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Income Possibilities from Irrigated Castorbeans, Texas High Plains

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Summary

Irrigated castorbean production is a relatively new enterprise on farms of the High Plains. Castorbeans compete with grain sorghum for land and water that are surplus to cotton requirements. Castorbeans usually receive about the same amount of irrigation, about 50 percent more fertilizer, and considerably more hoeing than grain sorghum averaging 4,500 pounds per acre.

At 1959 price and yield levels, the return from castorbeans averaged about $9.00 per acre more than similar returns from grain sorghum. Assuming a general yield relation of 1,600 to 2,000 pounds of castorbeans per acre and 4,000 to 5,000 pounds of grain sorghum per acre, castorbeans at 5 cents per pound can compete favorably with grain sorghum at $1.50 to $1.75 per 100 pounds.

High Plains farmers, like those in many other areas, are searching for profitable new uses for their land and other farm resources. In recent years, there has been a growing interest in the production of irrigated castorbeans.

The objectives of this study are to develop information pertaining to yields of castorbeans and to the labor, power and materials used in producing them, and to compare the returns from castorbeans with those from grain sorghum and cotton.

Although castorbean production was promoted during World War II, few were grown commercially in the United States before 1950. In that year, castor oil was classified by the Office of Defense Mobilization as one of the six strategic oils. A domestic castorbean production and procurement program was initiated by the U. S. Department of Agriculture for the 1951 crop and was continued through the 1954 crop. The price paid farmers for the 1951 and 1952 crops produced under the program was 10 cents a pound, hulled basis, or the market price, whichever was higher.

The minimum guarantee for the 1953 crop was 9 cents a pound and for the 1954 crop, the last year of the program, the price was 6 cents a pound (1).

About 80,000 acres of castorbeans were harvested in Texas in 1953, Figure 1. Essentially none of this acreage was irrigated, and average yields were estimated to be about 380 pounds per acre. About 10,000 acres were harvested in 1954, but less than 1,000 acres were planted in 1955 and 1956 (2).

The recent introduction of high-yielding dwarf varieties of castorbeans, which are well adapted to irrigation, the development of an efficient harvester-huller and the interest of commercial processors has contributed to an increase in castorbean production (3). The acreage of irrigated castorbeans on the High Plains increased from about 2,000 in 1957 to approximately 20,000

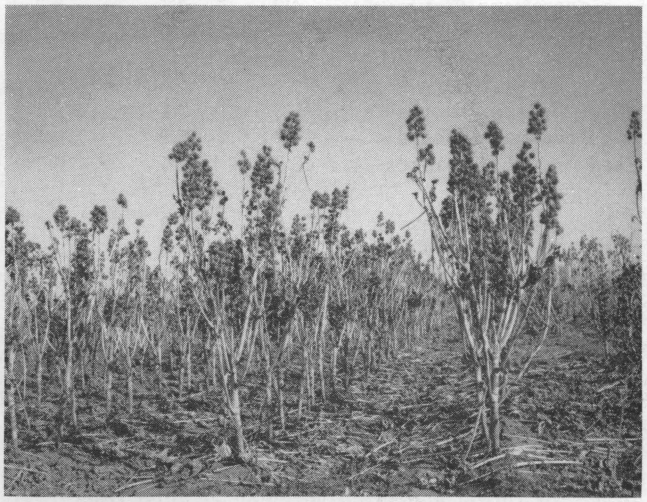

Figure 1. Castorbeans ready for harvest. Varieties grown on the High Plains usually are ready for harvest about 10 days after a killing frost.

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Figure 2. Castorbeans and grain sorghum compete for land and irrigation water.

in 1960 (4). This production is centered primarily in southern Swisher county, northeastern Floyd county and northern Hale county.

Data pertaining to production practices, materials and services used in the production of castorbeans and to yields were obtained from 17 farmers producing castorbeans in 1960. This sample of farmers was selected at random from a complete list of castorbean growers in Swisher and Hale counties.

These farms ranged in size from about 200 to 1,200 acres of cropland and averaged 524 acres per farm. The average percentage distribution of cropland on these farms was: cotton, 27; grain sorghum, 23; wheat, 10; castorbeans, 37; and fallow and other crops, 3.

Castorbeans generally have replaced grain sorghum on these farms, Figure 2. For a representative sample of farms in the same general area of the High Plains in 1958, the percentage distribution of cropland was: cotton, 30; grain sorghum, 60; and wheat, fallow and other crops, 10. The cotton acreage allotment was slightly less in 1960 than in 1958.

The farmers interviewed planted a total of about 3,300 acres of castorbeans in 1960, nearly 200 acres per farm, or about one-sixth of the estimated acreage planted on the High Plains.

