ECONOMIC IMPACTS OF HIGH OLEIC SUNFLOWER PRODUCTION IN THE TEXAS HIGH PLAINS[1]

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ABSTRACT

The production of high oleic acid sunflowerseed (HOS) as an alternative crop in the Texas High Plains and the subsequent impact upon the area and state economy was assessed. Enterprise budgeting showed that dryland HOS production generated positive net returns compared with negative returns for three dryland and six irrigated crops produced in the Texas High Plains. HOS production, when combined with area and state input-output multipliers, resulted in a positive effect on total economic activity, income and employment in the Texas High Plains and the state of Texas.

Key words: High Oleic Sunflowerseed, Alternative Crop, Input-Output Effects, Economic Impact

INTRODUCTION

Unfavorable economic conditions in the Texas High Plains through most of the 1980s have caused many agricultural producers to reassess farming operations. To increase the probability of economic survival, many producers have considered alternative crops in addition to improving production, management and marketing techniques.

A possible alternative crop for area producers, a high oleic acid sunflowerseed (HOS), was planted commercially for the first time in 1985 in Minnesota and the Dakotas and in 1986 on the Texas High Plains.[3] Extracted oil from HOS, considered superior in quality to other oilseed oils in general because of its high oleic oil content, was expected to perform well in industrial applications (e.g., cosmetics, pharmaceuticals, and textiles), lubricant derivatives and specialty food items.

OBJECTIVES

The purpose of this study was to assess the potential of HOS as an alternative crop in the Texas High Plains and the subsequent impact upon the area and state economy. Specifically, the analysis:

1. Adapted the 1986 Texas Agricultural Extension Service (TAEX) enterprise budgets for dryland and irrigated sunflowers to develop costs and returns for HOS.

2. Compared costs and returns for HOS with those for major crops produced in the Texas High Plains.

3. Illustrated the potential sensitivity of HOS production to changes in the market price of the commodity.

4. Determined the impact of HOS production at various acreage levels on the Texas High Plains economy and the Texas state economy with respect to effects on total economic activity, income and employment.

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[3]The sunflowerseed is a patented product of the Lubrizol Corporation. Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product by the authors and does not imply its approval to the exclusion of other products that may also be available.

METHODS AND PROCEDURES

Budgeting

Estimations of the dryland and irrigated HOS enterprise budgets were facilitated by modifying the Texas South Plains District TAEX sunflower enterprise budgets (TAEX, 1986). Modifications were made in cultural practices, costs, yields and price. Specific changes included a 20% reduction in diesel fuel cost from $1.00 to $0.80 per gallon and use of a 9.6% interest rate on operating capital (Condra et al., 1987). Yield levels of 12 cwt./acre and 18 cwt./acre for dryland and irrigated HOS were used, respectively. Custom harvesting and hauling charges were adjusted to account for the difference in yield levels. Seed cost was increased from $3.00/lb. for conventional sunflowers to $4.00/lb. for HOS. Seeding rates for dryland production were maintained at the same level but were reduced by 0.5 lbs. for irrigated production. A $10.00/cwt. contract price was used for HOS in the analysis (Gulley et al., 1986).

Additionally, bees were required to insure pollination of the hybrid plant. Farmers have not been charged for the bees by the contracting seed company, but will likely become responsible for this expense in the future. Therefore, the HOS budget was calculated with and without a cost for bees. A $6.25/acre charge was assessed for bee usage (Gulley et al., 1986).

Costs and Returns Comparison

The estimated HOS budgets were compared to the enterprise budgets for the major crops produced in the Texas High Plains. Break-even prices, the market price required for the commodity to cover all variable and fixed production costs, and returns to land and management for the major crops (Condra et al., 1987) were compared to the calculated values for HOS.

Price Sensitivity

Contract prices for HOS have been calculated at a $2.50/cwt. to $3.00/cwt. premium over conventional sunflowerseed market prices (Gulley et al., 1986). To account for this premium range, a minimum contract price of $10.00/wt. was incorporated into the budgets. The actual 1986 contract price for HOS was $11.50/cwt. Therefore, the contract price was varied in $.50/cwt. increments to illustrate the potential sensitivity of HOS production to price changes.

