

Organic Alfalfa Management Guide

Cost Calculator for Irrigated Organic Alfalfa Production



Photo by Rob Mikkelsen

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Table 1. Summary of Returns for Irrigated Organic Alfalfa Production (\$/acre/yr)

	No. of Years in Full Production	Cuttings Per Year	Total Cost (TC) of Operation (\$/acre)	Yield (tons/acre)	Price (\$/ton)	Revenue per acre (\$/acre)	Returns over TC (\$/acre)	Total Operating Costs (OC) (\$/acre)	Returns over OC (\$/acre)
Alfalfa Establishment, Fall			\$197					\$182	-\$182
Large Bale Production	3	4	\$1,210	8.0	\$200.00	1600	\$390	\$615	\$985
Small Bale Production	3	4	\$1,194	8.0	\$200.00	1600	\$406	\$607	\$993

ASSUMPTIONS:

1. The enterprise budget is for alfalfa grown under one or more 125-acre center pivot irrigation systems.
2. The annual land rental rate is \$400 per acre. This value can be changed on the Input Costs tab and it will change throughout the spreadsheet.
3. The landowner furnishes the center pivot system and the operator pays the irrigation charges, including repairs and power (see budget).
4. Irrigation labor is estimated at .85 hour per acre per year.
5. All labor costs are estimated at \$20.00/hour. This value can be changed in the Input Costs tab.
6. Interest rate is 7% for operation and machinery loans, and for the use of equity capital.
7. Click on the links below to view input cost and machinery complement assumptions.

[Input Costs](#)

[Machinery Complement](#)

[Machinery Costs Per Hour](#)

Table 2: Input Costs

	Unit	Price/unit
Fuel:		
Diesel	gal	\$2.50
Gas	gal	\$1.75
Seed:		
Alfalfa seed	lb	\$3.00
Fertilizer:		
Manure (hauled & spread)	ton	\$25.00
Irrigation:		
Power	acre	\$48.00
Water Access	acre	\$45.00
Repairs to Center Pivot	acre	\$25.00
Labor	acre	\$17.00
Other:		
Twine, small bales ¹	ton	\$2.00
Twine, large bales ¹	ton	\$3.00
Crop insurance	ton	\$2.00
Tarps	ton	\$4.00
Gopher control	acre	\$2.00
Soil test	acre	\$0.30
Labor:		
Hourly machine labor ²	hour	\$20.00
Land Cost:		
Cash rent	acre	\$400.00

¹While less twine is used for large bale production, the higher strength twine necessary for large bales is more expensive per roll.

²Includes all applicable state and federal taxes.

Table 3. Schedule of Operations Per Acre for Establishing Alfalfa Hay Following Wheat or Barley in the Columbia Basin, Center Pivot Irrigation

Schedule	Operation	Tooling
August	Irrigation	Center Pivot Leased w/ Land
August	Fertilize	As indicated by soil testing
August	Disc & Pack	250HP-WT, 26' Tandem Disk & Pack
August	Disc & Pack	250HP-WT, 26' Tandem Disk & Pack
August	Seedbed Maker	150HP-WT, 20' Seedbed Maker
August	Plant	150HP-WT, 20' Double Disc Drill
Fall	Irrigation	Center Pivot Leased w/Land

Table 4. Production Costs Per Acre for Establishing Organic Alfalfa Hay Following Wheat or Barley in the Columbia Basin, Center Pivot Irrigation (\$/acre/year)

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Gross Returns				\$0.00
Operating Inputs				
Seed:				\$72.00
Alfalfa Seed	24	lb	\$3.00	\$72.00
				\$0.00
Fertilizer:				\$0.00
Manure, large bale production ¹		ton	\$25.00	\$0.00
				\$0.00
				\$0.00
Pesticides:				\$0.00
Custom & Consultants:				\$0.30
Soil Test	1	acre	\$0.30	\$0.30
				\$0.00
				\$0.00
Irrigation ² :				\$33.75
Irrigation Power-CP	0.25	acre	\$48.00	\$12.00
Water Access	0.25	acre	\$45.00	\$11.25
Irrigation Repairs	0.25	acre	\$25.00	\$6.25
Irrigation Labor-CP	0.25	acre	\$17.00	\$4.25
				\$0.00
Machinery:				\$30.32
Fuel	3.03	gal	\$2.50	\$16.81
Lubricants	1	acre	\$1.37	\$2.28
Machinery Repairs	1	acre	\$4.13	\$4.13
Machinery Labor	0.36	acre	\$20.00	\$7.10
				\$0.00
Other:				\$0.00
Storage Facility & Equip. Repairs				\$0.00
				\$0.00
Overhead ³				\$6.82
Operating Interest ⁴				\$4.77
Total Operating Costs				\$181.71
Net Returns Above Operating Expenses				-\$181.71

