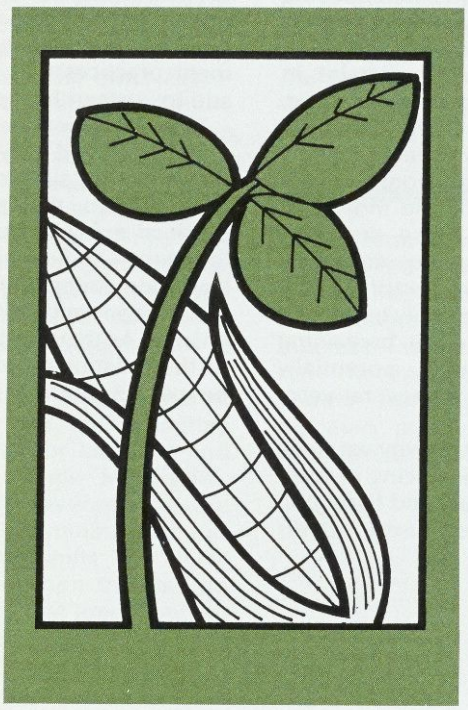
Virtually all of the Southeast suffered a drought during 1980 and into 1981. Some crop prices rise when drought cuts production, but often not enough to offset the production decline. Irrigation offers short-term benefits but may severely deplete future water resources.



The Impact of Drought

The fortunes of most of the country are largely dependent upon precipitation. In the Southeast, especially, rainfall is the virtual life-blood of agricultural production during each growing season. Over the long run, nearly all economic activity is dependent upon water supplies originating as rainfall. When rainfall drops below normal or virtually ceases as it did during the summer of 1980, practically every sector of the economy feels the impact of restricted water supplies.

Drought typically results in increased use of water at the very time when supplies are restricted. In the elevated temperatures that

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CONSTRUCTION

12-Month Cumulative Rate	JUN 1981	MAY 1981	JUN 1980	ANN. % CHG.		JUN 1981	MAY 1981	JUN 1980	ANN. % CHG.
UNITED STATES									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	156,290	154,835	147,173	6	Value - $ mil.	69,015	68,428	62,803	10
Nonresidential Contracts					Number of Units - Thous.	1,378.1	1,378.5	1,400.5	-2
Value - $ mil.	56,235	55,955	50,443	11					
Sq. Ft. - mil.	1,215.6	1,213.2	1,279.5	-5	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	733.8	737.8	748.3	-2
Value - $ mil.	31,040	30,451	33,927	-9	Number multi-family	498.9	501.1	488.7	2
SOUTHEAST									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	28,330	28,129	23,991	18	Value - $ mil.	14,191	14,084	12,035	18
Nonresidential Contracts					Number of Units - Thous.	321.6	323.8	303.9	6
Value - $ mil.	8,338	8,226	7,032	19					
Sq. Ft. - mil.	196.0	194.8	192.0	2	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	159.7	160.8	149.9	7
Value - $ mil.	5,835	5,818	4,924	19	Number multi-family	128.7	132.4	103.3	25
ALABAMA									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	1,955	1,978	1,739	12	Value - $ mil.	991	998	793	25
Nonresidential Contracts					Number of Units - Thous.	26.6	27.3	23.4	14
Value - $ mil.	539	537	573	-6					
Sq. Ft. - mil.	12.7	13.2	16.3	-22	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	8.6	8.9	8.4	2
Value - $ mil.	425	443	373	14	Number multi-family	7.4	8.1	5.9	25
FLORIDA									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	14,071	13,841	11,452	23	Value - $ mil.	7,967	7,899	6,875	16
Nonresidential Contracts					Number of Units - Thous.	179.6	180.2	171.9	4
Value - $ mil.	3,552	3,435	2,791	27					
Sq. Ft. - mil.	90.4	89.2	83.1	9	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	94.7	93.8	85.9	10
Value - $ mil.	2,552	2,506	1,786	43	Number multi-family	90.4	92.1	73.1	24
GEORGIA									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	3,925	3,951	3,708	6	Value - $ mil.	1,958	1,982	1,656	18
Nonresidential Contracts					Number of Units - Thous.	46.3	46.7	41.6	11
Value - $ mil.	1,246	1,214	1,211	3					
Sq. Ft. - mil.	35.5	34.6	37.3	-5	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	27.5	28.4	26.4	4
Value - $ mil.	720	755	841	-14	Number multi-family	10.8	11.0	6.8	59
LOUISIANA									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	3,683	3,567	3,135	17	Value - $ mil.	1,383	1,318	1,033	34
Nonresidential Contracts					Number of Units - Thous.	27.1	26.6	24.3	12
Value - $ mil.	1,255	1,250	1,270	-1					
Sq. Ft. - mil.	22.5	22.0	20.9	8	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	12.2	12.3	11.7	4
Value - $ mil.	1,045	999	831	26	Number multi-family	9.3	9.2	6.3	48
MISSISSIPPI									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	1,786	1,820	1,246	43	Value - $ mil.	679	652	540	26
Nonresidential Contracts					Number of Units - Thous.	15.4	15.8	14.3	8
Value - $ mil.	614	631	285	115					
Sq. Ft. - mil.	8.4	8.7	8.2	2	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	4.9	5.1	4.6	7
Value - $ mil.	528	538	421	25	Number multi-family	4.0	4.9	4.1	-2
TENNESSEE									
Total Construction Contracts					Residential Contracts				
Value - $ mil.	2,909	2,971	2,712	7	Value - $ mil.	1,213	1,235	1,137	7
Nonresidential Contracts					Number of Units - Thous.	26.7	27.1	28.5	-6
Value - $ mil.	1,131	1,158	902	25					
Sq. Ft. - mil.	26.6	27.0	26.2	2	Residential Permits - Thous.				
Nonbuilding Contracts					Number single-family	11.8	12.2	13.0	-9
Value - $ mil.	565	578	673	-16	Number multi-family	6.9	7.1	7.1	-3

