2012 Enterprise Budget for Establishing and Producing Irrigated Alfalfa in the Washington Columbia Basin

WASHINGTON STATE UNIVERSITY EXTENSION FACT SHEET • FS133E

Preface

The information in this publication can be used as a general guide for establishing and producing alfalfa using center pivot irrigation in the Columbia Basin of Washington State. Production costs and returns are highly variable for any particular hay operation due to farm specific:

- Capital, labor and farm resources
- Irrigation application methods
- Yields
- Type and size of machinery implements and use of custom operations
- Selected inputs used and prices
- Cultural practices
- Commodity prices and marketing
- Operation size
- Management skills

Cost estimation also varies with the intended use of the enterprise budget. To avoid drawing unwarranted conclusions for any particular hay operation, the reader must closely examine the outlined assumptions and make adjustments to the costs and returns as appropriate for their situation.

Alfalfa Production in Washington

Washington has an international reputation for producing high quality alfalfa hay. In 2011, all hay ranked fifth in the state in terms of value of production, and provides an important roughage input for dairy, cattle, and calves rations. Dairy and cattle rank in the top six in terms of value of production for Washington commodities, which further increases the economic importance of alfalfa hay for the state. The hay export market is another primary outlet for Washington alfalfa and hay. The primary export market destinations are the Pacific Rim countries of Japan, Korea, and Taiwan. China is a potential emerging export market, as

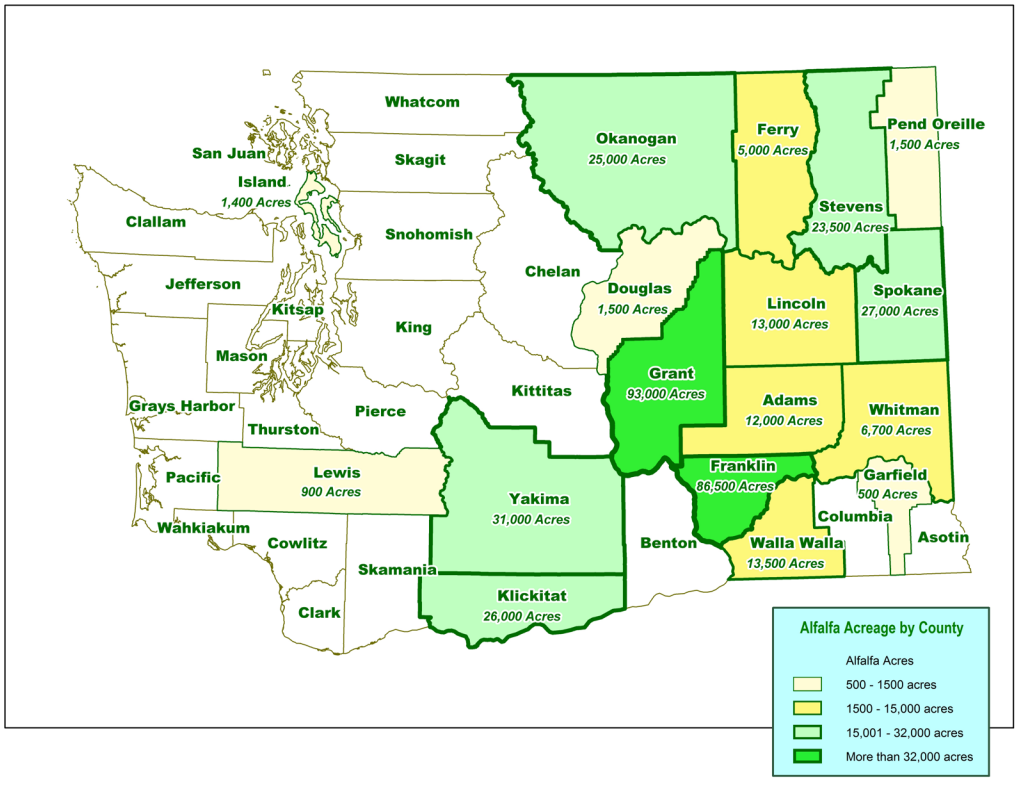

FIgure 1. Map of Washington State with 2012 alfalfa acreage by county (USDA NASS 2012).

well as the United Arab Emirates. The export market competes with the dairy market for high quality alfalfa and has become a primary pricing point in establishing hay value.

The primary alfalfa production region is the Columbia Basin (Figure 1). Grant, Franklin and Yakima counties lead the state in harvested alfalfa acres with 93,000, 86,500, and 31,000 acres respectively. These three counties account for about 50 percent of the harvested alfalfa acreage in the state, and about 66 percent of the state's alfalfa production because of the relatively high yields under irrigation in these counties (USDA NASS WA Quick).

