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**UNIVERSITY OF CALIFORNIA – COOPERATIVE EXTENSION**

**2008**

**SAMPLE COSTS TO  
ESTABLISH AND PRODUCE  
ALFALFA HAY**



Photo courtesy of Jerry Schmierer

**IN THE SACRAMENTO VALLEY  
FLOOD IRRIGATION**

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# UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

## SAMPLE COSTS TO ESTABLISH AND PRODUCE ALFALFA HAY

### IN THE SACRAMENTO VALLEY – 2008 – FLOOD IRRIGATION

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#### INTRODUCTION

Sample costs to establish an alfalfa stand and produce alfalfa hay in the Sacramento Valley are shown in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on the production practices considered typical for this crop and region, but will not apply to every farm situation. Sample costs for labor, materials, equipment and custom services are based on current figures. “Your Costs” columns in Tables 1, 2, 5 and 6 are provided for entering your farm costs.

The hypothetical farm operations, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, California, 530-752-2414 or the local UC Cooperative Extension office.

Sample cost of production studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, 530-752-2414. Current studies can be downloaded from the department website <http://coststudies.ucdavis.edu/> or obtained from the local county UC Cooperative Extension offices. Some archived studies are also available on the website.

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## ASSUMPTIONS

The assumptions refer to Tables 1 through 12 and pertain to sample costs to establish an alfalfa stand, and produce alfalfa for hay in the Sacramento Valley. Practices described represent production practices and materials considered typical of a well-managed alfalfa stand in the Sacramento Valley. Costs, materials, and practices in this study will not be applicable to all situations. Establishment and cultural practices vary among growers within the region. **The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.**

**Farm.** The hypothetical farm consists of 2,900 non-contiguous acres of field, row, and tree crops of which 600 acres are in alfalfa (440 in production and 160 being established) and the remaining 2,300 acres are planted to other crops such as almonds, corn, grains, processing tomatoes, sunflowers, dry beans or left as unusable ground. Most of the farm is leased and is operated by the grower.

### STAND ESTABLISHMENT OPERATING COSTS

Tables 1 to 3 show the costs associated with ground preparation, planting, equipment, and establishing an alfalfa stand. Land preparation and planting are done in the fall. The establishment year ends after the herbicide application in January.

**Land Preparation.** Stand establishment begins by laser levelling with a custom operator once every seven crop years (the alfalfa stand from planting to removal is considered one new crop year in this study). Therefore, one-seventh of the cost is included in the establishment costs. The fields are disced down to reduce the residue from the previous crop. The ground is chiseled to a depth of 18 to 24 inches to fracture the soil. See note on Table 1. The field is triplaned in three directions. Borders (levees) for irrigation checks are made at periodic intervals (60 feet in this study) through the field.

**Planting.** Alfalfa seed is planted with a Brillion seeder 1/4 inch or less deep at 25 pounds of seed per acre. The seed is planted in September and the stand life is four years. The field is harrowed and ring rolled after planting. For selecting an appropriate variety with specific characteristic that are best adapted to your region, view the listed varieties at the UC Alfalfa & Forage website at <http://alfalfa.ucdavis.edu/+producing/variety/>.

**Fertilization.** Nitrogen (N) and phosphorus (P) as 11-52-0 at 200 pounds per acre of material and sulfur at 200 pounds per acre are applied by a custom operator in September during to field work. The fertilizer application in this study is assumed to be sufficient for 3 years; therefore one-third of the cost is allocated to the establishment year and one-third to the first and to the second production year. Tissue analyses should be done in the beginning of the third year to determine nutrient needs of the alfalfa plant.