Input-Output Analysis

The estimated HOS yields of 12 cwt./acre, dryland, and 18 cwt./acre, irrigated, were used to determine total production at various planted acreage levels. Planted acreage was graduated in 10,000 acre increments from 10,000 acres to 100,000 acres (Terry and Hein, 1986; Oil Crops, 1986). Appropriate production, income and employment multipliers from input-output analysis (Stoecker et al., 1981, Wright et al., 1983; Jones and Kao, 1985) were multiplied by the 20 different (10 dryland, 10 irrigated) total output levels. A sector multiplier is defined as, "a coefficient indicating the total effect of a change in the entire economy that is associated with a unit change in the particular sector, all other sectors remaining constant" (Wright et al., 1979). Impact upon the Texas High Plains economy and the Texas state economy were estimated with respect to total economic activity, total income and the employment level. Multipliers for the Texas High Plains were: (1) output impact, 2.04, (2) income effect, 0.47 and (3) employment effect, 0.00003. Multipliers for the State of Texas were: (1) output impact, 3.12, (2) income effect, 0.70 and (3) employment effect, 0.000063.

The multiplier effects were considered to be net effects in this analysis. The 50/92 provisions of the Food Security Act of 1985 and the Food Security Improvements Act of 1986 allowed the planting of nonprogram crops on underplanted acres given the approval of the U.S. Secretary of Agriculture. The nonprogram crops were restricted to

conserving crops, one of which was sunflowers, under the 1986 Act (Fulton, 1986).

FINDINGS

Table 1 compares HOS and the major Texas High Plains crops in terms of break-even prices and returns to land and management. Only dryland HOS, without the expense for bees, and dryland wheat under program participation, generated positive returns of $1.24/acre and $32.68/acre to land and management, respectively.

The HOS contract price was varied in the enterprise budgets to determine the effects on returns to land and management. Table 2 illustrates the returns to land and management on a per acre basis. Dryland production provided postive returns for each price ranging from $10.00 to $11.50/cwt. except in one case. The exception, the $10.00/cwt. contract price combined with a budgeted bee pollination charge, resulted in a $5.16/acre loss. Irrigated HOS production was not shown in Table 2 because the break-even price was $12.60/cwt. without bees and $12.96/cwt. with bees, both higher than any considered contract price.

Table 1. Market Prices, Breakeven Prices, and Returns for High Oleic Sunflowers (HOS) and Major Crops, Texas High Plains.

Crop	Units	Market Price	Breakeven Price Prog[a]	Breakeven Price No Prog[b]	Returns-Land & Mgt. Prog	Returns-Land & Mgt. No prog
Dryland		Dollars		Dollars	Dollars/Acre	
HOS	cwt	10.00	—	9.89	—	1.24
HOS w/bees	cwt	10.00	—	10.43	—	- 5.16
Sunflower	cwt	7.00	—	7.83	—	-12.47
Cotton	lbs	0.48	1.08	1.35	-50.40	-152.31
Sorghum	cwt	3.10	6.08	7.01	-13.76	-44.26
Wheat	bu	2.15	1.85	3.27	32.68	- 3.34
Irrigated						
HOS	cwt	10.00	—	12.60	—	-46.91
HOS w/bees	cwt	10.00	—	12.96	—	-53.29
Sunflower	cwt	7.00	—	9.06	—	- 51.62
Corn	bu	1.90	2.21	3.24	-2.14	-155.11
Cotton	lbs	0.48	0.75	0.99	-29.89	-245.31
Sorghum	cwt	3.10	5.63	7.22	-61.22	-136.22
Soybeans	bu	4.10	8.69	8.69	-124.48	-124.48
Wheat	bu	2.15	3.33	4.89	-25.01	-113.49

[a]Participation in government farm programs.
[b]Not participating in government farm programs.
Source: Adapted from Condra et al., February 1987.

Table 2. Returns to Land and Management for Dryland High Oleic Sunflowers with Different Contract Prices, Texas High Plains, November 1986.

Price	W/out Bees	With Bees
Dollars	Dollars/Acre	
10.50	7.24	.84
11.00	13.24	6.84
11.50	19.24	12.84

Regional and State Economics Impacts

Tables 3 and 4 illustrates the impact of dryland and irrigated HOS production on the Texas High Plains economy at various acreage levels. Similarly, tables 5 and 6 represent the impacts on the Texas state economy. To avoid redundancy in tables 5 and 6, the total production and gross output values were omitted. The tables show that at the maximum estimated production level (i.e., 100,000 acres), for dryland and irrigated acres respectively, the impact on total economic activity was $24.48 million and $36.72 million in the Texas High Plains region; $37.44 million and $56.16 million on the Texas state economy. The total income effect was $5.64 million and $8.46 million for the Texas High Plains; $8.40 and $12.6 million for Texas as a whole. Employment levels at 100,000 acres of production were 360 and 540 additional persons employed on the Texas High Plains; 756 and 1,134 additional persons employed in the state of Texas.