Notes: Contracts are calculated from the F. W. Dodge Construction Potentials. Permits are calculated from the Bureau of the Census, Housing Units Authorized By Building Permits and Public Contracts. The Southeast data represent the total of the six states. The annual percent change calculation is based on the most recent month over prior year.

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GENERAL

	JUN 1981	MAY 1981	JUN 1980	ANN. % CHG.
UNITED STATES				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	2,292.5	2,228.3	2,062.8	11
Retail Sales - $ bil.- SA	86.4	85.3	77.8	11
Plane Passenger Arrivals (thous.)	N.A.	N.A.	N.A.	
Petroleum Prod. (thous. bls.)	8,633.6	8,564.2	8,733.9	-1
Consumer Price Index 1967=100	271.5	269.0	247.6	10
SOUTHEAST				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	266.8	258.6	235.0	14
Taxable Sales - $ bil.	N.A.	N.A.	N.A.	
Plane Passenger Arrivals (thous.)	N.A.	N.A.	N.A.	
Petroleum Prod. (thous. bls.)	1,444.9	1,442.3	1,546.9	-7
Consumer Price Index 1967=100	N.A.	N.A.	N.A.	
ALABAMA				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	31.1	30.3	28.2	10
Taxable Sales - $ bil.	N.A.	N.A.	N.A.	
Plane Passenger Arrivals (thous.)	119.6	120.0	127.8	-6
Petroleum Prod. (thous. bls.)	63.0	63.4	59.5	6
Consumer Price Index 1967=100	N.A.	N.A.	N.A.	
FLORIDA				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	95.3	92.2	82.0	16
Taxable Sales - $ bil.	62,836	61,529	54,958	14
Plane Passenger Arrivals (thous.) R	N.A.	1,826.2	1,898.0	
Petroleum Prod. (thous. bls.)	114.4	114.0	115.0	-1
Consumer Price Index - Miami	MAY	MAR	MAY	
Nov. 1977 = 100	143.2	140.0	129.7	10
GEORGIA				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	46.8	45.4	41.7	12
Taxable Sales - $ bil.	N.A.	N.A.	N.A.	
Plane Passenger Arrivals (thous.)	1,682.9	1,778.3	1,810.5	-7
Petroleum Prod. (thous. bls.)	N.A.	N.A.	N.A.	
Consumer Price Index - Atlanta	JUN	APR	JUN	
1967 = 100	269.2	265.9	242.2	11
LOUISIANA				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	38.1	36.7	33.2	15
Taxable Sales - $ bil.	N.A.	N.A.	N.A.	
Plane Passenger Arrivals (thous.)	N.A.	N.A.	N.A.	
Petroleum Prod. (thous. bls.)	0	0	0	0
Consumer Price Index 1967 = 100	N.A.	N.A.	N.A.	
MISSISSIPPI				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	17.4	17.0	15.9	9
Taxable Sales - $ bil.	N.A.	N.A.	N.A.	
Plane Passenger Arrivals (thous.)	N.A.	N.A.	N.A.	
Petroleum Prod. (thous. bls.)	95.0	96.0	105.4	-10
Consumer Price Index 1967 = 100	N.A.	N.A.	N.A.	
TENNESSEE				
Personal Income-$ bil. SAAR (Dates: 1Q, 4Q, 1Q)	38.1	37.0	34.0	12
Taxable Sales - $ bil.	N.A.	N.A.	N.A.	
Plane Passenger Arrivals (thous.)	176.2	173.5	187.3	-6
Petroleum Prod. (thous. bls.)	N.A.	N.A.	N.A.	
Consumer Price Index 1967 = 100	N.A.	N.A.	N.A.	

