



# Enterprise Budgets

## Cotton, Flood Irrigated, Southern Arizona

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This enterprise budget estimates the typical economic costs and returns to grow cotton 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

There are two products sold in this budget, cotton lint and seed. The price of lint is \$1.00 and \$0.15 per pound for seed; the average yield for lint is 1,500 and seed 2,250 pounds, for a 1.50 ratio of lint to seed production. The gross income for lint is \$1,500 and \$338 per acre for seed. The total gross income is \$1,838 per acre. Variable costs are \$1,206 per acre and fixed cash costs of \$335 per acre, giving a net return above variable cash costs of \$297 per acre. Total fixed costs are \$116 per acre, with a total cost of production of \$1,656 per acre when all variable and fixed costs are considered. The gross income minus total costs results in a \$181 per acre return.

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 1a. Economic and Cash Costs and Returns of Producing Cotton, \$/acre.

<b>Returns</b>			<b>Unit</b>	<b>\$/Unit</b>		<b>Quantity</b>	<b>Value</b>
Cotton Lint			pound	\$1.00		1,500	\$1,500.00
Cotton Seed			pound	0.15		2,250	<u>337.50</u>
<b>Total Returns</b>							<b>\$1,837.50</b>
<b>Variable Cash Costs</b>	<b>Price</b>	<b>Quantity</b>	<b>Unit</b>	<b>Labor</b>	<b>Machinery</b>	<b>Materials</b>	<b>Total</b>
Land Preparation and Maintenance <sup>1</sup>							
V-Ripper		1.00	acre	\$13.53	\$34.60	\$0.00	\$48.13
Offset Disk		3.00	acre	14.15	35.64	0.00	49.79
Moldboard Plow		1.00	acre	7.73	24.50	0.00	32.23
Landplane		1.00	acre	3.87	9.31	0.00	13.18
Lister		1.00	acre	6.18	14.44	0.00	20.63
Cotton Shredder/Root Puller		1.00	acre	2.97	4.15	0.00	7.12
Crop Production							
Row Planter	\$110.00	1.00	acre	4.51	13.34	110.00	127.85
- Seed		1.00	acre				
Fertilizer Spreader		1.00	acre	1.88	3.73	175.50	181.11
- Nitrogen	\$175.50	1.00	acre				
Boom Sprayer		3.00	acre	3.57	5.47	74.00	83.03
- Herbicides	\$24.00	1.00	acre				
- Insecticides	\$50.00	1.00	acre				
Row Cultivator		2.00	acre	6.01	8.76	0.00	14.78
Irrigation				72.75	0.00	275.00	347.75
- Irrigation Water, Flood	\$55.00	5.00	ac ft				
- Irrigation Labor, Flood	\$14.55	5.00	hours				
Harvest							
Harvest, Custom	\$160.00	1.00	acre	0.00	0.00	160.00	160.00
Research and Protection Assessment	\$3.00	3.00	bales	0.00	0.00	9.00	9.00
National Cotton Council	\$0.45	3.00	bales	0.00	0.00	1.35	135
Arizona Cotton Growers Association	\$0.65	3.00	bales	0.00	0.00	1.95	1.95
Cotton Board Assessment	\$1.00	3.00	bales	0.00	0.00	3.08	3.08
Classing Fee	0.005%		gross lint sales				
Classing Fee	\$2.30	3.00	bales	0.00	0.00	6.90	6.90
Other Charges							
Other Expenses		5.0%		0.00	0.00	55.75	55.75
Interest on Operating Capital		6.0%		<u>0.00</u>	<u>0.00</u>	<u>35.12</u>	<u>35.12</u>
<b>Total Variable Cash Costs</b>				<b>\$140.11</b>	<b>\$158.10</b>	<b>\$907.65</b>	<b>\$1,205.86</b>
<b>Fixed Cash Costs</b>					<b>Unit</b>	<b>\$/Unit</b>	<b>Value</b>
Fallow Costs					acre	\$164.84	\$164.84
Annual Cash Rent Payment					acre	170.00	<u>170.00</u>
<b>Total Fixed Cash Costs</b>							<b>\$334.84</b>
<b>Total Returns minus Total Variable and Fixed Cash Costs</b>							<b>\$296.80</b>
<b>Fixed Non-Cash Costs</b>					<b>Unit</b>	<b>\$/Unit</b>	<b>Value</b>
Power Units, Machinery & Equipment, depreciation & interest					acre	\$115.64	<u>\$115.64</u>
<b>Total Fixed Non-Cash Costs</b>							<b>\$115.64</b>
<b>Total Annual Costs</b>							<b>\$1,656.34</b>
<b>Returns minus Total Annual Costs</b>							<b>\$181.16</b>

