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Cotton

State-Level Costs of Production, 1986-88

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Abstract

This report presents State-level cotton production cost and return estimates for 1986-88. Six hundred fifty cotton producers from 10 States were interviewed about their production practices, input use, and expenditures. The estimates are calculated on a per-planted-acre basis and reflect average production practices, yields, and prices paid and received by cotton producers. Per-acre (per-pound) total economic costs among cotton-producing States varied from $256.09 to $934.13 ($0.61 to $o.77) in 1987. The estimates are based on the 1987 Farm Costs and Returns Survey (FCRS).

Keywords: Costs of production, State-level, cotton, enterprise costs and returns

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Introduction

This report presents State-level cotton production cost and return estimates for 1986-88. Six hundred fifty cotton producers from 10 States were interviewed about their production practices, input use, and expenditures. The estimates are calculated on a per-planted-acre basis and reflect average production practices, yields, and prices paid and received by cotton producers. Per-acre (per-pound) total economic costs among cotton-producing States varied from $256.09 to $934.13 ($0.61 to $0.77) in 1987. The estimates are based on the 1987 Farm Costs and Returns Survey (FCRS). For comparison purposes, the corresponding 1986-88 U.S. and regional estimates are reprinted from Economic Indicators of the Farm Sector: Costs of Production--Major Field Crops, 1988[1] (tables 14-18).

Individual operation costs vary because of differences in production practices, inputs, type, and size of machinery used. They may also vary considerably from average cost estimates. The U.S. Department of Agriculture's (USDA) Economic Research Service (ERS) provides after-the-fact estimates of costs incurred in producing cotton. The estimates do not purport to represent "best management" cropping practices. The estimates include the costs and returns to both farm operators and landlords, thus capturing all costs associated with producing cotton. But the estimates exclude direct costs and returns associated with government commodity programs, which makes the estimates more useful for policy analysis.

Cotton Production

U.S. cotton yield in 1987 averaged 706 pounds per harvested acre, 73 pounds above the previous record established in 1985 (Crop Production). There are regional cost advantages in cotton production and regional differences in risks associated with cotton production. For instance, cotton production in Arizona is less dependent on rainfall, because of the level of irrigation, than cotton in Texas, and therefore, is less subject to yield risk associated with rainfall.

Costs of producing cotton in 1987 varied with yields across regions. Regions with high per-acre costs also had high yields. Dry conditions and an early frost reduced yields in the Southeast (Alabama and Georgia). In the Delta, Southern Plains, and Southwest regions, yields were above average, setting records for all States except Mississippi.

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[1] Full citations of underlined titles are listed in the References.

Cotton was planted on 44, 38, 49, and 63 percent of the total crop acres on the cotton farms represented in the survey in the Southeast, Delta, Southern Plains, and Southwest, respectively.

Analysis of State-Level Cost and Return Estimates

Oklahoma had the lowest costs per acre ($256.09) and Arizona had the highest ($934.13). California had the lowest costs per pound ($0.61) and Alabama the highest ($0.77). Chemical costs are the highest cost items in the Southeast, Delta, and Southwest because of insect problems in those regions. In Arizona, purchased irrigation water costs are almost as high as chemical costs in the State. Ginning costs in Arizona are also high relative to other expenses in the State.

A brief weather summary offers information that partially explains the State-to-State differences in per-pound production costs during 1986-88. Yield variations translate into fluctuations in per-unit costs and gross and net returns, even if per-acre costs were the same everywhere.

Warm temperatures and abundant moisture characterized most of the cotton regions during early 1986. Cotton seeding was underway in Arizona by mid-February. By mid-March, much of the Southern Plains and Southeastern regions were turning dry. Cotton planting progressed in California and Texas, and planting was ahead of 1985 in Arizona. Texas and the Southeast region continued dry through April. Insect problems began occuring during May in Arizona, Arkansas, and Texas. The Southeast region continued dry through the first half of August. In the Southern Plains region, wet weather hampered harvest and reduced cotton quality. Dry weather also hampered growth in the Delta, Southeast, and Southwest regions, and later wet weather slowed harvest in these regions.

Excellent growing and harvesting conditions characterized 1987 everywhere but in the Southeast, where dry conditions and an early frost reduced yields.

In 1988, cotton planting proceeded ahead of normal in the Southern Plains and Southwest, but in the Delta and Southeast wetness and low temperatures slowed progress. Hot, dry weather worsened into the growing season everywhere, although cotton fared better than most crops. However, cotton bolls started dropping off the cotton plants in California, Arizona, and the Southern Plains by the end of August. Wet conditions slowed harvest in the Southeast and Southwest, and an early frost accelerated defoliation in the Southern Plains. Although harvest was ahead of normal by early December everywhere, rains slowed harvest in the Southern Plains.

Accounting Concepts

ERS presents production costs and returns in the form of a commodity account, which lists gross value of production, variable cash expenses, fixed cash expenses, capital replacement, allocated returns to owned inputs (or opportunity costs), and three measures of residual returns.

Five characteristics affect ERS accounting. These characteristics relate to the treatment of participation in Government programs, the combined operation-landlord costs and returns, the per-planted-acre accounting, the treatment of

multiple outputs (cotton seed and cotton lint), and the separation of production and marketing costs.

Government Programs

ERS estimates exclude the direct effects of Government programs where possible so that policymakers may be informed as to production costs and returns in the absence of programs. Exclusion of all effects of Government programs, however, is not possible, so estimated charges to some inputs, like land, are somewhat higher than they might be if there were no Government programs.

Future reports will include the costs of participating in Government programs because changes in the FCRS questionnaires will provide the data necessary to estimate the additional costs. Costs of Government program participation are spread over base acres planted, while benefits are paid on average production on all base acres planted. Therefore, changes in variable costs are expected to be small, but returns should be higher, as was the case for rice.[2] Changes in net land rent will probably account for the largest change in costs of producing cotton, as in rice, because landlords receive a share of the Government payments as part of the land rent on share-rented land. Regional differences in the percentage of share-rented land will likely lead to regional differences in net land rents when Government program participation is accounted for.

Combined Operation-Landlord Costs and Returns

ERS estimates of costs and returns cover the farm operation and landlord combined, as if they were one business. ERS estimates of economic costs are designed to account for the value of all inputs in production, regardless of ownership. ERS, therefore, imputes a cost for land used in cotton production, whether owned by an operation or rented from a landlord.