	JUN 1981	MAY 1981	JUN 1980	ANN. % CHG.
Agriculture				
Prices Rec'd by Farmers Index (1967=100)	258	260	232	11
Broiler Placements (thous.)	84,702	85,570	81,919	3
Calf Prices ($ per cwt.)	68.20	68.80	59.10	15
Broiler Prices (¢ per lb.)	29.2	28.2	24.4	20
Soybean Prices ($ per bu.)	6.99	7.42	5.76	21
Broiler Feed Cost ($ per ton)	234	235	190	23
Agriculture				
Prices Rec'd by Farmers Index (1967=100)	270	267	233	16
Broiler Placements (thous.)	33,468	33,714	31,917	5
Calf Prices ($ per cwt.)	60.21	61.13	70.91	-15
Broiler Prices (¢ per lb.)	27.6	26.6	23.5	17
Soybean Prices ($ per bu.)	7.14	7.36	5.87	22
Broiler Feed Cost ($ per ton)	228	228	184	24
Agriculture				
Farm Cash Receipts - $ mil. (Dates: JUN, JUN)	801		710	13
Broiler Placements (thous.)	10,684	10,884	10,693	-0
Calf Prices ($ per cwt.)	57.70	61.00	68.00	-15
Broiler Prices ($ per lb.)	27.5	26.5	23.0	20
Soybean Prices ($ per bu.)	7.06	7.24	5.86	20
Broiler Feed Cost ($ per ton)	250	240	184	36
Agriculture				
Farm Cash Receipts - $ mil. (Dates: JUN, JUN)	2,779		2,478	12
Broiler Placements (thous.)	1,993	1,917	1,639	22
Calf Prices ($ per cwt.)	67.10	64.90	79.60	-16
Broiler Prices (¢ per lb.)	26.0	26.0	22.5	16
Soybean Prices ($ per bu.)	7.06	7.24	5.86	20
Broiler Feed Cost ($ per ton)	240	240	205	17
Agriculture				
Farm Cash Receipts - $ mil. (Dates: JUN, JUN)	1,145		1,028	11
Broiler Placements (thous.)	13,040	13,098	12,147	7
Calf Prices ($ per cwt.)	57.10	58.50	68.00	-16
Broiler Prices (¢ per lb.)	26.5	26.0	23.5	13
Soybean Prices ($ per bu.)	7.07	7.33	5.89	20
Broiler Feed Cost ($ per ton)	210	220	186	13
Agriculture				
Farm Cash Receipts - $ mil. (Dates: JUN, JUN)	595		542	10
Broiler Placements (thous.)	N.A.	N.A.	N.A.	
Calf Prices ($ per cwt.)	57.00	61.00	66.50	-14
Broiler Prices (¢ per lb.)	28.0	28.0	24.0	17
Soybean Prices ($ per bu.)	7.41	7.59	5.96	24
Broiler Feed Cost ($ per ton)	245	245	190	29
Agriculture				
Farm Cash Receipts - $ mil. (Dates: JUN, JUN)	788		785	0
Broiler Placements (thous.)	6,428	6,443	6,090	6
Calf Prices ($ per cwt.)	62.20	60.10	71.10	-13
Broiler Prices (¢ per lb.)	29.5	27.0	24.5	20
Soybean Prices ($ per bu.)	7.01	7.35	5.81	21
Broiler Feed Cost ($ per ton)	220	220	175	26
Agriculture				
Farm Cash Receipts - $ mil. (Dates: JUN, JUN)	699		647	8
Broiler Placements (thous.)	1,323	1,373	1,348	-2
Calf Prices ($ per cwt.)	60.00	62.00	75.20	-20
Broiler Prices ($ per lb.)	29.5	29.0	22.5	31
Soybean Prices ($ per bu.)	7.12	7.20	5.87	21
Broiler Feed Cost ($ per ton)	225	215	178	26

