



FBEI UPDATES: Costs of Production

Updates on Farm Business Economic Indicators

Sorghum Production Costs, Income, and Farm Characteristics

In this report...Costs of producing grain sorghum per acre and per bushel vary considerably among sorghum producing regions, due primarily to differences in yields, irrigation, and cropping practices. In 1995, the Central Plains, the major sorghum region, produced sorghum at an average cash cost of \$1.78 per bushel (or \$98 per acre), while the Southern Plains produced sorghum at \$2.49 per bushel (or \$110 per acre).

During the winter of 1996, USDA surveyed grain sorghum growers in 6 States for the 1995 production year. These farms accounted for about 94 percent of the U.S. grain sorghum production in 1995. This report contains some of the preliminary findings from that survey. A later report will fully explain sorghum production costs, distributions, input use, farm characteristics, and other production factors at various levels.

1995 Production Costs

U.S. farmers produced 460 million bushels of grain sorghum from the 9.5 million acres planted. This was the smallest area planted for grain sorghum since 1953 and the lowest production since 1956.

Respondents to USDA's Farm Costs and Returns Survey reported an average grain yield of 51 bushels per planted acre. Regionally, planted-acre yields averaged 55 bushels in the Central Plains and 44 bushels in the Southern Plains (see map). Expected yields, on a *harvested-acre* basis, averaged 80 bushels in the Central Plains and 61 bushels in the Southern Plains. Expected yields are more in line with recent history, although sorghum yields tend to be quite variable.

Excluding Government programs, cash costs of producing U.S. sorghum averaged \$2.00 per bushel (\$102 per planted acre); total economic costs averaged \$3.58 per bushel (\$183 per planted acre). Fertilizer, chemicals, fuels and repairs accounted for 80 percent of variable cash expenses. At the

Grain Sorghum Production Regions



average harvest-month price of \$2.79 per bushel, 60 percent of growers were able to cover cash costs. On average, the value of sorghum at harvest time covered the cash costs in both regions. Harvest-time value covered the additional costs of capital replacement and unpaid labor in the Central Plains, but could only cover cash costs in the Southern Plains. Residual returns to management and risk were negative in both regions.

At the regional level, cash costs varied due to differences in cropping practices, input use, and irrigation. Total cash costs ranged from \$98 per acre in the Central Plains to \$110 per acre in the Southern Plains. The Southern Plains had higher costs due primarily to irrigation. Irrigation costs are included in costs for fuel, repairs and capital replacement. These three items averaged \$74 per acre in the Southern Plains, but only \$51 per acre in the Central Plains.

Differences in cropping patterns were another important factor in regional differences. In the Southern Plains the most common crops grown prior to sorghum were cotton, sorghum and wheat. In the Central Plains growers reported soybeans, sorghum and wheat as their most common prior crops. The most common rotation reported in both regions was sorghum-sorghum.

Roughly three-fourths of growers in the Central Plains reported cash grains as their production specialty compared with less than half in the Southern Plains. About one-third of growers in the Southern Plains reported field crops as their production specialty while less than 5 percent of growers in the Central Plains listed field crops.

About two-thirds of sorghum growers participated in government programs in both regions. There was little difference in base acreage reported, but tremendous difference in acreage involved in conserving uses. Growers in the Southern Plains reported an average of 108 acres in CRP or conserving uses, while those in the Central Plains reported an average of 44 acres.

Distribution of Costs

Estimated 1995 variable costs were converted to a per-bushel basis and ranked from lowest to highest to form a weighted cumulative distribution of farms and production. These costs were then compared with the distribution estimated from 1990 costs.

Twenty-five percent of farms had per-bushel variable costs of \$1.03 or less (low-cost) and accounted for 35 percent of total production. At the other end of the distribution, 25 percent of farms had variable costs of \$2.66 per bushel or more (high-

cost) but accounted for only 9 percent of sorghum production.

Variable costs ranged from \$0.78 to \$4.07 per bushel, due primarily to differences in yields. High-cost growers had average yields of only 22 bushels per acre compared with 73 bushels per acre for low-cost producers. High-cost producers had expected yields of 51 bushels per acre compared with 79 bushels expected by low-cost producers. High-cost producers were also more likely to irrigate than low-cost producers.