**Irrigation.** Water for seed germination is sprinkled immediately after planting and then again two weeks later with a total of 6 acre-inches. Flood irrigation may be used when sprinkler irrigation is not available, but for this study, sprinkler irrigation is used. The water is supplied by an irrigation district, although some growers may use or supplement with well water. Water prices vary among irrigation districts, but for this study it is \$32.04 per acre-foot. This cost is an average of delivered water from several randomly selected irrigation districts in the Sacramento Valley. The average includes standby charges and land assessments charged by some districts. Irrigation costs include the water and the estimated labor costs of 0.8 hours per acre for laying out and moving the sprinkler pipe as well as labor during the irrigation.

**Pest Management.** For pest identification, monitoring, management and pesticide information, visit the UC IPM website at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu). Written recommendations are required for many pesticides, and are available from licensed pest control advisers. For information on pesticide use permits, contact the local county Agricultural Commissioner's office.

*Weeds.* Post-emergent herbicides (Raptor) and (Buctril) are applied in December or January for broadleaf and grass weed control.

**Overhead Costs.** One-half of the cash and non-cash overhead costs for the 160 acres are allocated to the previous crop.

## PRODUCTION OPERATING COSTS

**Irrigation.** Irrigation includes the water cost and labor expense of 0.18 hours per acre per irrigation. From April to September, seven irrigations totaling 3.5 acre-feet of water are applied by flooding the checks. The actual water requirement will vary each year based on soil, climatic, and plant physiological factors. Water is pumped through alfalfa valves at the head of the field and flows down the alfalfa check between the borders. The water cost of \$32.04 per acre-foot is the average of several randomly selected irrigation districts in the Sacramento Valley. The cost includes standby charges and land assessments that are charged by some districts.

**Fertilization.** Once the stand is established, plant tissue tests should be taken to determine nutrient requirements. In this study, phosphorous as 11-52-0, at 200 pounds per acre, is applied in April of the third year and is assumed to be sufficient for the remaining stand life. This cost is allocated over the remaining two years of the life of the stand.

**Pest Management.** The pesticides, rates, and application practices mentioned in this cost study are listed in the *UC IPM Pest Management Guidelines – Alfalfa*. Pesticides mentioned in this study are not recommendations, but those commonly used in the region. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. For information on other pesticides available, pest identification, monitoring, and management, visit the UC IPM website at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu). Pest control costs can vary considerably each year depending upon local conditions and pest populations in any given year. Adjuvants are recommended for many pesticides for effective control and are an added cost. The adjuvants in this study are not included as a cost in all applications.

*Pest Control Adviser (PCA).* Written recommendations are required for many pesticides and are available from licensed pest control advisers. In addition the PCA or an independent consultant will monitor the field for agronomic problems including irrigation and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company.

*Weeds.* Residual herbicides (Velpar and Gramoxone) for control of winter weeds are applied in January of each year. A preemergence herbicide (Treflan TR-10) is applied in January of the third year on 50% of the acreage for grass control. The herbicide costs will vary slightly during the production years due to the difference each year in weed control.

*Insects.* Several insect species attack alfalfa, but weevils, alfalfa caterpillar, and armyworms are the major economic pests in this study. Weevils are assumed to reach population levels requiring a single treatment for control for which an insecticide (Warrior or Baythroid) is applied by ground in March. Worms (alfalfa caterpillar and armyworms) are controlled by air in July with Lannate and in August with Steward.

*Vertebrate Pest Control.* Pocket gophers and meadow mice are the main vertebrate pests that can cause damage in alfalfa stands in the Sacramento Valley. Control is usually a poison bait, depending on the pest causing the damage, applied by hand or mechanically. Flood irrigations may destroy some rodents, but most growers do not treat unless the populations are severe enough to cause economic loss. The pests are not treated in this study.

**Harvest.** In this study, the alfalfa is custom harvested for hay seven times; April, May, June, July (twice), August, and September. Alfalfa for hay is cut with a self-propelled swather and left to dry for several days before it is turned and windrowed using a rake. Once the hay has dried to the correct moisture content, it is baled into 100 to 125 pound for small bales or 1,500 pounds for large bales. The bales are picked up with a balewagon that moves them from the field and roadsides (stacks) the bales.