Per-Planted-Acre Accounting

ERS cost and returns estimates are provided on a per-planted-acre basis. A planted acre is a unit that is comparable, and in some cases, substitutable, among crops. Per-planted-acre estimates are preferred for making comparisons across crops. Estimates on a per-unit-of-output basis may be calculated by dividing per-planted-acre costs by per-planted-acre yield. Per-unit-of-output costs are readily comparable with product prices and levels of Government support and are especially useful for examining effects of annual changes in yield on production costs.

Multi-Output Operations

In an attempt to reduce risks through diversification, most agricultural commodities are produced by farm businesses producing more than one commodity. Some inputs, such as tractors, insurance, utilities, and buildings, are used

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[2]See Salassi and others. They found that variable costs for the United States increased less than $1.50 per acre due to Government program participation. Land charges increased significantly, from $58 to $121 per acre. Overall total economic costs per acre increased from $475 to $547. Total value of production increased more dramatically, from $370 to $596 per acre.

in the production of more than one commodity. ERS uses standard, accepted procedures for allocating fixed costs and inputs that are shared in the production of other commodities. These allocation rules, based on the acres covered or the hours used for a particular piece of machinery, are necessary for machinery-related costs.

Separation of Production and Marketing Costs

ERS separates the costs of production from the costs of marketing by measuring production costs to the point of first sale or storage. Ginning costs and costs of hauling the crop to the gin are included. ERS excludes both storage costs and returns from storage, so cotton is valued at the average price during the peak harvest month.

Data Sources and Estimation Procedures

A detailed description of the data sources and estimation procedures are reported in Economic Indicators of the Farm Sector: Costs of Production--Major Field Crops, 1988. The ERS estimates are (1) directly summarized or calculated from the FCRS, for example, chemical costs, (2) derived by multiplying National Agricultural Statistics Service (NASS) prices times quantities obtained from the FCRS, for example, fertilizer and seed costs, or (3) are derived by combining FCRS data with specific engineering coefficients, for example, fuel and capital replacement. A brief synopsis of the survey design and selected variable estimation procedures is presented below.

Data Sources

While data used in the cost and returns estimation procedures are obtained from many sources, the primary data on production technology come from the FCRS. The FCRS is a multiframe, stratified survey conducted annually by ERS and NASS. Because of survey costs, USDA cannot undertake detailed surveys of every commodity each year, thus the FCRS covers each commodity about every 4 years. In nonsurvey years, ERS does not change production practices and technology, but updates the costs only with price and yield data and information from the whole-farm versions of the FCRS, from other USDA sources, and other publications. Cotton farmers were interviewed in February and March 1988 about their 1987 cotton crop.

Estimation Procedures

State-level costs of production (COP) are constructed from estimates of actual input and machinery use made from the FCRS, combined with input price data from other sources. Computerized estimation procedures are used to process the COP data.

Gross Value of Production

ERS calculates the per-acre gross value of cotton production by multiplying the harvest-period prices for cotton and cottonseed times the planted-acre yields. Harvest prices, rather than season-average prices, are used since season-average prices reflect marketing factors like storage. Payments from Government farm programs, such as deficiency and disaster payments, are excluded from gross value of production. State-level yields are updated annually from Crop Production. Prices are updated annually from Agricultural Prices.

Variable Cash Expenses

Variable cash expenses consist of seed, fertilizers, lime, gypsum, chemicals, custom operations, hired labor, fuel, lubrication, repairs, ginning, technical services, and purchased irrigation water.

Per-acre seed costs are derived using seeding rates reported by farmers and a weighted proportion of the amounts of homegrown seed and seed purchased commercially. Data on the share of seed purchased and home grown come from the FCRS. Commercial seed prices are obtained from Agricultural Prices, while homegrown seed is valued at the previous year's season-average price for the crop plus an allowance for cleaning and treating.

Fertilizer costs are calculated by summing the products of prices per pound of each primary nutrient and the total pounds of the nutrient applied. Prices and compositions of commercial fertilizers are obtained from Agricultural Prices and Commercial Fertilizers. Application rates of nitrogen, phosphorus, potassium, lime, gypsum, and micronutrients are obtained from the FCRS, and State average application rates for nitrogen, phosphorus, and potassium are listed in table 19. Prices of lime come from Agricultural Prices, gypsum from major suppliers, and micronutrients from the Chemical Marketing Reporter.

Chemical costs are directly summarized from the FCRS. The FCRS provides the total chemical cost for the cotton acres. Costs of individual chemicals are not identified in the survey because of the large number of chemical compounds and trade names. In nonsurvey years, chemical costs are updated using the Prices Paid Index for farm chemicals given in Agricultural Prices.

Custom operation expenses are the hiring of machinery and labor as a single unit to perform a farming operation. Examples of custom operations are land leveling, plowing, planting, cultivating, crop spraying, harvesting, and hauling cotton to a gin. Custom expenses are directly summarized from the FCRS and are adjusted between surveys by yield differences and the index of farm services and cash rent, published in Agricultural Prices.

Fuel, lubrication, and electricity are the costs of fuel and power used by tractors, strippers, pickers, trucks, pickups, and irrigation pumps used in the cotton production process. ERS estimates fuel, lubrication, and electricity costs from the FCRS and engineering performance data. FCRS data indicate machine types, sizes, and acres covered. These data are combined with engineering specifications, speed, and field efficiency, much of which comes from published reports of the American Society of Agricultural Engineers, to arrive at hours of use per acre. Fuel costs are calculated by multiplying the hours each machine is used in producing cotton times a fuel consumption rate and a fuel price that varies with the size of machine and fuel type. Repair expense is calculated by multiplying hours of machine use times a calculated repair rate per hour. ERS estimates the lubrication costs at 15 percent of fuel costs. Electricity costs for pumping irrigation water are estimated from FCRS data on well, pump, and motor sizes and the hours that water is pumped.

Fuel prices are updated annually. ERS obtains prices of gasoline, diesel, and liquefied petroleum gas from Agricultural Prices and subtracts Federal and State per-gallon taxes on gasoline that are refunded for agricultural use.

Natural gas prices are obtained from the U.S. Department of Energy and electricity prices come from the Edison Electric Institute.