Washington's harvested alfalfa acreage has been declining over the past five years as other commodities, such as corn and wheat, have increased in market value. Increasingly, producers are substituting these crops for alfalfa acreage. Figure 2 presents the comparative corn, wheat, and alfalfa prices, each converted to dollars-per-pound from 2005 to 2012. The graph indicates that each commodity has an increasing price trend with some volatility, but corn and wheat have relatively higher prices. Corn and wheat have lower production risk compared to alfalfa, particularly to an alfalfa stands first cutting, which in recent years has incurred a high incidence of rain damage. The general decline in hay acreage across the West, combined with the 2011 drought in the Southwest, and the large-scale 2012 drought, have decreased the hay and forage supply, which have supported high market values for the crop. Transportation costs of moving hay in export markets and to non-traditional domestic markets due to droughts, adds to the cost livestock producers pay to source hay for their operations.

Objectives

This study provides an enterprise budget of the costs of the equipment, materials, supplies, custom operations, and labor required to establish and produce alfalfa under center pivot irrigation in the Columbia Basin. The enterprise budget can be used to evaluate the production and market risk of alfalfa production. The data and assumptions used in this study were gathered from a group of experienced alfalfa producers in Washington, and represent modern, well-managed irrigated hay operations. Information gathered from these sources includes production practices, input requirements, and costs of custom operations.

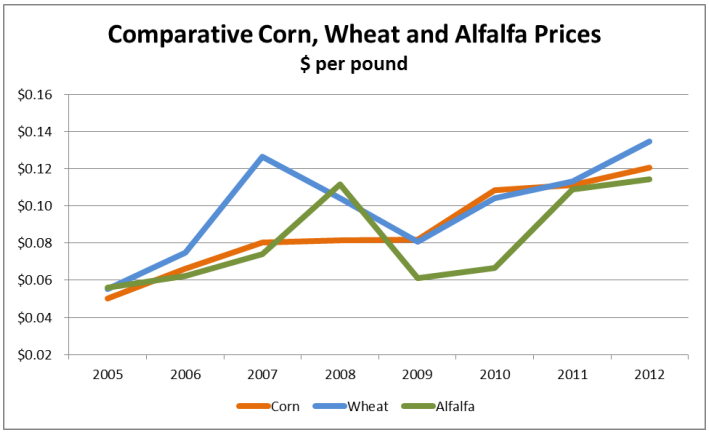

Figure 2. Comparative Corn, Wheat, and Alfalfa Price Dollar per Pound for 2005 to 2012.

This budget is an update of the *2009 Alfalfa Hay Budget* (Hinman et al. 2009). Nearly all of the input prices have changed since 2009, except for baling and stacking custom rates. The production operations and yield estimates remain the same in the updated budget. However, one major change in this study as compared to 2009, is it provides separate budgets for establishment, the year following establishment, and full production of the alfalfa crop. This better represents production and fertilization practices, and therefore, the cash flow and net returns required to produce alfalfa (Figures 3 and 4).

Due to the assumptions and sources of information used, the data in this publication should be considered representative of what knowledgeable growers in the area anticipate over the life of an alfalfa stand. Many factors alter crop establishment and production costs. Yield loss should be periodically anticipated. The primary value of this report is its identification of the types of inputs, costs, and yields considered to be typical of a well-managed alfalfa stand. This publication does not necessarily represent the average grower, and is not intended to be a guide to production practices. However, it does indicate current trends in the industry, and as such, can be helpful in estimating the financial requirements of alfalfa production. An Excel

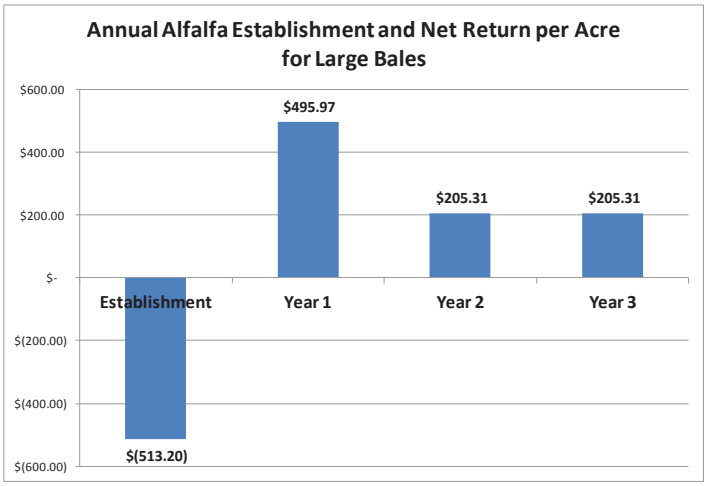

Figure 3. Annual per acre net return for establishing and producing alfalfa.

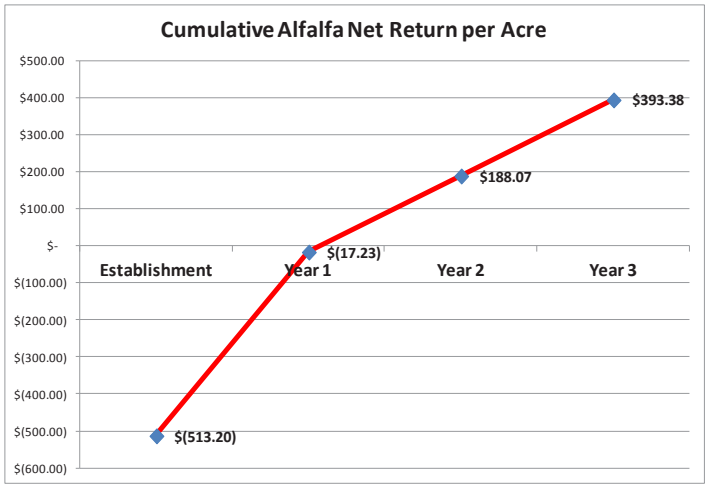

Figure 4. Cumulative per acre alfalfa production cash flow.

spreadsheet is included with this study that allows users to adjust assumptions and input parameters for their own operations (see Excel Workbook below). The budget assumptions and alfalfa production practices were reviewed by a panel of leading alfalfa producers.