Table 3. Impacts on Total Economic Activity, Income, and Employment in the Texas High Plains, High Oleic Sunflowers, Dryland.

Acres	Total Prod.	Gross Output $10/cwt	Output Impact Mult-2.04	Income Effect Mult-.47	Employment Effect Mult-.00003
	cwt	Dollars	Dollars		Persons
10,000	120,000	1,200,000	2,448,000	564,000	36
20,000	240,000	2,400,000	4,896,000	1,128,000	72
30,000	360,000	3,600,000	7,344,000	1,692,000	108
40,000	480,000	4,800,000	9,792,000	2,256,000	144
50,000	600,000	6,000,000	12,240,000	2,820,000	180
60,000	720,000	7,200,000	14,688,000	3,384,000	216
70,000	840,000	8,400,000	17,136,000	3,984,000	252
80,000	960,000	9,600,000	19,584,000	4,512,000	288
90,000	1,080,000	10,800,000	22,032,000	5,076,000	324
100,000	1,200,000	12,000,000	24,480,000	5,640,000	360

Table 4. Impacts on Total Economic Activity, Income, and Employment in the Texas High Plains, High Oleic Sunflowers, Irrigated.

Acres	Total Prod. cwt	Gross Output $10/cwt Dollars	Output Impact Mult-2.04 Dollars	Income Effect Mult-.47 Dollars	Employment Effect Mult-.00003 Persons
10,000	180,000	1,800,000	3,672,000	846,000	54
20,000	360,000	3,600,000	7,344,000	1,692,000	108
30,000	540,000	5,400,000	11,016,000	2,538,000	162
40,000	720,000	7,200,000	14,688,000	3,384,000	216
50,000	900,000	9,000,000	18,360,000	4,230,000	270
60,000	1,080,000	10,800,000	22,032,000	5,076,000	324
70,000	1,260,000	12,600,000	25,704,000	5,922,000	378
80,000	1,440,000	14,400,000	29,376,000	6,768,000	432
90,000	1,620,000	16,200,000	33,048,000	7,614,000	486
100,000	1,800,000	18,000,000	36,720,000	8,460,000	540

Table 5. Impacts on Total Economic Activity, Income, and Employment in the State of Texas, High Oleic Sunflowers, Dryland.

Acres	Output Impact Mult-3.12	Income Effect Mult-.70	Employment Effect Mult-.000063
	Dollars		Persons
10,000	3,744,000	840,000	76
20,000	7,488,000	1,680,000	151
30,000	11,232,000	2,520,000	227
40,000	14,976,000	3,360,000	302
50,000	18,720,000	4,200,000	378
60,000	22,464,000	5,040,000	454
70,000	26,208,000	5,880,000	529
80,000	29,952,000	6,720,000	605
90,000	33,696,000	7,560,000	680
100,000	37,440,000	8,400,000	756

Table 6. Impacts on Total Economic Activity, Income, and Employment in the State of Texas, High Oleic Sunflowers, Irrigated.

Acres	Output Impact Mult-3.12	Income Effect Mult-.70	Employment Effect Mult-.000063
	Dollars		Persons
10,000	5,616,000	1,260,000	113
20,000	11,232,000	2,520,000	227
30,000	16,848,000	3,780,000	340
40,000	22,464,000	5,040,000	454
50,000	28,080,000	6,300,000	567
60,000	33,696,000	7,560,000	680
70,000	39,312,000	8,820,000	794
80,000	44,928,000	10,080,000	907
90,000	50,544,000	11,340,000	1,021
100,000	56,160,000	12,600,000	1,134

SUMMARY AND CONCLUSIONS

Appropriate cost and price data were gathered and modified and values generated to evaluate the economic performance of HOS production as compared to the major crops produced in the Texas High Plains. Subsequently, estimated production values from the budgets were used to determine the potential total production at various acreage levels. Appropriate production, income and employment multipliers were applied to each output level to determine the impact upon the economics of the Texas High Plains and the state of Texas.

Results revealed dryland HOS production without the bee charge (at assumed yield level and contract price) generated postive net returns compared with negative returns for three dryland and six irrigated crops produced in the Texas High Plains. Additionally, simulated HOS production had a positive effect on total economic activity, income and employment in the Texas High Plains and the state of Texas.

Analysis results only considered average yields, estimated production costs for a single growing season, one schedule of contract prices and one series of total production levels. Changes in any of these variables would affect the results obtained in this study.

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