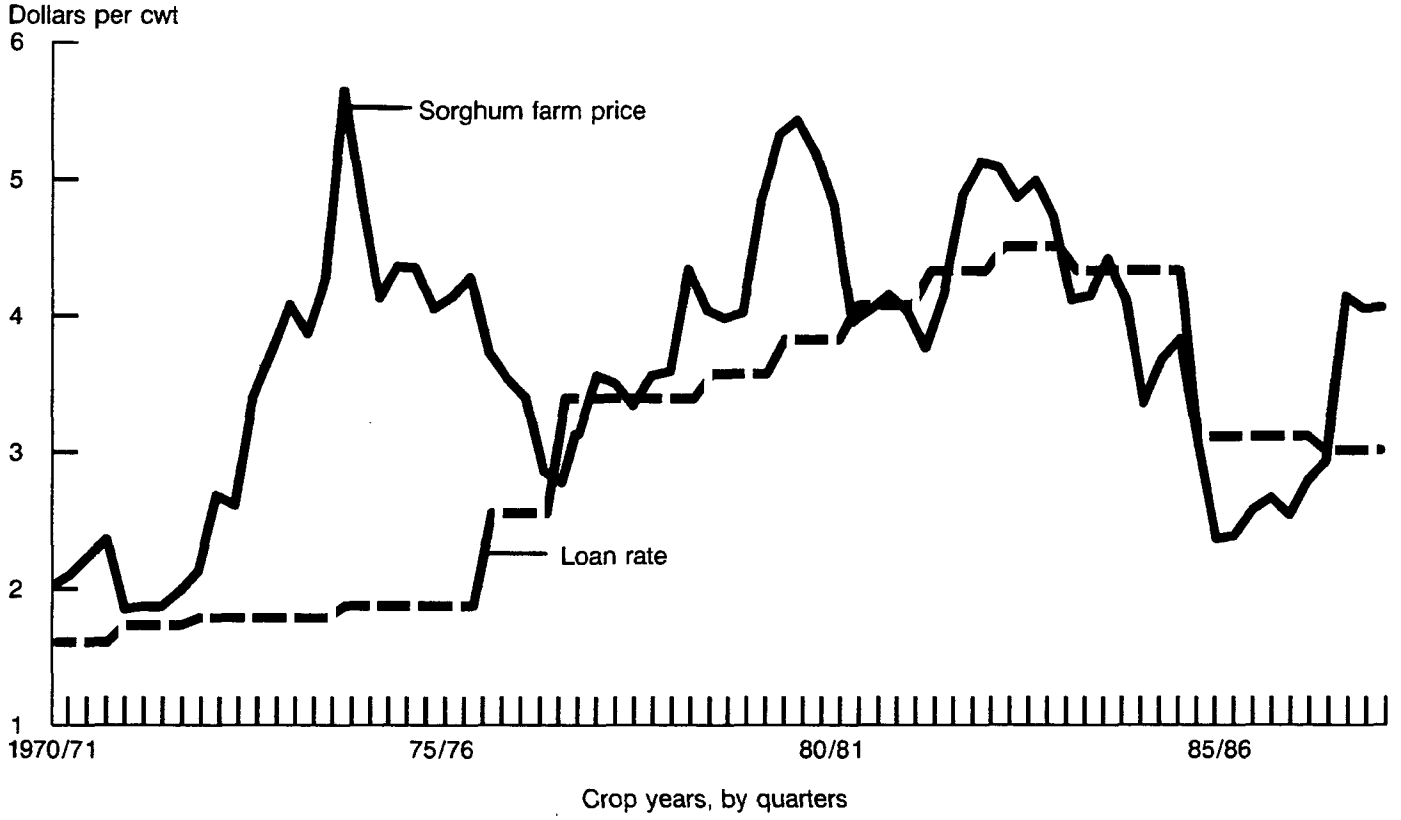
Figure 3

Sorghum farm prices and loan rates



1970's. The payment-in-kind program and drought reduced production of sorghum and corn significantly in 1983, and sorghum prices strengthened.

The drought and payment-in-kind program in 1983 temporarily curtailed the growth in sorghum stocks and reduced the stocks-to-use ratio from 61 percent in 1982/83 to 45 percent in 1983/84. Record yields during 1984-86 together with large sorghum plantings in 1984-85, however, set the stage for a stocks buildup. Stocks of sorghum totaled 743 million bushels at the end of 1986/87, enough to meet the demands of domestic use and exports. The stocks-to-use ratio reached 95 percent or higher in the marketing years of 1986/87 and 1987/88. The excessive stocks buildup and a 25-percent decline in the announced loan rate in 1986/87 caused a downturn of sorghum prices in the mid-1980's. The 1988 drought resulted in a large cutback in feed grain production and an upturn in sorghum prices.

Costs and Returns

While sorghum prices trended down from $2.36 per bushel in 1975/76 to $1.82 in 1977/78, total cash expenses of growing sorghum remained high. As a result, real returns above cash expenses declined from $1.76 a bushel to $1.35 (in 1982 dollars), causing financial stress for many sorghum farmers (table 11). Cash expenses of producing sorghum accelerated between the late

Table 11--Returns above cash expenses in U.S. sorghum production, 1975-87 crop years

Crop year	Crop value 1/	Direct Government payments 2/	Gross income	Total cash expenses 3/	Returns above cash expenses 4/ Total Nominal	Total Real ($1982)	Per bushel Nominal	Per bushel Real ($1982)
	Million dollars						Dollars per bushel	
1975	1,775	26	1,801	1,016	785	1,324	1.04	1.76
1976	1,450	38	1,488	1,016	472	748	.66	1.05
1977	1,434	180	1,614	906	708	1,052	.91	1.35
1978	1,470	257	1,727	890	837	1,159	1.15	1.59
1979	1,889	111	2,000	1,016	984	1,252	1.22	1.55
1980	1,703	95	1,798	1,162	636	742	1.10	1.28
1981	2,093	342	2,435	1,493	942	1,002	1.08	1.14
1982	2,104	179	2,283	1,565	718	718	.86	.86
1983 5/	1,337	622	1,959	1,331	628	604	1.29	1.24
1984	2,009	192	2,201	1,742	460	427	.53	.49
1985	2,162	258	2,420	1,654	766	691	.68	.61
1986	1,285	613	1,898	1,278	620	544	.66	.58
1987	1,260	733	1,993	1,012	980	833	1.32	1.12