Budget Assumptions

1. The budget and production cost items are based on a 120 acre center pivot irrigation system.
2. The alfalfa field is seeded in the fall following a crop of wheat or barley. Because the alfalfa is a second crop there is no land cost assigned to the fall seeding.
3. The establishment irrigation cost is 36 percent of the annual total irrigation costs.
4. Raptor herbicide is used the establishment year.
5. Establishment costs are amortized over a three year productive life of the alfalfa stand.
6. There is no fertilizer cost in the first year, because fertilizer was applied during establishment.
7. The hay harvesting costs are custom hired.

Summary of Results

The tables at the end of this publication present the establishment and production enterprise budget cost and return estimates for producing alfalfa hay. Table 1 presents budget cost inputs that are common in producing alfalfa under center pivot irrigation with a three year production life. Table 2 outlines the production calendar for establishing alfalfa. Table 3 presents the alfalfa establishment costs. Table 4 presents the cost of production for Year 1, and Table 5 presents alfalfa production for Years 2 and 3. Tables 4 and 5 are based on harvesting and baling alfalfa using 1-ton bales, as is common throughout the Columbia Basin. Tables 6 and 7 are based on production and harvesting costs using small two-tie bales. Both large and small bales use custom harvesting.

The annual net returns for producing alfalfa and harvesting large bales is summarized in Figure 3, using data from Tables 1 through 5. The establishment cost for alfalfa is $513.20 per acre. This is about $100 higher than the 2009 budget due to higher input prices. The establishment year is cropped after the wheat or barley crop is harvested. Land cost is not expensed in the establishment year, because the land cost is assumed to be fully assigned to the preceding wheat or barley crop. In the first year following alfalfa establishment, the net return is $495.97. There is a higher net return in Year 1, when compared to Years 2 and 3, since fertilizer expense is incurred during establishment, and weed control is the tillage operations that occurred in establishment. These factors lower production costs for the first year. Years 2 and 3 include fertilizer, herbicide, and other expenses, which increases costs and lowers the per acre net return.

The cumulative alfalfa production, cumulative net returns, and the breakeven time point are show in Figure 4. At the end of Year 2, the cumulative net return is $188.07. At the end of Year 3, the cumulative net return is $393.38. This is an important point to consider as farms look to manage cash flow, and for comparing alternative crops and rotations over time. It is important to note the establishment cost is amortized as a fixed-cost in the production budget at the operating loan interest rate, and the assumed three-year productive life of the alfalfa stand. If the alfalfa crop is maintained in production past Year 3, the cumulative net return will increase and will provide an even greater return to the establishment cost. Increasing the alfalfa stand's life beyond three years would increase the annual net return to $399.08 ($205.31 + 193.77), because the establishment cost is fully recaptured at the end of Year 3, and would no longer be charged. The three-year production period is common in the representative production area because of weed competition and yield loss.

Annual yield and price received are two key factors affecting the net return to growers. To illustrate their effects on the profitability of producing alfalfa, Table 8 presents a breakeven analysis based on adjusting price and yield assumptions and differing cost definitions. Breakeven is the point where cost is equal to revenue. This is represented mathematically as:

Cost definition = (yield x price)

The operating cost breakeven is the amount required to cover total variable costs. The ownership cost breakeven price is the amount necessary to cover total fixed costs. The total cost breakeven price represents the amount required to cover total costs. Table 8 also illustrates alternative price and yield scenarios for the alfalfa field, using a 10% adjustment in base yield and price, to determine the breakeven price and yield. The top half of Table 8 adjusts yield and presents the breakeven price. The bottom half adjusts price and determines the breakeven yield.

For example, a 10 percent decrease in yield from the base budget estimate of 8 tons, results in a 7.2 ton yield. The alfalfa hay price required to breakeven on just operating costs would be $116 per ton. The alfalfa hay price required to breakeven on just ownership costs would be $78 per ton. The alfalfa hay price required to breakeven on total costs is $194 per ton. Alternatively, the breakeven points can be evaluated by looking at price change and calculating breakeven yields. The breakeven yields for a 10 percent decrease in base price to $180 are: 4.6, 3.1, and 7.7 tons per acre for operating, ownership, and total cost respectively.

The alfalfa budgets in Tables 9 through 13 are presented in a short-form format, which some producers may prefer over the detailed forms. The short-form presentation aggregates expenses such as fertilizer into one cost, as opposed to detailing each fertilizer expense component. The budget estimates should be the same, whether the more detailed format is used (Tables 3, 4, and 5) or the short-form presentation used (Tables 9, 10, and 11). Both formats are provided in the Excel Workbook.