*Custom Harvest.* In this study, the custom harvester charges \$41 per ton to swath, rake, bale, roadside (pickup bales and stack), and load. Many harvesting companies swath, rake, bale, roadside, and load the harvested alfalfa for a single fee. Fees to swath, rake, bale, roadside, and load the hay range from \$35 to \$44 per hay ton and are usually based on a minimum of one-ton of hay per acre. Some companies will hire out for the individual operations and charge accordingly, but these fees when added together may be higher than the fee quoted for all operations. Individually, swathings range around \$10 to \$12 per acre, raking \$4 to \$5 per acre, baling \$12 to \$14 per ton, and roadsiding \$4 to \$6 per ton.

**Yields.** The crop is assumed to yield 7.0 tons of hay per acre at 90% dry matter (DM). Annual yields range from 5.0 to 9.0 tons of hay per acre in this region.

**Returns.** A price of \$220 per ton for hay is based on current USDA California 2008 averages over all grades for the Sacramento Valley market districts. Hay prices and hay quality will vary during the season and by district. USDA alfalfa hay standards are Supreme, Premium, Good, Fair, and Utility, with Supreme garnering the highest price. Table 9 shows grower returns over a range of yields and prices.

**Pickup/ATV.** The two pickups and the all terrain vehicle (ATV) each travel 7.12 miles per acre for alfalfa production or a total of 712 miles per vehicle per year. Costs are estimated and not based on any specific data.

**Labor.** Labor rates of \$15.72 per hour for machine operators and \$10.88 for general labor includes payroll overhead of 36%. The basic hourly wages are \$11.65 for machine operators and \$8.00 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for field crops (code 0171), and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2008 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 1 and 4 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

**Equipment Operating Costs.** Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower and fuel type. Prices for on-farm delivery of diesel and gasoline are \$3.54 and \$3.57 per gallon respectively. Fuel costs are derived from American Automobile Association (AAA) and Energy Information Administration (EIA) 2008 monthly data. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 1 are determined by multiplying the total hourly operating cost in Table 9 for each piece of equipment used for the selected operation by the hours per acre.

Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

**Risk.** Production risks should not be minimized. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect the profitability and economic viability of alfalfa production.

## CASH OVERHEAD

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, share rent, supervisors' salaries, field sanitation, crop insurance, and investment repairs. Employee benefits, insurance, and payroll taxes are included in labor costs and not in overhead. Cash overhead costs are shown in Tables 1, 2, 5, 6, and 8. A portion of the overhead costs in the establishment year is allocated to the previous crop.

**Interest On Operating Capital.** Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 6.75% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

**Property Taxes.** Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

**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 charged at 0.740% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,438 for the entire farm or \$0.50 per acre.

**Office Expense.** Costs are estimated at \$104,893 for the entire farm or \$36.17 per acre and are a cost involved for bookkeeping, payroll, tax preparation, and telephone.

**Share Rent.** The grower pays 21% of the gross income to the landlord. The grower pays all cultural costs and the landlord maintains the irrigation system and related land improvements and taxes.

**Investment Repairs.** Annual repairs on investments or capital recovery items that require maintenance are calculated as 5% of the average price. Repairs are not calculated for land and establishment costs.

## NON-CASH OVERHEAD

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. A portion of the overhead costs in the establishment year are allocated to the previous crop

**Capital Recovery Costs.** Capital recovery cost is the annual depreciation and interest costs for a capital investment and is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). The capital recovery costs are equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex

method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is;

$$\left[ \left( \frac{\text{Purchase Price}}{\text{Salvage Value}} \right) \times \left( \frac{\text{Capital Recovery}}{\text{Factor}} \right) \right] + \left[ \frac{\text{Salvage Value} \times \text{Interest Rate}}{\text{Value Rate}} \right]$$

**Salvage Value.** Salvage value is the estimated value of an investment at the end of its useful life. For farm machinery the value is a percentage of the new cost of the investment (Boehlje and Eidman). The value is calculated from equations developed by ASAE based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE, by the annual hours of use in the operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate.