1/ Value of sorghum produced for grain; production times season-average price received by farmers.
2/ The sum of deficiency, diversion, disaster, and farmer-owned reserve storage payments.
3/ Expenses per planted acre times acreage planted for grain; expense of maintaining conserving use acreage is 20 percent of cash expenses times the acreage. Acreage planted for grain was taken to be total planted acreage less acreage harvested for silage and forage. Cash expenses for 1975-79 were computed by adjusting 1980 per acre cash expenses by the percentage changes in variable production costs (excluding labor) during 1975-80. Variable production costs were reported by USDA prior to the reporting of total cash expenses, for which 1980 is the first year of available data.
4/ The difference between total gross income and total cash expenses, and this difference divided by quantity produced and deflated using gross national product implicit price deflator, 1982=1.0.
5/ Government payments include 170 million bushels of payment-in-kind program entitlements valued at $2.74 a bushel, the estimated season-average farm price.

1970's and 1981/82 when inflation eased. Weak sorghum prices and high production costs reduced real returns above cash expenses to $1.14 per bushel in 1981/82 and $0.86 in 1982/83. Farmers' returns per bushel nearly doubled in 1983/84 as a result of higher prices and payment-in-kind program entitlements.

Declining sorghum prices in the 1984 and 1985 crop years lowered real returns above cash expenses to sorghum producers. Higher market prices and Government payments in 1987/88, however, improved producers' returns position.

Sorghum farmers' returns, while subject to changing economic conditions, also depend on the size of the operation. Based on a previous ERS study, total farm production costs (including variable production expenses, machinery depreciation and interest, and operator and family labor, but excluding land rent per dollar of total farm receipts, declined as farm size increased from 100-249 harvested acres of sorghum to 500-999 acres. Beyond 1,000 acres, no additional decline in cost was evident. Large commercial sorghum farms were more cost efficient than small farms and likely had higher returns above cash expenses per bushel than the average U.S. sorghum farm. The gain

in efficiency was substantially reduced or leveled for farms reaching 500-999 acres.

History of Sorghum Programs

This section highlights changes in history of sorghum programs, issues, and economic settings which caused the changes.

Origins to 1955

Today's farm programs originated in the 1920's. After World War I, U.S. exports of crops fell, lowering prices and farm incomes. The Government had demonstrated some success in controlling trade and prices of grain during World War I, and this partly inspired farm sector demands for Government involvement in solving the problems of the 1920's. A major proposal of the 1920's was the McNary-Haugen Plan, which suggested boosting exports using a two-price market: managed domestic prices and exports sold at world prices. The President vetoed the plan twice. The Agricultural Marketing Act of 1929 attempted to support prices without production control. The onset of the depression caused farm prices to fall 50 percent between 1929 and 1932. Without production control, the act's funds available for purchasing surpluses were soon exhausted.

The Agricultural Adjustment Act of 1933 attempted to restore farm purchasing power to the 1909-14 level. The act designated wheat, cotton, field corn, hogs, rice, tobacco, and milk as basic commodities. Although amendments to the 1933 Act included sorghum as a basic commodity in 1934, it was not included in the early 1930's acreage reduction programs, such as those for wheat, corn, and cotton. In January 1936, the Supreme Court invalidated the 1933 Act. Although sorghum has been subject to Federal farm programs since the early 1930's, production controls were not imposed until 1960, and sorghum prices generally were supported at a lower percentage of parity--the price established to provide a level of purchasing power equivalent to an earlier period--than were other basic commodities.

In the Agricultural Adjustment Act of 1938, sorghum was included under commodities eligible for "permissive" support--left to the discretion of the Secretary of Agriculture--rather than mandatory. Sorghum was not included among the allotments, marketing quotas, and mandatory nonrecourse loan provisions established for other crops, such as corn, wheat, and cotton. Neither was sorghum included under the Steagall Amendment which required support of at least 85 percent of parity for nonbasic commodities. Sorghum was also not counted among the commodities receiving mandatory support at 90 percent of parity under the Agriculture Act of 1948 or among those receiving mandatory support under the Agricultural Act of 1949. Sorghum was simply listed as a nonbasic commodity that was authorized to receive support at up to 90 percent of parity, depending on availability of funds. However, sorghum producers received indirect benefits from programs for other crops during these early years.

Sorghum's substitutability with corn and wheat meant that programs aimed at raising the prices of those crops also supported sorghum prices.

From a Nonbasic Commodity to Production Control in the 1960's

The 1956-60 period was significant for sorghum from both production and policy standpoints. Production rose threefold and Government-owned sorghum stocks increased significantly. As a result, sorghum programs became aligned with those for corn. Since 1961, sorghum has been subject to virtually the same provisions as corn.

Following the Korean War, the high price supports that had been provided for basic commodities plus the rapid adoption of new and improved production technology resulted in commodity surpluses, particularly for corn, wheat, and cotton. Wheat, cotton, and rice production were subject to mandatory marketing quotas which reduced their acreages. Corn was under acreage allotments. Each farm was assigned an allotment based on planting history. Planting within the allotment was not mandatory, but it was required for eligibility for price support loans. Since the allotments and quotas were used to lower the acreage of allotment crops, farmers switched to other commodities in order to use their cropland.