The cost of water purchased from irrigation districts as well as the cost of pumping private association water are obtained from the FCRS and listed under variable cash costs as purchased irrigation water.

The hired labor cost is calculated from estimates of the portion of whole-farm hired labor expenses allocated to cotton, including both cash and noncash benefits, reported by producers in the survey.

Estimates of ginning costs are based on an annual survey (Cotton Ginning Charges, Harvesting Practices, and Selected Marketing Costs, 1987/88) of cotton gins. These cost estimates reflect costs of drying cotton, bagging, ties, cleaning lint, and insurance.

Technical services include soil testing, scouting, and land surveying. The cost is taken directly from the FCRS and is updated using the Prices Paid Index.

Fixed Cash Expenses

Fixed cash expenses are general farm overhead, taxes, insurance, and interest on operating and real estate loans.

General farm overhead includes expenses for electricity and nonirrigation water for general farm and office use, telephone, farm shop and office equipment and supplies, fence maintenance and repairs, water drainage, farm share of motor vehicle registration and licensing fees, accounting and legal fees, business travel, dues for memberships in farm organizations, farm share of liability and blanket insurance policies, and herbicides used to maintain farm roads and ditches. ERS collects costs for these items from the FCRS and allocates them to the respective commodities on the basis of cotton's share of the total value of production for all crops and livestock produced on the farm.

Taxes include a personal property tax on machinery and real estate tax. ERS calculates insurance and personal property tax cost for each machine based on the current purchase price of the machine lagged 4 years. This procedure assumes high-cost items, such as tractors, are owned about 8 years. This cost is then lagged 4 years to assume an average age of machine. ERS estimates taxes on farm real estate from the FCRS by dividing the total whole-farm annual real estate taxes paid by the acres of farmland owned.

ERS allocates a portion of whole-farm interest expenses to each commodity in a manner similar to general farm overhead (by value of production). Interest expenses are separated into two categories: interest on operating loans and interest on loans secured by real estate. Interest on operating loans includes finance charges and service fees on loans used for purchasing variable inputs and farm machinery. Interest on real estate includes interest and service fees on farm business loans, land contracts, and other loans secured by real estate.

Capital Replacement

The capital replacement, or economic depreciation, cost represents a charge sufficient to maintain investment in machinery or equipment and production capacity through time. ERS calculates capital replacement costs for machinery, vehicles, and irrigation equipment. Costs are based on a per-hour rate that prorates the value of each machinery and equipment item and on the hours per acre that each is used in the production of a crop.

Economic (Full-Ownership) Costs

Economic costs are long-term costs, designed to account for the costs of all inputs. An imputed cost is calculated for all inputs, whether owned, rented, or financed, in a consistent manner that accounts for all costs incurred in producing cotton. Economic costs reflect the production situation as if the operation and landlord fully owned the production inputs. This full-ownership assumption allows comparisons across crops without regard to the actual ownership and debt positions of producers. ERS defines economic costs as variable cash expenses, general farm overhead, taxes and insurance, capital replacement, allocated returns to the capital invested in the production process, unpaid labor, and land. Cash expenses, which are part of full economic costs, are valued at market prices reported by producers and suppliers. Opportunity costs of owned inputs are imputed from values of capital, land, and unpaid labor in alternative uses.

The opportunity cost of operating capital is the cost of carrying input expenses from the time they are used until harvest. ERS imputes this cost at the 6-month U.S. Treasury bill rate. The return to other nonland capital is the cost of having capital invested in farm machinery and equipment. ERS imputes this cost as equal to the longrun rate of return to production assets in the farm sector. ERS values land in cost-of-production accounts at its rental value. The alternative use of land by any one landowner is to rent it to someone else who will produce the same crop. The net land return is a composite of share (valued at the harvest-period price) and cash rental rates for a particular crop, minus real estate taxes and the value of inputs supplied by the landlord. ERS imputes the value of unpaid labor (hired labor is a variable cash expense) at the wage rate for agricultural workers. Additional value of unpaid labor, such as for management and entrepreneurial skill and the return to risk, are measured as a residual return.

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Table 1--Farms producing cotton, acres planted, production, and yield, 1987

Region and State	Farms producing cotton 1/	Acres planted 2/	Production 2/	Yield 3/
	Number	Acres	1,000 pounds	Bales
Southeast:				
Alabama	1,188	449,071	233,323	518
Georgia	1,438	201,026	92,897	461
Delta:				
Arkansas	1,326	298,876	226,076	758
Louisiana	1,641	258,044	197,906	768
Mississippi	2,671	809,835	626,257	773
Tennessee	1,611	284,350	192,767	677
Southern Plains:				
Oklahoma	2,077	323,177	121,487	374
Texas	8,759	3,065,957	1,283,264	418
Southwest:				
Arizona	1,099	476,961	722,690	1,517
California	1,815	427,451	504,662	1,181

1/ Source: 1987 Census of Agriculture.
2/ Source: USDA's Crop Production 1988 Summary.
3/ Derived by dividing production by number of acres planted (column 3 divided by column 2).

Table 2--Per-planted-acre: U.S., regional, and State cost estimates for cotton, 1987 1/

Region and State	Variable cash expenses	Fixed cash expenses	Capital replacement	Total economic costs
		Dollars per acre		
Southeast	274.17	49.39	58.99	442.86
Alabama	276.46	41.50	53.62	437.15
Georgia	271.13	59.96	66.20	450.56
Delta	269.60	66.50	57.18	490.12
Arkansas	270.44	73.32	61.88	522.72
Louisiana	284.84	60.81	54.46	516.63
Mississippi	380.26	70.12	52.32	575.87
Tennessee	214.94	57.36	66.25	437.70
Southern Plains	168.11	48.23	42.82	341.03
Oklahoma	117.56	44.73	28.69	256.09
Texas	172.61	48.54	44.08	348.60
Southwest	487.46	154.31	69.06	805.72
Arizona	600.32	169.55	78.00	934.13
California	450.08	149.26	66.10	763.20
United States	250.74	69.57	51.65	458.55

1/ U.S. and regional cost estimates were taken from Economic Indicators of the Farm Sector: Costs of Production--Major Field Crops, 1988.