Table 4. Production Costs Per Acre for Establishing Organic Alfalfa Hay Following Wheat or Barley in the Columbia Basin, Center Pivot Irrigation (\$/acre/year)

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Ownership Costs:				
Machinery depreciation				\$8.68
Machinery interest				\$5.06
Machinery insurance, taxes housing, licenses				\$1.57
Land Cost ⁵	1	acre	\$0.00	\$0.00
Total Ownership Costs				\$15.30
Ownership Costs per Unit				
Total Costs per Acre				\$197.01

¹General guidelines are to apply 1.25 ton of manure per ton of alfalfa removed from the field. Soil testing is recommended to check for fertility needs. During the establishment period, fertility needs may well be met with residual nutrients.

²25% of irrigation repair cost assigned to fall alfalfa establishment.

³Covers legal, accounting, and utility fees. Calculated as 5% of operating expenses.

⁴Calculated at 7% interest on operating capital for 6 months.

⁵Land cost is charged against the previous crop.

Table 5. Schedule of Operations Per Acre for Producing Irrigated Organic Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Large (1500 lb) Bales

Schedule	Operation	Tooling
Seasonal	Irrigation	Center Pivot
Per cutting	Swath Hay	14' Swather
Per cutting	Rake Hay	150HP-WT, 20' Side Delivery Rake
Per cutting	Bale Hay	250HP-WT, 1500-lb Baler
Per cutting	Haul and Stack Hay	Self-propelled Bale Wagon
Fall	Soil Test	Custom
Fall	Fertilize	Custom Ground Application

Table 6: Production Costs Per Acre for Producing Organic Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Large (1500 lb) Bales

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Gross Returns				
Alfalfa	8	tons	\$200.00	\$1,600.00
Operating Inputs				
Seed:				\$0.00
				\$0.00
				\$0.00
Fertilizer:				\$250.00
Top-dress manure or organic fertilizer as necessary	10	ton	\$25.00	\$250.00
				\$0.00
				\$0.00
Pesticides:				\$0.00
				\$0.00
Custom & Consultants:				\$0.30
Soil Test	1	acre	\$0.30	\$0.30
				\$0.00
				\$0.00
Irrigation:				\$132.45
Irrigation Power-CP	1	acre	\$48.00	\$48.00
Water Access	1	acre	\$45.00	\$45.00
Irrigation Repairs	1	acre	\$25.00	\$25.00
Irrigation Labor-CP	0.85	hr	\$17.00	\$14.45
				\$0.00
Machinery:				\$110.24
Fuel	14.34	gal	\$2.50	\$35.85
Lubricants	1	acre	\$6.47	\$6.47
Machinery Repairs	1	acre	\$23.40	\$23.40
Machinery Labor	2.23	acre	\$20.00	\$44.52
Other:				\$74.00
Twine	8	ton	\$3.00	\$24.00
Tarping	8	ton	\$4.00	\$32.00
Crop insurance	8	ton	\$2.00	\$16.00
Gopher control	1	acre	\$2.00	\$2.00
Overhead ¹				\$28.35
Operating Interest ²				\$19.84
Total Operating Costs				\$615.18
Operating Costs per Unit				\$76.90
Net Returns Above Operating Expenses				\$984.82

Table 6: Production Costs Per Acre for Producing Organic Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Large (1500 lb) Bales

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Ownership Costs:				
Machinery depreciation				\$70.10
Machinery interest				\$34.98
Machinery insurance, taxes housing, licenses				\$14.31
Amortized establishment cost	1	acre	\$75.07	\$75.07
Land Cost	1	acre	\$400.00	\$400.00
Total Ownership Costs				\$594.46
Ownership Costs per Unit				\$74.31
Total Costs per Acre				\$1,209.65
Total Cost per Unit				\$151.21
Returns to Risk				\$390.35

¹Covers legal, accounting, and utility fees. Calculated as 5% of operating expenses.

²Calculated at 7% interest on operating capital for 6 months.