A comparison of the labor, power and materials used in producing castorbeans, grain sorghum and cotton is presented in Table 1. Estimates in this table represent usual inputs and yield expectations. Production requirement data for castorbeans are derived from the information obtained from the farmers interviewed. Inputs and yields for cotton and grain sorghum and per unit power, machinery and water costs are based on other applicable research for the High Plains area. Prices for products and input items used in calculating receipts and expenses are similar to those prevailing in the area in 1959.

TABLE 1. COMPARISON OF USUAL LABOR, POWER AND MATERIALS USED PER ACRE IN PRODUCING COTTON, GRAIN SORGHUM AND CASTORBEANS UNDER IRRIGATION, HIGH PLAINS, TEXAS[1]

Item	Unit	Cotton	Grain sorghum	Castor-beans
Man-labor preharvest operations				
Tractor operations	Hours	4.2	2.7	2.8
Labor used for:				
Hoeing	Hours	7.2	2.0	5.5
Irrigation	Hours	1.6	2.4	2.4
Total labor	Hours	13.0	7.1	10.7
Seed	Pounds	48.0	8.5	15.5
Fertilizer:				
Nitrogen	Pounds	46.0	76.0	122.0
P_2O_5	Pounds	18.0	—	—
K_2O	Pounds	7.0	—	—
Number irrigations during season		3.0	5.0	5.0
Number insecticide applications		3.5	—	1.0

[1]Data for cotton and grain sorghum adapted from Texas Agr. Expt. Sta. Bul. 851.
Data for castorbeans based on survey of 17 producers in 1960.

Production Practices and Yields

Land preparation and planting practices and dates of performance for castorbeans are essentially the same as for cotton. However, castorbeans grow off somewhat faster than cotton and require three cultivations, compared with five cultivations for cotton. Less hand labor is needed for weed control than with cotton, but considerably more than for grain sorghum, Table 1.

Nitrogen was the only fertilizer used on castorbeans by the farmers interviewed. Considerably more nitrogen was used per acre on irrigated castorbeans than ordinarily is used on cotton and grain sorghum in the area, Table 1.

Five seasonal irrigations usually are applied for high-yielding grain sorghum. The number of irrigations and the quantity of water used on castorbeans are much the same. As with other irrigated crops, seasonal rainfall affects the number of times castorbeans are irrigated. Farmers reported that castorbeans normally received two more irrigations than cotton. Since cotton is the more remunerative crop, it usually gets first priority for water.

Insect control costs on castorbeans are much less than for cotton, but more than for grain sorghum.

There is no particular competition for labor between grain sorghum and castorbeans. The crops are planted, cultivated and harvested at different times and irrigation labor is required only for the crop being irrigated.

TABLE 2. COMPARISON OF PER-ACRE COSTS AND RETURNS FROM IRRIGATED COTTON, GRAIN SORGHUM AND CASTORBEANS, HIGH PLAINS, TEXAS

Item	Unit	Cotton	Grain sorghum	Castorbeans
Production per acre	Pounds	660	4,500	2,000
Price per pound	Cents	28.0	1.42	5.0
Gross value of production	$	184.80[1]	63.90	100.00
Specified costs:				
Preharvest Man labor	$	12.28	7.81	10.33
Power and machinery[2]	$	16.13	7.10	7.31
Seed	$	3.12	1.53	2.25
Insecticides and application	$	6.32	—	1.90
Fertilizer	$	6.29	6.55	10.42
Irrigation water[3]	$	3.66	6.10	6.10
Total preharvest	$	47.80	29.09	38.31
Harvest	$	62.70[2,4]	11.25[5]	17.00[5]
Total specified costs	$	110.50	40.34	55.31
Returns above specified costs[6]	$	74.30	23.56	44.69

[1]Includes value of cottonseed.

[2]Adapted from Texas Agr. Expt. Sta. Bul. 851. Includes repairs, fuel, oil, grease, interest and depreciation.

[3]Water costs include operating costs only (fuel, oil and repairs). They represent average costs for plants using natural gas in the area where castorbeans are grown.

[4]Includes ginning and other associated costs.

[5]Usually custom operations, 25 cents per hundredweight for grain sorghum and 85 cents per hundredweight for castorbeans.

[6]Represents returns to land, management and overhead.

