

Profitability and Production Costs of Grain Sorghum in Texas

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Principal Investigator: Phillip Johnson (Texas Tech University)
Co-Principal Investigator: Larry Falconer (Texas Agricultural Experiment Station)
Primary Agency Affiliation: Texas Tech University, Lubbock, Texas
Contact Information: Phillip Johnson
Agricultural and Applied Economics
Texas Tech University
P.O. Box 42132
Lubbock, TX 79409-2132
phil.johnson@ttu.edu

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NON-TECHNICAL REPORT

Project Description and Expected Results

The long-term viability of grain sorghum production in Texas will depend on its profitability within farming operations. The objective of this study is to evaluate profitability and production costs of grain sorghum production in the High Plains (HP) and Coastal Bend (CB) regions of Texas using the Standardized Performance Analysis (SPA) program. SPA is a management tool designed to complete an integrated financial, production, and marketing analysis of an entire farming operation using farm financial statements and relevant production data.

Results from this project provide producers with a detailed analysis of their financial information over the entire farm. A database of farm level financial and economic analyses, including production cost and profitability information has been compiled for grain sorghum production across the HP and CB regions for 1999 and 2000. In addition to the project's primary objectives, this study has been expanded to evaluate the economic impact of utilizing grain sorghum in rotations with cotton in the Southern High Plains (SHP) of Texas.

Producer Benefit

The results from this study benefit farmers, researchers, and extension personnel. The SPA analysis provides grain sorghum producers with individual management information to assist with management decisions. The databases of results provide grain sorghum producers the ability to evaluate their individual performance against other producers within their region and across the state. It is expected that producer performance will increase, as farmers are provided with more detailed and complete financial and production costs information on their farming operations. The SPA database also provides researchers and extension personnel with cost of production and financial information that will be valuable for future research in grain sorghum production.

Current Project Accomplishments

This project has made significant strides towards completion of the research objectives this past year. Database information has been compiled for the HP and CB regions for irrigated grain sorghum, dryland grain sorghum, irrigated grain sorghum behind failed cotton, and dryland grain sorghum behind failed cotton. The results from 1999 have been finalized and analyses for the 2000 crop year are currently being completed. Additionally, analyses of grain sorghum-cotton rotation results for the SHP have been completed through the 2000 crop year. The results from the rotation analysis indicate a significant benefit to cotton production in the SHP by including grain sorghum in a cotton rotation.

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Project Type: This project is being completed under the individual economic research support projects.

Project Objectives: 1) Perform integrated enterprise and financial analysis of grain sorghum producing farms in the High Plains and Coastal Bend regions of Texas; 2) Compile a database of grain sorghum production costs and profitability; and 3) Evaluate the profitability of grain sorghum-cotton rotation systems.

Methodology: Standardized Performance Analysis (SPA) is an integrated financial analysis program that allows analysis of multiple agricultural enterprises within a single farming operation. SPA generates fiscal year production and financial data with a focus on determining enterprise cost of production, profitability, and return on assets using producer's actual financial information. In addition, participating producers are provided with detailed farm financial information. The use of a standardized analytical tool, such as SPA, provides the means to generate analyses that are comparable across the state and regions and between differing types of ownership structures, such as sole proprietorships, partnerships, and corporations. A database program is used to compile the individual farm level financial and economic analyses, including production costs and profitability information, for grain sorghum production across the two primary production regions in the state.

Production information and past cropping patterns were obtained from four individual SPA participants in the SHP and used to evaluate grain sorghum-cotton rotation systems. A regression model using ordinary least squares estimation procedures was utilized to estimate the impact of grain sorghum on cotton yields in a rotation system. Simulation models were developed to evaluate the profitability of various rotation strategies compared to continuous cotton in the SHP. The following rotation strategies were evaluated for irrigated and dryland production: 1) 1/3 grain sorghum - 2/3 cotton, 2) 1/4 grain sorghum - 3/4 cotton, 3) 1/5 grain sorghum - 4/5 cotton, 4) 1/10 grain sorghum - 9/10 cotton, and 5) continuous cotton.

Results and Discussion: The SPA results have been completed and are reported on a crop share basis for the 1999 and 2000 crop years. Databases of results were compiled for the Southern High Plains (SHP), Northern High Plains (NHP), and Coastal Bend (CB) regions evaluating irrigated and dryland grain sorghum as a primary crop, and irrigated and dryland grain sorghum behind failed cotton. For the purposes of this project, the boundary between the NHP and the SHP was defined as the southern county lines of Parmer, Castro, Swisher, Briscoe, Hall, and Childress counties. The database program provides a means to aggregate the results across all individual SPA analyses and crop years. **The reporting of production, marketing, and financial standards is strictly on an aggregate basis. All information gathered from individual operations is held in strict confidence.**

Tables 1, 2, 3, and 4 provide a summary of production costs and profitability for grain sorghum production in the SHP, NHP, and CB regions. The results reported for the SHP and NHP regions are on a crop share basis while the results for the CB region is reported on a cash lease and crop share basis. Family living withdrawals were not included in the analyses due to the significant variation in this expense across producers.