Breakeven Analysis:	-	Base	+
	10%		10%
	Yield		
<u>Price</u>	7.2	8	8.4
Operating Cost Breakeven	\$85.44	\$76.90	\$73.24
Ownership Cost Breakeven	\$82.56	\$74.31	\$70.77
Total Cost Breakeven	\$168.01	\$151.21	\$144.01
	Price		
<u>Yield</u>	\$180.00	\$200.00	\$220.00
Operating Cost Breakeven	3.4	3.1	2.8
Ownership Cost Breakeven	3.3	3.0	2.7
Total Cost Breakeven	6.7	6.0	5.5

Table 7: Schedule of Operations Per Acre for Producing Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Small (2-tie) Bales

Schedule	Operation	Tooling
Season	Irrigation	Center Pivot
Per cutting	Swath Hay	14' Swather
Per cutting	Rake Hay	150HP-WT, 20' Rake
Per cutting	Bale Hay	150HP-WT, Baler
Per cutting	Haul and Stack Hay	Bale Wagon
Fall	Soil Test	Custom
Fall	Fertilize	Custom Ground Application

Table 8: Production Costs Per Acre for Producing Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Small (2-tie) Bales

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Gross Returns				
Alfalfa, small bales	8	tons	200	\$1,600.00
Operating Inputs				
Seed:				\$0.00
				\$0.00
				\$0.00
Fertilizer:				\$250.00
Top-dress with manure or organic fertilizer if necessary	10	acre	\$25.00	\$250.00
				\$0.00
				\$0.00
Pesticides:				\$0.00
				\$0.00
				\$0.00
Custom & Consultants:				\$0.30
Soil Test	1	acre	\$0.30	\$0.30
				\$0.00
				\$0.00
Irrigation:				\$132.45
Irrigation Power-CP	1	acre	\$48.00	\$48.00
Water Access	1	acre	\$45.00	\$45.00
Irrigation Repairs	1	acre	\$25.00	\$25.00
Irrigation Labor-CP	0.85	hr	\$17.00	\$14.45
				\$0.00
Machinery:				\$110.91
Fuel	13.72	gal	\$2.50	\$34.30
Lubricants	1	acre	\$6.17	\$6.17
Machinery Repairs	1	acre	\$22.74	\$22.74
Machinery Labor	2.39	acre	\$20.00	\$47.70
Other:				\$66.00
Twine, small bales	8	ton	\$2.00	\$16.00
Tarping	8	ton	\$4.00	\$32.00
Crop insurance	8	ton	\$2.00	\$16.00
Gopher control	1	acre	\$2.00	\$2.00
				\$0.00
Overhead ¹				\$27.98
Operating Interest ²				\$19.59
Total Operating Costs				\$607.23
Operating Costs per Unit				\$75.90
Net Returns Above Operating Expenses				\$992.77

Table 8: Production Costs Per Acre for Producing Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Small (2-tie) Bales

Item	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Ownership Costs:				
Machinery depreciation				\$65.24
Machinery interest				\$33.30
Machinery insurance, taxes housing, licenses				\$13.65
Amortized establishment cost	1	acre	\$75.07	\$75.07
Land Cost	1	acre	\$400.00	\$400.00
Total Ownership Costs				\$587.26
Ownership Costs per Unit				\$73.41
Total Costs per Acre				\$1,194.49
Total Cost per Unit				\$149.31
Returns to Risk				\$405.51

¹Covers legal, accounting, and utility fees. Calculated as 5% of operating expenses.

²Calculated at 7% interest on operating capital for 6 months.

Breakeven Analysis:	-	Base	+
	10%		10%
	<u>Yield</u>		
<u>Price</u>	7.2	8	8.4
Operating Cost Breakeven	\$84.34	\$75.90	\$72.29
Ownership Cost Breakeven	\$81.56	\$73.41	\$69.91
Total Cost Breakeven	\$165.90	\$149.31	\$142.20
	<u>Price</u>		
<u>Yield</u>	\$180.00	\$200.00	\$220.00
Operating Cost Breakeven	3.4	3.0	2.8
Ownership Cost Breakeven	3.3	2.9	2.7
Total Cost Breakeven	6.6	6.0	5.4