Excel Workbook

The budget tables are based on comprehensive, underlying information included in an Excel spreadsheet version of the alfalfa budgets (http://extecon.wsu.edu/pages/Enterprise_Budgets). Growers can use the Excel workbook as a starting

point for collecting and analyzing their own cost data, in order to make informed decisions about the cost structures involved in establishing and producing alfalfa.

Concluding Remarks

This publication includes a description of current industry practices and can be used as a general guide for identifying production inputs, costs, and yields, as well as for developing budgets for alfalfa enterprises. This study does not represent any particular operation or recommends any particular production practices. Therefore, it is important when using these enterprise budgets to understand the assumptions and procedures that were used, and to interpret the results accordingly. A full discussion of budget cost concepts and their economic interpretation is beyond the scope of this publication. Interpretation of the enterprise budget requires an understanding of both economic and production concepts, because it incorporates information about specific resources, management practices, and technology used in production (such as one-ton bales versus two-tie bales). Additional information can be found in *Using Enterprise Budgets in Farm Financial Planning* (Doye and Sahs n.d.).

References

Doye, Damona and Roger Sahs. (n.d.) Using Enterprise Budgets in Farm Financial Planning. *Oklahoma Cooperative Extension Publication* AGEC-243. http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-1658/.

Hinman, Herbet, John Kugler, Kate Painter and Phil Petersen. 2009. *Cost of Producing Alfalfa Hay Under Center Pivot Irrigation in the Columbia Basin of Washington State*. http://extecon.wsu.edu/pages/Enterprise_Budgets.

United States Department of Agriculture National Agricultural Statistics Service. 2012. Data and Statistics—Quick Stats Lite. USDA NASS. http://www.nass.usda.gov/Quick_Stats/Lite/.

Table 1. 2012 Input Cost Assumptions for Producing Alfalfa.

Item	Unit	Price/unit
Fuel:		
Diesel	gal	$4.00
Gas	gal	$3.85
Seed:		
Alfalfa seed	lb	$4.00
Fertilizer:		
Dry Nitrogen	lb	$0.49
Dry Phosphate	lb	$1.17
Dry Potash	lb	$0.70
Dry Sulfur	lb	$0.38
Zinc	lb	$2.84
Boron	lb	$6.40
Pesticides:		
Raptor	ounce	$5.61
Velpar Alfamax	lb	$16.70
Labor:		
Hourly machine labor	hour	$20.00
Land Cost:		
Cash rent	hour	$300.00
Interest Rates:		
Operating loan	percent	6.50%
Machinery loan	percent	7.50%

NOTE: Changing the values in the tan highlighted cells will cause all formulas with these inputs to be adjusted throughout the worksheets.

Table 2. Schedule of Operations for Establishing Alfalfa Hay Following Wheat or Barley in the Columbia Basin, Center Pivot Irrigation.

Month	Operation	Tooling	Materials/Service
Fall	Irrigation	Center Pivot Leased with Land	$14.40 Power, $16.20 Water, $3.60 Labor, $5.40/Acre Repair (36% Annual Cost)
August	Disc and Pack	250HP-WT, 26' Tandum Disc and Pack	Custom hired $50 per acre 2 passes through field
August	Soil Test	Custom	$0.30/Acre
August	Fertilize	Custom Ground Application	$9.00/Acre, Fertilizer approx. $206/Acre
August	Plant	150HP-WT, 20' Double Disc Drill	20 lb Alfalfa Seed @ $4/lb

Table 3. Production Costs for Establishing Alfalfa Hay in Fall Following Wheat or Barley in the Columbia Basin, Center Pivot Irrigation.

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre	
Variable Costs					
Seed:				**$98.00**	
Alfalfa Seed	20	lb	$4.00		$80.00
Custom Seeding	1	acre	$18.00		$18.00
Fertilizer:				**$215.58**	
Dry Nitrogen	0	lb	$0.49		$0.00
Dry Phosphate	92	lb	$0.90		$82.89
Dry Potash	140	lb	$0.64		$89.66
Dry Sulfur	25	lb	$0.28		$7.04
Zinc	5	lb	$2.84		$14.20
Boron	2	lb	$6.40		$12.79
Custom Application	1	acre	$9.00		$9.00
Pesticides:				**$42.63**	
Herbicide—Raptor	6	ounces	$5.61		$33.63
Herbicide Custom Application	1	acre	$9.00		$9.00
Custom Work:				**$50.30**	
Soil Test	1	acre	$0.30		$0.30
Custom Disc and Pack 2X	1	acre	$50.00		$50.00
					$0.00
					$0.00
Irrigation:				**$39.80**	
Irrigation Power-CP	0.36	acre	$40.00		$14.40
Water Access	0.36	acre	$45.00		$16.20
Irrigation Repairs	0.36	acre	$15.00		$5.40
Irrigation Labor-CP	0.18	acre	$20.00		$3.60
Other:				**$18.46**	
Fuel	2.50	gal	$4.00		$10.00
Lubricants	1	acre	$1.22		$1.22
Machinery Repairs	1	acre	$2.24		$2.24
Machinery Labor	0.25	acre	$20.00		$5.00
					$0.00
					$0.00
Overhead					$23.23
Operating Interest					$12.58
Total Variable Costs					**$500.38**
Fixed Costs					
Machinery depreciation					$6.33
Machinery interest					$4.24
Machinery insurance, taxes housing, license					$2.25
Land Cost					$0.00
Total Fixed Costs					**$12.82**
Fixed Costs per Unit					
Total Costs per Acre					**$513.20**

Notes: Land costs are allocated to the preceding wheat/barley crop and all straw has been removed.