Table 3--Per-pound: U.S., regional, and State cost estimates for cotton, 1987 1/

Region and State	Variable cash expenses	Fixed cash expenses	Capital replacement	Total economic costs
		Cents per pound		
Southeast	45	8	10	73
Alabama	49	7	9	77
Georgia	42	9	10	69
Delta	35	9	7	63
Arkansas	35	9	8	67
Louisiana	37	8	7	67
Mississippi	46	9	6	70
Tennessee	31	8	10	63
Southern Plains	36	10	9	73
Oklahoma	30	11	7	65
Texas	36	10	9	73
Southwest	38	12	5	63
Arizona	45	13	6	70
California	36	12	5	61
United States	37	10	8	67

1/ Regional and U.S. cost estimates were taken from Economic Indicators of the Farm Sector: Costs of Production--Major Field Crops, 1988.

Table 4--Alabama: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	242.90	377.11	257.31
Secondary crop	23.24	31.34	38.44
Total	266.14	408.45	295.75
Cash expenses:			
Seed	5.24	6.82	6.82
Fertilizer	30.47	28.47	36.23
Lime and gypsum	5.13	3.65	3.54
Chemicals	98.11	95.79	97.33
Custom operations	7.82	8.77	7.85
Fuel, lube, and electricity	15.11	18.33	18.21
Repairs	16.72	16.85	17.73
Hired labor	51.46	53.83	57.30
Ginning	38.83	43.70	37.32
Technical services	.25	.25	.25
Total, variable cash expenses	269.14	276.46	282.58
General farm overhead	12.58	12.28	13.02
Taxes and insurance	10.80	11.15	11.29
Interest on operating loans	12.42	8.75	7.73
Interest on real estate	11.51	9.32	8.64
Total, fixed cash expenses	47.31	41.50	40.68
Total, cash expenses	316.45	317.96	323.26
Net returns less cash expenses 3/	-50.31	90.49	-27.51
Capital replacement	53.19	53.62	56.43
Net returns less cash expenses and capital replacement	-150.91	36.87	-83.94
Economic (full ownership) costs:			
Variable cash expenses	269.14	276.46	282.58
General farm overhead	12.58	12.28	13.02
Taxes and insurance	10.80	11.15	11.29
Capital replacement	53.19	53.62	56.43
Allocated returns to owned inputs:			
Return to operating capital 4/	7.98	9.30	10.64
Return to other nonland capital 5/	8.79	9.86	11.81
Net land rent 6/	43.00	52.38	45.60
Unpaid labor	11.57	12.10	12.88
Total, economic costs	417.05	437.15	444.25
Residual returns to management and risk 7/	-150.91	-28.70	-148.50
Harvest-period price (dollars per pound)	.48	.66	.53
Yield (pounds per planted acre)	502.90	568.80	486.40

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 5--Arizona: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	612.29	864.80	624.21
Secondary crop	91.56	98.27	117.76
Total	703.85	963.07	741.97
Cash expenses:			
Seed	7.24	7.17	7.42
Fertilizer	66.85	61.59	69.21
Lime and gypsum	.08	.08	.08
Chemicals	125.80	122.83	124.81
Custom operations	8.66	8.72	8.95
Fuel, lube, and electricity	78.53	76.99	82.40
Repairs	35.22	35.51	37.37
Hired labor	74.33	77.75	83.78
Purchased irrigation water	96.57	96.57	96.57
Ginning	102.48	112.39	96.44
Technical services	.72	.72	.72
Total, variable cash expenses	596.48	600.32	607.75
General farm overhead	81.70	79.78	84.56
Taxes and insurance	19.29	21.47	21.78
Interest on operating loans	69.27	48.79	43.11
Interest on real estate	24.09	19.51	18.09
Total, fixed cash expenses	194.35	169.55	167.54
Total, cash expenses	790.83	769.87	775.29
Net returns less cash expenses 3/	-86.98	193.20	-33.32
Capital replacement	77.37	78.00	82.08
Receipts less cash expenses and capital replacement	-164.35	115.20	-115.40
Economic (full ownership) costs:			
Variable cash expenses	596.48	600.32	607.75
General farm overhead	81.70	79.78	84.56
Taxes and insurance	19.29	21.47	21.78
Capital replacement	77.37	78.00	82.08
Allocated returns to owned inputs:			
Return to operating capital 4/	14.88	16.39	19.70
Return to other nonland capital 5/	14.73	16.53	19.79
Net land rent 6/	101.60	100.98	108.66
Unpaid labor	21.40	20.66	22.26
Total, economic costs	927.45	934.13	966.58
Residual returns to management and risk 7/	-223.60	28.94	-224.61
Harvest-period price (dollars per pound)	.50	.65	.55
Yield (pounds per planted acre)	1219.70	1338.70	1124.70

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 6--Arkansas: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	289.54	493.23	384.36
Secondary crop	27.92	43.85	59.29
Total	317.46	537.08	443.65
Cash expenses:			
Seed	5.54	8.64	7.20
Fertilizer	31.08	28.13	33.40
Chemicals	62.20	60.73	61.71
Custom operations	6.55	8.32	8.04
Fuel, lube, and electricity	20.01	26.51	25.62
Repairs	24.77	24.97	26.28
Hired labor	47.57	49.75	49.75
Ginning	45.65	62.87	59.38
Technical services	.52	.52	.52
Total, variable cash expenses	243.89	270.44	271.90
General farm overhead	23.61	23.05	24.43
Taxes and insurance	16.29	17.04	17.26
Interest on operating loans	24.85	17.50	15.46
Interest on real estate	19.42	15.73	14.58
Total, fixed cash expenses	84.17	73.32	71.73
Total, cash expenses	328.06	343.76	343.63
Net returns less cash expenses 3/	-10.60	193.32	100.02
Capital replacement	61.39	61.88	65.13
Net returns less cash expenses and capital replacement	-71.99	131.44	34.89
Economic (full ownership) costs:			
Variable cash expenses	243.89	270.44	271.90
General farm overhead	23.61	23.05	24.43
Taxes and insurance	16.29	17.04	17.26
Capital replacement	61.39	61.88	65.13
Allocated returns to owned inputs:			
Return to operating capital 4/	4.78	5.26	6.14
Return to other nonland capital 5/	11.94	13.39	16.03
Net land rent 6/	70.53	110.29	94.43
Unpaid labor	21.52	21.37	21.37
Total, economic costs	453.95	522.72	516.69
Residual returns to management and risk 7/	-136.49	14.36	-73.04
Harvest-period price (dollars per pound)	.49	.63	.53
Yield (pounds per planted acre)	589.70	779.20	725.20

