



Enterprise Budgets

Durum Wheat, Following Cotton, Flood Irrigated, Southern Arizona

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This enterprise budget estimates the typical economic costs and returns to grow durum wheat after a cotton crop using flood irrigation in southern Arizona. It should be used as a guide to estimate actual costs and returns and is not representative of any farm. The assumptions used in constructing this budget are discussed below. Assistance provided by area producers and agribusinesses is much appreciated.

As of the date of this publication, the price for labor, fuel, fertilizer, and chemicals is increasing dramatically, which makes developing a long-term budget difficult. Therefore, a sensitivity analysis shows the net returns per acre as these inputs increase by 10 and 20 percent.

Cropping Pattern

This budget is based on a 1,500-tillable acre farm. As Arizona is experiencing irrigation water shortages, approximately 40 percent (597 acres) of the total farm tillable acres are fallowed. This fallowed land will allow adequate water to irrigate the following crops: 271 acres in cotton, 45 acres in silage corn, 90 acres in spring barley, 181 acres in durum wheat, and 316 acres of alfalfa hay. The costs to fallow land are allocated to each crop based on its water use. All crops are grown using flood irrigation.

Labor

Tractor driver labor cost is \$17.89 per hour and general labor \$14.55 per hour; both rates include social security, workers' compensation, unemployment insurance, and other labor overhead expenses. For this study, owner labor is valued at the same rate as tractor driver rates, and all labor is assumed to be a cash cost. Tractor labor hours are calculated based on machinery hours, plus ten percent.

Capital

Interest on operating capital for harvest and production inputs (six percent) is treated as a cash expense, borrowed for 6-months. An interest rate of six percent is charged as an opportunity to the owner for machinery ownership.

Machinery and Equipment

The machinery and equipment used in this budget are sufficient for a 1,500-acre farm with 1,000 acres in crops. The machinery and equipment hours reflect producing cotton, silage corn, spring barley, durum wheat, and alfalfa hay. A detailed breakdown of machinery values is shown in Table 2. Estimated labor, variable, and fixed costs for machinery are shown in Table 3, based on an hour and per acre basis. The machinery costs are calculated based on the total farm use of the machinery. Off-road diesel is \$4.00 per gallon.

Operations

The cultural operations are listed approximately in the order in which they are performed. A 175-hp tractor is used to pull the v-ripper, heavy offset disk, moldboard plow, landplane, lister, and planter. A 125-hp tractor is used to pull the shredder/root puller, drill, cultivator, fertilizer spreader, and boom sprayer. A charge for miscellaneous and other expenses is five percent of production costs, including additional labor, machinery repairs and maintenance, supplies and materials, tax preparation, memberships in professional organizations, and educational workshops not included in field operations.

Results

In this budget the price of durum wheat is \$18 per cwt, with an average yield of 66 cwt, resulting in a gross income of \$1,188 per acre. Variable costs are \$916 per acre and fixed cash costs of \$285 per acre, giving a net return above variable cash costs of -\$14 per acre. Total fixed costs are \$46 per acre and total costs of \$1,248 per acre, when all variable and fixed costs are considered. The gross income minus total costs results in a -\$60 per acre return. A breakeven price of \$18.20 per cwt would be required to cover variable and fixed cash costs and \$18.91 per cwt to cover total costs.

Tables 4 and 5 show the baseline net returns per acre for cash and total costs at various yields and prices as in this study. Tables 6, 7, 8, and 9 show a sensitivity analysis of returns per acre as the price for labor, fuel, fertilizer, and chemicals are increased an additional 10 and 20 percent.

NOTE: Not included in these budgets are family living withdrawals for unpaid labor, returns to management, depreciation and opportunity costs for vehicles, buildings and improvements, inflation, property and crop insurance, and local, state, and federal income and property taxes.

Table 1. Economic and Cash Costs and Returns of Producing Durum Wheat Following Cotton, \$/acre.