**Capital Recovery Factor.** Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate and equipment life.

**Interest Rate.** The interest rate of 4.25% is used to calculate capital recovery cost is the effective long-term interest rate in April 2008. The interest rate is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector. In other words, the next best alternative use for these resources is in another agricultural enterprise.

**Shop Building.** A shop building is used for equipment maintenance and repair, parts and supply storage, a bathroom, and houses the farm’s office. The building encompasses 8,000 square feet, has a concrete floor, and is wired and plumbed as needed to meet building codes.

**Tools.** Includes shop equipment/tools and other tools used on the farm and does not recognize any specific inventory.

**Irrigation System.** The system for the alfalfa land consists of underground lines with alfalfa valves and gated pipe. The permanent irrigation system consists of wells, pumps and motors, and a buried mainline and is included in the land rental costs.

**Hay Barn.** The open barn with a metal roof covers 5,000 square feet and is 20 feet high. The building’s ten support poles are on concrete piers with a natural floor (ground). Construction costs included in the price are based on prevailing wage.

**Fuel Tanks.** Two 500-gallon fuel tanks using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

**Establishment Costs.** Costs to establish the alfalfa stand are used to determine capital recovery expenses, depreciation, and interest on investment, during the production years. The establishment cost is the sum of cash costs for land preparation, planting, and cash overhead for establishing the alfalfa. The Total Cash Cost shown in Table 1 and 2 represents the establishment cost per acre. For this study, the cost is \$407 per acre or \$179,080 for the 440 producing acres. The alfalfa stand establishment cost is amortized over the 4-year stand life.

**Equipment.** Although, farm equipment is purchased new or used, the study shows the current purchase price for new equipment. The new purchase price is adjusted to 40% to indicate a mix of new and used equipment. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

**Table Values.** Due to rounding, the totals may be slightly different from the sum of the components.

**Acknowledgements.** The authors appreciate the help provided by growers and other cooperators who provided information for this study.



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Table 1.

UC COOPERATIVE EXTENSION  
 COSTS PER ACRE TO ESTABLISH AN ALFALFA STAND  
 SACRAMENTO VALLEY – 2008  
 Flood Irrigation

Labor Rate: \$15.72/hr. machine labor  
 \$10.88hr. non-machine labor

Short Term Interest Rate: 6.75%

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre				Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent		
<b>Preplant:</b>							
Laser Level Field (1 in 7 years)	0.00	0	0	0	19	19	
Fertilize - Sulfur (1/3 of the cost)	0.00	0	0	7	3	9	
Fertilize - 11-52-0 (1/3 of the cost)	0.00	0	0	28	2	30	
Disc Crop Stubble Residue	0.11	2	8	0	0	10	
Chisel Ground	0.14	3	10	0	0	12	
Level Field with Triplane 3X	0.52	10	37	0	0	46	
Pull Borders	0.03	0	1	0	0	1	
Roll Field	0.10	2	4	0	0	5	
ATV Use	0.28	5	1	0	0	6	
<b>TOTAL PREPLANT COSTS</b>	1.17	22	59	35	24	140	
<b>Cultural:</b>							
Plant Alfalfa	0.22	4	8	80	0	92	
Irrigate - Sprinkler 2X	0.00	0	0	55	0	55	
Weed Control - Winter Weed Control	0.11	2	1	61	0	63	
Pickup Truck Use	0.19	4	3	0	0	6	
<b>TOTAL CULTURAL COSTS</b>	0.52	10	11	196	0	217	
Interest on Operating Capital @ 6.75%						9	
<b>TOTAL OPERATING COSTS/ACRE</b>		32	70	230	24	365	
<b>CASH OVERHEAD:</b>							
Office Expense						36	
Liability Insurance						1	
Property Taxes						1	
Property Insurance						1	
Investment Repairs						3	
<b>TOTAL CASH OVERHEAD COSTS</b>						42	
<b>TOTAL CASH COSTS/ACRE</b>						407	
<b>NON-CASH OVERHEAD:</b>							
		Per producing Acre		-- Annual Cost -- Capital Recovery			
Investment							
Fuel Tanks & Pumps		1		0		0	
Hay Barn		17		1		1	
Shop Building - 8,000 SqFt		71		5		5	
Shop Tools		5		0		0	
Equipment		148		16		16	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		242		23		23	
<b>TOTAL COSTS/ACRE</b>						430	

