

Southwestern Idaho

Alfalfa Hay

Ben Eborn



Southwestern
Idaho

Background and Assumptions

The University of Idaho's costs and returns estimates are based on economic costs, not accounting costs. All resources are valued at a market rate or "opportunity cost." Input prices are taken from the U of I's annual survey of agricultural supply companies. The selling price is an historical average, not a current year's price. The cost estimate shown here is typical for producing alfalfa in southwestern Idaho. Production practices most closely resemble those in Canyon, Payette and Owyhee counties. Although production practices may be similar for individual farms, each farm has a unique set of resources with different levels of productivity, different production problems, and therefore different costs. Farm size, crop rotation, age and type of equipment, and the quality and intensity of management are all crucial factors that influence costs.

The Model Farm

This costs and returns estimate models a 1,200-acre farm with 150 acres in alfalfa hay production. In addition to alfalfa hay, the farm grows 300 acres of potatoes or sugarbeets, 150 acres of dry beans, 300 acres of grain, and 150 acres of alfalfa seed. Approximately 30 acres of alfalfa are established each year and kept in production 5 years. The farm uses a concrete ditch and siphon tube irrigation system with water delivered to the farm from an irrigation district. The district charges a flat fee per acre for water.

Production Practices

Tillage costs are incurred only in the year hay is established and should be prorated along with other establishment costs over the alfalfa hay production years. This is approximately \$60-65 per acre assuming a 5-year life. Hay ground is corrugated once during the growing season, and harvested four times. Hay is cut and custom baled in June, July, August and October, then custom stacked. A total of 7.5 tons per acre are produced: 2.9 tons on the first cutting, 1.75 tons on the second cutting, 1.65 tons on the third

cutting, and 1.2 tons on the fourth cutting. Fertilizer is applied once in the spring by a custom applicator. The farm operator applies an herbicide in the spring before alfalfa breaks dormancy, and an insecticide in June. Alfalfa hay is irrigated a total of 14 times: once in April, twice in May, twice in June, three times in July, three times in August, twice in September and once in October.

Table 1 lists costs and returns by cost category (fertilizers, pesticides, machinery) for alfalfa production in southwestern Idaho. The cost for each operation can be found in Table 2. Costs by month can be found in Table 3.

Resources: Machinery, Land, Labor & Capital

Table 4 lists hourly equipment costs for the tractors, trucks, and other farm equipment, along with total annual hours of use for this crop and for all crops in the model farm. Except for trucks, machinery is valued at 75 percent of new replacement cost. In the years between equipment price surveys, which are done approximately every five years, machinery prices are adjusted using USDA's Farm Machinery Prices Paid Index. Machinery cost assumptions are listed in Table 5, and include purchase price, salvage value, annual capital recovery costs, and cash overhead costs.

Land rent for alfalfa production is estimated to be \$250 per acre. The cost of the irrigation system is included in the rent. The University of Idaho uses the budget generator program *Budget Planner* from the University of California-Davis to produce the various tables shown in this publication. Machinery operating and ownership costs are calculated based on engineering equations in this program. Machinery operating costs include fuel, lubricants and repairs. The cost of labor used in this study includes a base wage, plus a percentage to account for various payroll taxes (FICA, SUTA & FUTA), and workman's

compensation, as well as benefits such as paid vacation/personal leave days, health insurance and bonuses. Labor is classified by the type of work performed. Labor classifications, labor rates and payroll overhead are shown below.

Labor Values

Labor Class	Base Rate	Payroll Overhead	Effective Rate
General Farm Labor	\$9.25	15%	\$10.65
Truck Drivers	\$12.50	15%	\$14.14
Equipment Operators	\$14.80	25%	\$18.50
Irrigation Labor			
Set Move: HL & WL	\$10.10	30%	\$13.15
Continuous Move: CP & L	\$14.80	25%	\$18.50

Based on the speed, width and overall field efficiency, *Budget Planner* calculates equipment operator labor hours for all field operations except those performed on a custom basis. Custom operations are listed separately. General farm labor accounts for extra field labor used during planting or harvest.

A management fee is charged based on approximately 5% of total production costs.

Capital and Overhead Costs

Interest on operating capital is charged from the time an input is applied until harvest and is calculated at a nominal rate of 5.75 percent. Interest on intermediate term capital, primarily equipment, is calculated using a rate of 5.5 percent. A general overhead charge, calculated at approximately 2.5

percent of operating expenses, is included to cover unallocated whole-farm costs such as office expenses, legal and accounting fees, cell phones, internet service and utilities. Irrigation power is not included as part of general farm utilities.

