity benefits less adjustments for feed price increases and for payment limitations.

Participant Benefits Model

Total net benefits of participants in the 1982 ARP (BENP) were defined as potential deficiency payments (PAY), plus increased market receipts from program-induced price increases (INCP), less the income forgone by participating in the ARP (OPPCST), less the increased feed expenses due to increased feed grain price increases (INFP), as shown in equations (1) through (11).

BENP = Total net benefits = PAY - LIM + INCP - OPPCST - INFP. (1)
PAY = Potential deficiency payments = DP*QP. (2)
INCP = Increased market receipts = DEL*QP. (3)
OPPCST = Forgone net income = REDP - REXP + CEXP. (4)
INFP = Increased feed expenses = PCTF*FEXP. (5)
REDP = Reduced market receipts = PWO*(1-AR)QPWO. (6)
REXP = Reduced expenses = (VC/QP)(1-AR)QPWO. (7)
CEXP = Conservation costs = (CC/QP)(1-AR)QPWO. (8)
QPWO = Production with no ARP = QP/AR. (9)
VC/QP = Variable cost per unit of production = (VC/A)/YP. (10)
CC/QP = Conservation cost per unit of production = (CC/A)/YP. (11)

14/ Disaster payments amounted to $147 million in 1982. Also, gross storage payments to participants in the FOR amounted to $964 million in 1982, but an unknown amount of actual storage costs borne by farmers should be subtracted from this total to obtain an estimate of net returns from storage in the FOR.

Where:

DP = 1982 deficiency payment rate per unit of production from ASCS (see reference item 13),

QP = 1982 production,

LIM = Adjustment for effect of payment limitations as estimated by the U.S. Senate Budget Committee (see reference item 23),

DEL = Price increase due to the programs estimated with FAPSIM,

PCTF = The estimated increase in feed expenditures due to the program-induced feed grain price increase as a percentage of actual 1982 feed expenses (13.827365 percent),

FEXP = 1982 feed expenses,

PWO = Estimated market price received by farmers with no programs as estimated with FAPSIM,

AR = Percentage of participants' acres planted, equal to 1 minus the actual legal ARP percentage rate of reduction,

VC/A = Variable cost per acre from ERS (14),

CC/A = Conservation cost per acre assumed to be $20 per acre, and

YP = Yield per acre computed from census data.

This model provides an aggregate estimate of the shortrun (1 year) increase in net farm income of participants in the ARP attributable to the 1982 programs, including the ARP, regular commodity loan programs, FOR commodity loan programs, and the target price-deficiency payment program. This interpretation of the total net benefit measure is demonstrated by the following analysis of equation 12, which defines the change in net income.

$$BENP = ((DP + DEL + PWO)QP - LIM - (VC/Q)QP - (CC/Q)(1-AR)QPWO - FIXED - INFP) - (PWO*QPWO - (VC/Q)QPWO - FIXED). \quad (12)$$

$$= DP*QP - LIM + DEL*QP + PWO*QP - PWO*QPWO - (VC/Q)*QP + (VC/Q)QPWO - (CC/Q)(1-AR)QPWO - INFP.$$

Substituting QPWO*AR = QP, from equation (9):

$$BENP = DP*QP - LIM + DEL*QP - PWO(1-AR)QPWO + (VC/Q)(1-AR)*QPWO - (CC/Q)(1-AR)QPWO - INFP.$$

Then, using definitions in equations (2), (3), (4), (6), (7), and (8):

$$BENP = PAY - LIM + INCP - OPPCST - INFP, \text{ as in equation (1).}$$

Where:

FIXED = Fixed costs assumed to be unchanged in 1982 with or without the programs, and

Other variables as defined above for equations (1) through (11).

Nonparticipants' Benefits Model

Total net benefits of nonparticipants in the 1982 ARP (BENN) were defined as increased market receipts from the program-induced price increases (INCN), less the increased feed expenses due to increased feed grain price increases (INFN), as shown in equations (13) through (15), below.