Table 2.

UC COOPERATIVE EXTENSION  
 COSTS AND RETURNS TO ESTABLISH AN ALFALFA STAND PER ACRE  
 SACRAMENTO VALLEY – 2008  
 Flood Irrigation

Labor Rate: \$15.72/hr. machine labor  
 \$10.88hr. non-machine labor

Short Term Interest Rate: 6.75%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>OPERATING COSTS</b>					
Custom:					
Laser Level	0.14	Acres	135.00	19	
Ground Application - Sulfur	0.33	Ton	8.50	3	
Ground Application - Fertilizer	0.33	Acres	6.25	2	
Fertilizer:					
Sulfur	66.67	Lb	0.100	7	
11-52-0	66.67	Lb	0.42	28	
Seed:					
Seed - Alfalfa	25.00	Lb	3.20	80	
Irrigation:					
Water	6.00	AcIn	2.67	16	
Pump - Fuel, Lube, & Repairs	6.00	AcIn	6.50	39	
Herbicide:					
Buctril	1.50	Pint	21.938	33	
Raptor	4.00	FLOz	6.067	24	
Adjuvant:					
Crop Oil	1.00	Pint	3.56	4	
Labor (machine)	2.03	Hrs	15.72	32	
Labor (non-machine)	0.00	Hrs	0.00	0	
Fuel - Gas	0.83	Gal	3.57	3	
Fuel - Diesel	13.97	Gal	3.54	49	
Lube				8	
Machinery repair				10	
Interest on Operating Capital @ 6.75%				2	
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>365</b>	
<b>CASH OVERHEAD COSTS:</b>					
Office Expense				36	
Liability Insurance				1	
Property Taxes				1	
Property Insurance				1	
Investment Repairs				3	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>42</b>	
<b>TOTAL ACCUMULATED NET CASH COST</b>				<b>407</b>	
<b>NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):</b>					
Fuel Tanks & Pumps				0	
Hay Barn				1	
Shop Building - 8,000 SqFt				5	
Shop Tools				0	
Equipment				16	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>23</b>	
<b>TOTAL COSTS/ACRE</b>				<b>430</b>	

Table 3.

UC COOPERATIVE EXTENSION  
ESTABLISHMENT EQUIPMENT COSTS  
SACRAMENTO VALLEY – 2008  
Flood Irrigation

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
08	100 Gallon Sprayer for ATV	5,218	10	923	575	23	31	629
08	115 HP 4WD Tractor	95,309	10	28,153	9,580	457	617	10,654
08	235 HP Crawler	208,000	10	61,440	20,906	997	1,347	23,250
08	ATV	6,459	7	2,450	778	33	45	856
08	Brillion Seeder	14,169	10	2,506	1,562	62	83	1,707
08	Chisel - 18'	15,487	10	2,739	1,708	67	91	1,866
08	Cultipacker - 16'	17,850	10	3,157	1,968	78	105	2,151
08	Disc - Border	2,000	10	354	221	9	12	241
08	Disc - Tandem 21'	23,318	10	4,124	2,571	102	137	2,810
08	Pickup - 4WD 3/4 Ton	36,000	7	13,656	4,338	184	248	4,770
08	Triplane - 16'	20,667	10	3,655	2,279	90	122	2,491
TOTAL		444,477		123,157	46,486	2,100	2,838	51,425
40% of New Cost *		177,791		49,263	18,594	840	1,135	20,570

\* Used to reflect a mix of new and used equipment.