Notes:
Personal Income data supplied by U. S. Department of Commerce. Taxable Sales are reported as a 12-month cumulative total. Plane Passenger Arrivals are collected from 26 airports. Petroleum Production data supplied by U. S. Bureau of Mines. Consumer Price Index data supplied by Bureau of Labor Statistics. Agriculture data supplied by U. S. Department of Agriculture. Farm Cash Receipts data are reported as cumulative for the calendar year through the month shown. Broiler placements are an average weekly rate. The Southeast data represent the total of the six states. N.A. = not available. The annual percent change calculation is based on most recent data over prior year.
R = revised.

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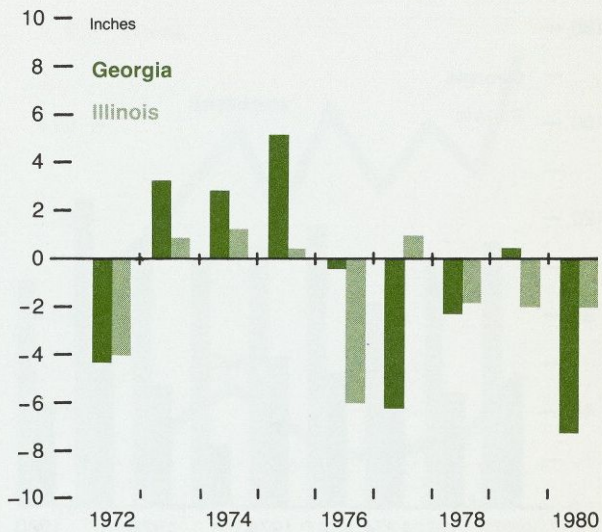
accompany summertime drought, city residents tend to drink more water, take more baths, step up the pace of watering lawns and gardens, and use more water in swimming pools as efforts to restore physical comfort increase. Water consumption by government, industrial, and business users increases for many of the same reasons. Agricultural producers equipped for irrigation compound use mightily in efforts to supplement dwindling moisture supplies of growing crops. All in all, reserve water supplies, such as lakes, reservoirs, and underground aquifers, diminish rapidly as use multiplies. Streams recede not only from increased withdrawal rates but because they are not recharged with rainfall. A continuation of this situation for several months in succession and from one growing season to another could bring disaster of wide dimensions to the affected areas.

It was just such a continuation of 1980's drought into the 1981 season that was causing grave concern as the spring progressed without rainfall having yet been restored to its normal level. By the end of May of 1981, most weather stations across the nation were reporting below-normal precipitation since January 1 and virtually all of the stations in states within the Sixth Federal Reserve District reported deficit rainfall. The south Florida area had one of the nation's most serious rainfall deficits, with rainfall totaling less than 50 percent of its normal level in several locations during the first five months of 1981. Rainfall levels at 75 percent or less of normal were common for much of the rest of the District. However, rainfall frequencies were increasing toward the end of May, renewing hope that water supplies might reach adequate levels as summer arrived.

Effects of Drought on Agricultural Production

Crop yields vary from year to year for a number of reasons, but the most serious variations are usually caused by drought. Weather records indicate that the Southeast experienced serious deficits of rainfall during the primary crop-growing season (April through August) in four of the nine years since 1971 (see Figure 1). The most serious droughts occurred in 1977 and 1980 when

Chart 1
Departure From Normal Precipitation
April through August



rainfall fell six and seven inches respectively below the normal level during that period. Other shortages of consequence occurred in 1972 and 1978 when rainfall lagged normal levels by four inches and two inches, respectively.