BENN = Total net benefits = INCN - INFN. (13)
INCN = Increased market receipts = DEL*QN. (14)
INFN = Increased feed expenses = PCTF*FEXN. (15)

Where:

QN = 1982 production,

FEXN = 1982 feed expenses, and

Other variables = As defined above for equations (1) through (11).

Appendix table 2--Calculation of potential deficiency payments in 1982

Commodity	Production 1/		Deficiency payment rates 1/	Potential payments			
				Participants		Nonparticipants	
	Participants	Nonparticipants		Amount 2/	Share	Amount 2/	Share
	1,000 units		Dollars per unit	Million dollars	Percent	Million dollars	Percent
Wheat	848,918	1,516,762	0.50	424.5	30.7	758.4	31.4
Corn	1,771,021	5,690,901	.15	3/ 283.7	19.2	3/ 963.5	35.3
Sorghum	302,723	425,920	.18	54.5	3.9	76.7	3.2
Barley	179,922	288,796	.40	72.0	5.2	115.5	4.8
Oats	104,475	402,623	4/	4/	4/	4/	4/
Rice	70,381	81,085	2.71	190.7	13.8	219.7	9.1
Cotton	5,489	5,764	68.11	373.9	27.1	392.6	16.2
Total	--	--	--	1,399.2	100.0	2,526.4	100.0

-- = Not applicable.

1/ Production units on which this table is based are hundredweight for rice, bales for cotton, and bushels for the other commodities. The payment rate for cotton is 13.9¢ per pound or $68.11 per bale. Production of corn is corn for grain.

2/ This item equals production times the deficiency payment rate.

3/ Corn payments for corn for grain were increased to reflect the payments associated with corn planted for silage. The adjustment multiplier was based on the ratio of total corn acres to corn-for-grain acres in each of 10 sales classes.

4/ No payments were made for oats in 1982.

Appendix table 3--Benefits of commodity programs in 1982

Item	Name	Units	Wheat	Corn 1/	Sorghum	Barley	Oats	Cotton 2/	Rice	Total
Participant's benefits:										
Potential deficiency payment	PAY	Thous.dol.	424,458	283,678	54,492	71,969	0	373,877	190,733	NA
Percentage of participant acres planted	AR	Pct.	.85	.90	.90	.90	.90	.85	.85	NA
Production	QP	Thous.units	848,918	1,771,021	302,723	179,922	104,475	2,689,768	70,381	NA
Price increase due to program	DEL	Dol.	1.4100	1.1200	1.0500	1.3800	.2900	.1544	NA	NA
Cost per acre:										
Variable cost	VC/A	Do.	52.2200	132.1500	67.9200	57.6400	42.8000	210.4200	240.1200	NA
Conservation costs	CC/A	Do.	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	NA
Yield per acre	YP	Units	32.9811	111.8237	58.2087	52.2068	55.0458	526.6064	48.6792	NA
Cost per unit:										
Variable costs	VC/QP	Do.	1.5833	1.1818	1.1668	1.1041	.7775	.3996	4.9327	NA
Conservation costs	CC/QP	Do.	.6064	.1789	.3436	.3831	.3633	.0380	.4109	NA
No program variables:										
Production	QPWO	Thous.units	998,727	1,967,801	336,358	199,914	116,084	3,164,433	82,801	NA
Market price	PWO	Dol.	2.1400	1.5600	1.4700	.8400	1.2000	.4366	8.1100	NA
Feed expenses	FEXP	Thous.dol.	--	--	--	--	--	--	--	1,305,906
Total net benefits:										
Payments	PAY	Do.	424,458	283,678	54,492	71,969	NA	373,877	190,733	1,399,207
Increased market receipts	INCP	Do.	1,196,975	2,118,130	317,859	248,293	30,298	415,300	NA	4,326,854
Forgone income from ARP	OPPCST	Do.	174,239	117,061	21,754	2,379	9,122	35,601	44,566	404,722
Reduced market receipts	REDP	Do.	320,591	327,806	49,445	16,793	13,930	207,239	100,728	1,036,531
Reduced expenses	REXP	Do.	237,198	248,328	39,248	22,072	9,026	189,665	61,265	806,801
Conservation costs	CEXP	Do.	90,846	37,583	11,557	7,659	4,218	18,027	5,103	174,992
Increased feed expenses	INFP	Do.	--	--	--	--	--	--	--	180,572
Adjusted for payment limits	LIM	Do.	NA	NA	NA	NA	NA	NA	NA	136,000
Total net benefits	BENP	Do.	1,447,193	2,284,747	350,597	317,882	21,176	753,576	146,167	5,004,767
Nonparticipant's benefits:										
Production	QN	Thous.units	1,516,762	5,690,901	425,920	288,796	402,623	2,824,378	81,085	--
Feed expenses	FEXN	Thous.dol.	--	--	--	--	--	--	--	17,229,440
Total net benefits:										
Increased market receipts	INCN	Do.	2,138,635	7,194,373	447,216	398,538	116,761	436,084	NA	10,731,607
Increased feed expenses	INFN	Do.	--	--	--	--	--	--		2,382,378
Total net benefits	BENN	Do.	2,138,635	7,194,373	447,216	398,538	116,761	436,084	NA	8,349,230