Returns		Unit	\$/Unit	Quantity	Value		
Durum Wheat		CWT	\$18.00	66.00	<u>\$1,188.00</u>		
Total Returns					\$1,188.00		
Variable Cash Costs	Price	Quantity	Unit	Labor	Machinery	Materials	Total
Land Preparation and Maintenance							
V-Ripper		1.00	acre	\$13.53	\$34.60	\$0.00	\$48.13
Offset Disk		2.00	acre	9.43	23.76	0.00	33.19
Crop Production							
Drill		1.00	acre	5.41	10.13	58.50	74.04
- Seed	\$0.39	150.00	pounds				
Fertilizer Spreader		1.00	acre	1.88	3.73	340.50	346.11
- Nitrogen	\$273.00	1.00	acre				
- Phosphorus	\$67.50	1.00	acre				
Boom Sprayer		1.00	acre	1.19	1.82	17.00	20.01
- Herbicides	\$17.00	1.00	acre				
Irrigation				50.93	0.00	192.50	243.43
- Irrigation Water, Flood	\$55.00	3.50	ac ft				
- Irrigation Labor, Flood	\$14.55	3.50	hours				
Harvest							
Harvest, Custom ¹	\$25.00	3.30	tons	0.00	0.00	82.50	82.50
Other Charges							
Other Expenses		5.0%		0.00	0.00	42.37	42.37
Interest on Operating Capital		6.0%		<u>0.00</u>	<u>0.00</u>	<u>26.69</u>	<u>26.69</u>
Total Variable Cash Costs				\$82.37	\$74.05	\$760.06	\$916.48
Fixed Cash Costs				Unit	\$/Unit	Value	
Fallow Costs				acre	\$115.39	\$115.39	
Annual Cash Rent Payment				acre	170.00	<u>170.00</u>	
Total Fixed Cash Costs						\$285.39	
Total Returns minus Total Variable and Fixed Cash Costs							-13.87
Fixed Non-Cash Costs				Unit	\$/Unit	Value	
Power Units, Machinery & Equipment, depreciation & interest				acre	\$45.88	<u>\$45.88</u>	
Total Fixed Non-Cash Costs						\$45.88	
Total Annual Costs							\$1,247.75
Returns minus Total Annual Costs							-\$59.75

¹ Cost includes cutting and hauling wheat from field to a market within a round trip of 20 miles..

Table 2. Whole Farm Machinery Cost Assumptions.

Machine	Width (feet)	Market Value	Annual Use	Hours of Expected Life (Years)
175 HP Tractor	N/A	\$180,000	1,365	10
125 HP Tractor	N/A	80,000	495	15
V-Ripper	8.0	22,000	459	10
Offset Disk	18.0	30,000	517	15
Moldboard Plow	9.3	35,000	138	15
Landplane	16.0	18,000	78	15
Lister	10.0	6,500	99	15
Cotton Shredder/Root Puller	20.0	12,000	41	15
Row Planter	24.0	40,000	72	15
Row Cultivator	24.0	22,000	103	10
Drill	20.0	25,000	97	15
Fertilizer Spreader	40.0	18,000	109	20
Boom Sprayer	60.0	9,500	145	20

Table 3. Machinery Cost Calculations, on a per hour and per acre basis.

Machine	-Variable Costs-		Fixed Cost		Total Cost
	Fuel & Lube	Repairs & Maint.	Deprec. & Interest		
----- Costs Per Hour -----					
175 HP Tractor	\$36.80	\$7.37	\$17.20		\$61.37
125 HP Tractor	23.00	1.78	18.31		43.09
V-Ripper	0.00	6.16	6.19		12.35
Offset Disk	0.00	5.40	6.48		11.88
Moldboard Plow	0.00	18.20	28.29		46.50
Landplane	0.00	3.24	25.80		29.04
Lister	0.00	1.78	7.32		9.10
Cotton Shredder/Root Puller	0.00	2.76	32.57		35.33
Row Planter	0.00	14.02	64.48		78.50
Row Cultivator	0.00	3.90	27.10		30.99
Drill	0.00	12.06	30.14		42.20
Fertilizer Spreader	0.00	14.31	19.02		33.34
Boom Sprayer	0.00	5.36	7.51		12.87
----- Costs Per Acre -----					
Field Operation	Acre/ Hour	Operator Labor	Variable Costs	Fixed Costs	Total Costs
175 HP Tractor & V-Ripper	1.45	\$13.53	\$34.60	\$16.08	\$64.21
175 HP Tractor & Offset Disk	4.17	4.72	11.88	5.68	22.27
175 HP Tractor & Moldboard Plow	2.55	7.73	24.50	17.87	50.11
175 HP Tractor & Landplane	5.09	3.87	9.31	8.45	21.62
175 HP Tractor & Lister	3.18	6.18	14.44	7.71	28.33
175 HP Tractor & Shredder	6.64	2.97	4.15	7.67	14.78
175 HP Tractor & Planter	4.36	4.51	13.34	18.72	36.56
175 HP Tractor & Cultivator	6.55	3.01	4.38	6.94	14.32
175 HP Tractor & Drill	3.64	5.41	10.13	13.32	28.87
175 HP Tractor & Fertilizer Spreader	10.47	1.88	3.73	3.56	9.18
175 HP Tractor & Boom Sprayer	16.55	1.19	1.82	1.56	4.57

Table 4. Estimated Per Acre Returns Over Cash Cost at Varying Yields and Prices at Full Production.