Sorghum was used as a substitute in the wheat areas and in the southwestern Corn Belt. Soybeans were substituted in the Corn Belt and some cotton areas. The increase in sorghum acreage was accompanied by increasing use of hybrid sorghums. Sorghum plantings rose from an average of 13.8 million acres during 1949-53 to 22.6 million acres during 1954-58. Between 1954 and 1958, sorghum yields increased from 20 bushels an acre to 35 bushels. Carryover stocks jumped from under 100 million bushels in 1956 and 1957 to over 300 million bushels in 1958. Surplus sorghum stocks continued to grow every year through 1960/61, when carryover stocks exceeded 700 million bushels.

The soil bank program, a title of the Agricultural Act of 1956, authorized long-term land diversions under its conservation reserve program and annual diversions for wheat, corn, rice, cotton, and peanuts and several types of tobacco under its acreage reserve program. The 1956 Act made price supports mandatory for sorghum at 76 percent of parity for the 1956 crop and not less than 70 percent of parity for the 1957 crop. By 1957, production controls on other crops caused sorghum acreage to soar to nearly 27 million acres.

The Agricultural Act of 1958 required that, beginning with the 1959 crop, support would be made available for oats, barley, rye, and sorghum at a price level "determined to be fair and reasonable in relation to the level of support made available for corn." In effect, the 1956 and 1958 Acts provided a mandatory, corn-related price support program for sorghum.

The authority for marketing quotas for corn was repealed by the Agricultural Act of 1954. In 1958, farmers voted out corn allotments in a referendum. In 1959 and 1960, all feed grains had prices supported through commodity loans but no production controls. The corn and sorghum loan rates were lowered in 1959 and 1960 from the 1958 level. Despite the drop, corn acreage increased nearly 10 million acres in 1959. Sorghum acreage was virtually unchanged. Without prices below support levels, demand could not accommodate the increasing feed grain production, and the Government acquired the stocks put up as collateral for the price support loans. During 1960-63, Commodity Credit Corporation (CCC) ending stocks exceeded 600 million bushels in each year (app. table 3). The size and cost of these rapidly accumulating surpluses became a public issue.

The Feed Grain Act of March 1961 provided for voluntary acreage diversions for the 1961 corn and sorghum crops. Farmers were eligible for price support loans only after diverting to conserving use 20 percent of a farm's base acreage, established from acreage in 1959 and 1960. Loan rates were also raised.

This voluntary diversion program set the basic pattern for feed grain programs used since then. A price support payment in addition to the diversion payment was introduced in 1963, a step in separating income and price support. The payment was set at 18 cents per bushel for corn and at a comparable rate for sorghum and barley. After 1961, sorghum yields continued to trend up. But, with acreage diversion, production growth was less than use, and stocks declined every year through 1966/67.

The Food and Agriculture Act of 1965, the first omnibus farm law, set provisions for crops and dairy for 4 years. Price support loans, direct payments, and diversion payments for sorghum were continued. A cropland adjustment program was added to retire land under 5- and 10-year contracts.

Feed Grain Programs in the 1970's

The Agricultural Act of 1970 attempted to address producer concerns about the effects of program restrictions on their production patterns and public concerns about the high cost of programs and large payments to individual producers. It introduced the set-aside concept and imposed a $55,000 per-person, per-crop payment limit. The limitation applied to all direct payments--except commodity loans or purchases--received by producers of upland cotton, wheat, and feed grains, which included sorghum.

Under the set-aside concept, a participating producer had to idle a stated percentage of the feed grain base, wheat allotment, or cotton allotment to be eligible for direct payments or the loan program. Having done that, farmers were free to plant remaining land to any nonquota crop. Thus, set-aside allowed more flexibility in the production mix, but it also reduced the effectiveness of acreage control for a specific crop.

The 1970 Act provided price support payments to participating farmers on one-half of their feed grain bases. The corn payment was the higher of $1.35 per bushel or 70 percent of the parity price less the average market price for the first 5 months of the marketing year. Sorghum supports were set in relation to corn. Thus, the 1970 Act introduced the concept of a variable payment rate that depended on the market price received. The support level remained tied to the parity concept.

By 1973, the last year under the 1970 Act, demand for U.S. grain was high due to world crop shortages and to world economic activity built on available credit and a weakened U.S. dollar. Devaluation of the dollar in the early 1970's made U.S. commodities cheaper in terms of foreign currencies. The huge stockpile of grains on hand at the beginning of the 1960's was completely liquidated. Sorghum stocks were reduced by 1970.

The focus for farm legislation had changed from a preoccupation with support levels and production adjustment to a focus on providing farmers with a price and income "safety net" in case prices were to weaken in the face of bumper crops or a lull in export demand. Sorghum exports did not surge as was the case for wheat and corn. But since sorghum readily substituted as a domestic feed grain, the strong grain prices extended to sorghum.

The major new features in the Agriculture and Consumer Protection Act of 1973 were target prices and a disaster payments program. The target price was not tied to parity prices; it was to be adjusted based on an index of production costs and on yields. Demand conditions were not a factor in the determination of target prices. The disaster payments program provided direct payments to producers who were unable to plant or suffered low yields because of natural disaster. This was of particular interest to sorghum producers, because sorghum was typically planted in areas subject to drought. Many counties in sorghum-producing areas were not eligible for Federal crop insurance because of their high risk. Loan rates and target prices for sorghum continued to be set in relation to corn. The 1973 Act, which covered the 1974-1977 crops, had set-aside provisions, but they were never used.

The Food and Agriculture Act of 1977 was debated during the fourth consecutive year of declining farm income. Prices and income had fallen to safety-net levels provided by the 1973 Act. Part of the debate was whether loan and target levels were high enough and whether they provided sufficient protection against rising production costs, which were much higher than in the 1950's and 1960's.