Average yields of corn and soybeans reflected the moisture shortages by falling sharply in 1977 and 1980. In 1977, corn yields fell 61 percent from the year-earlier level (see Figure 2). In 1980, yields again dropped by 35 percent from 1979's level.

The decline undoubtedly would have been greater had the drought not become most serious in mid-to-late summer when some corn was well on its way to maturity. Also, more southeastern farmers were irrigating corn in 1980 than ever before.

Soybean yields showed the most severe drought effects in 1972, 1978 and 1980 (see Figure 3). The impact of variations in April to August rainfall is different for corn and soybeans because soybeans are typically planted later than corn and they mature later in the season. Thus, soybeans are more seriously affected by late summer drought because the crop enters a critical fruiting stage in late July and August. Rainfall deficits were more severe in July and August than in earlier

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Chart 2
Average Corn Yields
Bushels Per Acre

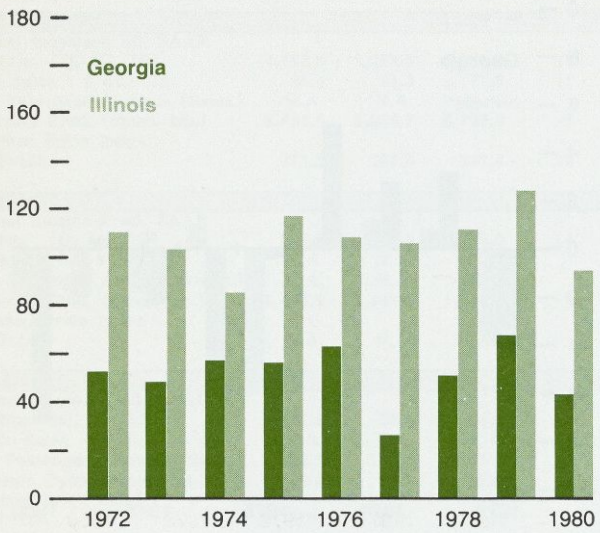
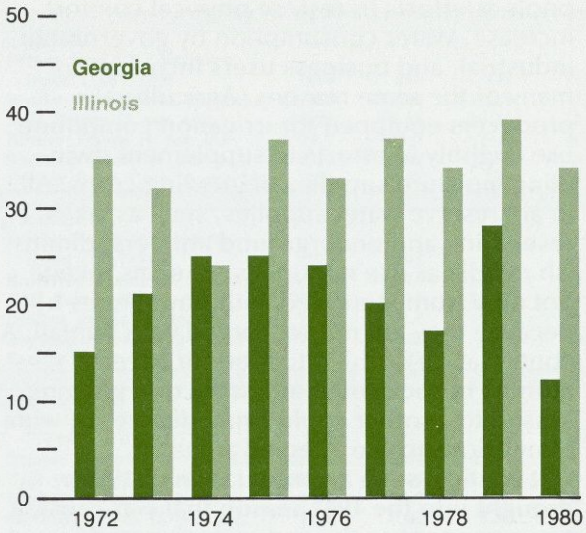


Chart 3
Average Soybean Yields
Bushels Per Acre



months during 1972, 1978, and 1980, accounting for the more serious declines in average soybean yields during those years. In 1980, three-fourths of Georgia's rainfall shortage occurred in July and August and soybean yields dropped 57 percent from the year-earlier level.

Because droughts do not usually occur uniformly across the country, some regions may be receiving relatively abundant rainfall at the same time that another region is exceedingly dry. Thus, it is possible that national crop production is good at the same time severe problems are experienced in the Southeast. Conversely, the Southeast can harvest bumper crops at the same time other sections of the nation have severe problems.

Cumulative rainfall in the April through August period in Illinois, a centrally located state in the midwestern region, was compared with Georgia's rainfall (see Figure 1). In 1974 and 1976, the Midwest experienced severe droughts that the Southeast largely escaped.[1] On the other hand, the Midwest did not share in the Southeast's drought in 1977 and the Midwest's rainfall shortage was much less severe than the Southeast's in 1980. Only in 1972 and 1978 were rainfall deficits approximately similar in the two regions. Neither corn nor soybean yields declined from the year earlier in Illinois in 1972, but soybean yields did drop almost 10 percent in 1978 when they also fell about 12 percent in Georgia. During the Midwest's most severe recent droughts in 1974 and 1976, yields of both corn and soybeans declined by about 20 percent and eight percent, respectively, from the year earlier levels.