Change in Prices/Lb	Tons per Acre						
	60.00	62.0	64.0	66.0	68.0	70.0	72.0
\$16.50	(\$212)	(\$179)	(\$146)	(\$113)	(\$80)	(\$47)	(\$14)
\$17.00	(182)	(148)	(114)	(80)	(46)	(12)	22
\$17.50	(152)	(117)	(82)	(47)	(12)	23	58
\$18.00	(122)	(86)	(50)	(14)	22	58	94
\$18.50	(92)	(55)	(18)	19	56	93	130
\$19.00	(62)	(24)	14	52	90	128	166
\$19.50	(32)	7	46	85	124	163	202

Table 5. Estimated Per Acre Returns Over Total Cost at Varying Yields and Prices at Full Production.

Change in Prices/Lb	Tons per Acre						
	60.00	62.0	64.0	66.0	68.0	70.0	72.0
\$16.50	(\$258)	(\$225)	(\$192)	(\$159)	(\$126)	(\$93)	(\$60)
\$17.00	(228)	(194)	(160)	(126)	(92)	(58)	(24)
\$17.50	(198)	(163)	(128)	(93)	(58)	(23)	12
\$18.00	(168)	(132)	(96)	(60)	(24)	12	48
\$18.50	(138)	(101)	(64)	(27)	10	47	84
\$19.00	(108)	(70)	(32)	6	44	82	120
\$19.50	(78)	(39)	0	39	78	117	156

Table 6. Estimated Per Acre Returns Over Cash Cost at Varying Yields and Prices at Full Production with a 10 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

Change in Prices/Lb	Tons per Acre						
	60.00	62.0	64.0	66.0	68.0	70.0	72.0
\$16.50	(\$266)	(\$233)	(\$200)	(\$167)	(\$34)	(\$101)	(\$68)
\$17.00	(236)	(202)	(168)	(134)	(100)	(66)	(32)
\$17.50	(206)	(171)	(136)	(101)	(66)	(31)	4
\$18.00	(176)	(140)	(104)	(68)	(32)	4	40
\$18.50	(146)	(109)	(72)	(35)	2	39	76
\$19.00	(116)	(78)	(40)	(2)	36	74	112
\$19.50	(86)	(47)	(8)	31	70	109	148

Table 7. Estimated Per Acre Returns Over Total Cost at Varying Yields and Prices at Full Production with a 10 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

Change in Prices/Lb	Tons per Acre						
	60.00	62.0	64.0	66.0	68.0	70.0	72.0
\$16.50	(\$312)	(\$279)	(\$246)	(\$213)	(\$180)	(\$147)	(\$114)
\$17.00	(282)	(248)	(214)	(180)	(146)	(112)	(78)
\$17.50	(252)	(217)	(182)	(147)	(112)	(77)	(42)
\$18.00	(222)	(186)	(150)	(114)	(78)	(42)	(6)
\$18.50	(192)	(155)	(118)	(81)	(44)	(7)	30
\$19.00	(162)	(124)	(86)	(48)	(10)	28	66
\$19.50	(132)	(93)	(54)	(15)	24	63	102

Table 8. Estimated Per Acre Returns Over Cash Cost at Varying Yields and Prices at Full Production with a 20 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

Change in Prices/Lb	----- Tons per Acre -----						
	64.5	65.0	65.5	66.0	66.5	67.0	67.5
\$16.50	(\$350)	(\$287)	(\$254)	(\$221)	(\$188)	(\$155)	(\$122)
\$17.00	(290)	(256)	(222)	(188)	(154)	(120)	(86)
\$17.50	(260)	(225)	(190)	(155)	(120)	(85)	(50)
\$18.00	(230)	(194)	(158)	(122)	(86)	(50)	(14)
\$18.50	(200)	(163)	(126)	(89)	(52)	(15)	22
\$19.00	(170)	(132)	(94)	(56)	(18)	20	58
\$19.50	(140)	(101)	(62)	(23)	16	55	94

Table 9. Estimated Per Acre Returns Over Total Cost at Varying Yields and Prices at Full Production with a 20 percent Increase in Fuel, Labor, Fertilizer and Chemical Costs.

Change in Prices/Lb	----- Tons per Acre -----						
	64.5	65.0	65.5	66.0	66.5	67.0	67.5
\$16.50	(\$366)	(\$333)	(\$300)	(\$267)	(\$234)	(\$201)	(\$168)
\$17.00	(336)	(302)	(268)	(234)	(200)	(166)	(132)
\$17.50	(306)	(271)	(236)	(201)	(166)	(131)	(96)
\$18.00	(276)	(240)	(204)	(168)	(132)	(96)	(60)
\$18.50	(246)	(209)	(172)	(135)	(98)	(61)	(24)
\$19.00	(216)	(178)	(140)	(102)	(64)	(26)	12
\$19.50	(186)	(147)	(108)	(69)	(30)	9	48



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