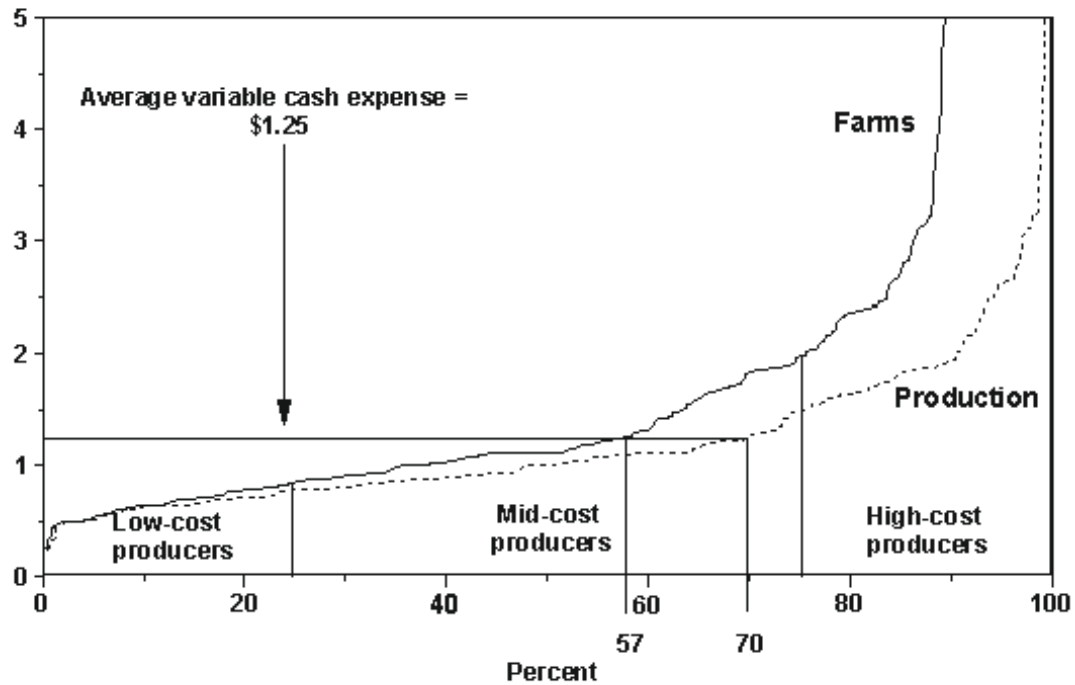
According to the previous sorghum survey in 1990, high-cost producers had variable costs of \$3.27 per bushel and accounted for 10 percent of production. These growers expected 54 bushels per acre but harvested only 23. Low cost-producers, in contrast, had variable costs of \$0.67 per bushel and accounted for 33 percent of production. Their actual yield was 6 bushels over the 77 they expected to harvest.

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Cumulative distribution of sorghum variable cash expenses, 1990

