

## Humboldt County Alfalfa Hay Establishment, Production Costs and Returns, 2004

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### INTRODUCTION

Sample costs and returns to establish and produce alfalfa hay under center pivot irrigation in Humboldt County, Nevada, are presented in this publication. This publication is intended to be a guide used to make production decisions, determine potential returns, and prepare business and marketing plans. Practices described are based on the production practices considered typical for this crop and region, but may not apply to every situation. A “*Your Farm*” column in Tables 1 & 2 is provided for your use.

### ASSUMPTIONS

The following assumptions refer to Tables 1 through 4 and reflect the typical costs and returns

to establish and produce alfalfa hay stands under center pivot irrigation in Humboldt County, Nevada. The practices described are not the recommendations of the University of Nevada, Reno, but rather the production practices and materials considered typical of a well-managed farm in the region, as determined by a producer panel in November 2004. Costs, materials, and practices are not applicable to all situations, as establishment and cultural practices vary among growers within the region.

**Farm.** The representative farm consists of 640 acres of land, on which 500 acres is cultivated for alfalfa production and 140 acres are used for owner/employee housing, machine shop, roads,

and pivot corners. During the growing season the enterprise will produce four cuttings with total production at 5.5 tons per acre. Each cutting varies as to the yield, with the first cutting averaging 1¾ tons per acre, the second 1½ tons per acre, the third 1¼ tons per acre, and the fourth 1 ton per acre. The land market value in 2004 was approximately \$800 per acre.

### ***Stand Establishment***

The establishment year follows one or two years of winter wheat production. The establishment year consists of 18 months. The alfalfa stand life in Humboldt County is seven years.

Establishment year costs are provided in Table 1.

**Land Preparation.** The ground is ripped to break up the soil to improve water infiltration and fertilizer penetration. The field is then disked to break up the soil and establish the seed bed.

**Planting.** In late August, alfalfa seed is drilled at 18 pounds per acre.

**Fertilization.** Prior to planting, fertilizers are spread and incorporated by disking. The common fertilizer used is 11-52-0\*. Additionally, sulfur and zinc in a liquid or dry form is normally applied.

**Irrigation.** Irrigation begins immediately after planting to establish the alfalfa seedlings prior to winter. The main irrigation system consists of four pivots on four wells.

**Pest Management.** Insecticide and herbicide may be used during the establishment year, but is less likely due to the application of Roundup\* prior to establishment. The insecticides most commonly used are Mustang\* and Lorsban\*, at an annual per acre cost of \$10.00. Herbicide use during the establishment year has an average cost of \$15.00 per acre and may include a combination of Velpar\*, Sencor\*, V Rapter\*, Select\*, and/or Pursuit\*.

**Harvest.** Harvest will begin in late May or early June of the establishment year and continue through September (14<sup>th</sup> month).

**Establishment Investment.** The alfalfa establishment investment cost is placed into the investment summary (Table 3) and is depreciated across the 7-year stand life.



### ***Production Cultural Practices and Material Inputs***

**Irrigation.** Irrigation begins in April and continues through the last cutting, usually in early September. Irrigation costs shown in Table 2 represent power costs associated with the center pivot irrigation system. Average estimated irrigation power is \$.06 per kilowatt per hour and \$65.00 per acre on an annual basis.

**Irrigation System.** The farm has four wells and four pivots. Pivot life is approximately 25 years depending on management practices and maintenance needed. Maintenance for all 4 pivots is estimated at \$16.00 per acre annually.

**Fertilization.** Both dry and liquid fertilizers are used. 11-52-0, plus sulfur and zinc are most commonly used and represent a per acre annual cost of \$55.00.

**Pest Management.** A variety of pest management methods are used depending on pest population cycles. Pest treatment will normally begin in April and continue on for the six-month production cycle.

**Weeds.** Herbicides commonly used are Velpar\*, Sencor\*, V Rapter\*, Select\*, and Pursuit\*. A combination of two or more is common at an annual per-acre cost of \$22.00.

**Insects.** Several species of insects are problematic for alfalfa production in Humboldt County. The insecticides most commonly used are Mustang\* and Lorsban\* with a \$15.00 per acre cost.