-- = Not applicable. NA = Not available or not computed.

1/ Corn benefits were increased by 6.78517 percent for participants and by 12.874 percent for nonparticipants to include benefits associated with acres used for corn silage.

2/ Assumes 490 pound bales of cotton.

Appendix table 4--Calculating what effect payment limitations have on the distribution of participant deficiency payments, by sales class

Item	Unit	Farm sales class: $1 million or more	$500,000-$999,999	$250,000-$499,999	$100,000-$249,999	Less than $100,000	All farms
Farms with potential deficiency payments:							
$50,000 or more	Number	540	1,145	1,652	495	4	3,836
$25,000 to $49,999	Do.	185	662	1,779	3,349	348	6,323
$10,000 to $24,999	Do.	228	986	3,915	9,650	7,168	21,947
$5,000 to $9,999	Do.	78	367	2,807	11,433	15,621	30,306
$2,500 to $4,999	Do.	30	170	1,106	10,370	26,791	38,467
Less than $2,500	Do.	25	112	490	5,847	69,541	76,015
Unknown payment 1/	Do.	19	21	75	445	6,798	7,358
All farms	Do.	1,105	3,463	11,824	41,589	126,271	184,252
Potential deficiency payment before payment limitation: 2/							
Total amount with no silage	Thous. dol.	134,573	169,103	275,529	418,559	383,418	1,381,182
Total amount with silage	Thous. dol.	136,230	170,644	278,678	424,690	338,965	1,399,207
Per farm amount	Dollars	123,285	49,276	23,569	10,212	3,080	7,594
Share of total	Percent	9.7	12.2	19.9	30.4	27.8	100.0
Estimated deficiency payments for farms with payments of:							
Less than $50,000 3/	Thous. dol.	11,656	45,610	161,038	426,406	443,040	1,087,750
$50,000 or more --							
Residual 4/	Do.	122,917	123,493	114,491	-7,847	-59,622	293,432
Maximum 5/	Do.	27,000	57,250	82,600	24,750	200	191,800
Difference 6/	Do.	95,917	66,243	31,891	7/	7/	194,051
Total saving 6/	Do.	67,229	46,420	22,351	7/	7/	136,000
Potential deficiency payment adjusted for limitation 8/							
Total amount	Thous. dol.	69,001	124,224	256,327	424,690	388,965	1,263,207
Per farm amount	Dollars	62,444	35,872	21,679	10,212	3,080	6,856
Share of total	Percent	5.5	9.8	20.3	33.6	30.8	100.0

1/ These farms were not classified by size of potential payment in the tabulation process.