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 7--California: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	525.87	872.00	643.32
Secondary crop	94.52	102.08	122.22
Total	620.39	974.08	765.54
Cash expenses:			
Seed	8.79	9.28	10.25
Fertilizer	48.73	44.80	48.35
Lime and gypsum	.78	.78	.78
Chemicals	51.39	50.18	50.99
Custom operations	31.29	31.51	32.37
Fuel, lube, and electricity	29.33	34.25	36.09
Repairs	23.63	23.82	25.07
Hired labor	76.83	80.39	82.30
Purchased irrigation water	48.48	48.48	48.48
Ginning	109.20	125.92	99.88
Technical services	.67	.67	.67
Total, variable cash expenses	429.12	450.08	435.23
General farm overhead	51.69	50.47	53.49
Taxes and insurance	23.18	23.21	23.57
Interest on operating loans	23.40	16.48	14.56
Interest on real estate	72.96	59.10	54.80
Total, fixed cash expenses	171.23	149.26	146.42
Total, cash expenses	600.35	599.34	581.65
Net returns less cash expenses 3/	20.04	374.74	183.89
Capital replacement	65.57	66.10	69.56
Net returns less cash expenses and capital replacement	-45.53	308.64	114.33
Economic (full ownership) costs:			
Variable cash expenses	429.12	450.08	435.23
General farm overhead	51.69	50.47	53.49
Taxes and insurance	23.18	23.21	23.57
Capital replacement	65.57	66.10	69.56
Allocated returns to owned inputs:			
Return to operating capital 4/	9.84	11.18	13.19
Return to other nonland capital 5/	10.36	11.62	13.91
Net land return 6/	97.39	119.79	111.80
Unpaid labor	28.75	30.75	30.79
Total, economic costs	715.90	763.20	751.54
Residual returns to management and risk 7/	-95.51	210.88	14.00
Harvest-period price (dollars per pound)	.49	.70	.63
Yield (pounds per planted acre)	1077.60	1247.50	1013.10

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 8--Georgia: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	195.77	420.55	275.52
Secondary crop	22.76	22.76	48.65
Total	218.53	443.31	324.17
Cash expenses:			
Seed	5.53	5.87	5.86
Fertilizer	20.53	20.22	24.91
Lime and gypsum	.23	.24	.23
Chemicals	100.98	98.59	100.18
Custom operations	6.71	11.05	8.89
Fuel, lube, and electricity	18.33	24.14	22.80
Repairs	20.99	21.16	22.27
Hired labor	30.72	32.13	34.20
Ginning	34.92	57.50	45.48
Technical services	.23	.23	.23
Total, variable cash expenses	239.17	271.13	265.05
General farm overhead	15.04	14.69	15.57
Taxes and insurance	15.42	16.02	16.22
Interest on operating loans	17.48	12.31	10.88
Interest on real estate	20.91	16.94	15.71
Total, fixed cash expenses	68.85	59.96	58.38
Total, cash expenses	308.02	331.09	323.43
Net returns less cash expenses 3/	-89.49	112.22	0.74
Capital replacement	65.67	66.20	69.67
Net returns less cash expenses and capital replacement	-155.16	46.02	-68.93
Economic (full ownership) costs:			
Variable cash expenses	239.17	271.13	265.05
General farm overhead	15.04	14.69	15.57
Taxes and insurance	15.42	16.02	16.22
Capital replacement	65.67	66.20	69.67
Allocated returns to owned inputs:			
Return to operating capital 4/	5.98	6.81	8.11
Return to other nonland capital 5/	11.55	12.96	15.51
Net land rent 6/	38.23	38.39	43.40
Unpaid labor	23.30	24.36	25.92
Total, economic costs	414.36	450.56	459.45
Residual returns to management and risk 7/	-195.83	-7.25	-135.28
Harvest-period price (dollars per pound)	.50	.65	.54
Yield (pounds per planted acre)	394.70	649.00	507.40

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 9--Louisiana: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	266.80	499.16	329.43
Secondary crop	28.36	47.48	56.30
Total	295.16	546.64	385.73
Cash expenses:			
Seed	6.21	6.73	6.45
Fertilizer	30.70	28.93	36.12
Lime and gypsum	1.13	1.16	1.13
Chemicals	86.08	84.05	85.40
Custom operations	17.57	18.78	18.49
Fuel, lube, and electricity	19.55	24.78	23.97
Repairs	22.97	23.15	24.37
Hired labor	34.92	36.52	36.52
Ginning	43.17	60.37	47.74
Technical services	.37	.37	.37
Total, variable cash expenses	262.67	284.84	280.56
General farm overhead	20.21	19.73	20.91
Taxes and insurance	11.33	11.66	11.80
Interest on operating loans	20.60	14.51	12.82
Interest on real estate	18.41	14.91	13.82
Total, fixed cash expenses	70.55	60.81	59.35
Total, cash expenses	333.22	345.65	339.91
Net returns less cash expenses 3/	-38.06	200.99	45.82
Capital replacement	54.03	54.46	57.32
Net returns less cash expenses and capital replacement	-92.09	146.53	-11.50
Economic (full ownership) costs:			
Variable cash expenses	262.67	284.84	280.56
General farm overhead	20.21	19.73	20.91
Taxes and insurance	11.33	11.66	11.80
Capital replacement	54.03	54.46	57.32
Allocated returns to owned inputs:			
Return to operating capital 4/	5.70	6.47	7.45
Return to other nonland capital 5/	10.26	11.50	13.77
Net land rent 6/	73.90	99.96	85.05
Unpaid labor	28.20	28.01	28.01
Total, economic costs	466.30	516.63	504.87
Residual returns to management and risk 7/	-171.14	30.01	-119.14
Harvest-period price (dollars per pound)	.48	.64	.53
Yield (pounds per planted acre)	557.00	775.10	620.40