Cost inflation was addressed by using actual crop production costs to set and adjust target prices. The target price for sorghum continued to be established at a level that would be "fair and reasonable" in relation to the target price for corn. However, this was reinterpreted to mean that target prices for other feed grains including sorghum would be fair and reasonable if based on the same components of cost of production as were

used for corn. On this basis, the 1978 corn target price was set at $2.10 a bushel and sorghum, at $2.28. Under the traditional 95-percent feed-value relationship, the sorghum target would have been $2.00 a bushel. However, the sorghum loan rate was maintained at the feeding value level or $1.90 a bushel, compared with $2.00 for corn.

The 1977 Act provided that current planted acreage, rather than allotments, would serve as the base for deficiency payments and for any set-aside acreage. An "allocation factor" could be used to reduce deficiency payments by a maximum of 20 percent if farmers in the aggregate exceeded a national program acreage. The national program acreage represented the acreage needed to meet anticipated domestic and export demand for the commodity.

The 1977 Act also created the farmer-owned reserve (FOR) to promote greater stability in prices and supplies. Corn, sorghum, barley, and oats were all included. The reserve provided extended loans of 3 to 5 years duration and storage payments. Stocks rose following the export surge from 1972/73 to 1974/75 which depleted surpluses. It was again possible that CCC could acquire large inventories through nonrecourse loans. The farmer-owned reserve helps to prevent or delay this acquisition because the grain under FOR loans is farmer owned. This allows farmers to benefit when prices rise. Under the regular loan program, farmers who forfeit grain to the CCC have no opportunity to benefit from rising prices. Crops under FOR loans cannot be redeemed and sold by the farmer until farm prices reach a specified level, known as the release or trigger price.

Programs in the Early 1980's

Farm income rebounded in 1978 and 1979 and then declined in 1980 and 1981. As a result, the Agriculture and Food Act of 1981 was also debated in an atmosphere of declining farm income. The issues of adequate levels of price and income supports and appropriate adjustments in support levels resurfaced. There was dissatisfaction with cost of production as an adjuster of target prices. The set-aside programs in 1978 and 1979 had not proven effective in reducing crop acreage, particularly in 1978 when sorghum growers idled 1.4 million acres and plantings still rose. The farmer-owned reserve had been popular in the late 1970's but it had not provided the expected stability. Grain held in the reserve tended to substitute for grain that would have been stored anyway. Officials used the reserve as an additional method to enhance prices and to encourage program participation. Grain placed in the reserve qualified for a reserve loan rate greater than the regular loan rate. This raised the question of whether the high reserve loan interfered with the buffer stock objective of the farmer-owned reserve and whether it gave price signals to farmers to maintain production even though supplies were excessive.

To address the issue of effective acreage reduction, the 1981 Act authorized acreage reduction and paid land diversion in addition to a continuation of the set-aside provision. Operation of the

acreage reduction program and paid land diversion requires establishment of a crop-specific base acreage, and acreage reduction is from that base. Idle acreage plus planted acreage cannot exceed the base acreage for a program participant. Acreage reduction was used for sorghum in 1982, 1983, and 1984 (table 12). The corn and sorghum bases were combined into one base and farmers could interchange the crops.

The 1981 Act mandated minimum loan rates and minimum target prices directly for corn and indirectly for sorghum for each of the 4 years covered. The cost of production formula was eliminated as a method to adjust target prices. The yearly adjustments in support levels that Congress wrote into the 1981 Act have turned out to exceed the actual rate of inflation, which was sharply reduced. When cost of production was used to set target prices, sorghum targets exceeded corn targets. For example, the sorghum target price was $2.55 a bushel in 1981/82 and the corn target price was $2.40. However, the market has valued sorghum at a lower price than corn, which has been reflected in the sorghum target prices set since 1982.

The acreage reduction programs from 1982 to 1984 were implemented to deal with excess supplies. As world grain trade contracted in

Table 12--Sorghum programs, 1982-88

Item	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89
			Percent of base acreage				
Provisions:							
Set-aside (SA)	--	--	--	--	--	--	--
Acreage reduction (ARP)	10	10	10	10	17.5	20	20
Cash diversion	--	10	--	--	2.5	15	--
Payment-in-kind	--	1/ 10-30	--	--	--	--	--
			Dollars per bushel				
Target price	2.60	2.72	2.88	2.88	2.88	2.88	2.78
Regular loan rate	2.42	2.52	2.42	2.42	1.82	1.74	1.68
Reserve loan rate	2.75	2.52	2.42	2.42	1.82	1.74	1.68
Indicators:							
Farm price	2.47	2.74	2.32	1.93	1.37	1.70	2.30
			Million bushels				
Beginning stocks	319	439	287	300	551	743	663
			Million acres				
Acreage idled:							
Acreage reduction program	0.7	.8	.6	.9	2.3	4.1	3.8
Cash diversion	--	1.2	--	--	--	--	--
Payment-in-kind	--	3.5	--	--	--	--	--

-- = Not applicable.
1/ In addition, participants in the payment-in-kind program had an option of idling the whole base.

the early 1980's, U.S. sorghum exports fell 6 percent in 1980/81 and 18 percent in 1981/82. Falling exports and record sorghum yields during 1981/82 led to a near tripling of stocks. The 10-percent acreage reduction program for feed grains in 1982/83 could not offset near-record sorghum yields and a 14-percent drop in exports, the third consecutive export drop. Stocks rose by a third. For 1983, a required 10-percent cash diversion was added for all feed grains and an optional 10- to 30-percent payment-in-kind program was added for corn and sorghum farmers. The payment-in-kind program offered farmers 80 percent of their farms' established program yields to divert acreage to conservation use, and the payment was exempt from the per-person limit on direct payments. Farmers could also submit bids to idle their entire bases for payment-in-kind. Of the 17.8 million base acres of sorghum, 69 percent complied with the 1983 program requirements and about half of the base was in either the whole base or 10- to 30-percent payment-in-kind program.