**Vertebrates.** Gophers are the common vertebrate problem in alfalfa stands. Rodenticide and/or trapping are common treatments, at an annual cost of \$5.50 per acre annually.

**Harvest.** Harvest equipment owned by the farm and operated by the owner/operator or hired help consists of a mower/swather with a 16" foot header, a set of rakes, two balers (one large and one small) pulled by a tractor and a harrowbed to haul the hay off the field and stack it.

**Labor.** The owner/operator wage is based on an annual salary of \$24,000.00. There is one additional full-time employee and one seasonal employee for the six-month production cycle. Employees are paid at a rate of \$2,000.00 a month. All employee benefits, payroll taxes, and worker's compensation insurance are included in labor costs. Employee housing and associated utilities are included in the farm investment costs.

**Yield.** The 500 acre farm yields 5.5 tons of alfalfa hay per acre across four annual cuttings.

**Returns.** Returns are based on 2004 market prices across a range of hay quality levels. An estimated price of \$98.00 per ton of hay was used to calculate returns. Returns will vary during the growing season due to market conditions.

### ***Overhead and Capital Recovery Costs***

**Cash Overhead.** Cash overhead consists of various cash expenses paid out during the year. These costs include property taxes, interest, office expenses, liability and property insurance, as well as investment/machinery repairs. A complete listing of farm investments and associated costs can be found in Table 3.

**Interest on Operating Capital.** Total operating capital is calculated based on 80% of

total operating (variable) costs. The interest on operating capital is calculated at a rate of 6.5% for the six month production cycle.

**Property Taxes.** Property taxes in Nevada differ across counties. For the purposes of this publication, investment property taxes are calculated as 1% of the average asset value of the property.



**Insurance.** Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is .666% of the average asset value. Liability insurance covers accidents on the farm at an annual cost of \$1,749.00.

**Fuel and Lube.** The fuel and lube for each piece of equipment is calculated at 8% of the average asset value. Fuel and lube in the establishment year is 125% of that in a normal production year, due to increased machinery use.

**Investment Repairs.** Annual repairs on all farm investments or capital recovery items that require maintenance are calculated at 2% of the average asset value.

**Office & Travel.** Office and travel costs are estimated at \$3,000.00 for an average year. These expenses include office supplies, telephone service, Internet service, and travel expenses to educational seminars.

**Capital Recovery.** Capital recovery costs are the annual depreciation (opportunity cost) of all farm investments. Capital recovery costs are calculated using straight line depreciation. Farm equipment

may be purchased new or used, depending on producer panel preferences.

**Salvage Value.** Salvage value is 10% of the new purchase price, which is an estimate of the remaining value of an investment at the end of its useful life. The salvage value for land is the purchase price, as land does not normally depreciate.

#### **Average Asset Value Computation**

$$\left(\frac{\text{Purchase Price} + \text{Salvage Value}}{2}\right)$$

#### **Straight Line Depreciation Computation**

$$\left(\frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Useful Life}}\right)$$

\*The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by Cooperative Extension is implied.

#### **REFERENCES**

Smathers, Robert (2001). The Costs of Owning and Operating Farm Machinery in the Pacific Northwest 2000. A Pacific Northwest Publication #346. University of Idaho, Washington State University, and Oregon State University.

Orloff, Steve B., Karen M. Klonsky, and Richard L. De Moura (2001). Sample Costs to Establish and Produce Alfalfa Hay, Intermountain Region, Siskiyou County, Center Pivot Irrigation. Publication AF-IR-01-2, University of California Cooperative Extension.

#### **NOTES**

Sample production costs and returns publications for significant agricultural products in various regions of Nevada are available online at the University of Nevada Cooperative Extension Web site at <http://www.unce.unr.edu/pubs.html>. For additional information, contact the Department of Resource Economics at the University of Nevada, Reno at (775) 784-6701 or your local University of Nevada Cooperative Extension office.