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 10--Mississippi: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	273.28	516.53	380.61
Secondary crop	29.63	51.85	60.20
Total	302.91	568.38	440.81
Cash expenses:			
Seed	4.22	7.18	7.46
Fertilizer	27.26	24.10	30.57
Lime and gypsum	1.13	1.16	1.13
Chemicals	83.21	81.24	82.55
Custom operations	11.13	13.73	13.04
Fuel, lube, and electricity	18.31	24.98	27.31
Repairs	20.00	20.16	21.22
Hired labor	44.29	46.32	46.32
Ginning	43.34	64.37	57.12
Technical services	.45	.45	.45
Total, variable cash expenses	253.34	283.69	287.17
General farm overhead	23.75	23.19	24.58
Taxes and insurance	12.76	13.12	13.29
Interest on operating loans	25.06	17.65	15.60
Interest on real estate	19.95	16.16	14.98
Total, fixed cash expenses	81.52	70.12	68.45
Total, cash expenses	334.86	353.81	355.62
Net returns less cash expenses 3/	-31.95	214.57	85.19
Capital replacement	51.90	52.32	55.06
Net returns less cash expenses and capital replacement	-83.85	162.25	30.13
Economic (full ownership) costs:			
Variable cash expenses	253.34	283.69	287.17
General farm overhead	23.75	23.19	24.58
Taxes and insurance	12.76	13.12	13.29
Capital replacement	51.90	52.32	55.06
Allocated returns to owned inputs:			
Return to operating capital 4/	5.53	6.37	7.37
Return to other nonland capital 5/	9.79	10.98	13.15
Net land rent 6/	64.98	73.51	74.00
Unpaid labor	16.23	16.12	16.21
Total, economic costs	438.28	479.30	490.83
Residual returns to management and risk 7/	-135.37	89.08	-50.02
Harvest-period price (dollars per pound)	.49	.63	.53
Yield (pounds per planted acre)	560.00	821.20	714.10

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 11--Oklahoma: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	134.57	244.36	139.80
Secondary crop	14.02	29.52	27.47
Total	148.59	273.88	167.27
Cash expenses:			
Seed	5.55	7.42	6.79
Fertilizer	6.67	6.02	7.18
Chemicals	12.25	11.96	12.15
Custom operations	4.09	4.51	4.23
Fuel, lube, and electricity	11.76	15.49	16.67
Repairs	9.99	11.17	11.75
Hired labor	12.58	13.02	13.04
Purchased irrigation water	.64	.64	.64
Ginning	26.43	41.63	30.15
Technical services	5.70	5.70	5.70
Total, variable cash expenses	95.66	117.56	108.30
General farm overhead	13.26	12.95	13.73
Taxes and insurance	6.82	7.92	8.03
Interest on operating loans	14.06	9.90	8.75
Interest on real estate	17.24	13.96	12.94
Total, fixed cash expenses	51.38	44.73	43.45
Total, cash expenses	147.04	162.29	151.75
Net returns less cash expenses 3/	1.55	111.59	15.52
Capital replacement	24.46	28.69	30.20
Net returns less cash expenses and capital replacement	-22.91	82.90	-14.68
Economic (full ownership) costs:			
Variable cash expenses	95.66	117.56	108.30
General farm overhead	13.26	12.95	13.73
Taxes and insurance	6.82	7.92	8.03
Capital replacement	24.46	28.69	30.20
Allocated returns to owned inputs:			
Return to operating capital 4/	2.32	2.75	3.10
Return to other nonland capital 5/	4.04	5.18	6.20
Net land rent 6/	37.11	63.36	41.11
Unpaid labor	17.10	17.68	17.71
Total, economic costs	200.77	256.09	228.38
Residual returns to management and risk 7/	-52.18	17.79	-61.11
Harvest-period price (dollars per pound)	.53	.62	.46
Yield (pounds per planted acre)	252.00	395.40	302.60

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 12--Tennessee: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	264.45	443.32	277.93
Secondary crop	30.48	41.66	49.16
Total	294.93	484.98	327.09
Cash expenses:			
Seed	7.00	8.76	8.99
Fertilizer	34.68	34.17	41.62
Chemicals	38.03	37.13	37.73
Custom operations	5.70	5.73	5.88
Fuel, lube, and electricity	20.40	22.24	23.26
Repairs	31.87	32.13	33.81
Hired labor	20.32	22.78	25.47
Ginning	40.42	50.17	38.25
Technical services	1.83	1.83	1.83
Total, variable cash expenses	200.25	214.94	216.84
General farm overhead	12.66	12.36	13.10
Taxes and insurance	12.67	13.18	13.33
Interest on operating loans	15.09	10.63	9.39
Interest on real estate	26.16	21.19	19.65
Total, fixed cash expenses	66.58	57.36	55.47
Total, cash expenses	266.83	272.30	272.31
Net returns less cash expenses 3/	28.10	212.68	54.78
Capital replacement	65.72	66.25	69.72
Net returns less cash expenses and capital replacement	-37.62	146.43	-14.94
Economic (full ownership) costs:			
Variable cash expenses	200.25	214.94	216.84
General farm overhead	12.66	12.36	13.10
Taxes and insurance	12.67	13.18	13.33
Capital replacement	65.72	66.25	69.72
Allocated returns to owned inputs:			
Return to operating capital 4/	3.70	4.07	4.93
Return to other nonland capital 5/	11.37	12.75	15.26
Net land rent 6/	71.52	93.77	73.12
Unpaid labor	20.34	20.38	22.77
Total, economic costs	398.23	437.70	429.07
Residual returns to management and risk 7/	-103.30	47.28	-101.98
Harvest-period price (dollars per pound)	.47	.64	.53
Yield (pounds per planted acre)	559.10	691.60	524.40