Stocks fell during 1983/84 but were still large. However, sorghum prices moved above the target price, supported by strong corn prices which reflected unusually tight corn stocks. Consequently, the 1984 feed grain program called for only a 10-percent acreage reduction. The stronger sorghum prices during 1983/84 led to a drop in participation in the 1984 program; 42 percent of base acres enrolled. Planted acreage totaled 17.3 million, which raised carryover stocks slightly in 1984/85. The Agricultural Programs Adjustment Act, which became law in April 1984, set provisions for the 1985 feed grain program. These provisions were again based on corn. The corn target price was frozen at the 1984 level. Thus, the sorghum target price remained at $2.88 a bushel in 1985. Since corn stocks on September 30, 1985, totaled 1.6 billion bushels, the 1985 feed grain program included a 10-percent acreage reduction.

Programs in the Late 1980's

Prior to the enactment of the Food Security Act of 1985, there was a consensus that the cost of farm programs had skyrocketed (the program cost reached nearly $18 billion in FY-1985) and must be brought under control. Equally important, there was consensus that the health of U.S. agriculture was contingent upon its ability to become more competitive in world markets, and that price support levels should be set more in line with market clearing prices, not rigidly legislated by Congress as in the 1981 Act.

This consensus, however, was tempered by concerns over financial distress facing many farmers in the United States and what may be further compounded by price-depressing effects of a market-oriented farm policy in the short run. Many farmers expanded their farming operations in the late 1970's by obtaining high-interest-rate mortgage loans. The onset of declining commodity prices soon after 1980 when export markets turned bleak caused the value of farmland to plummet. As a result, many farmers ran into cash flow problems and some even had their farms foreclosed.

Farmers' net cash flow reached a record low, $30.2 billion in 1985, compared with $43.8 billion in 1979.

The 1985 Act thus was a compromise between a desire to make U.S. agriculture more competitive in world markets through lower loan rates and the issuance and exchange of generic certificates and an immediate need to continue farm income protection via frozen target prices (thereby larger deficiency payments). The 1985 Act also added some new features in dealing with surplus production by retiring highly erodible land from production on a long-term basis under the conservation reserve program.

Unlike the 1981 Act where minimum loan rates were legislated by Congress, the 1985 Act permitted lowering the 1986 loan rate for sorghum to $1.82 per bushel, a decline of about 25 percent from $2.42 in 1985. This was made possible because the Secretary of Agriculture has discretion to reduce loan rates below the "basic" (or statutory) level by up to 20 percent in any year during 1986-90 as authorized by the Findley amendment. In addition, the 1985 Act put into place a mechanism to continue lowering the loan rate. For 1987-90 wheat and feed grains, loan rates were to be 75-85 percent of the simple average of market prices during the preceding 5 years, excluding the highest and lowest prices. However, loan rates could be reduced by no more than 5 percent from the preceding year's rate.

The 1985 Act froze minimum target prices at the 1985 level--$2.88 per bushel--for 1986-87. Target price provides a basis from which payments are made to eligible producers if the national weighted average market price received by farmers for the first 5-months fell below the target level. The "basic" deficiency payment rate is the difference between the target price and the higher of the 5-month national weighted average market prices received by farmers or the basic (statutory) loan rate. An additional payment equal to the difference between the basic loan rate and the higher of the announced loan rate or the national weighted average market price received by farmers for the entire marketing year will be made to producers participating in the program.

Total deficiency payments to be received by eligible producers are based on the quantity equal to the payment acreage times the farm program yield. The payment acreage is the acreage actually planted to sorghum, but it cannot exceed the permitted acreage. However, growers who underplant their permitted acreage by planting between 50 and 92 percent of the permitted acreage and devoting the remaining permitted acres to a conserving use would receive payments on 92 percent of the permitted acreage.

Planting on the underplanted acreage for nonprogram crops was not permitted if supply of the nonprogram crop was deemed by the Secretary of Agriculture to greatly exceed demand. Starting from the 1988 program, producers may elect to participate in an optional acreage diversion program known as 0/92 under which producers devote all or a portion of the permitted planting

acreage to conserving uses and receive deficiency payments on an acreage not to exceed 92 percent of the crop's permitted acreage.

For program participation purposes, the individual corn and grain sorghum bases are combined into one base. The corn-sorghum acreage base is the average of acres planted and considered planted (acres put into conserving uses under the acreage reduction program and the paid land diversion to corn and sorghum in the last 5 years). The payment yield is the average of the program yields in 1981 through 1985, excluding the highest and lowest yields.

The 1985 Act authorized the Secretary of Agriculture to make in-kind payments in the form of negotiable certificates. As of March 31, 1988, $636 million of certificates had been issued to producers in the form of sorghum deficiency and diversion payments since April 1986. First holders may redeem certificates for any outstanding loan or sell certificates before the first-holder expiration date. Certificates may be redeemed for cash during the preceding 3-month period prior to the expiration date of the certificate. A subsequent holder may redeem the certificate for any outstanding loan, sell the certificate, or redeem the certificate for any CCC-owned commodity before the expiration date. For producers who place their crop under loan with intention to forfeit their grain to CCC, certificates allow them to receive the loan rate without having to incur storage costs over the 9-month loan period. Using certificates to exchange for CCC loan collateral can yield positive returns whenever the posted county price is less than the loan repayment level. In this sense, generic certificates offered producers similar advantages to marketing loans. As of May 31, 1988, 545 million bushels of sorghum CCC inventory and producer loans had been exchanged by certificates.

Limited cross compliance was required for programs in the late 1980's. To be eligible for program benefits, the acreage planted in other nonparticipating program crops could not exceed the crop acreage bases of those crops.

The Budget Reconciliation Act of 1987 authorized the Secretary of Agriculture to reduce the basic loan rate by an additional 2 percent to maintain market competitiveness. The 1987 Act also slightly reduced minimum target prices for the 1988 sorghum crop to $2.78 per bushel, and the 1989 crop to $2.70. The act also established the 0/92 program for 1988 and 1989 wheat and feed grains.