<sup>1</sup> The cost to shred cotton stocks are not included in this budget, however, when cotton follows a cotton crop include the shredding costs listed in Table 3.

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						
	1,200	1,300	1,400	1,500	1,600	1,700	1,800
\$0.85	(\$251)	(\$143)	(\$36)	\$72	\$179	\$287	\$394
\$0.90	(191)	(78)	34	147	259	372	484
\$0.95	(131)	(13)	104	222	339	457	574
\$1.00	(71)	52	174	297	419	542	664
\$1.05	(11)	117	244	372	499	627	754
\$1.10	49	183	314	447	579	712	844
\$1.15	109	247	384	522	659	797	934

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

Change in Prices/Lb	Tons per Acre						
	1,200	1,300	1,400	1,500	1,600	1,700	1,800
\$0.85	(\$366)	(\$259)	(\$151)	(\$44)	\$64	\$171	\$279
\$0.90	(306)	(194)	(81)	317	144	256	369
\$0.95	(246)	(129)	(11)	106	224	341	459
\$1.00	(186)	(64)	59	181	304	426	549
\$1.05	(126)	1	129	256	384	511	639
\$1.10	(66)	66	199	331	464	596	729
\$1.15	(6)	131	269	406	544	681	819

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						
	1,200	1,300	1,400	1,500	1,600	1,700	1,800
\$0.85	(\$306)	(\$199)	(\$91)	\$16	\$124	\$231	\$339
\$0.90	(246)	(134)	(21)	91	204	316	429
\$0.95	(186)	(69)	49	166	284	401	519
\$1.00	(126)	(4)	119	241	364	486	609
\$1.05	(66)	61	189	316	444	571	699
\$1.10	(6)	126	259	391	524	656	789
\$1.15	54	191	329	466	604	741	879

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						
	1,200	1,300	1,400	1,500	1,600	1,700	1,800
\$0.85	(\$422)	(\$315)	(\$207)	(\$100)	\$8	\$116	\$223
\$0.90	(362)	(250)	(137)	(25)	88	200	313
\$0.95	(302)	(185)	(67)	50	168	285	403
\$1.00	(242)	(120)	3	125	248	370	493
\$1.05	(182)	(55)	73	200	328	455	583
\$1.10	(122)	10	143	275	408	540	673
\$1.15	(62)	75	213	350	488	625	763

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						
	1,200	1,300	1,400	1,500	1,600	1,700	1,800
\$0.85	(\$362)	(\$255)	(\$147)		\$68	\$175	\$283
\$0.90	(302)	(190)	(77)		148	260	373
\$0.95	(242)	(125)	(7)		228	345	463
\$1.05	(122)	5	133		388	515	643
\$1.10	(62)	70	203		468	600	733
\$1.15	(2)	135	273		548	685	823

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						
	1,200	1,300	1,400	1,500	1,600	1,700	1,800
\$0.85	(\$478)	(\$370)	(\$263)	(\$155)	(\$48)	\$60	\$167
\$0.90	(418)	(305)	(193)	(80)	32	145	257
\$0.95	(358)	(240)	(123)	(5)	112	230	347
\$1.00	(298)	(175)	(533)	70	192	315	437
\$1.05	(238)	(110)	17	145	272	400	527
\$1.10	(178)	(45)	87	220	352	485	617
\$1.15	(118)	20	157	295	432	570	707



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