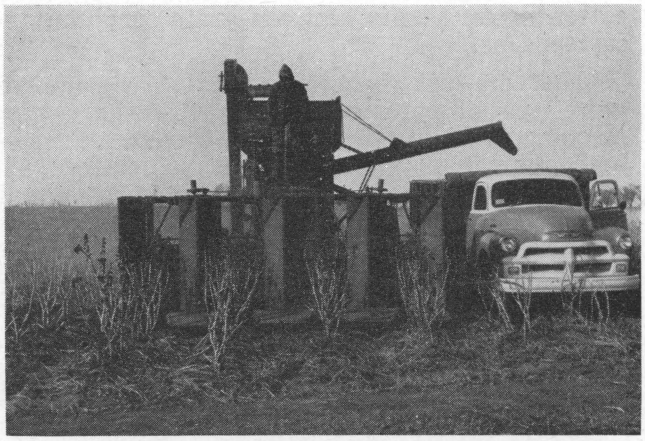

Figure 3. Castorbeans are harvested mechanically with multi-row equipment. A 4-row harvester mounted on a self-propelled combine in use on the High Plains.

On the farms studied, 1959 yields ranged from 1,200 to 2,005 pounds per acre, averaging 1,687 pounds of clean castorbeans per acre. Alternaria leaf spot damage was associated with all reported yields of 1,500 pounds or less per acre. Although individual farm yields approaching 3,000 pounds per acre have been reported, authorities believe that a yield of 2,000 pounds of clean castorbeans per acre represents a reasonably anticipated yield level for irrigated castorbeans in the High Plains.

Costs and Returns

Estimates of costs and returns from cotton, grain sorghum and castorbeans are shown in Table 2. With the cost price and yield relationships used in this analysis, the returns above specified costs are about $30 more for cotton, but about $21 less for grain sorghum than for castorbeans. Thus cotton gets first priority and the competition for land and water not used in

TABLE 3. COMPARISON OF RETURNS FOR CASTORBEANS AND GRAIN SORGHUM WITH VARYING PRICES AND YIELDS[1]

Grain sorghum		Castorbeans								
Yield	Price per cwt.	Yield 1,600 pounds per acre, cents per pound			Yield 2,000 pounds per acre, cents per pound			Yield 2,400 pounds per acre, cents per pound		
		4	5	6	4	5	6	4	5	6
Cwt.	$	Dollars								
40	1.20	2.18	18.18	34.18	14.78	34.78	54.78	27.38	51.38	75.38
40	1.40	— 5.82	10.18	26.18	6.78	26.78	46.78	19.38	43.38	67.38
40	1.60	—13.82	2.18	18.18	— 1.22	18.78	38.78	11.38	35.38	59.38
40	1.80	—21.82	— 5.82	10.18	— 9.22	10.78	30.78	3.38	27.38	51.38
45	1.20	— 1.57	14.43	30.43	11.03	31.03	51.03	23.63	47.63	61.72
45	1.40	—10.57	5.43	21.43	2.03	22.03	42.03	14.63	38.63	52.72
45	1.60	—19.57	— 3.57	12.43	— 6.97	13.03	33.03	5.63	29.63	43.72
45	1.80	—28.57	—12.57	3.43	—15.97	4.03	24.03	— 3.37	20.63	34.72
50	1.20	— 6.32	9.68	25.68	6.28	26.28	46.28	18.88	42.88	66.88
50	1.40	—16.32	— 0.32	15.68	— 3.72	16.28	36.28	8.88	32.88	56.88
50	1.60	—26.32	—10.32	5.68	—13.72	6.28	26.28	— 1.12	22.88	46.88
50	1.80	—36.32	—20.32	— 4.32	—23.72	— 3.72	16.28	—11.12	12.88	36.88

[1]Considering the effects of cost and yields, the figures shown in the columns represent the difference in returns between castorbeans and grain sorghum. Minus (—) indicates grain sorghum more profitable than castorbeans.

cotton production is between grain sorghum and castorbeans.

Neither castorbeans nor grain sorghum require special equipment other than harvesting machinery, Figure 3. Much of the harvesting of both crops is on a custom basis. Therefore, the relative profitability of the two crops on an individual farm depends largely on yields and prospective prices.

The effects of various yield and price relationships on the relative returns to land management and overhead are shown in Table 3. The figures shown represent the difference between returns for the two crops. A minus sign indicates that grain sorghum is more profitable than castorbeans.

This analysis indicates that with prices prevailing in 1959 (5 cents per pound for castorbeans and $1.40 per hundredweight for grain sorghum) and with 4,500 pounds of grain sorghum per acre, the returns from the two crops would be about equal with a castorbean yield of about 1,700 pounds per acre.

With a price of $1.80 per hundredweight for grain sorghum and a yield of 4,500 pounds, a castorbean yield of a little more than 1,900 pounds at a price of 5 cents a pound would be needed to equalize the returns from the two crops.

References Cited

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(3) Raymond D. Brigham and Ben R. Spears. "Castorbeans in Texas," Texas Agricultural Experiment Station and Texas Agricultural Extension Service, Bulletin 954.

(4) Arwin Bolin, field representative, Baker Castor Oil Company, Plainview, Texas.

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