The Disaster Assistance Act of 1988 was enacted by Congress in response to the early spring and summer drought. Producers enrolled in the 1988 farm program whose yields were reduced by up to 35 percent from normal will be allowed to keep advance payments received on that crop up to the percentage of yield lost. Participants whose yields are reduced by 35-75 percent of normal will receive a payment based on 65 percent of the target price. For producers sustaining yield loses of 75 percent or

more, the payment rate increases under the law to 90 percent on that portion of yield loss that exceeds 75 percent.

For the 1988 marketing year, the 1988 Act stipulates that if the farmer-owned grain reserve for wheat or feed grains is triggered, the reserve will remain in release status for the remainder of the year regardless of subsequent market prices.

Effects of Sorghum Programs

Government sorghum program objectives have generally been to support farm price, enhance farm income, and reduce periodic surplus stocks. Consumer objectives are to provide adequate and stable sorghum supplies at reasonable prices. Program effects on producers, consumers, and taxpayers depend on how policy provisions ultimately interact with market conditions.

Producers

Program benefits accrue to program participants directly through target price protection, direct payments, and loans on crops pledged as collateral and indirectly through price increases caused by the program. However, nonparticipants also benefit indirectly from the higher prices. This section examines the distribution of benefits and how these benefits have supplemented farm incomes. Program effects on participant's production and prices are also assessed.

Farm Income

The importance of sorghum program payments has varied in recent years (table 13). Since 1980, payments have ranged from 5 percent of total sorghum returns (crop value plus program payments) in 1980 to 41 percent in 1987. Government payments began to decline in 1988 as strengthening prices reduced deficiency payments.

The proportion of returns above cash expenses represented by Government payments is another indicator of these payments' significance to sorghum producers. In 1980, when disaster program payments were the only direct payments made, Government payments accounted for 15 percent of net returns to the sorghum sector. As surpluses began mounting in the early 1980's, the payment share rose: 36 percent in 1981, 25 percent in 1982, and 102.1 percent in 1983. This percentage rose to 104.0 and 84.2 percent in 1986 and 1987 as Government payments increased.

Although program payments were clearly a major source of net returns to the sorghum sector as a whole, the beneficiaries of these payments were program participants. Participation rates, and therefore the proportion of farmers benefiting from the direct payments and access to the loan program, vary from year to year (table 14). During 1978, 1983, and 1988, the proportion of sorghum acreage receiving benefits ranged from 69 to 81 percent.

Table 13--Direct payments to sorghum farmers and net returns, crop years, 1980-88

Item	1980	1981	1982	1983	1984	1985	1986	1987	1988
				Million dollars					
Deficiency payments	0	233	64	0	158	228	565	569	262
Diversion payments	0	0	0	114	0	0	13	130	58
Reserve storage payments	-6	74	112	42	35	24	30	28	10
Disaster payments	101	35	3	0	0	0	3	0	15
Payment-in kind entitlements	--	--	--	1/ 485	--	--	--	--	--
Long-term conservation reserve program	--	--	--	--	--	--	37	98	113
Total payments	95	342	179	641	193	252	645	825	458
Crop value	1,798	2,435	2,283	1,382	2,055	2,243	1,322	1,193	1,362
Total returns	1,893	2,777	2,462	2,023	2,248	2,495	1,967	2,018	1,820
Net returns above cash expenses 2/	636	942	718	628	460	766	620	980	NA
				Percent					
Payment share of:									
Total returns	5.0	12.3	7.3	31.7	8.61	0.1	32.8	40.9	25.2
Net returns	14.1	36.3	24.9	102.1	42.0	32.9	104.0	84.2	NA

-- = No payments.
NA = Not available.
1/ 170 million bushels valued at the estimated season-average farm price of $2.85 a bushel for 1983/84.
2/ Taken from table 11.

In addition to direct payments, sorghum programs have a variety of complex effects on farm income. If the target price is set above the price that would prevail in a free market (no Government programs), farmers tend to use the target price as their expected total return and expand production above the free market level. Thus, total farm returns will be expanded by deficiency payments and the value of the added production. The added production reduces farm prices below free market levels. However, the acreage reduction program tends to reduce this added production and loan rates tend to serve as a price floor (excluding recent years when generic certificates forced prices below loan rates).

The effect of the corn program is also critical to sorghum production and prices. For example, after passage of the Food Security Act of 1985, corn loan rates were reduced which had a price depressing effect on corn and also on sorghum and the other feed grains. The 1988 drought and the 1988 corn program lowered corn stocks during 1988/89 to well below average levels. Sorghum stocks were also lowered but remained above average levels. However, the higher corn prices pulled sorghum prices above the

Table 14--Sorghum program participation rates, selected years 1/

Region and major States	1978	1983	1988 2/
		Percent	
Northeast	14	56	61
North Central	48	62	78
Missouri	52	63	79
South	35	50	68
Plains	79	71	84
Kansas	79	66	86
Nebraska	80	86	94
Oklahoma	80	56	76
Texas	77	68	78
Southwest	75	77	77
Northwest	6	67	72
U.S. total	74	69	81

1/ Years in which acreage reduction programs were in effect. Participation is defined as complying acres as a percentage of total acres in 1978 and 1979 and complying acres as a percentage of base acres in 1982 and 1983.
2/ Preliminary.

loan rate, despite the modest sorghum stocks. The stronger, corn-induced sorghum prices contributed to increased sorghum plantings in 1989 and a lower program participation rate (76 percent) for 1989. Thus, the corn program helped to give farmers signals to expand sorghum acreage, while large sorghum supplies gave the opposite signal.