**Table 1: Humboldt County Alfalfa Hay Establishment Costs**

	Total Units	Unit	Price/Cost Per Unit	Total Cost/Value	Total Cost/Value Per Acre	Your Farm
<b>OPERATING COSTS</b>						
Rodent Control	500.00	Acre	\$5.50	\$2,750.00	\$5.50	_____
Insecticide	500.00	Acre	\$10.00	\$5,000.00	\$10.00	_____
Herbicide	500.00	Acre	\$15.00	\$7,500.00	\$15.00	_____
Fertilizer	500.00	Acre	\$55.00	\$27,500.00	\$55.00	_____
Irrigation	500.00	Acre	\$65.00	\$32,500.00	\$65.00	_____
Alfalfa Seed	18.00	Lbs/Acre	\$2.75	\$24,750.00	\$49.50	_____
Roundup	2.50	Quarts/Acre	\$11.25	\$14,062.50	\$28.13	_____
Hired Labor	1.50	Annual	\$24,000.00	\$36,000.00	\$72.00	_____
Operator Labor	1.00	Annual	\$24,000.00	\$24,000.00	\$48.00	_____
Accounting & Legal	1.00	Annual	\$2,000.00	\$2,000.00	\$4.00	_____
Fuel & Lube	1.25	Annual	\$20,724.00	\$25,905.00	\$51.81	_____
Maintenance	1.00	Annual	\$12,859.00	\$12,859.00	\$25.72	_____
Utilities	1.00	Annual	\$6,000.00	\$6,000.00	\$12.00	_____
Miscellaneous	500.00	Acre	\$5.00	\$2,500.00	\$5.00	_____
Interest Operating Capital	\$178,661.20	\$	0.065	\$5,806.49	\$11.61	_____
<b>TOTAL OPERATING COSTS</b>				<b>\$229,132.99</b>	<b>\$458.27</b>	
<b>OWNERSHIP COSTS</b>						
<b>CASH OVERHEAD COSTS</b>						
Liability Insurance				\$1,749.00	\$3.50	_____
Office & Travel				\$3,000.00	\$6.00	_____
Annual Investment Insurance				\$4,150.18	\$8.30	_____
Annual Investment Taxes				\$11,549.50	\$23.10	_____
<b>TOTAL CASH OVERHEAD COSTS</b>				<b>\$20,448.68</b>	<b>\$40.90</b>	
<b>NONCASH OVERHEAD COSTS (Capital Recovery)</b>						
Buildings, Improvements, & Equipment				\$23,688.00	\$47.38	_____
Machinery & Vehicles				\$41,340.00	\$82.68	_____
<b>TOTAL NONCASH OVERHEAD COSTS</b>				<b>\$65,028.00</b>	<b>\$130.06</b>	
<b>TOTAL OWNERSHIP COSTS</b>				<b>\$85,476.68</b>	<b>\$170.95</b>	
<b>TOTAL COSTS</b>				<b>\$314,609.67</b>	<b>\$629.22</b>	
<b>YEAR ONE INCOME</b>						
Alfalfa Hay	5.50	Tons	\$98.00	\$269,500.00	\$539.00	_____
<b>TOTAL GROSS INCOME</b>				<b>\$269,500.00</b>	<b>\$539.00</b>	
<b>TOTAL ESTABLISHMENT INVESTMENT</b>				<b>\$45,109.67</b>	<b>\$90.22</b>	