2/ See appendix table 2 for method of calculation. The amount with silage includes estimated payments associated with corn acres planted for silage.

3/ This item was calculated as the sum of the products of the assumed class mean and the number of farms in each of the five smallest payment classes. The assumed mean was the midpoint of each class interval.

4/ Residual payments are the total amount of potential deficiency payments for the class "with no silage" less the calculated amount for the farms with less than $50,000 in payments.

5/ Assuming a $50,000 actual average payment for the farms with $50,000 or more in potential payments. Fifty thousand dollars is assumed to be the maximum amount allowed after payment limitation adjustments, as a first approximation.

6/ The difference between the residual payment and the maximum payment represents the first approximation of payment reduction due to the payment limitation. This difference was adjusted to sum to the total savings of $136 million calculated by the U.S. Senate Budget Committee (23).

7/ Since the residual amount of potential payment was negative, it was assumed that the payment limit had no quantifiable effect in this class.

8/ Amount of payment before limitations, "with silage," less the Government's total savings due to payment limitations.

APPENDIX D--METHODOLOGY FOR ESTIMATING DIRECT PAYMENTS FOR 1986 WITH AND WITHOUT TEMPORARY LOAN RATE REDUCTIONS

This appendix discusses the methods and assumptions underlying the estimates of 1986 direct payments which are modified by temporary loan rate reductions.

Deficiency and Diversion Payments

I computed payments for 1986 as 1982 census production, adjusted for the assumed 1986 rate of participation and for the acreage reduction percentage requirements, times the assumed payment rate per unit (crop by crop), less an aggregate adjustment for payment limitations. The 1986 deficiency payment rates per unit of production were assumed to be the maximum possible, equaling the differences between the target prices and the loan rates. Payments with or without additional loan rate reductions were obtained by simply varying the loan rate to change the payment rate. Producers of wheat and feed grains in 1986 also received diversion payments on 2.5 percent of their base acres (app. table 5).

Production on Participating Farms in 1986

I estimated the amount of production of each crop eligible for 1986 payments (86QP86) for each of 10 farm sales classes from the estimated amount of 1982 production on farms participating in 1986 (82QP86). Given the 1982 production on such farms (explained below), 1986 production was computed as:

$$86QP86 = (1 - red86)*(82QP86/(1 - red82)).$$

Where:

red86 = The required percentage reduction rate for a crop in 1986, and
red82 = The required percentage reduction rate for 1982.

The 1982 production of farms participating in the 1986 ARP, by 1982 sales classes, was assumed to include the reported production on farms participating in the 1982 ARP (82QP82) plus a share (K) of the production of non-participants in 1982 (82QN82), or:

$$82QP86 = 82QP82 + K*(82QN82). \quad (17)$$

This procedure was also used to derive the number of participating farms in 1986 by sales classes.

1982 Nonparticipants' Acreage Participating in 1986

Given an estimated rate of participation for total acres in 1986 (AR86, as explained below), total 1982 acres (82A), and the total acres participating in 1982 (82AP82), the total 1982 nonparticipant's acres participating in 1986 in each value of sales class (N82AP86) was computed as:

$$N82AP86 = AR86*82A - 82AP82 \quad (18)$$

The 1986 share (K) was then computed as:

$$K = N82AP86/82AN82 \quad (19)$$

Appendix table 5--Program variables and assumptions used for 1982 and 1986 direct payments 1/