Distribution of Program Payments by Region

Sorghum program payments (deficiency and diversion) were predominantly disbursed to the Plains region in fiscal year 1987 (table 15). The high concentration of sorghum production in the Plains explains why most of payments were made to this region. In addition, the predominant share of program payments in the Plains can be attributed to above-average rates of program compliance in Kansas and Nebraska. While the U.S. rate of program compliance averaged 81 percent in 1988, compliance rates in Kansas and Nebraska were 86 and 94 percent. A similar situation occurred for the 1978 sorghum program. While the U.S. rate of program compliance averaged 74 percent in 1978, Kansas and Nebraska both had higher rates at about 80 percent. The rate of program compliance in Texas came close to the national average in 1978 and 1988.

Sorghum acreage in the North Central region--primarily Missouri and to a lesser extent Illinois--comprised 8 percent of the national total and also received about 8.6 percent of program payments. This can be largely attributed to high rates of program compliance. The national participation rate was 81 percent in 1988, 75 percent for Illinois, and 79 percent for Missouri. Program compliance in the Southwest, close to the U.S. average in 1988, caused the share of program payments to about equal that region's share of production.

Distribution of Program Payments by Size of Farm

Analyses of the 1978 and 1982 programs reaffirm what is widely known about crop programs: that benefits are closely proportional to production volume. Consequently, the larger farms, although few in number, receive a larger share of the program payments.

The distribution of sorghum program payments by size of the participants' normal crop acreages (NCA) in 1978 and total cropland in 1982 is shown in table 16. The table indicates the following highlights:

- Half the participants, those with the smallest farms, received only 13 percent of deficiency payments in 1978 and 15 percent of deficiency and disaster payments in 1982.

- The largest 10 percent of farms received 46 percent of total payments in 1978 and 37 percent in 1982.

Table 15--Distribution of sorghum deficiency and diversion payments by region, fiscal year 1987

Region 1/	Payments	Distribution
	1,000 dollars	Percent
Northeast	156.0	2/
North Central	47,111.7	8.6
South	43,784.9	7.8
Plains	479,987.6	81.8
Southwest	9,815.5	1.8
Northwest	44.1	2/
U.S. total	580,899.7	100.0

1/ Northeast: MD, DE, PA, NJ, NY, CT, RI, MA, VT, NH, ME; North Central: MN, WI, MI, IA, MO, IN, IL, OH; South: TN, KY, WV, NC, SC, GA, AL, FL, MS, LA, AR; Plains: MT, ND, SD, NE, KS, OK, TX, CO, WY; Southwest: CA, NV, AZ, UT, NM; Northwest: WA, OR, ID.
2/ Less than 0.005 percent.

- Large producers with NCA or cropland of 1,000 acres or more received nearly 20 percent of total feed grain payments in 1978 and 29 percent of sorghum payments in 1982.
- Small producers with NCA or cropland of fewer than 500 acres--the average size of farms growing sorghum--received 59 percent of total feed grain payments in 1978, and 46 percent sorghum payments in 1982.
- The distribution of program payments in 1982 followed essentially the same pattern as in 1978.

In 1982, the average payment per participant in the sorghum program was around $715. However, the average payment for the largest 10 percent of farms was about $2,650. These farms received 37 percent of the payments and accounted for about the same percentage of sorghum acreage. These payments exclude reserve storage payments which, for the Nation, were nearly twice as large as disaster and deficiency payments.

Consumers

Final use of sorghum by consumers is mostly in the form of animal products. Sorghum prices were lowered in 1986 and later crop years because of the Food Security Act of 1985. This act lowered loan rates and program payments were made, in part, with generic certificates which acted to lower producer prices. In past years such as 1984 and 1985, the sorghum program strengthened sorghum

Table 16--Distribution of sorghum program payments, by size of farm, 1978 and 1982 1/

Size of farm	1978	1982	Size of farm (percentile)	1978	1982
Acres			Percent		
Less than 70	6.2	5.8	Smallest 10	1.5	2.0
70-139	10.6	7.7	Smallest 20	3.0	--
140-219	12.2	8.4	Smallest 25	--	4.8
220-259	5.6	4.0	Smallest 30	5.0	--
260-499	24.4	20.6	Smallest 50	13.0	14.8
500-999	21.6	24.2	Largest 50	87.0	85.2
1,000-1,499	8.5	12.4	Largest 30	72.0	--
1,500-1,999	4.2	6.4	Largest 25	--	62.5
2,000-2,499	2.2	3.6	Largest 20	62.0	--
2,500 and over	4.5	6.9	Largest 10	46.0	37.0

-- = Not available.
1/ Size of farm is measured by normal crop acreage in 1978 and total cropland in 1982. Payments are deficiency payments in 1978 and deficiency and disaster payments in 1982.

farm prices above what they would otherwise be through acreage reduction programs, paid land diversion, the operation of the CCC loan and the farmer-owned reserve programs, and export initiatives. Programs for other crops such as corn and wheat also affect sorghum prices and in recent years these effects were to lower sorghum prices. Lower feed grain and sorghum prices mean reduced costs of producing animal products, such as red meat, poultry, milk, and eggs. For example, the cost per head of custom feeding a 600-pound feeder steer to slaughter weight in the Great Plains--the area where most sorghum is used--between October and April 1988/89 is estimated at $835. A typical steer would consume 1,500 pounds each of sorghum and corn valued at an estimated $77 and $84. Thus, sorghum accounts for about 9 percent of the livestock production costs and feed grain accounts for 19 percent. By the time the beef is marketed to the consumer, the grain share is even smaller. The farmer's share of the retail price of beef (cuts from choice yield grade 3 carcass) averaged 58 percent during 1988. Thus, sorghum and feed grains may have accounted for only 5 percent and 11 percent of retail beef prices (assuming farm prices equaled production costs).

These margins can be used to trace the effects on beef prices of program-related sorghum price increases. In 1978, set-aside and diversion were found to increase sorghum prices by 4 percent. Assuming all feed grain prices rose by about this amount and other production expenses and margins were unchanged, retail beef prices would have risen one-half of 1 percent. Much greater

effects on sorghum and other feed grain prices were likely for the 1982 and 1983 programs, making program costs to consumers higher. For example in 1982/83, prior to the payment-in-kind announcement, USDA estimated the 1982/83 sorghum farm price at $2.15-$2.30 a bushel. The final season average price was $2.52 a bushel. Part of the change was due to the 1983 drought, but part of it was a consequence of the payment-in-kind program.