Sensitivity Analysis

Impacts of changes in crop price and yield assumptions on net returns, known as sensitivity or ranging analysis, can be found in Table 6.

University of Idaho costs and returns estimates for both crops and livestock can be found at:
<http://www.uidaho.edu/idaho-agbiz>

Authors

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Disclaimer

The practices and chemicals specified in the publication are not recommendations. Always read and follow the directions printed on the pesticide label. Due to constantly changing pesticide laws and labels, some pesticides may have been cancelled or had certain uses prohibited. The use of trade names for various products simplifies presentation of this material and should not be considered an endorsement, nor is any criticism implied of similar products not mentioned.

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TABLE 1. COSTS AND RETURNS PER ACRE TO PRODUCE ALFALFA HAY

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Alfalfa Hay	7.50	ton	135.00	1,012.50	
TOTAL GROSS RETURNS	7.50	ton		1,012.50	
OPERATING COSTS					
Fertilizer:				94.00	
Dry Nitrogen	15.00	lb	0.55	8.25	
Dry P2O5	75.00	lb	0.53	39.75	
K2O	80.00	lb	0.44	35.20	
Sulfur	40.00	lb	0.27	10.80	
Pesticide:				43.10	
Velpar Alfamax DG	2.00	lb	11.50	23.00	
Furadan 4F	1.00	qt	20.10	20.10	
Irrigation:				48.35	
Water Assessment	1.00	acre	45.60	45.60	
Irrig. Repairs - Concrete Ditch	1.00	acre	2.75	2.75	
Custom and Consultants:				268.50	
Custom Fertilize	1.00	acre	7.75	7.75	
Custom Swath & Rake	4.00	acre	23.00	92.00	
Custom Bale: 1-ton	7.50	ton	17.00	127.50	
Custom Haul & Stack: 1-ton	7.50	ton	5.50	41.25	
Labor				86.71	
Equipment Operator Labor	1.20	hrs	18.50	22.28	
Irrigation Labor	4.90	hrs	13.15	64.44	
Machinery				12.34	
Fuel-Gas	1.28	gal	2.50	3.20	
Fuel-Diesel	1.65	gal	2.30	3.81	
Fuel-Road Diesel	0.63	gal	2.85	1.78	
Lube				1.32	
Machinery Repair				2.23	
Interest on Operating Capital @ 5.75%				10.87	
TOTAL OPERATING COSTS/ACRE				563.87	
TOTAL OPERATING COSTS/TON				75.18	
NET RETURNS ABOVE OPERATING COSTS				448.63	

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TABLE 1. CONTINUED

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
General Overhead				15.00	
Land Rent				250.00	
Management Fee				42.00	
Property Taxes				0.00	
Property Insurance				1.34	
Investment Repairs				0.00	
TOTAL CASH OVERHEAD COSTS/ACRE				308.34	
TOTAL CASH OVERHEAD COSTS/TON				41.11	
TOTAL CASH COSTS/ACRE				872.21	
TOTAL CASH COSTS/TON				116.29	
NET RETURNS ABOVE CASH COSTS				140.29	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Amort. Est. Cost				62.45	
Equipment				21.63	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				84.08	
TOTAL NON-CASH OVERHEAD COSTS/TON				11.21	
TOTAL COST/ACRE				956.29	
TOTAL COST/TON				127.51	
NET RETURNS ABOVE TOTAL COST				55.71	

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TABLE 2. COSTS PER ACRE TO PRODUCE ALFALFA HAY

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube &Repairs	Material Cost	Custom/ Rent		
Preharvest:								
Fertilize	0.00	0.00	0.00	0.00	101.75	0.00	101.75	
Ground Spray	0.14	3.13	1.31	0.63	43.10	0.00	48.17	
Corrugate	0.14	3.05	2.49	0.90	0.00	0.00	6.45	
Irrigation Water Assessment	0.00	0.00	0.00	0.00	45.60	0.00	45.60	
Irrigation Repairs	0.00	0.00	0.00	0.00	2.75	0.00	2.75	
Irrigate	0.00	64.44	0.00	0.00	0.00	0.00	64.44	
General Pickup Use	0.48	10.55	3.20	1.30	0.00	0.00	15.05	
General Truck Use	0.25	5.55	1.78	0.72	0.00	0.00	8.05	
TOTAL PREHARVEST COSTS	1.00	86.71	8.79	3.55	193.20	0.00	292.25	
Harvest:								
Swath	0.00	0.00	0.00	0.00	92.00	0.00	92.00	
Bale	0.00	0.00	0.00	0.00	127.50	0.00	127.50	
Custom Haul & Stack	0.00	0.00	0.00	0.00	41.25	0.00	41.25	
TOTAL HARVEST COSTS	0.00	0.00	0.00	0.00	260.75	0.00	260.75	
Interest on Operating Capital at 5.75%							10.87	
TOTAL OPERATING COSTS/ACRE	1.00	86.71	8.79	3.55	453.95	0.00	563.87	