Table 4. Production Costs for Alfalfa Hay Year 1 Following Establishment, Center Pivot Irrigation, Large (1-ton) Bales, Custom Haying

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre	
Gross Returns					
Alfalfa Hay	8	ton	$200.00		$1,600.00
Operating Inputs					
Fertilizer:				**$0.00**	
Dry Nitrogen	0	lb	$0.49		$0.00
Dry Phosphate	0	lb	$1.17		$0.00
Dry Potash	0	lb	$0.70		$0.00
Dry Sulfur	0	lb	$0.38		$0.00
Pesticides:				**$0.00**	
Herbicides may or may not be required					$0.00
after establishment					$0.00
Custom Work:				**$368.00**	
Swath	4	acre	$20.00		$80.00
Rake	4	acre	$10.00		$40.00
Bale 3x4x8	8	ton	$17.00		$136.00
Haul and Stack	8	ton	$9.00		$72.00
Tarping	8	ton	$5.00		$40.00
					$0.00
					$0.00
Irrigation:				**$110.00**	
Irrigation Power-CP	1	acre	$45.00		$45.00
Water Access	1	acre	$40.00		$40.00
Irrigation Repairs	1	acre	$15.00		$15.00
Irrigation Labor-CP	0.5	acre	$20.00		$10.00
Other:				**$32.72**	
Gopher control	1	acre	$5.00		$5.00
Fuel	2.28	gal	$4.00		$9.12
Lubricants	1	acre	$0.80		$0.80
Machinery Repairs	1	acre	$1.80		$1.80
Haystack Insurance	8	ton	$2.00		$16.00
					$0.00
					$0.00
Overhead					$25.54
Operating Interest					$19.36
Total Variable Costs					**$555.62**
Variable Costs per Unit					$69.45
Net Returns Above Variable Costs					**$1,044.38**
Fixed Costs					
Machinery depreciation					$5.42
Machinery interest					$3.08
Machinery insurance, taxes housing, license					$2.79
Management (5% of Total Cost)					$43.35
Establishment Cost					$193.77
Land Cost	1	acre	$300.00		$300.00
Total Fixed Costs					**$548.41**
Fixed Costs per Unit					$68.55
Total Costs per Acre					**$1,104.03**
Total Cost per Unit					$138.00
Estimated Net Return					**$495.97**

Notes:

Table 5. Production Costs for Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Large (1-ton) Bales Years 2 and 3, Custom Haying

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre	
Gross Returns					
Alfalfa Hay	8	ton	$200.00		$1,600.00
Operating Inputs					
Fertilizer:				**$215.88**	
Dry Nitrogen	0	lb	$0.49		$0.00
Dry Phosphate	92	lb	$0.90		$82.89
Dry Potash	140	lb	$0.64		$89.66
Dry Sulfur	25	lb	$0.28		$7.04
Zinc	5	lb	$2.84		$14.20
Boron	2	lb	$6.40		$12.79
Custom Application	1	acre	$9.00		$9.00
Soil Test	1	acre	$0.30		$0.30
Pesticides:				**$0.00**	
Herbicide—Velpar Alfamax	2	lb	$16.70		$33.40
Custom Application	1	acre	$9.00		$9.00
Custom Work:				**$368.00**	
Swath	4	acre	$20.00		$80.00
Rake	4	acre	$10.00		$40.00
Bale 3x4x8	8	ton	$17.00		$136.00
Haul and Stack	8	ton	$9.00		$72.00
Tarping	8	ton	$5.00		$40.00
Irrigation:				**$110.00**	
Irrigation Power-CP	1	acre	$45.00		$45.00
Water Access	1	acre	$40.00		$40.00
Irrigation Repairs	1	acre	$15.00		$15.00
Irrigation Labor-CP	0.5	acre	$20.00		$10.00
Other:				**$32.72**	
Haystack Insurance	8	ton	$2.00		$16.00
Gopher control	1	acre	$5.00		$5.00
Fuel	2.28	gal	$4.00		$9.12
Lubricants	1	acre	$0.80		$0.80
Machinery Repairs	1	acre	$1.80		$1.80
					$0.00
					$0.00
Overhead					$38.45
Operating Interest					$24.99
Total Variable Costs					**$832.44**
Variable Costs per Unit					$104.06
Net Returns Above Variable Costs					**$767.56**
Fixed Costs					
Machinery depreciation					$5.42
Machinery interest					$3.08
Machinery insurance, taxes housing, license					$2.79
Management (5% of Total Cost)					$57.19
Establishment Cost					$193.77
Land Cost	1	acre	$300.00		$300.00
Total Fixed Costs					**$562.25**
Fixed Costs per Unit					$70.28
Total Costs per Acre					**$1,394.69**
Total Cost per Unit					$174.34
Estimated Net Return					**$205.31**

Notes:

Table 6. Production Costs for Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Small Two Tie Bales Year 1, Custom Haying.