Item	Unit	Wheat	Corn	Sorghum	Barley	Oats	Cotton	Rice
1982 program:								
Required acreage reduction	Percent	15	10	10	10	10	15	15
Deficiency payments--								
Rate per unit	Dollars	.50	.15	.18	.40	0	.139	2.71
Amount 2/								
Census-based 2/	Mil. dol.	424	284	54	72	0	374	191
Actual USDA	Do.	479	287	62	59	0	661	311
Ratio of census/USDA	Percent	89	99	87	122	0	57	61
1986 programs:								
Required acreage reduction 3/	Do.	25	20	20	20	20	25	35
Target price 3/	Dol./Unit	4.38	3.03	2.88	2.60	1.60	.81	11.90
Loan rates--								
No additional loan reduction 4/	Do.	3.00	2.40	2.28	1.95	1.24	.55	7.20
Additional loan reduction 3/	Do.	2.40	1.92	1.82	1.56	.99	.55	7.20
Maximum deficiency payment per unit:								
No additional loan reduction 4/	Do.	1.38	.63	.60	.65	.36	.26	4.70
Additional loan reduction 3/	Do.	1.98	1.11	1.06	1.04	.61	.26	4.70
Diversion rate, dollars per unit diverted 5/	NA	1.10	.73	.65	.57	.36	NA	NA

NA = Not applicable.

1/ Production units on which this table is based are pounds for cotton, hundredweight for rice, and bushels for all other commodities shown.

2/ The 1982 census-based estimate is described in the text. Both the census-based and actual amounts are values before payment limit effects.

3/ Program provisions announced for the 1986 program on Jan. 13, 1986.

4/ Uses the minimum loans for 1986 as specified in the Food Security Act of 1985.

5/ As announced for the 1986 program on Jan. 29, 1986, for 2.5 percent of base acreage.

Where:

82AN82 is the total 1982 acres of target price commodities in a sales class not participating in the 1982 ARP.

1986 Rate of Participation for Acres

The "rate of participation" is the percentage of total acres in each sales class estimated to be on a farm that participated in 1986. The 1986 rate of participation for total acres (AR86) was estimated from the 1982 rates by graphic interpolation using a curvilinear relationship between the overall rate of participation and participation rates for specific classes. This relationship for each class was based on three plotted points, where the rate for each class was shown on the Y axis and the overall rate was shown on the X axis. One point is the origin where all classes have rates equal to zero percent. A second point is where all classes have rates equal to 100 percent. The third point represents the 1982 rates by sales class from the census, where the overall rate of participation for acres was 35 percent and the rates for individual classes varied from 12 percent in the smallest sales class to 40 percent for farms with $500,000-$999,999 in sales.

Given the above relationships, the 1986 rates of participation were then determined by assuming an overall rate of 90 percent (8). This overall rate is much higher than the 1985 rate of 69 percent. Participation was expected to be quite high in 1986 because of continued weak demand, greatly reduced loan rates, expected low market prices, and target prices frozen at 1985 levels. The resulting 1986 sales class rates vary from 75 percent in the smallest class to 93 percent in the next-to-largest class.

1986 Payment Limitations

The estimated savings from payment limitations in 1986 was $880 million, assuming no loan rate reduction. Savings from the limitations amounted to $1,819 million with loan rate reduction assumed but with no payment limit exemption for the extra loan payments assumed. This is the "maximum payment limit" savings shown in tables 27 and 29. Assuming the payment limit exclusion, the Government savings from the limitation with the announced reduced loan rates would be the same as with no loan rate reduction, or $880 million. Thus, the payment limit exclusion gave large farmers an additional $939 million.

The effects of payment limitations in 1986 were determined by first computing the aggregate and per farm amount of payments for 1986 for each value of sales class based on the estimated amount of production on farms participating in the 1986 ARP, as discussed earlier in this appendix. The indicated changes in the per farm payments by class between 1982 and 1986 were then used to adjust the 1982 size distribution of payments within each sales class to determine the estimated number of farms with more than and less than $50,000 in payments per farm in 1986. Given this information, the effect of the payment limit for 1986 was determined in the same way as for 1982.

Changes in the payment size distributions within sales classes between 1982 and 1986 reflect only the estimated changes in the average payments per 1982 farm for each class. The actual effect of farms reorganizing themselves into different size units to avoid the effect of the payment limits or for other reasons is not reflected in these estimates.

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