Table 9. Per-Acre Machinery Costs by Type of Machine

Type of Machine	Depreciation (\$/acre)	Interest (\$/acre)	THI&L ¹ (\$/acre)	Total					Total Variable			Total Costs (\$/acre)
				Fixed Costs (\$/acre)	Repairs (\$/acre)	Fuel (\$/acre)	Fuel (gal/acre)	Lube (\$/acre)	Costs (\$/acre)	Labor (\$/acre)	Labor (hr/acre)	
14' Swather (self-propelled)	3.90	1.99	0.91	6.80	1.47	2.12	0.71	0.32	3.91	3.24	0.16	13.95
Disk & Pack, 250HP-WT	2.27	1.39	0.19	3.85	1.16	2.75	0.92	0.41	4.32	1.83	0.09	10.00
1500-lb Baler, 250HP-WT	3.18	1.49	0.45	5.12	0.71	1.67	0.56	0.25	2.63	1.21	0.06	8.96
Baler, 2-Tie, 150HP-WT	2.57	1.32	0.39	4.28	0.63	1.26	0.42	0.19	2.08	1.55	0.08	7.91
Bale Wagon, lg bales (self-propelled)	2.27	1.00	0.44	3.71	0.95	0.45	0.15	0.07	1.47	0.91	0.05	6.09
Bale Wagon, sm bales (self-propelled)	2.07	0.89	0.39	3.35	0.92	0.55	0.18	0.08	1.55	1.10	0.06	6.00
20' Side Delivery Rake, 150HP-WT	1.43	0.87	0.12	2.42	0.47	1.68	0.56	0.25	2.40	2.06	0.10	6.88
Seedbed Maker, 150HP-WT	2.09	1.26	0.17	3.52	0.93	2.17	0.72	0.33	3.43	2.44	0.12	9.39
Disk Drill, 150HP-WT	2.96	1.69	0.51	5.16	1.59	2.30	0.77	0.35	4.24	2.83	0.14	12.23
Manager's Pickup	2.14	1.58	1.53	5.25	0.60	4.50	1.50	0.68	5.78	0.00	0.00	11.03
Labor's Pickup	3.28	1.30	1.26	5.84	1.20	3.00	1.00	0.45	4.65	0.00	0.00	10.49

¹Taxes, housing, insurance, and licensing

Table 10. Per-Acre Machinery Costs for Organic Alfalfa Establishment (\$/acre)

Type of Machine	Depreciation (\$/acre)	Interest (\$/acre)	THI&L ¹ (\$/acre)	Total					Total Variable			Total Costs (\$/acre)
				Fixed Costs (\$/acre)	Repairs (\$/acre)	Fuel (\$/acre)	Fuel (gal/acre)	Lube (\$/acre)	Costs (\$/acre)	Labor (\$/acre)	Labor (hr/acre)	
Disk & Pack, 250HP-WT	2.27	1.39	0.19	3.85	1.16	2.75	0.92	0.41	4.32	1.83	0.09	10.00
Seedbed Maker, 150HP-WT	2.09	1.26	0.17	3.52	0.93	2.17	0.72	0.33	3.43	2.44	0.12	9.39
Disk Drill, 150HP-WT	2.96	1.69	0.51	5.16	1.59	2.30	0.77	0.35	4.24	2.83	0.14	12.23
Manager's Pickup	0.54	0.40	0.38	1.31	0.15	1.13	0.38	0.17	1.45	0.00	0.00	2.76
Labor's Pickup	0.82	0.33	0.32	1.46	0.30	0.75	0.25	0.11	1.16	0.00	0.00	2.62
Total	8.68	5.06	1.57	15.30	4.13	9.10	3.03	1.37	14.60	7.10	0.36	37.00

¹Taxes, housing, insurance, and licensing

Table 11. Per-Acre Machinery Costs for Organic Alfalfa Production, Large Bales (\$/acre)

Type of Machine	Depreciation (\$/acre)	Interest (\$/acre)	THI&L ¹ (\$/acre)	Total					Total Variable			Total Costs (\$/acre)
				Fixed Costs (\$/acre)	Repairs (\$/acre)	Fuel (\$/acre)	Fuel (gal/acre)	Lube (\$/acre)	Costs (\$/acre)	Labor (\$/acre)	Labor (hr/acre)	
<i>Per cutting:</i>												
14' Swather (self-propelled)	3.90	1.99	0.91	6.80	1.47	2.12	0.71	0.32	3.91	3.24	0.16	13.95
20' Side Delivery Rake, 150HP-WT	1.43	0.87	0.12	2.42	0.47	1.68	0.56	0.25	2.40	2.06	0.10	6.88
1500-lb Baler, 250HP-WT	3.18	1.49	0.45	5.12	0.71	1.67	0.56	0.25	2.63	1.21	0.06	8.96
Bale Wagon, lg bales (self-propelled)	2.27	1.00	0.44	3.71	0.95	0.45	0.15	0.07	1.47	0.91	0.05	6.09
<i>Total per cutting:</i>	<i>10.78</i>	<i>5.35</i>	<i>1.92</i>	<i>18.05</i>	<i>3.60</i>	<i>5.92</i>	<i>1.97</i>	<i>0.89</i>	<i>10.41</i>	<i>7.42</i>	<i>0.37</i>	<i>35.88</i>
<i>Total per season:</i>												
	43.12	21.40	7.68	72.20	14.40	23.68	7.89	3.56	41.64	29.68	1.48	143.52
Manager's Pickup	2.14	1.58	1.53	5.25	0.60	4.50	1.50	0.68	5.78	0.00	0.00	11.03
Labor's Pickup	3.28	1.30	1.26	5.84	1.20	3.00	1.00	0.45	4.65	0.00	0.00	10.49
Total	70.10	34.98	14.31	119.39	23.40	43.02	14.34	6.47	72.89	44.52	2.23	236.80