Dollars per bushel



Cumulative distribution of sorghum variable cash expenses, 1995

Dollars per bushel

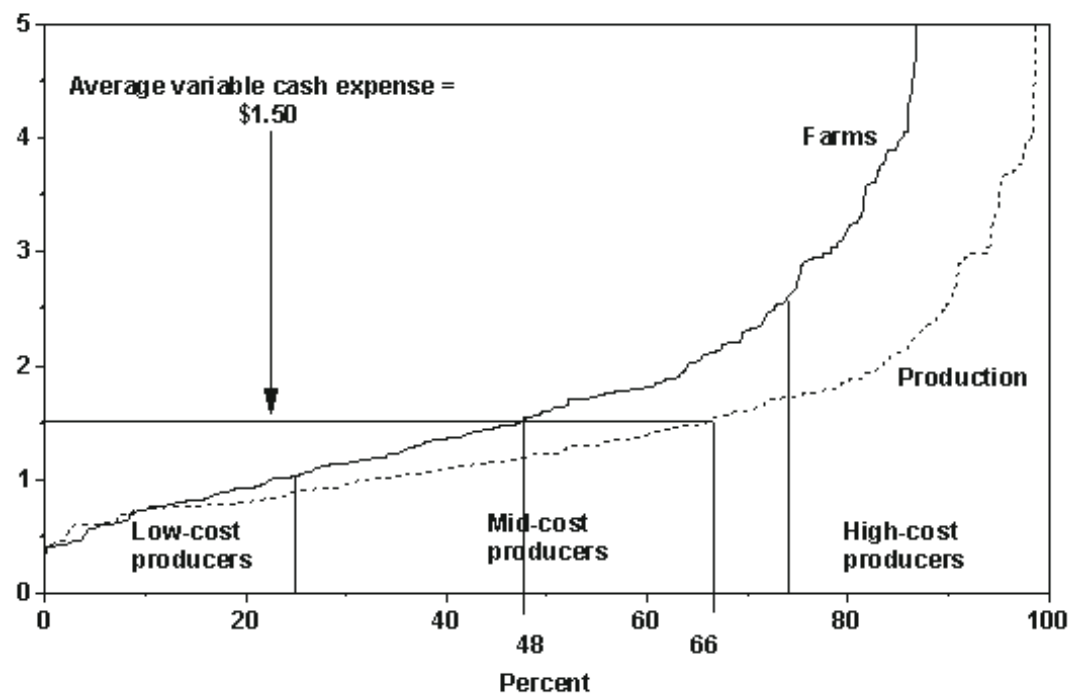


Table 1—Production costs and input use of average sorghum farms, by region, 1995

Item	Unit	Central Plains	Southern Plains	All FCRS Farms
Share of FCRS:				
Sorghum acres	percent	63.55	36.45	100.00
Sorghum production	do.	68.54	31.46	100.00
Sorghum yield, actual	bushels per acre	55.14	44.14	51.13
Sorghum yield, expected	do.	79.65	61.48	73.03
Costs:				
Variable cash costs	dollars per acre	71.38	86.82	77.00
Fixed cash costs	do.	26.63	23.05	25.32
Total, cash costs	do.	98.01	109.87	102.32
Economic costs	do.	179.44	188.44	182.87
Returns:				
Gross value of production	do.	154.94	120.94	142.65
Returns above cash costs	do.	56.93	11.07	40.33
Returns above economic costs	do.	-24.50	-67.97	-40.22
Seed:				
Rate-all acres	pounds per acre	5.27	6.38	5.68
Percent of acres reseeded	percent of acres	3.03	7.79	4.76
Fertilizers				
Nitrogen	percent of farms	95.92	74.39	88.30
Phosphorus	do.	38.67	55.75	44.72
Potassium	do.	19.84	25.97	22.01
Fertilizer Application rate				
Nitrogen	pounds per acre	71.98	58.90	67.22
Phosphorus	do.	14.03	15.04	14.40
Potassium	do.	8.72	4.96	7.35
Chemicals				
Any chemicals	percent of farms	98.87	99.97	99.26
Herbicides	do.	98.87	96.50	98.03
Herbicide	acre-treatments	1.74	2.44	1.99
Custom operations				
Any custom operations	percent of farms	61.48	46.89	56.32
Fertilizer application	do.	38.49	15.78	30.45
Chemical application	do.	56.42	22.65	44.47
Fuel use:				
Diesel	gallons per acre	4.53	6.88	5.39
Gasoline	do.	3.06	3.16	3.09
Natural gas	thou cu ft per ac	d	2.24	0.90
Electricity	kw hours per acre	0.15	d	0.46
Labor use:				
Unpaid labor	hours per acre	1.52	1.94	1.67

d = Insufficient data for disclosure.

Table 2—Characteristics of average sorghum farms, by region, 1995

Item	Unit	Central Plains	Southern Plains	All FCRS Farms
Share of FCRS:				
Sorghum farms	percent	64.60	35.40	100.00
Sorghum production	do.	68.54	31.46	100.00
Farm Size:				
Total acres operated	acres	885	984	920
Sorghum acres planted	do.	109	114	111
Sales Class:				
\$0-\$49,999	percent of farms	44.58	50.55	46.69
\$50,000-\$99,999	do.	21.01	13.03	18.19
\$100,000-\$499,999	do.	31.00	31.13	31.04
\$500,000 or more	do.	3.41	5.29	4.07
Sorghum production value	dollars per farm	16,898	13,790	15,798
Farm production value	do.	117,348	124,520	119,887
Enterprise size:				
Fewer than 50 acres	percent of farms	45.33	53.08	48.07
50-199 acres	do.	39.58	30.38	36.32
200-399 acres	do.	11.62	11.67	11.64
400 or more acres	do.	3.48	4.87	3.97
Sorghum Acreage-Tenure				
Owned	percent of acreage	36.83	30.56	34.54
Cash rented	do.	15.07	16.01	15.42
Share rented	do.	48.10	53.17	49.95
Sorghum Acreage-Practices				
Irrigated	do.	5.13	16.23	9.18
Dryland	do.	94.87	83.77	90.82
Double-cropped	do.	d	7.48	4.74
Fallow	do.	8.43	8.08	8.31
Previous crop:				
Cotton	percent of farms	0	28.22	9.99
Sorghum	do.	28.07	26.84	27.63
Soybeans	do.	30.35	d	22.23
Wheat	do.	23.14	19.60	21.89
Crop rotation				
Fallow-Wheat	do.	15.08	d	9.92
Sorghum-Soybeans	do.	10.56	d	7.09
Sorghum-Sorghum	do.	19.10	17.85	18.66
Production specialty				
Cash grains	do.	75.40	47.83	65.64
Field crops	do.	d	32.48	12.32
Livestock	do.	23.33	19.68	22.04
Government payments				
Participation in all programs	dollars per farm	7,252	8,811	7,804
Participation in sorghum program	percent of farms	80.60	80.35	80.52
Sorghum base acres	do.	68.11	64.28	66.76
Set aside, CRP, CU acres	acres	111	103	108
	do.	44	108	67
Operator characteristics:				
Farming as major occupation	percent of farms	82.47	86.95	84.05
Older than 65 years	do.	19.94	37.07	26.01