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre	
Gross Returns					
Alfalfa Hay	8	ton	$220.00		$1,760.00
Operating Inputs					
Fertilizer:				**$0.00**	
Dry Nitrogen	0	lb	$0.49		$0.00
Dry Phosphate	0	lb	$1.17		$0.00
Dry Potash	0	lb	$0.70		$0.00
Dry Sulfur	0	lb	$0.38		$0.00
Pesticides:				**$0.00**	
Herbicides may or may not be required					$0.00
after establishment					$0.00
Custom Work:				**$446.00**	
Swath	4	acre	$20.00		$80.00
Rake	4	acre	$10.00		$40.00
Bale 2 Tie 80 lb bales	200	bale	$0.95		$190.00
Haul and Stack	200	bale	$0.40		$80.00
Tarping	8	ton	$7.00		$56.00
					$0.00
					$0.00
Irrigation:				**$110.00**	
Irrigation Power-CP	1	acre	$45.00		$45.00
Water Access	1	acre	$40.00		$40.00
Irrigation Repairs	1	acre	$15.00		$15.00
Irrigation Labor-CP	0.5	acre	$20.00		$10.00
Other:				**$32.72**	
Gopher control	1	acre	$5.00		$5.00
Fuel	2.28	gal	$4.00		$9.12
Lubricants	1	acre	$0.80		$0.80
Machinery Repairs	1	acre	$1.80		$1.80
Haystack Insurance	8	ton	$2.00		$16.00
					$0.00
					$0.00
Overhead					$29.44
Operating Interest					$22.32
Total Variable Costs					**$640.48**
Variable Costs per Unit					$80.06
Net Returns Above Variable Costs					**$1,119.52**
Fixed Costs					
Machinery depreciation					$5.42
Machinery interest					$3.08
Machinery insurance, taxes housing, license					$2.79
Management (5% of Total Cost)					$47.59
Establishment Cost					$193.77
Land Cost	1	acre	$300.00		$300.00
Total Fixed Costs					**$552.65**
Fixed Costs per Unit					$69.08
Total Costs per Acre					**$1,193.13**
Total Cost per Unit					$149.14
Estimated Net Return					**$566.87**

Notes:

Table 7. Production Costs for Alfalfa Hay in the Columbia Basin, Center Pivot Irrigation, Small Two Tie Bales Years 2 and 3, Custom Haying.

Item	Quantity Per Acre	Unit	Price or Cost	Value or Cost/Acre	
Gross Returns					
Alfalfa Hay	8	ton	$220.00		$1,760.00
Operating Inputs					
Fertilizer:				**$215.88**	
Dry Nitrogen	0	lb	$0.49		$0.00
Dry Phosphate	92	lb	$0.90		$82.89
Dry Potash	140	lb	$0.64		$89.66
Dry Sulfur	25	lb	$0.28		$7.04
Zinc	5	lb	$2.84		$14.20
Boron	2	lb	$6.40		$12.79
Custom Application	1	acre	$9.00		$9.00
Soil Test	1	acre	$0.30		$0.30
Pesticides:				**$42.40**	
Herbicide—Velpar Alfamax	2	lb	$16.70		$33.40
Custom Application	1	acre	$9.00		$9.00
					$0.00
Custom Work:				**$446.00**	
Swath	4	acre	$20.00		$80.00
Rake	4	acre	$10.00		$40.00
Bale 2 Tie 80 lb bales	200	bale	$0.95		$190.00
Haul and Stack	200	bale	$0.40		$80.00
Tarping	8	ton	$7.00		$56.00
Irrigation:				**$110.00**	
Irrigation Power-CP	1	acre	$45.00		$45.00
Water Access	1	acre	$40.00		$40.00
Irrigation Repairs	1	acre	$15.00		$15.00
Irrigation Labor-CP	0.5	acre	$20.00		$10.00
Other:				**$32.72**	
Haystack Insurance	8	ton	$2.00		$16.00
Gopher control	1	acre	$5.00		$5.00
Fuel	2.28	gal	$4.00		$9.12
Lubricants	1	acre	$0.80		$0.80
Machinery Repairs	1	acre	$1.80		$1.80
					$0.00
					$0.00
Overhead					$42.35
Operating Interest					$27.53
Total Variable Costs					**$916.88**
Variable Costs per Unit					$114.61
Net Returns Above Variable Costs					**$843.12**
Fixed Costs					
Machinery depreciation					$5.42
Machinery interest					$3.08
Machinery insurance, taxes housing, license					$2.79
Management (5% of Total Cost)					$61.41
Establishment Cost					$193.77
Land Cost	1	acre	$300.00		$300.00
Total Fixed Costs					**$566.47**
Fixed Costs per Unit					$70.81
Total Costs per Acre					**$1,483.35**
Total Cost per Unit					$185.42
Estimated Net Return					**$276.65**

Notes:

Table 8A. Breakeven Analysis for Large (1-ton) Bales Years 2 and 3.

