

Grain Sorghum Cost-Return Budget in Western Kansas

Department of Agricultural Economics



Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Troy J. Dumler
Agricultural Economist, SW

Curtis R. Thompson
Crops and Soils, SW

Daniel M. O'Brien
Agricultural Economist, NW

Roger Stockton
Crops and Soils, NW

The state of Kansas ranked first in the nation in grain sorghum production in 2000 with 188,800,000 bushels produced. Harvested acreage of sorghum for grain in Kansas was 3,200,000 acres in 2000. During the 1995-2000 period, on average 28 percent of dryland grain sorghum harvested acreage (927,033 acres per year) and 25 percent of Kansas dryland grain sorghum production (59,268,667 bushels per year) came from the western third of the state. Grain sorghum is well suited to the arid climate of western Kansas, especially as part of intensive wheat-grain sorghum-fallow cropping systems.

During 1996, grain sorghum acreage in the western third of Kansas increased by 153 percent from 557,400 acres the previous year to 1,413,500 acres. This one-time dramatic acreage increase came in response to a late spring freeze that severely damaged the western Kansas wheat crop. Opportunistic farmers then quickly adopted no-till practices and planted grain sorghum and other summer crops on acreage where severe wheat freeze damage occurred. Dryland grain sorghum acreage has declined from 1996 levels in following years, but has remained above pre-1996 levels.

In parts of southwest Kansas, grain sorghum has been cropped continuously on sandy soils. Planting with a lister

has been the long-accepted practice, but in recent years some producers have switched to a reduced tillage, surface-planted system. Farmers may plant grain sorghum with listers for two primary reasons: 1) potential wind damage is reduced because the crop is protected between the ridges; and 2) mechanical tillage moves a lot of soil, uprooting and covering broadleaf and grassy weeds. Pre-emergence soil-applied herbicides are not effective in this system. The high ridges between rows are subject to erosion from wind and rain, and can cover young, growing grain sorghum. In an average year in this region, farmers usually plan on replanting a significant number of listed acres. Another negative aspect of lister-planting is that it requires numerous tillage operations leading to high machinery operation expenses. It is also a labor-intensive cropping system.

In contrast, reduced tillage continuous grain sorghum appeals to some producers because the reduced number of tillage operations, lower machinery requirements, and lower operating expense. The likelihood of wind- and rain-induced replantings is also reduced in a surface-planted system. Herbicides substitute for pre-plant tillage in the surface-planted system, making this system more herbicide intensive. Soil-applied herbicides can also be effective in this

Table 1A. Production Inputs — Continuous Sorghum

Item	Lister Planted	Surface Planted	
	30 bu/ac	45 bu/ac	
Seed, lbs/acre*	2.66	2.00	\$2.54/lb
Fertilizer:			
N (anhydrous)	35	0	\$0.16/lb
N	0	52	\$0.23/lb
P	14	21	\$0.21/lb
K	0	0	\$0.14/lb
Lime	0	0	\$0.01/lb
Herbicide			
Marksman	2.0	0.0	\$3.67/pt
Roundup Ultra	0.0	24.0	\$0.33/oz
+ Atrazine 4L + crop oil			
	0.0	1.0	\$4.20/qt
Dual II Magnum	0.0	1.2	\$13.28/pt
Insecticide / Fungicide			

* *Concep and Gaucho treated* — Lister rate assumes one-third of acres are replanted.

Table 1B. Production Inputs — Wheat-Sorghum-Fallow

Item	Yield Level (bu)			
	60	75	85	
Seed, lbs/acre*	3.0	3.0	3.0	\$2.36/lb
Fertilizer:				
N (anhydrous)	0	0	0	\$0.16/lb
N	70	87	99	\$0.23/lb
P	27	34	39	\$0.21/lb
K	0	0	0	\$0.14/lb
Lime	0	0	0	\$0.01/lb
Herbicide				
RT Master + 2,4-D + Atrazine 90DF				
	1.0	1.0	1.0	\$9.49/ac
RT Master + Additives				
	1.0	1.0	1.0	\$5.50/ac
Roundup Ultra + Biceplite II Magnum				
	1.0	1.0	1.0	\$25.66/ac
Insecticide / Fungicide				

* *Gaucho treated.*

system. However, the use of triazine herbicides on sandy soil can cause significant crop injury. This budget provides cost and return estimates for continuous lister- and surface-planted grain sorghum in southwest Kansas as well as for no-till grain sorghum in a wheat-grain sorghum-fallow system for the entire western third of the state.