¹Taxes, housing, insurance, and licensing

Table 12. Per-Acre Machinery Costs for Organic Alfalfa Production, Small Bales (\$/acre)

Type of Machine	Depreciation (\$/acre)	Interest (\$/acre)	THI&L ¹ (\$/acre)	Total					Total Variable			Total Costs (\$/acre)
				Fixed Costs (\$/acre)	Repairs (\$/acre)	Fuel (\$/acre)	Fuel (gal/acre)	Lube (\$/acre)	Costs (\$/acre)	Labor (\$/acre)	Labor (hr/acre)	
<i>Per cutting:</i>												
14' Swather (self-propelled)	3.90	1.99	0.91	6.80	1.47	2.12	0.71	0.32	3.91	3.24	0.16	13.95
20' Side Delivery Rake, 150HP-WT	1.43	0.87	0.12	2.42	0.47	1.68	0.56	0.25	2.40	2.06	0.10	6.88
Baler, 2-Tie, 150HP-WT	2.57	1.32	0.39	4.28	0.63	1.26	0.42	0.19	2.08	1.55	0.08	7.91
Bale Wagon, sm bales (self-propelled)	2.07	0.89	0.39	3.35	0.92	0.55	0.18	0.08	1.55	1.10	0.06	6.00
<i>Total per cutting:</i>	<i>9.97</i>	<i>5.07</i>	<i>1.81</i>	<i>16.85</i>	<i>3.49</i>	<i>5.61</i>	<i>1.87</i>	<i>0.84</i>	<i>9.94</i>	<i>7.95</i>	<i>0.40</i>	<i>34.74</i>
<i>Total per season:</i>												
	39.88	20.28	7.24	67.40	13.96	22.44	7.48	3.36	39.76	31.80	1.59	138.96
Manager's Pickup	2.14	1.58	1.53	5.25	0.60	4.50	1.50	0.68	5.78	0.00	0.00	11.03
Labor's Pickup	3.28	1.30	1.26	5.84	1.20	3.00	1.00	0.45	4.65	0.00	0.00	10.49
Total	65.24	33.30	13.65	112.19	22.74	41.16	13.72	6.17	70.07	47.70	2.39	229.96

¹Taxes, housing, insurance, and licensing

Table 13. Machine Complement for Producing Irrigated Organic Alfalfa

Type of Machine	Current Value \$	Annual Hours of Use	Age When Purchased (years)	Expected Ownership (years)	Labor Multiplier	Taxes, Housing, Insurance, Licenses (% of avg value)	Annual Repairs (Materials & Labor) \$	Salvage Value \$	Acres per Hour
Manager's Pickup	30,000	18,000	0	7		6.80	600	15,000	
Labor's Pickup	15,000	6,000	7	7		6.80	600	3,500	
250HP-WT	100,000	500	5	10		1.20	2,000	26,000	
150HP-WT	80,000	500	5	10		1.20	1,530	20,000	
14' Swather	65,000	200	5	10	1.10	3.20	2,000	12,000	6.8
1500-lb Baler (rectangular)	80,000	150	5	10	1.20	2.50	1,500	8,000	20.0
2-Tie Baler	50,000	150	5	10	1.20	2.50	1,000	8,000	15.0
Bale Wagon, self-propelled, lg bales	135,000	200	5	10	1.20	3.10	5,000	15,000	26.4
Bale Wagon, self-propelled, sm bales	100,000	200	5	10	1.20	3.10	4,000	10,000	21.7
26' Tandem Disk & Pack	31,000	150	0	15	1.10	0.60	1,500	3,000	12.0
20' Seedbed Maker	17,000	150	0	15	1.10	0.60	800	1,650	9.0
20' Side Delivery Rake	12,000	200	0	15	1.10	0.60	500	1,000	11.6
20' Double Disk Drill	22,000	120	0	12	1.20	3.00	1,250	3,050	8.5