Effects on Incomes

Droughts cut agricultural production because of the reduction in yields, but they may or may not result in income reductions to farmers. If a significant proportion of total national production has been lost, prices of affected commodities may increase by a larger percentage than production has been reduced, resulting in an actual increase in total revenue to farmers. Frequently, however, production is cut sharply in the region where the drought occurs but, because production is

[1] Although cumulative rainfall for the growing season did not reflect a drought in 1974 because very little rainfall was received in Illinois during the crucial period in July, crop production was reduced severely.

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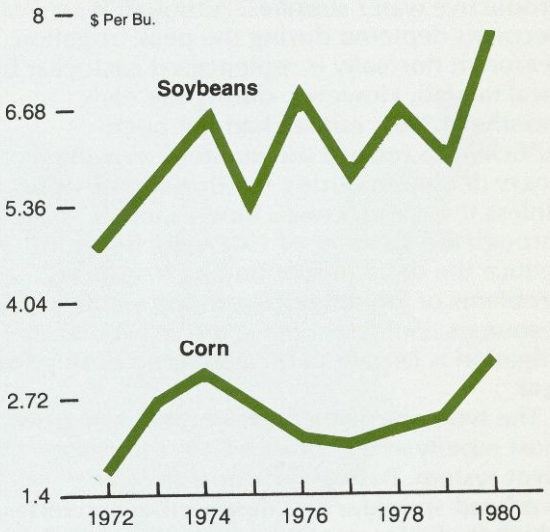
normal or sometimes above normal in other areas, total production may decline only slightly or not at all. Prices then do not rise, and producers suffer income losses to the full extent of the reduction in production. Because the Southeast accounts for relatively small shares of most crops produced nationwide, the decline in southeastern production does not have a sufficient impact on total output of such crops as corn and soybeans to cause prices to increase.

Income losses from droughts in the Southeast are usually heavy. In 1977, for example, the sharp declines in the Southeast's output of corn and soybeans were accompanied by price declines since national output increased at the same time (see Figure 4). In 1980, the drought, though most severe in the Southeast, was also felt in the important midwestern area of production. Total production declined along with southeastern production, and commodity prices rose. Price increases were greater than production declines for the U.S. as a whole, indicating that the drought may have actually increased the nation's farm income in 1980. In the Southeast, however, the average corn price rose just enough to offset the production decline. In the case of soybeans, the largest single source of southeastern crop income, yields declined 57 percent while the season-average price rose 23 percent, leaving farmers with a large income loss. Income from several other crops declined as well, compounding the disaster of 1980's rainfall deficit for southeastern farmers.

Use of Irrigation

Significant moisture shortages during four of the past nine years, coupled with even more frequent periods of unevenly distributed rainfall during the growing season, have sharpened the interest of southeastern farmers in irrigation. During seven of the past nine years, moisture dropped below the normal level during July. In addition, there are usually several periods during the growing season when crops can benefit from supplemental moisture because plants can suffer from moisture stress even though a heavy rainstorm is received in time to bring monthly precipitation up to its normal level.

Chart 4
Season Average Prices Received By Farmers
United States



An annual survey of crop irrigation practices in Georgia conducted by the Agricultural Extension Service shows that irrigated acreage increased five-fold from 1973 to 1980, with the total irrigated area reaching just under one million acres in 1980.[2] Corn, peanuts, and soybeans were the crops receiving most of the irrigation, with corn alone accounting for 40 percent of the total acreage.

Irrigation's rapid growth continued in 1980, with acreage expanding by 23 percent in one year. About 1,200 new irrigation systems were installed in 1980 alone, and 450 new irrigation wells were added. Although most irrigation systems were pumping water from ponds, wells have been the most rapidly increasing water source for irrigation since 1973. Fewer than 1,000 wells were in use in 1973, but the number had reached 3,387 by 1980. The capacity of most newer wells has been increasing, too, constituting an increasingly heavy drain on Georgia's underground water resources. Three-fourths of Georgia's irrigated acreage is within the Southwest District where most of the wells are fed from the principal

[2]K.A. Harrison and R.F. Skinner, "Irrigation Surveys," Cooperative Extension Service, University of Georgia, College of Agriculture, Athens, Georgia, 1973-80.

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