The Food Security Act of 1985 authorized a reduction in feed grain loan rates which consequently reduced feed grain prices. All livestock producers were found to benefit from lower feed grain prices. Cattle feeders, hog producers, and dairy producers benefited the most in the long run, whereas poultry producers and cow-calf enterprises benefited the least. Consumers gained from reduced feed grain prices because retail prices for meats were generally lower after an initial period of higher meat prices as current production was reduced to expand cattle and hog breeding herds.

The operation of the loan program also directly affects consumers. If the regular loan rate is set above the price that balances supply and demand when supplies are large, the loan rate tends to prevent prices from falling to market-clearing levels, assuming the absence of generic certificates. Consumers are then worse off than in the absence of the loan program. The reserve loan program has a similar effect.

The loan programs are essentially a Government inducement to farmers to store grain. The stored grain acts as a buffer stock when supplies are short and the loan rate functions as a price floor when supplies are excessive. Loan programs have been found to enhance producer prices but provide little effect on price stability. Thus, these aspects of the loan program help crop producers when prices are supported but help livestock producers and consumers when prices are reduced (such as the experience of the Food Security Act of 1985).

Taxpayers

Net Government expenditures on sorghum programs are financed by CCC borrowings from the U.S. Treasury. Thus, net program expenditures are a transfer from U.S. taxpayers to the sorghum farming sector. Direct payments to farmers for crops of recent years were presented in table 13. Appendix table 4 shows complete sorghum program costs, including loan operations.

Net program expenditures for sorghum reached $1.2 billion in fiscal year 1986. They are estimated at $1.2 billion for fiscal year 1988. Expenditures per bushel of sorghum produced rose significantly in fiscal years 1986 and 1987, both in nominal and real terms, about equalling previously established highs set in 1982 and 1983. Expenditures per taxpayer also increased significantly in 1986 and 1987.

The following tabulation shows net program expenditures on sorghum in relation to net CCC expenditures on all commodity

price support and related activities:

	FY 1985	FY 1986	FY 1987	FY 1988
		Billion dollars		
Feed grains	5.21	12.21	13.97	9.05
Sorghum	.46	1.18	1.20	.76
Total CCC	17.68	25.84	22.41	12.46

Expenditures on sorghum accounted for 5-6 percent of CCC's program expenditures during fiscal year 1986-88. Table 17 shows the program expenditures on a per bushel and per taxpayer basis.

Indirect

Sorghum programs also have indirect effects on farmers, consumers, and taxpayers. These include effects on land values, resource use, other crops, and trade competition.

Program payments, particularly those associated with a base or allotment, are capitalized into the value of land. Consequently, landowners originally allocated a base or allotment benefited from an increase in both current income (program payments) and wealth (land values). Renters or tenants, who accounted for 71 percent of farmers growing sorghum in 1978, received a share of the current income, but they also faced increased rents because of higher land values. Subsequent landowners have to pay a higher price for land which dilutes the program benefits, particularly in the longer run, and also increases the subsequent costs of entry for new farmers.

The program effects on land values are becoming less pronounced under the current program, since program participation is no longer tied to historical allotments, but to an average 5-year base and fixed program yield. Nevertheless, in years of acreage reduction programs, base acreage takes on added value. This aspect and the prospects for program payments and higher producer returns raise land values above what they would otherwise be.

Sorghum programs encourage irrigation because higher sorghum returns increase the demand for irrigation, and because irrigation is a means of boosting production. The programs also were a factor contributing to increases in pesticide and fertilizer use in the 1970's. Moreover, sorghum producers have expanded their base acreage from about 17.7 million acres in 1982 to 19.3 million in 1985, partly in anticipation of continued sorghum programs. This expansion occurred despite excess supplies. After passage of the Food Security Act of 1985, base acreage dropped to 17 million acres in 1989, partly because of the conservation reserve.

Policy provisions for corn and sorghum affect not only their own industries but indirectly the soybean, wheat, and livestock sectors. Attractive loan rates and target prices for corn and sorghum may have attracted some soybean farmers to switch from

Table 17--Net sorghum program expenditures, 1965-88

Fiscal year	Expenditures per bushel produced		Expenditures per taxpayer 1/	
	Nominal	Real ($1982) 2/	Nominal	Real ($1982) 2/
	Cents per bushel			
1965	30	89	271	812
1966	16	46	149	426
1967	-8	-22	-74	-206
1968	23	61	210	557
1969	37	93	339	852
1970	22	52	185	440
1971	13	29	136	306
1972	27	58	249	535
1973	18	36	188	380
1974	23	43	158	293
1975	8	13	63	106
1976 3/	3	5	22	35
1977	18	27	143	212
1978	53	73	386	535
1979	24	31	185	235
1980	12	14	63	74
1981	12	13	96	102
1982	118	118	897	897
1983	167	-161	729	702
1984	9	8	65	60
1985	41	37	401	362
1986	126	111	1,006	883
1987	162	138	1,003	852
1988	132	108	628	516

1/ The number of taxpayers is assumed to be the number of people in the civilian labor force.
2/ Deflated using gross national product implicit price deflator, 1982=1.0.
3/ Includes July-September 1976 to account for shift in fiscal years from July/June to October/September.

soybeans to sorghum. This would particularly apply to the southern regions. To the extent that sorghum complements double-cropped wheat better than soybeans, the sorghum program could encourage the expansion of soft red winter wheat.

The sorghum program could possibly affect exports. U.S. loan rates below market-clearing levels can contribute to an increase in U.S. sorghum exports by lowering foreign currency prices of U.S. sorghum. A depreciating U.S. dollar adds to this effect.