Income Per Acre

Crop production costs per unit and net returns are highly dependent on yields. The following estimated budgets include three different yield levels, which are intended to represent expected yields for land of varying quality for a given level of management. Alternative expected yields could help producers compare the profitability of crop enterprises on farmland tracts with varying yield potential. Land values and government payments have been adjusted for alternative yield levels in this budget. In customizing a

budget to your farm, attention should be given to using land values representative of your farm's productive capacity.

Price per bushel represents an expected harvest price in Scott City, KS, accounting for government marketing loan price support levels. Grain sorghum producers in other regions of western Kansas should use an expected price that is representative for their location.

Crop insurance was not included as an input expense in this budget because yields reflect an average of all years (good and bad). If crop insurance is included as an input expense, then an expected value for indemnity payments should be included in the returns section. Historically, crop insurance indemnity payments have typically exceeded premiums due to government subsidies.

Table 2A. Machinery and Land Resources — Continuous Sorghum

Item	Lister Planted 30 bu/ac	Surface Planted 45 bu/ac	
Tillage/Planting/Chemical Applications:			
Sweep	0	0	\$5.13/ac
Disk	0	0	\$5.60/ac
Lister plant	1	0	\$7.00/ac
Surface plant	0	1	\$8.28/ac
Anhydrous application	1	0	\$5.23/ac
Fertilizer application	0	1	\$3.67/ac
Herbicide application	1	2	\$3.61/ac
Insecticide application	0	0	\$3.66/ac
Harvest			
Base charge	1	1	\$13.82/ac
Extra charge for yields exceeding	32	32	\$0.129/bu
Hauling	30	45	\$0.125/bu
Non-machinery labor	0.50	0.50	\$10.00/hr
Irrigation labor	0.00	0.00	\$10.00/hr
Land value/acre	\$488	\$488	6.00%
Interest on capital			8.0%

Table 2B. Machinery and Land Resources — Wheat-Sorghum-Fallow

Table 2.2. Machinery and Labor Resources – Wheat, Soybean, Corn				
Item	Yield Level (bu)			
	60	75	85	
Tillage/Planting/Chemical Applications:				
Sweep	0	0	0	\$5.13/ac
Disk	0	0	0	\$5.60/ac
Field cultivate	0	0	0	\$5.74/ac
No-till plant	1	1	1	\$9.41/ac
Anhydrous application	0	0	0	\$5.23/ac
Fertilizer application	1	1	1	\$3.64/ac
Herbicide application	3	3	3	\$3.61/ac
Insecticide application	0	0	0	\$3.66/ac
Harvest				
Base charge	1	1	1	\$13.82/ac
Extra charge for yields exceeding	32	32	32	\$0.129/bu
Hauling	60	75	85	\$0.125/bu
Non-machinery labor	0.50	0.50	0.50	\$10.00/hr
Irrigation labor	0.00	0.00	0.00	\$10.00/hr
Land value/acre	\$406	\$508	\$610	6.00%
Interest on capital				8.0%

Costs Per Acre

Production costs at the three production levels are shown on lines 1 through 13. Kansas Custom Rates for specific field operations are used to represent fuel and labor costs as well as machinery repair, depreciation, and interest expenses in these budgets. Tables 1A and 1B identify the typical seed, fertilizer, herbicide, and insecticide requirements (rate and cost/unit) for grain sorghum in continuous and wheat-grain sorghum-fallow cropping systems, respectively. Herbicide requirements include both pre-crop and in-crop treatments. Tables 2A and 2B outline the machinery and land resources used for grain sorghum in these alternative cropping systems. Each tillage, planting, and harvest operation is identified.