Table 4.

ESTABLISHMENT HOURLY EQUIPMENT COSTS

Yr	Description	----- COSTS PER HOUR -----							Total Costs/Hr.
		Actual Hours Used	- Cash Overhead -			----- Operating -----			
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
08	100 Gallon Sprayer for ATV	149.3	2.31	0.09	0.12	1.41	0.00	1.41	3.94
08	115 HP 4WD Tractor	1,599.5	3.59	0.17	0.23	2.56	27.17	29.73	33.72
08	235 HP Crawler	1,599.3	7.84	0.37	0.51	5.58	55.52	61.10	69.82
08	ATV	284.8	1.64	0.07	0.09	0.48	2.74	3.22	5.02
08	Brillion Seeder	149.9	6.25	0.25	0.33	3.94	0.00	3.94	10.78
08	Chisel - 18'	199.6	5.13	0.20	0.27	3.31	0.00	3.31	8.92
08	Cultipacker - 16'	199.2	5.93	0.23	0.32	2.05	0.00	2.05	8.53
08	Disc - Border	200.0	0.66	0.03	0.04	0.33	0.00	0.33	1.05
08	Disc - Tandem 21'	189.4	8.14	0.32	0.43	3.87	0.00	3.87	12.77
08	Pickup - 4WD 3/4 Ton	294.4	8.84	0.37	0.51	2.67	12.32	14.99	24.71
08	Triplane - 16'	299.0	4.57	0.18	0.24	3.19	0.00	3.19	8.18

Table 5.

UC COOPERATIVE EXTENSION  
 COSTS PER ACRE TO PRODUCE ALFALFA HAY  
 SACRAMENTO VALLEY – 2008  
 Flood Irrigation

Labor Rate: \$15.72/hr. machine labor  
 \$10.88hr. non-machine labor

Short Term Interest Rate: 6.75%

Operation	Operation Time (Hrs/A)	----- Cash and Labor Costs per Acre -----					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Weed Control - Dormant Spray	0.11	2	0	20	0	23		
Weed Control - Dormant Spray on 50% of Acres	0.02	0	0	4	0	4		
Fertilize - 11-52-0 (& sulfur costs)	0.00	0	0	35	2	37		
Insect Control - Weevil	0.11	2	0	12	0	15		
Irrigate	1.08	12	0	112	0	124		
Insect Control - Worms 2X	0.00	0	0	47	18	64		
Pickup Truck Use	<u>0.46</u>	<u>9</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>15</u>		
TOTAL CULTURAL COSTS	1.77	25	7	230	20	282		
Harvest:								
Harvest - Custom 7X	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>287</u>	<u>287</u>		
TOTAL HARVEST COSTS	0.00	0	0	0	287	287		
Interest on Operating Capital @ 6.75%						13		
TOTAL OPERATING COSTS/ACRE		25	7	230	307	582		
CASH OVERHEAD:								
Office Expense						36		
Liability Insurance						1		
Land Rent @ 21% of Gross Returns						294		
Property Taxes						3		
Property Insurance						2		
Investment Repairs						<u>3</u>		
TOTAL CASH OVERHEAD COSTS						338		
TOTAL CASH COSTS/ACRE						920		
NON-CASH OVERHEAD:								
Investment		Per producing		-- Annual Cost --				
Alfalfa Stand Establishment Cost		<u>Acres</u>		<u>Capital Recovery</u>				
Fuel Tanks & Pumps		407		113		113		
Shop Building - 8,000 SqFt		1		0		0		
Shop Tools		71		5		5		
Hay Barn		5		0		0		
Equipment		17		1		1		
		<u>30</u>		<u>4</u>		<u>4</u>		
TOTAL NON-CASH OVERHEAD COSTS						123		
TOTAL COSTS/ACRE						1,043		

Table 6.