TABLE 2. CONTINUED

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TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE ALFALFA HAY

	MAR 15	APR 15	MAY 15	JUN 15	JUL 15	AUG 15	SEP 15	OCT 15	NOV 15	DEC 15	JAN 16	FEB 16	Total
Preharvest:													
Fertilize	101.75												101.75
Ground Spray	25.54		22.64										48.17
Corrugate		6.45											6.45
Irrigation Water Assessment		45.60											45.60
Irrigation Repairs		2.75											2.75
Irrigate		4.60	9.21	9.21	13.81	13.81	9.21	4.60					64.44
General Pickup Use	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	15.05
General Truck Use	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	8.05
TOTAL PREHARVEST COSTS	129.21	61.33	33.77	11.13	15.73	15.73	11.13	6.53	1.92	1.92	1.92	1.92	292.25
Harvest:													
Swath			23.00		23.00	23.00		23.00					92.00
Bale			49.30		29.75	28.05		20.40					127.50
Custom Haul & Stack			15.95		9.63	9.07		6.60					41.25
TOTAL HARVEST COSTS	0.00	0.00	88.25	0.00	62.38	60.13	0.00	50.00	0.00	0.00	0.00	0.00	260.75
Interest on Operating Capital @5.75%	0.62	0.91	1.50	1.55	1.93	2.29	2.34	-0.31	-0.04	-0.03	-0.02	-0.01	10.74
TOTAL OPERATING COSTS/ACRE	129.83	62.24	123.51	12.68	80.03	78.15	13.47	56.22	1.89	1.90	1.91	1.92	563.74
CASH OVERHEAD													
General Overhead	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	15.00
Land Rent	250.00												250.00
Management Fee	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	42.00
Property Taxes													0.00
Property Insurance		1.34											1.34
Investment Repairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OVERHEAD COSTS	254.75	6.09	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	308.34
TOTAL CASH COSTS/ACRE	384.58	68.33	128.26	17.43	84.78	82.90	18.22	60.97	6.64	6.65	6.66	6.67	872.08

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TABLE 4. HOURLY EQUIPMENT COSTS

Yr	Description	ALFALFA HAY	Total	Cash Overhead			Operating			Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insur- ance	Taxes	Lube& Repairs	Fuel	Total Oper.	
15	Pickup 1 - 3/4 ton	28	750	8.57	0.16	0.00	3.28	8.32	11.60	20.33
15	Pickup 2 - 3/4 ton	28	750	8.57	0.16	0.00	3.28	8.32	11.60	20.33
15	Sprayer - 30'	21	150	2.93	0.07	0.00	1.65	0.00	1.65	4.65
15	Tractor - 75hp	23	300	14.19	0.47	0.00	2.55	8.47	11.02	25.67
15	4-wheeler	15	160	3.45	0.10	0.00	0.67	0.83	1.50	5.04
15	Corrugator/Bedder 6R, 30"	21	150	2.26	0.06	0.00	0.96	0.00	0.96	3.27
15	Tractor - 145hp	23	215	39.52	1.39	0.00	5.11	16.47	21.58	62.49
15	Service Truck	38	80	36.69	1.21	0.00	2.87	7.13	9.99	47.89

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TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
15	Pickup 1 - 3/4 ton	41,000.00	5	13,750.00	7,137.56	136.88	0.00	7,274.43
15	Pickup 2 - 3/4 ton	41,000.00	5	13,750.00	7,137.56	136.88	0.00	7,274.43
15	Sprayer - 30'	4,100.00	10	725.05	487.62	12.06	0.00	499.69
15	Tractor - 75hp	52,000.00	15	10,123.48	4,728.76	155.31	0.00	4,884.07
15	4-wheeler	5,500.00	10	1,500.00	613.17	17.50	0.00	630.67
15	Corrugator/Bedder 6R, 30"	3,500.00	12	484.77	376.52	9.96	0.00	386.48
15	Tractor - 145hp	118,000.00	20	15,140.76	9,439.93	332.85	0.00	9,772.79
15	Service Truck	40,000.00	20	3,000.00	3,261.14	107.50	0.00	3,368.64
TOTAL		305,100.00	-	58,474.06	33,182.26	908.94	0.00	34,091.20
90% of New Cost*		274,590.00	-	52,626.65	29,864.04	818.04	0.00	30,682.08