**Table 2: Humboldt County Alfalfa Hay Production Costs and Returns**

	Total Units	Unit	Price/Cost Per Unit	Total Cost/Value	Total Cost/Value Per Acre	Your Farm
<b>GROSS INCOME</b>						
Alfalfa Hay	5.50	Tons	\$98.00	\$269,500.00	\$539.00	
<b>TOTAL GROSS INCOME</b>				<b>\$269,500.00</b>	<b>\$539.00</b>	
<b>OPERATING COSTS</b>						
Rodent Control	500.00	Acre	\$5.50	\$2,750.00	\$5.50	_____
Insecticide	500.00	Acre	\$15.00	\$7,500.00	\$15.00	_____
Herbicide	500.00	Acre	\$22.00	\$11,000.00	\$22.00	_____
Fertilizer	500.00	Acre	\$55.00	\$27,500.00	\$55.00	_____
Irrigation	500.00	Acre	\$65.00	\$32,500.00	\$65.00	_____
Hired Labor	1.50	Annual	\$24,000.00	\$36,000.00	\$72.00	_____
Operator Labor	1.00	Annual	\$24,000.00	\$24,000.00	\$48.00	_____
Accounting & Legal	1.00	Annual	\$2,000.00	\$2,000.00	\$4.00	_____
Fuel & Lube	1.00	Annual	\$20,724.00	\$20,724.00	\$41.45	_____
Maintenance	1.00	Annual	\$12,859.00	\$12,859.00	\$25.72	_____
Utilities	1.00	Annual	\$6,000.00	\$6,000.00	\$12.00	_____
Miscellaneous	500.00	Acre	\$5.00	\$2,500.00	\$5.00	_____
Interest Operating Capital	\$148,266.40	\$	0.065	\$4,818.66	\$9.64	_____
<b>TOTAL OPERATING COSTS</b>				<b>\$190,151.66</b>	<b>\$380.30</b>	
<b>INCOME ABOVE OPERATING COSTS</b>				<b>\$79,348.34</b>	<b>\$158.70</b>	
<b>OWNERSHIP COSTS</b>						
<b>CASH OVERHEAD COSTS</b>						
Liability Insurance				\$1,749.00	\$3.50	_____
Office & Travel				\$3,000.00	\$6.00	_____
Annual Investment Insurance				\$4,150.18	\$8.30	_____
Annual Investment Taxes				\$11,549.50	\$23.10	_____
<b>TOTAL CASH OVERHEAD COSTS</b>				<b>\$20,448.68</b>	<b>\$40.90</b>	
<b>NONCASH OVERHEAD COSTS (Capital Recovery)</b>						
Buildings, Improvements, & Equipment				\$30,132.24	\$60.26	_____
Machinery & Vehicles				\$41,340.00	\$82.68	_____
<b>TOTAL NONCASH OVERHEAD COSTS</b>				<b>\$71,472.24</b>	<b>\$142.94</b>	
<b>TOTAL OWNERSHIP COSTS</b>				<b>\$91,920.92</b>	<b>\$183.84</b>	
<b>TOTAL COSTS</b>				<b>\$282,072.58</b>	<b>\$564.15</b>	
<b>NET PROJECTED RETURNS</b>				<b>-\$12,572.58</b>	<b>-\$25.15</b>	

**Table 3: Investment Summary**

Description	Purchase Price	Salvage Value	Useful Life (Yrs)	Annual Taxes	Annual Insurance	Annual Capital Recovery	Annual Repairs	Annual Fuel & Lube
<b>Buildings, Improvements, and Equipment</b>								
Shop (20X40) & Tools	\$38,000.00	\$3,800.00	25.00	\$209.00	\$139.19	\$1,368.00	\$418.00	
Irrigation System	\$480,000.00	\$48,000.00	25.00	\$2,640.00	\$1,758.24	\$17,280.00	\$5,280.00	
Owner House	\$120,000.00	\$12,000.00	50.00	\$660.00	\$439.56	\$2,160.00	\$1,320.00	
Employee House	\$30,000.00	\$3,000.00	25.00	\$165.00	\$109.89	\$1,080.00	\$330.00	
Implements	\$30,000.00	\$3,000.00	15.00	\$165.00	\$109.89	\$1,800.00	\$330.00	
Land	\$512,000.00	\$512,000.00	100.00	\$5,120.00	\$3,409.92	\$0.00	\$0.00	
Alfalfa Establishment	\$45,109.67		7.00			\$6,444.24		
<b>Sub Total</b>	<b>\$1,255,109.67</b>	<b>\$581,800.00</b>	<b>NA</b>	<b>\$8,959.00</b>	<b>\$2,446.88</b>	<b>\$30,132.24</b>	<b>\$7,678.00</b>	
<b>Machinery and Vehicles</b>								
160 HP Tractor	\$101,000.00	\$10,100.00	15.00	\$555.50	\$369.96	\$6,060.00	\$1,111.00	\$4,444.00
80 HP Tractor w/loader	\$52,000.00	\$5,200.00	15.00	\$286.00	\$190.48	\$3,120.00	\$572.00	\$2,288.00
80 HP Tractor	\$52,000.00	\$5,200.00	15.00	\$286.00	\$190.48	\$3,120.00	\$572.00	\$2,288.00
Harrow Bed	\$56,000.00	\$5,600.00	15.00	\$308.00	\$205.13	\$3,360.00	\$616.00	\$2,464.00
Rotary Mower	\$60,000.00	\$6,000.00	15.00	\$330.00	\$219.78	\$3,600.00	\$660.00	\$2,640.00
Rakes	\$20,000.00	\$2,000.00	15.00	\$110.00	\$73.26	\$1,200.00	\$220.00	\$880.00
Baler (1 large or 2 small)	\$52,000.00	\$5,200.00	10.00	\$286.00	\$190.48	\$4,680.00	\$572.00	\$2,288.00
3/4 Ton Pickup (2)	\$72,000.00	\$7,200.00	4.00	\$396.00	\$263.74	\$16,200.00	\$792.00	\$3,168.00
4-Wheeler	\$6,000.00	\$600.00	5.00	\$33.00	\$21.98	\$1,080.00	\$66.00	\$264.00
<b>Sub Total</b>	<b>\$471,000.00</b>	<b>\$46,500.00</b>	<b>NA</b>	<b>\$2,590.50</b>	<b>\$1,703.30</b>	<b>\$41,340.00</b>	<b>\$5,181.00</b>	<b>\$20,724.00</b>
<b>Total</b>	<b>\$1,726,109.67</b>	<b>\$628,300.00</b>	<b>NA</b>	<b>\$11,549.50</b>	<b>\$4,150.18</b>	<b>\$71,472.24</b>	<b>\$12,859.00</b>	<b>\$20,724.00</b>