UC COOPERATIVE EXTENSION  
COSTS AND RETURNS PER ACRE TO PRODUCE ALFALFA HAY  
SACRAMENTO VALLEY – 2008  
Flood Irrigation

Labor Rate: \$15.72/hr. machine labor  
\$10.88hr. non-machine labor

Short Term Interest Rate: 6.75%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Alfalfa Hay	7.0	Tons	200.00	<u>1,540</u>	
<b>TOTAL GROSS RETURNS FOR ALFALFA HAY</b>				1,540	
<b>OPERATING COSTS</b>					
Herbicide:					
Gromoxone Max	1.00	Pint	7.13	7	
Velpar 90S	0.33	Lb	38.76	13	
Treflan TR 10	3.33	Lb	1.20	4	
Lannate 90 SP	1.00	Lb	31.05	31	
Steward	7.00	FlOz	2.23	16	
Adjuvant:					
Crop Oil	4.26	FlOz	0.131	1	
Fertilizer:					
11-52-0	66.67	Lb	0.419	28	
Sulfur	66.67	Lb	0.10	7	
Custom:					
Ground Application	0.33	Acre	6.25	2	
Hay Harvest	7.00	Acre	41.00	287	
Air Application	2.00	Acre	8.75	18	
Insecticide:					
Warrior T	3.80	FlOz	3.216	12	
Lannate 90 SP					
Steward					
Irrigation:					
Water	42.00	AcIn	2.67	112	
Labor (machine)	0.83	Hrs	15.72	13	
Labor (non-machine)	1.08	Gal	10.88	12	
Fuel - Gas	1.53	Gal	3.57	5	
Lube				1	
Machinery repair				1	
Interest on Operating Capital @ 6.75%				<u>13</u>	
<b>TOTAL OPERATING COSTS/ACRE</b>				582	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				958	
<b>CASH OVERHEAD COSTS:</b>					
Office Expense				36	
Liability Insurance				1	
Land Rent @ 21% of Gross Returns				294	
Property Taxes				3	
Property Insurance				2	
Investment Repairs				<u>3</u>	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				338	
<b>TOTAL CASH COSTS/ACRE</b>				920	
<b>NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):</b>					
Alfalfa Stand Establishment Cost				113	
Fuel Tanks & Pumps				0	
Shop Building - 8,000 SqFt				5	
Shop Tools				0	
Hay Barn				1	
Equipment				<u>4</u>	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				123	
<b>TOTAL COSTS/ACRE</b>				1,043	
<b>NET RETURNS ABOVE TOTAL COSTS/ACRE</b>				497	

Table 7.

UC COOPERATIVE EXTENSION  
MONTHLY CASH COSTS PER ACRE TO PRODUCE ALFALFA  
SACRAMENTO VALLEY – 2008  
Flood Irrigation

Beginning JAN 08	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 08	08	08	08	08	08	08	08	08	08	08	08	08	08
Cultural:													
Weed Control - Dormant Spray	23												23
Weed Control - Dormant Spray on 50% of Acres		4											4
Fertilize - 11-52-0 (& sulfur costs)			37										37
Insect Control - Weevil			15										15
Irrigate				21	21	21	41	21					124
Insect Control - Worms 2X							40	24					64
Pickup Truck Use	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>15</u>
<b>TOTAL CULTURAL COSTS</b>	<b>25</b>	<b>6</b>	<b>53</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>83</b>	<b>47</b>	<b>2</b>				<b>282</b>
Harvest:													
Harvest - Custom 7X				<u>41</u>	<u>41</u>	<u>41</u>	<u>41</u>	<u>82</u>	<u>41</u>				<u>287</u>
<b>TOTAL HARVEST COSTS</b>				<b>41</b>	<b>41</b>	<b>41</b>	<b>41</b>	<b>82</b>	<b>41</b>				<b>287</b>
Interest on Operating Capital @ 6.75%	0	0	0	1	1	2	2	3	3				13
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>25</b>	<b>6</b>	<b>54</b>	<b>64</b>	<b>65</b>	<b>65</b>	<b>126</b>	<b>132</b>	<b>46</b>				<b>582</b>
CASH OVERHEAD:													
Office Expense	4	4	4	4	4	4	4	4	4				36
Liability Insurance	1												1
Land Rent @ 21% of Gross Returns							294						294
Property Taxes	1						1						3
Property Insurance	1						1						2
Investment Repairs	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>7</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>301</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>338</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>32</b>	<b>10</b>	<b>58</b>	<b>68</b>	<b>69</b>	<b>69</b>	<b>427</b>	<b>136</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>920</b>