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 13--Texas: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	122.74	298.49	226.98
Secondary crop	14.68	32.37	42.32
Total	137.42	330.86	269.30
Cash expenses:			
Seed	6.23	8.53	8.20
Fertilizer	12.69	11.57	13.15
Chemicals	19.36	18.90	19.20
Custom operations	6.64	7.97	8.25
Fuel, lube, and electricity	20.74	24.02	24.61
Repairs	17.05	17.19	18.09
Hired labor	27.89	28.84	28.90
Purchased irrigation water	.21	.21	.21
Ginning	28.02	53.25	48.03
Technical services	2.13	2.13	2.13
Total, variable cash expenses	140.96	172.61	170.77
General farm overhead	12.55	12.25	12.98
Taxes and insurance	10.30	11.50	11.67
Interest on operating loans	19.45	13.70	12.11
Interest on real estate	13.69	11.09	10.28
Total, fixed cash expenses	55.99	48.54	47.04
Total, cash expenses	196.95	221.15	217.81
Net returns less cash expenses 3/	-59.53	109.71	51.49
Capital replacement	43.73	44.08	46.39
Net returns less cash expenses and capital replacement	-103.26	65.63	5.10
Economic (full ownership) costs:			
Variable cash expenses	140.96	172.61	170.77
General farm overhead	12.55	12.25	12.98
Taxes and insurance	10.30	11.50	11.67
Capital replacement	43.73	44.08	46.39
Allocated returns to owned inputs:			
Return to operating capital 4/	3.43	3.99	4.47
Return to other nonland capital 5/	7.39	8.29	9.92
Net land rent 6/	32.20	75.55	61.46
Unpaid labor	19.66	20.33	20.37
Total, economic costs	270.22	348.60	338.03
Residual returns to management and risk 7/	-132.80	-17.74	-68.73
Harvest-period price (dollars per pound)	.48	.63	.51
Yield (pounds per planted acre)	253.60	475.30	447.70

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 14--Delta: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	273.78	495.29	352.34
Secondary crop	29.10	47.43	57.24
Total	302.88	542.72	409.58
Cash expenses:			
Seed	5.35	7.65	7.43
Fertilizer	29.89	27.75	34.32
Lime and gypsum	.74	.72	.69
Chemicals	73.34	70.14	71.11
Custom operations	10.99	12.41	12.00
Fuel, lubrication, and electricity	19.24	24.80	25.49
Repairs	23.33	23.88	25.17
Hired labor	39.36	40.83	41.30
Ginning	43.36	60.74	52.27
Technical services	.64	.68	.68
Total, variable cash expenses	246.24	269.60	270.46
General farm overhead	21.32	20.54	21.77
Taxes and insurance	13.12	13.62	13.82
Interest on operating loans	22.56	15.71	13.88
Interest on real estate	20.34	16.63	15.42
Total, fixed cash expenses	77.34	66.50	64.89
Total, cash expenses	323.58	336.10	335.35
Net returns less cash expenses 3/	-20.70	206.62	74.23
Capital replacement	56.25	57.18	60.24
Net returns less cash expenses and Capital replacement	-76.95	149.44	13.99
Economic (full ownership) costs:			
Variable cash expenses	246.24	269.60	270.46
General farm overhead	21.32	20.54	21.77
Taxes and insurance	13.12	13.62	13.82
Capital replacement	56.25	57.18	60.24
Allocated returns to owned inputs:			
Return to operating capital 4/	5.16	5.77	6.71
Return to other nonland capital 5/	10.56	11.91	14.28
Net land return 6/	69.14	90.81	80.83
Unpaid labor	20.73	20.69	21.15
Total, economic costs	442.52	490.12	489.26
Residual returns to management and risk 7/	-139.64	52.60	-79.68
Harvest-month price (dollars per pound)	.48	.64	.53
Yield (pounds per planted acre)	565.15	779.89	662.98

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 15--Southeast: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	223.26	395.68	266.10
Secondary crop	23.04	27.67	43.37
Total	246.30	423.35	309.47
Cash expenses:			
Seed	5.36	6.41	6.36
Fertilizer	26.32	24.94	30.77
Lime and gypsum	3.09	2.19	1.94
Chemicals	99.30	96.99	98.71
Custom operations	7.36	9.74	8.36
Fuel, lubrication, and electricity	16.45	20.81	20.43
Repairs	18.50	18.69	19.92
Hired labor	42.82	44.56	46.15
Ginning	37.20	49.60	41.26
Technical services	.24	.24	.24
Total, variable cash expenses	256.64	274.17	274.14
General farm overhead	13.60	13.31	14.25
Taxes and insurance	12.72	13.23	13.67
Interest on operating loans	14.53	10.27	9.25
Interest on real estate	15.43	12.58	12.05
Total, fixed cash expenses	56.28	49.39	49.22
Total, cash expenses	312.92	323.56	323.36
Net returns less cash expenses 3/	-66.62	99.79	-13.89
Capital replacement	58.39	58.99	62.82
Net returns less cash expenses and capital replacement	-125.01	40.80	-76.71
Economic (full ownership) costs:			
Variable cash expenses	256.64	274.17	274.17
General farm overhead	13.60	13.31	14.25
Taxes and insurance	12.72	13.23	13.67
Capital replacement	58.39	58.99	62.82
Allocated returns to owned inputs:			
Return to operating capital 4/	7.15	8.24	9.42
Return to other nonland capital 5/	9.94	11.18	13.60
Net land return 6/	41.01	46.40	44.54
Unpaid labor	16.46	17.34	19.18
Total, economic costs	415.91	442.86	451.62
Residual returns to management and risk 7/	-169.61	-19.51	-142.15
Harvest-month price (dollars per pound)	.49	.66	.54
Yield (pounds per planted acre)	457.82	603.07	496.54

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 16--Southern Plains: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	123.64	294.08	220.41
Secondary crop	14.63	32.14	41.20
Total	138.27	326.22	261.61
Cash expenses:			
Seed	6.18	8.44	8.09
Fertilizer	12.24	11.10	12.69
Chemicals	18.82	18.33	18.67
Custom operations	6.45	7.69	7.95
Fuel, lubrication, and electricity	20.06	23.33	24.01
Repairs	16.52	16.70	17.61
Hired labor	26.73	27.55	27.70
Purchased irrigation water	.24	.25	.24
Ginning	27.90	52.30	46.68
Technical services	2.40	2.42	2.40
Total, variable cash expenses	137.54	168.11	166.04
General farm overhead	12.60	12.31	13.04
Taxes and insurance	10.04	11.21	11.39
Interest on operating loans	19.04	13.39	11.85
Interest on real estate	13.96	11.32	10.48
Total, fixed cash expenses	55.64	48.23	46.76
Total, cash expenses	193.18	216.34	212.80
Net returns less cash expenses 3/	-54.91	109.88	48.81
Capital replacement	42.26	42.82	45.17
Net returns less cash expenses and capital replacement	-97.17	67.06	3.64
Economic (full ownership) costs:			
Variable cash expenses	137.54	168.11	166.04
General farm overhead	12.60	12.31	13.04
Taxes and insurance	10.04	11.21	11.39
Capital replacement	42.26	42.82	45.17
Allocated returns to owned inputs:			
Return to operating capital 4/	3.35	3.89	4.37
Return to other nonland capital 5/	7.14	8.03	9.64
Net land return 6/	32.57	74.55	59.93
Unpaid labor	19.47	20.11	20.17
Total, economic costs	264.97	341.03	329.75
Residual returns to management and risk 7/	-126.70	-14.81	-68.14
Harvest-month price (dollars per pound)	.49	.63	.50
Yield (pounds per planted acre)	253.48	468.79	436.76