Other Grain Sorghum Production Management Resources

K-State Research and Extension has a number of resources available relating to grain sorghum production management. The *Kansas Grain Sorghum Production Handbook*, C-687, provides information on recommended production practices. More information on grain sorghum variety performance, insect, weed and disease management, market prospects, sorghum residue and yield estimation, and other sorghum production and marketing information can be obtained through Local K-State Research and Extension Offices or via the K-State Research and Extension website, www.oznet.ksu.edu.

COST-RETURN PROJECTION — GRAIN SORGHUM — (CONTINUOUS) WESTERN KANSAS

	Lister Planted 30 bu/ac	Surface Planted 45 bu/ac	Your Farm
INCOME PER ACRE			
A. Yield per acre	30	45	
B. Price per bushel	\$ 1.99	\$ 1.99	
C. Net government payment	\$ 16.05	\$ 16.05	
D. Indemnity payments	\$	\$	
E. Miscellaneous income	\$	\$	
F. Returns/acre ((A × B) + C + D + E)	\$ 75.75	\$ 105.60	
COSTS PER ACRE			
1. Seed	\$ 6.76	\$ 5.08	
2. Herbicide	7.34	28.02	
3. Insecticide / Fungicide			
4. Fertilizer and Lime	8.54	16.37	
5. Crop Consulting			
6. Crop Insurance			
7. Drying			
8. Miscellaneous	5.50	0.00	
9. Custom Hire / Machinery Expense	33.40	40.28	
10. Non-machinery Labor	5.00	5.00	
11. Irrigation			
a. Labor			
b. Fuel and Oil			
c. Repairs and Maintenance			
d. Depreciation on Equipment and Well			
e. Interest on Equipment			
12. Land Charge / Rent	29.28	29.28	
G. SUB TOTAL	\$ 95.82	\$ 124.04	
13. Interest on 1/2 Nonland Costs	2.66	3.79	
H. TOTAL COSTS	\$ 98.48	\$ 127.83	
I. RETURNS OVER COSTS (F - H)	\$ -22.73	\$ -22.23	
J. TOTAL COSTS/BUSHEL (H ÷ A)	\$ 3.28	\$ 2.84	
K. RETURN TO ANNUAL COST (I + 13) ÷ G	-20.94%	-14.87%	

**COST-RETURN PROJECTION — GRAIN SORGHUM — (W-S-F ROTATION)
WESTERN KANSAS**

	Yield Level (bu)			Your Farm
	60	75	85	
INCOME PER ACRE				
A. Yield per acre	60	75	85	
B. Price per bushel	\$ 1.99	\$ 1.99	\$ 1.99	
C. Net government payment	\$ 22.15	\$ 24.07	\$ 26.00	
D. Indemnity payments	\$	\$	\$	
E. Miscellaneous income	\$	\$	\$	
F. Returns/acre ((A × B) + C + D + E)	\$ 141.55	\$ 173.32	\$ 195.15	
COSTS PER ACRE				
1. Seed	\$ 7.08	\$ 7.08	\$ 7.08	
2. Herbicide	40.65	40.65	40.65	
3. Insecticide / Fungicide				
4. Fertilizer and Lime	21.77	27.15	30.96	
5. Crop Consulting				
6. Crop Insurance				
7. Drying				
8. Miscellaneous	5.50	5.50	5.50	
9. Custom Hire / Machinery Expense	48.81	52.62	55.15	
10. Non-machinery Labor	5.00	5.00	5.00	
11. Irrigation				
a. Labor				
b. Fuel and Oil				
c. Repairs and Maintenance				
d. Depreciation on Equipment and Well				
e. Interest on Equipment				
12. Land Charge / Rent	36.54	45.72	54.90	
G. SUB TOTAL	\$ 165.35	\$ 183.72	\$ 199.25	
13. Interest on 1/2 Nonland Costs	5.15	5.52	5.77	
H. TOTAL COSTS	\$ 170.50	\$ 189.24	\$ 205.02	
I. RETURNS OVER COSTS (F - H)	\$ -28.96	\$ -15.92	\$ -9.88	
J. TOTAL COSTS/BUSHEL (H ÷ A)	\$ 2.84	\$ 2.52	\$ 2.41	
K. RETURN TO ANNUAL COST (I + 13) ÷ G	-14.40%	-5.66%	-2.06%	

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