The results for the SHP for irrigated grain sorghum are reported in Table 1 and indicate that the average total enterprise cost of production was \$4.02/bu, the breakeven price after allowing for non-primary product

income was \$2.29/bu, and the average price received was \$1.78/bu. Net returns per acre were negative for both years and averaged - \$35.52/acre. Costs of production for irrigated grain sorghum behind failed cotton are only reported for 1999 and were \$4.69/bu and \$3.09/bu for total enterprise cost and breakeven price, respectively. Net returns per acre were negative at - \$44.88/acre.

Dryland grain sorghum results for the SHP are reported in Table 2 and indicate that the average total enterprise cost of production was \$9.19/bu, the breakeven price after allowing for non-primary product income was \$4.36/bu, and the average price received was \$1.81/bu. Net returns per acre were positive in 1999 and negative in 2000, however, the averaged net return was - \$20.68/acre. Costs of production for dryland grain sorghum behind failed cotton are only reported for 1999 and were \$3.68/bu and \$1.71/bu for total enterprise cost and breakeven price, respectively. Net returns per acre were negative at - \$2.72/acre.

The results for the NHP for irrigated and dryland grain sorghum are reported in Table 3. The indicated average total enterprise cost of production for irrigated grain sorghum was \$2.85/bu, the breakeven price after allowing for non-primary product income was \$1.41/bu, and the average price received was \$1.69/bu. Net returns per acre averaged \$22.25/acre for irrigated production. For dryland grain sorghum the average total enterprise cost and breakeven price were \$5.68/bu and \$2.57/bu, respectively. Net returns per acre were negative for both years and averaged - \$19.74/acre.

Results for the CB region reported in Table 4 indicated an average total enterprise cost of production for dryland crop share grain sorghum of \$1.67/bu, the breakeven price after allowing for non-primary product income of \$0.78/bu, and an average price received of \$1.74/bu. Net returns per acre were positive in both years and averaged \$65.32/acre. Grain sorghum produced under a cash lease was only reported for 2000 and indicated total enterprise cost of production of \$3.25/bu, a breakeven price of \$2.39/bu and net returns per acre of - \$27.06/acre.

The results reported for this project indicated a significant variation in the unit costs of production and profitability between grain sorghum producing regions. Additionally, the comparison of net returns and the level of non-primary product income show the importance of non-primary product income, which includes government payments, on profitability.

An evaluation of grain sorghum in a cotton rotation system indicated that cotton yields increased by 170 and 142 lbs/acre one year and two years following grain sorghum, respectively. A simulation of profitability for the various grain sorghum-cotton rotations was compared to continuous cotton and showed that the profitability of all rotations was higher, with the 1/3 grain sorghum-2/3 cotton rotation giving the highest profitability per planted acre. However, these results are based on a limited sample of producers and crop production years.

Technology Transfer and Education Activity: Currently there are two Research Assistants and two Student Assistants working on the project with the responsibility of working with project participants in completing their analysis.

One publication has been produced: Blackshear, Jason F., "Profitability and Production Costs of Grain Sorghum in Texas." Master's Thesis, December 2001.

Table 1 - 1999 and 2000* Southern High Plains Irrigated Results

Summary Category	Irrigated Grain Sorghum			Irrigated Grain Sorghum Behind Failed Cotton	
	1999	2000	Average	1999	2000
	(bushels/acre)				
Total Yields	94	122	108	43	**
Crop Share	63	82	73	29	**
	(\$/bushel)				
Total Cash Operating Expenses	3.61	3.02	3.32	3.79	**
Total Enterprise Cost***	4.38	3.65	4.02	4.69	**
Breakeven Cost of Production	2.32	2.26	2.29	3.09	**
Milo Price Received	1.62	1.94	1.78	1.54	**
	(\$/acre)				
Net Returns per Acre***	-44.62	-26.41	-35.52	-44.88	**
Non-Primary Product Income	129.44	113.83	121.64	46.41	**

* Results from 2000 are preliminary

** Not reported to avoid disclosing individual producers

*** Total enterprise cost and net returns do not include family living withdrawals

Table 2 - 1999 and 2000* Southern High Plains Dryland Results

Summary Category	Dryland Grain Sorghum			Dryland Grain Sorghum Behind Failed Cotton	
	1999	2000	Average	1999	2000
	(bushels/acre)				
Total Yields	32	13	23	35	**
Crop Share	21	9	15	23	**
	(\$/bushel)				
Total Cash Operating Expenses	3.39	12.51	7.95	2.83	**
Total Enterprise Cost***	4.45	13.84	9.19	3.68	**
Breakeven Cost of Production	1.32	7.39	4.36	1.71	**
Milo Price Received	1.71	1.90	1.81	1.59	**
	(\$/acre)				
Net Returns per Acre***	8.06	-49.41	-20.68	-2.72	**
Non-Primary Product Income	67.72	11.61	39.67	45.23	**

* Results from 2000 are preliminary

** Not reported to avoid disclosing individual producers

*** Total enterprise cost and net returns do not include family living withdrawals