Breakeven Analysis	— 10%	Base	+ 10%
		Yield	
Price Breakeven	7.2	8	8.8
Operating Cost Breakeven	116	104	95
Ownership Cost Breakeven	78	70	64
Total Cost Breakeven	194	174	158
		Price	
Yield Breakeven	$180.00	$200.00	$220.00
Operating Cost Breakeven	4.6	4.2	3.8
Ownership Cost Breakeven	3.1	2.8	2.6
Total Cost Breakeven	7.7	7.0	6.3

Table 8B. Breakeven Analysis for Small Two Tie Bales Years 2 and 3.

Breakeven Analysis	— 10%	Base	+ 10%
		Yield	
Price Breakeven	7.2	8	8.8
Operating Cost Breakeven	127	115	104
Ownership Cost Breakeven	79	71	64
Total Cost Breakeven	206	185	169
		Price	
Yield Breakeven	$198.00	$220.00	$242.00
Operating Cost Breakeven	4.6	4.2	3.8
Ownership Cost Breakeven	2.9	2.6	2.3
Total Cost Breakeven	7.5	6.7	6.1

Table 9. Short Form Establishment—Fall Seeding

	Labor, Machinery, Custom Hire $/acre	Materials $/acre	Total $/acre	Your Figures
CULTURAL OPERATIONS:[1]				
Disc and Pack 2X	$25.00		$50.00	_____
Fertilizing[2]	$9.30	$206.58	$215.88	_____
Plant Seed Cost 20 lb/a @ $4/lb	$18.00	$80.00	$98.00	_____
Herbicide Raptor (6 oz. full labeled rate)	$9.00	$33.63	$42.63	_____
Irrigation (labor and pivot cost)[3]	$23.40	$16.20	$39.60	_____
OTHER CHARGES:				
Fuel, Repairs, Labor, and Other Expenses	$5.00	$13.46	$18.46	_____
General Overhead[4]			$23.23	_____
Operating Capital Interest 6.50%, 6 mo.			$12.58	_____
Fixed Costs—Depreciation, Insurance, Taxes, etc.[5]			$12.82	_____
Total Establishment Cost			$513.20	_____
Amortized Est. Cost (3 yrs @ 6.50%)[6]			$193.77	_____

Notes:
[1]The first year expenses for these or equivalent operations are accounted for in the fall seeded establishment year, and amortized over the alfalfa stand's production period.
[2]Fertilizer amount was calc. using soil test from the Othello variety plots and current prices. Fertilizer price includes 92 lb. P_2O_5, 140 lb K_2O, 25 lb Sulfur, 5 lb. Zinc, and 1 lb Boron.
[3]36% of estimated annual total irrigation costs.
[4]Estimated at 5% of all costs.
[5]Land rent not charged on establishment year.
[6]Amortized establishment costs over 4 year productive life would be $149.80.

Table 10. Short Form Year 1 Following Establishment Production Large Bales.

GROSS RETURNS:	**Yield Tons/Acre**	**Price $/ton**	**Gross Return $/acre**	**Your Figures**
Alfalfa Hay	8	$200.00	$1,600.00	_____
CULTURAL OPERATIONS:	**Labor, Machinery, Custom Hire $/acre**	**Materials $/acre**	**Total $/acre**	**Your Figures**
Fertilizing	$0.00	$0.00	$0.00	_____
Herbicide Application	$0.00	$0.00	$0.00	_____
Irrigation (Labor and Pivot Expenses)	$65.00	$45.00	$110.00	_____
Gopher Control	$3.00	$2.00	$5.00	_____
HAYING:				
Swathing 4X	$20.00		$80.00	_____
Raking 4X	$10.00		$40.00	_____
Baling ($17.00/ton)	$17.00		$136.00	_____
Haul and Stack ($9.00/ton)	$9.00		$72.00	_____
Tarping ($5.00/ton)	$5.00		$40.00	_____
Hay Insurance		$16.00	$16.00	_____
OTHER CHARGES:				
Fuel, Repairs, Labor, and Other Expenses	$1.80	$9.92	$11.72	_____
General Overhead 5% of variable costs			$25.54	_____
Operating Capital Interest 6.50%, 6 mo.			$19.36	_____
Fixed Costs—Depreciation, Insurance, Taxes, etc.			$11.29	_____
Management Return			$43.35	_____
Land Cost			$300.00	_____
Amortized Establishment Cost			$193.77	_____
TOTAL COST PER ACRE PER YEAR			$1,104.03	_____
NET RETURN PER ACRE PER YEAR			$495.97	_____

Notes:

Table 11. Short Form Years 2 and 3 Full Production Large Bales.