d = Insufficient data for disclosure.

Table 3—Income and balance sheet statements for average sorghum farm, by region, 1995

Item	Central Plains	Southern Plains	All FCRS Farms
Number of sorghum farms	49,276	27,000	76,276
Acres operated	885	984	920
Dollars per operation			
Gross cash income	114,212	137,253	122,368
. Livestock sales	38,979	21,882	32,927
. Crop sales	59,162	77,004	65,478
. Government payments	7,252	8,811	7,804
. Other farm-related income	8,820	29,555	16,160
Less: Cash expenses	87,663	97,938	91,300
. Variable	65,854	77,065	69,822
. Livestock purchases	8,895	7,179	8,288
. Feed	8,425	2,107	6,189
. Other livestock expenses	1,199	1,062	1,150
. Seed and plants	4,362	4,701	4,482
. Fertilizer and chemicals	16,374	22,726	18,622
. Hired labor	4,073	7,325	5,224
. Fuels and oils	5,263	9,941	6,919
. Repairs and maintenance	9,227	10,666	9,737
. Machine-hire & custom	2,245	3,998	2,866
. Utilities	2,182	3,893	2,787
. Other variable expenses	3,610	3,465	3,559
. Fixed	21,809	20,873	21,478
. Real estate & property taxes	2,864	1,401	2,346
. Interest	8,255	7,205	7,883
. Insurance	3,431	5,361	4,114
. Rent and lease payments	7,259	6,906	7,134
Equals: Net cash farm income	26,549	39,315	31,068
Less:			
. Depreciation	11,335	12,121	11,613
. Non-cash labor benefits	412	542	458
Plus:			
. Inventory adjustment	-8,605	-8,228	-8,472
. Nonmoney income	3,385	2,680	3,135
Equals: Net farm income	9,581	21,104	13,660
Total assets	437,143	407,622	426,693
Less: Total debt	91,946	74,894	85,910
Equals: Networth	345,197	332,729	340,783
Debt-to-asset ratio	0.20	0.18	0.20
Financial position (percent of farms):			
Favorable	59.40	57.81	58.84
Marginal income	22.23	26.38	23.70
Marginal solvency/Vulnerable	18.37	15.82	17.46

Table 4—Sorghum production costs per planted acre (excluding Government program participation), by region, 1995

Item	Central Plains	Southern Plains	All FCRS Farms
Cash expenses:			
Seed	5.39	5.19	5.73
Fertilizer, lime, and gypsum	19.48	20.01	18.56
Chemicals	12.06	14.18	8.37
Custom operations	5.19	4.25	6.81
Fuel, lube, and electricity	14.58	8.92	24.46
Repairs	15.75	14.99	17.10
Hired labor	4.55	3.84	5.79
Total, variable cash expenses	77.00	71.38	86.82
General farm overhead	8.36	8.18	8.68
Taxes and insurance	9.16	9.87	7.93
Interest	7.80	8.58	6.44
Total, fixed cash expenses	25.32	26.63	23.05
Total, cash expenses	102.32	98.01	119.87
Economic (full-ownership) costs:			
Variable cash expenses	77.00	71.38	86.82
General farm overhead	8.36	8.18	8.68
Taxes and insurance	9.16	9.87	7.93
Capital replacement	29.50	27.82	32.44
Operating capital	2.15	2.00	2.43
Other nonland capital	13.24	13.46	14.59
Land	32.96	37.66	24.77
Unpaid labor	10.50	10.07	11.25
Total, economic (full-ownership) costs	182.87	179.44	188.91