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 17--Southwest: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	547.02	870.21	638.33
Secondary crop	93.80	101.13	121.05
Total	640.82	971.34	759.38
Cash expenses:			
Seed	8.41	8.76	9.51
Fertilizer	53.17	48.98	53.80
Lime and gypsum	.61	.61	.60
Chemicals	69.60	68.25	70.27
Custom operations	25.76	25.85	26.25
Fuel, lubrication, and electricity	41.37	44.88	48.19
Repairs	26.46	26.72	28.28
Hired labor	76.22	79.73	82.69
Purchased irrigation water	60.25	60.44	61.04
Ginning	107.56	122.56	98.98
Technical services	.68	.68	.68
Total, variable cash expenses	470.09	487.46	480.29
General farm overhead	59.03	57.76	61.61
Taxes and insurance	22.23	22.78	23.10
Interest on operating loans	34.60	24.52	22.02
Interest on real estate	61.00	49.25	45.21
Total, fixed cash expenses	176.86	154.31	151.94
Total, cash expenses	646.95	641.77	632.23
Net returns less cash expenses 3/	-6.13	329.57	127.15
Capital replacement	68.46	69.06	72.83
Net returns less cash expenses and capital replacement	-74.59	260.51	54.32
Economic (full ownership) costs:			
Variable cash expenses	470.09	487.46	480.29
General farm overhead	59.03	57.76	61.61
Taxes and insurance	22.23	22.78	23.10
Capital replacement	68.46	69.06	72.83
Allocated returns to owned inputs:			
Return to operating capital 4/	11.07	12.47	14.89
Return to other nonland capital 5/	11.43	12.84	15.45
Net land return 6/	98.42	115.11	110.98
Unpaid labor	26.95	28.24	28.56
Total, economic costs	767.68	805.72	807.71
Residual returns to management and risk 7/	-126.86	165.62	-48.33
Harvest-month price (dollars per pound)	.49	.69	.61
Yield (pounds per planted acre)	1112.37	1270.18	1042.25

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 18--United States: Cotton production costs and returns per planted acre, 1986-88 1/ 2/

Item	1986	1987	1988
		Dollars	
Gross value of production:			
Primary crop	225.95	442.64	323.32
Secondary crop	29.73	46.61	57.99
Total	255.68	489.25	381.31
Cash expenses:			
Seed	6.23	8.16	8.03
Fertilizer	23.16	22.21	25.98
Lime and gypsum	.44	.41	.40
Chemicals	44.23	44.44	45.69
Custom operations	10.32	11.87	11.89
Fuel, lubrication, and electricity	22.60	26.91	27.92
Repairs	19.74	20.27	21.44
Hired labor	37.69	40.16	40.99
Purchased irrigation water	8.47	9.49	9.55
Ginning	43.37	65.26	55.93
Technical services	1.59	1.56	1.54
Total, variable cash expenses	217.84	250.74	249.36
General farm overhead	21.29	21.59	22.97
Taxes and insurance	12.66	13.76	13.99
Interest on operating loans	21.84	15.54	13.81
Interest on real estate	22.17	18.68	17.27
Total, fixed cash expenses	77.96	69.57	68.04
Total, cash expenses	295.80	320.31	317.40
Net returns less cash expenses 3/	-40.12	168.94	63.91
Capital replacement	50.35	51.65	54.59
Net returns less cash expenses and capital replacement	-90.47	117.29	9.32
Economic (full ownership) costs:			
Variable cash expenses	217.84	250.74	249.36
General farm overhead	21.29	21.59	22.97
Taxes and insurance	12.66	13.76	13.99
Capital replacement	50.35	51.65	54.59
Allocated returns to owned inputs:			
Return to operating capital 4/	5.09	5.98	6.94
Return to other nonland capital 5/	8.76	9.99	12.03
Net land return 6/	51.44	83.48	72.51
Unpaid labor	20.65	21.36	21.67
Total, economic costs	388.08	458.55	454.06
Residual returns to management and risk 7/	-132.40	30.70	-72.75
Harvest-month price (dollars per pound)	.49	.65	.54
Yield (pounds per planted acre)	462.97	683.29	594.94

1/ Excludes direct effects of Government programs on costs and returns. 2/ Sum of operator and landlord costs and returns. 3/ Gross value of production less total cash expenses. 4/ Variable expenses multiplied by time between use and harvest and by 6-month U.S. Treasury bill rate. 5/ Value of machinery and equipment multiplied by longrun real rate of return to production assets in the farm sector. 6/ Rental value based on composite share and cash rent. 7/ Gross value of production less total economic costs.

Table 19--Per-planted-acre fertilizer and fuel use for cotton, 1987

Region and State	Seed rate	Fertilizer			Fuel type	
		N	P	K	Gas	Diesel
	----------Pounds----------				---Gallons---	
Southeast:						
Alabama	13.21	48.2	52.5	83.8	3.66	19.64
Georgia	10.43	29.2	39.6	64.6	3.93	24.30
Delta:						
Arkansas	14.40	85.6	37.5	55.7	6.10	26.67
Louisiana	12.08	103.6	36.3	40.1	6.17	26.13
Mississippi	13.05	91.8	23.4	35.2	2.83	27.02
Tennessee	15.03	78.1	59.3	70.0	5.24	22.71
Southern Plains:						
Oklahoma	16.48	20.7	13.9	2.5	2.20	15.19
Texas	20.30	36.6	27.3	3.2	2.58	24.95
Southwest:						
Arizona	13.41	218.1	38.0	1.5	8.00	32.54
California	16.58	147.3	36.0	9.3	6.62	24.33

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