**Table 4: Monthly Cash Flow**

Description	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production:													
Alfalfa Hay	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$67,375.00	\$67,375.00	\$67,375.00	\$67,375.00	\$0.00	\$0.00	\$0.00	\$269,500.00
Total Income	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$67,375.00	\$67,375.00	\$67,375.00	\$67,375.00	\$0.00	\$0.00	\$0.00	\$269,500.00
Operating Inputs:													
Rodent Control	\$0.00	\$0.00	\$0.00	\$687.50	\$687.50	\$275.00	\$275.00	\$275.00	\$275.00	\$275.00	\$0.00	\$0.00	\$2,750.00
Insecticide	\$0.00	\$0.00	\$0.00	\$1,250.00	\$1,250.00	\$1,250.00	\$1,250.00	\$1,250.00	\$1,250.00	\$0.00	\$0.00	\$0.00	\$7,500.00
Herbicide	\$0.00	\$0.00	\$0.00	\$1,833.33	\$1,833.33	\$1,833.33	\$1,833.33	\$1,833.33	\$1,833.33	\$0.00	\$0.00	\$0.00	\$11,000.00
Fertilizer	\$0.00	\$0.00	\$0.00	\$13,750.00	\$13,750.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$27,500.00
Irrigation	\$0.00	\$0.00	\$0.00	\$5,416.67	\$5,416.67	\$5,416.67	\$5,416.67	\$5,416.67	\$5,416.67	\$0.00	\$0.00	\$0.00	\$32,500.00
Hired Labor	\$2,000.00	\$2,000.00	\$2,000.00	\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00	\$4,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$36,000.00
Operator Labor	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$24,000.00
Accounting & Legal	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$166.67	\$2,000.00
Fuel & Lube	\$1,036.20	\$1,036.20	\$2,072.40	\$2,072.40	\$2,072.40	\$2,072.40	\$2,072.40	\$2,072.40	\$2,072.40	\$2,072.40	\$1,036.20	\$1,036.20	\$20,724.00
Maintenance	\$642.95	\$642.95	\$1,285.90	\$1,285.90	\$1,285.90	\$1,285.90	\$1,285.90	\$1,285.90	\$1,285.90	\$1,285.90	\$642.95	\$642.95	\$12,859.00
Utilities	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00	\$6,000.00
Miscellaneous	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$208.33	\$2,500.00
Interest OC	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$401.55	\$4,818.66
Total Operating Costs	\$6,955.70	\$6,955.70	\$8,634.85	\$33,572.35	\$33,572.35	\$19,409.85	\$19,409.85	\$19,409.85	\$19,409.85	\$8,909.85	\$6,955.70	\$6,955.70	\$190,151.66
Net Returns	-\$6,955.70	-\$6,955.70	-\$8,634.85	-\$33,572.35	-\$33,572.35	\$47,965.15	\$47,965.15	\$47,965.15	\$47,965.15	-\$8,909.85	-\$6,955.70	-\$6,955.70	\$79,348.34

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