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Amort. Est. Cost	40,000.00	5	0.00	9,367.06	100.00	0.00	0.00	9,467.06
TOTAL INVESTMENT	40,000.00	-	0.00	9,367.06	100.00	0.00	0.00	9,467.06

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
General Overhead	150.00	acre	15.00	2,250.00
Land Rent	150.00	acre	250.00	37,500.00
Management Fee	150.00	acre	42.00	6,300.00

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EBB2-AH-15

TABLE 6. RANGING ANALYSIS - ALFALFA HAY

COSTS PER ACRE AND PER TON AT VARYING YIELDS TO PRODUCE ALFALFA HAY

	YIELD(TON)						
	4.50	5.50	6.50	7.50	8.50	9.50	10.50
OPERATING COSTS/ACRE:							
Preharvest	292.25	292.25	292.25	292.25	292.25	292.25	292.25
Harvest	260.75	260.75	260.75	260.75	260.75	260.75	260.75
Interest on Operating Capital @ 5.75%	10.87	10.87	10.87	10.87	10.87	10.87	10.87
TOTAL OPERATING COSTS/ACRE	563.87	563.87	563.87	563.87	563.87	563.87	563.87
TOTAL OPERATING COSTS/TON	125.30	102.52	86.75	75.18	66.34	59.35	53.70
CASH OVERHEAD COSTS/ACRE	308.34	308.34	308.34	308.34	308.34	308.34	308.34
TOTAL CASH COSTS/ACRE	872.21	872.21	872.21	872.21	872.21	872.21	872.21
TOTAL CASH COSTS/TON	193.82	158.58	134.19	116.29	102.61	91.81	83.07
NON-CASH OVERHEAD COSTS/ACRE	84.08	84.08	84.08	84.08	84.08	84.08	84.08
TOTAL COSTS/ACRE	956.29	956.29	956.29	956.29	956.29	956.29	956.29
TOTAL COSTS/TON	212.51	173.87	147.12	127.51	112.50	100.66	91.08

Net Return Per Acre Above Operating Costs For Alfalfa Hay

PRICE (\$/ton)	YIELD (ton/acre)						
Alfalfa Hay	4.50	5.50	6.50	7.50	8.50	9.50	10.50
100.00	-113.87	-13.87	86.13	186.13	286.13	386.13	486.13
110.00	-68.87	41.13	151.13	261.13	371.13	481.13	591.13
120.00	-23.87	96.13	216.13	336.13	456.13	576.13	696.13
130.00	21.13	151.13	281.13	411.13	541.13	671.13	801.13
140.00	66.13	206.13	346.13	486.13	626.13	766.13	906.13
150.00	111.13	261.13	411.13	561.13	711.13	861.13	1,011.13
160.00	156.13	316.13	476.13	636.13	796.13	956.13	1,116.13

Net Return Per Acre Above Cash Costs For Alfalfa Hay

PRICE (\$/ton)	YIELD (ton/acre)						
Alfalfa Hay	4.50	5.50	6.50	7.50	8.50	9.50	10.50
100.00	-422.21	-322.21	-222.21	-122.21	-22.21	77.79	177.79
110.00	-377.21	-267.21	-157.21	-47.21	62.79	172.79	282.79
120.00	-332.21	-212.21	-92.21	27.79	147.79	267.79	387.79
130.00	-287.21	-157.21	-27.21	102.79	232.79	362.79	492.79
140.00	-242.21	-102.21	37.79	177.79	317.79	457.79	597.79
150.00	-197.21	-47.21	102.79	252.79	402.79	552.79	702.79
160.00	-152.21	7.79	167.79	327.79	487.79	647.79	807.79

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EBB2-AH-15

TABLE 6. RANGING ANALYSIS CONTINUED

Net Return Per Acre Above Total Costs For Alfalfa Hay

PRICE (\$/ton)	YIELD (ton/acre)						
Alfalfa Hay	4.50	5.50	6.50	7.50	8.50	9.50	10.50
100.00	-506.29	-406.29	-306.29	-206.29	-106.29	-6.29	93.71
110.00	-461.29	-351.29	-241.29	-131.29	-21.29	88.71	198.71
120.00	-416.29	-296.29	-176.29	-56.29	63.71	183.71	303.71
130.00	-371.29	-241.29	-111.29	18.71	148.71	278.71	408.71
140.00	-326.29	-186.29	-46.29	93.71	233.71	373.71	513.71
150.00	-281.29	-131.29	18.71	168.71	318.71	468.71	618.71
160.00	-236.29	-76.29	83.71	243.71	403.71	563.71	723.71