GROSS RETURNS:	**Yield Tons/Acre**	**Price $/ton**	**Gross Return $/acre**	**Your Figures**
Alfalfa Hay	8	$200.00	$1,600.00	_____
	Labor, Machinery, Custom Hire $/acre	**Materials $/acre**	**Total $/acre**	**Your Figures**
CULTURAL OPERATIONS:				
Fertilizing	$9.30	$206.58	$215.88	_____
Herbicide Application (2 lb/a Velpar Alfamax)	$9.00	$33.40	$42.40	_____
Irrigation (Labor and Pivot Expenses)	$65.00	$45.00	$110.00	_____
Gopher Control	$3.00	$2.00	$5.00	_____
HAYING:				
Swathing 4X	$20.00		$80.00	_____
Raking 4X	$10.00		$40.00	_____
Baling ($17.00/ton)	$17.00		$136.00	_____
Haul and Stack ($9.00/ton)	$9.00		$72.00	_____
Tarping ($5.00/ton)	$5.00		$40.00	_____
Hay Insurance		$16.00	$16.00	_____
OTHER CHARGES:				
Fuel, Repairs, Labor, and Other Expenses	$1.80	$9.92	$11.72	_____
General Overhead 5% of variable costs			$38.45	_____
Operating Capital Interest 6.50%, 6 mo.			$24.99	_____
Fixed Costs—Depreciation, Insurance, Taxes, etc.			$11.29	_____
Management Return			$57.19	_____
Land Cost			$300.00	_____
Amortized Establishment Cost			$193.77	_____
TOTAL COST PER ACRE PER YEAR			$1,394.69	_____
NET RETURN PER ACRE PER YEAR			$205.31	_____

Notes:

Table 12. Short Form Year 1 Following Establishment Small 2 Tie Bales

GROSS RETURNS:	Yield Tons/Acre	Price $/ton	Gross Return $/acre	Your Figures
Alfalfa Hay	8	$220.00	$1,760.00	_____
	Labor, Machinery, Custom Hire $/acre	**Materials $/acre**	**Total $/acre**	**Your Figures**
CULTURAL OPERATIONS:				
Fertilizing	$0.00	$0.00	$0.00	_____
Herbicide Application	$0.00	$0.00	$0.00	_____
Irrigation (Labor and Pivot Expenses)	$65.00	$45.00	$110.00	_____
Gopher Control	$3.00	$2.00	$5.00	_____
HAYING:				
Swathing 4X	$20.00		$80.00	_____
Raking 4X	$10.00		$40.00	_____
Baling ($0.95/bale 80 lb bales)	$0.95		$190.00	_____
Haul and Stack ($0.40/bale)	$0.40		$80.00	_____
Tarping ($7.00/ton)	$7.00		$56.00	_____
Hay Insurance		$16.00	$16.00	_____
OTHER CHARGES:				
Fuel, Repairs, Labor, and Other Expenses	$1.80	$9.92	$11.72	_____
General Overhead 5% of variable costs			$29.44	_____
Operating Capital Interest 6.50%, 6 mo.			$22.32	_____
Fixed Costs—Depreciation, Insurance, Taxes, etc.			$11.29	_____
Management Return			$47.59	_____
Land Cost			$300.00	_____
Amortized Establishment Cost			$193.77	_____
TOTAL COST PER ACRE PER YEAR			$1,193.13	_____
NET RETURN PER ACRE PER YEAR			$566.87	_____

Notes:

Table 13. Short Form Years 2 and 3 Full Production Small 2 Tie Bales

GROSS RETURNS:	**Yield Tons/Acre**	**Price $/ton**	**Gross Return $/acre**	**Your Figures**
Alfalfa Hay	8	$220.00	$1,760.00	_____
	Labor, Machinery, Custom Hire $/acre	**Materials $/acre**	**Total $/acre**	**Your Figures**
CULTURAL OPERATIONS:				
Fertilizing	$9.30	$206.58	$215.88	_____
Herbicide Application (2 lb/a Velpar Alfamax)	$9.00	$33.40	$42.40	_____
Irrigation (Labor and Pivot Expenses)	$65.00	$45.00	$110.00	_____
Gopher Control	$3.00	$2.00	$5.00	_____
HAYING:				
Swathing 4X	$20.00		$80.00	_____
Raking 4X	$10.00		$40.00	_____
Baling ($0.95/bale 80 lb bales)	$0.95		$190.00	_____
Haul and Stack ($0.40/bale)	$0.40		$80.00	_____
Tarping ($7.00/ton)	$7.00		$56.00	_____
Hay Insurance		$16.00	$16.00	_____
OTHER CHARGES:				
Fuel, Repairs, Labor, and Other Expenses	$1.80	$9.92	$11.72	_____
General Overhead 5% of variable costs			$42.35	_____
Operating Capital Interest 6.50%, 6 mo.			$27.53	_____
Fixed Costs—Depreciation, Insurance, Taxes, etc.			$11.29	_____
Management Return			$61.41	_____
Land Cost			$300.00	_____
Amortized Establishment Cost			$193.77	_____
TOTAL COST PER ACRE PER YEAR			$1,483.35	_____
NET RETURN PER ACRE PER YEAR			$276.65	_____

Notes:

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