Table 8.

UC COOPERATIVE EXTENSION  
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
SACRAMENTO VALLEY – 2008  
Flood Irrigation

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
08	100 Gallon Sprayer for ATV	5,218	10	923	575	23	31	629
08	ATV - 4WD	6,459	7	2,450	778	33	45	856
08	Pickup - 4WD 3/4 Ton	36,000	7	13,656	4,338	184	248	4,770
	TOTAL	47,677		17,029	5,691	239	324	6,254
	40% of New Cost *	19,071		6,812	2,276	96	129	2,502

\* 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								
Alfalfa Stand Establishment Cost	179,080	4		49,626	663	895	0	51,184
Fuel Tanks & Pumps	3,617	20	362	260	15	20	100	395
Hay Barn	50,638	20	5,064	3,643	206	279	1,392	5,520
Shop Building - 8,000 SqFt	206,688	20	20,669	14,871	841	1,137	5,684	22,533
Shop Tools	13,509	20	1,351	972	55	74	186	1,287
TOTAL INVESTMENT	453,532		27,446	69,372	1,780	2,405	7,362	80,918

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Land Rent @ 21% of Gross Returns	440	Acre	294.00	129,360
Liability Insurance	2,900	Acre	0.50	1,450
Office Expense	2,900	Acre	36.17	104,893

Table 9.

UC COOPERATIVE EXTENSION  
HOURLY EQUIPMENT COSTS  
SACRAMENTO VALLEY – 2008

Yr	Description	----- COSTS PER HOUR -----							Total Costs/Hr.
		Actual Hours Used	- Cash Overhead -			----- Operating -----			
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
08	100 Gallon Sprayer for ATV	157.5	1.46	0.06	0.08	0.94	0.00	0.94	2.54
08	ATV - 4WD	292.5	1.06	0.05	0.06	0.32	2.74	3.06	4.23
08	Pickup - 4WD 3/4 Ton	284.2	6.11	0.26	0.35	1.78	12.32	14.10	20.81



Table 10.

UC COOPERATIVE EXTENSION  
RANGING ANALYSIS  
SACRAMENTO VALLEY – 2008  
Flood Irrigation

COSTS PER ACRE TO PRODUCE ALFALFA AT VARYING YIELDS							
	YIELD (TONS/ACRE)						
	4.0	5.0	6.0	7.0	8.0	9.0	10.0
OPERATING COSTS/ACRE:							
Cultural Cost	282	282	282	282	282	282	282
Harvest Cost	287	287	287	287	287	287	287
Interest on Operating Capital	13	13	13	13	13	13	13
TOTAL OPERATING COSTS/ACRE	582	582	582	582	582	582	582
TOTAL OPERATING COSTS/TON	145	116	97	83	73	65	58
CASH OVERHEAD COSTS/ACRE	338	338	338	338	338	338	338
TOTAL CASH COSTS/ACRE	920	920	920	920	920	920	920
TOTAL CASH COSTS/TON	230	184	153	131	115	102	92
NON-CASH OVERHEAD COSTS/ACRE	123	123	123	123	123	123	123
TOTAL COSTS/ACRE	1,043	1,043	1,043	1,043	1,043	1,043	1,043
TOTAL COSTS/TON	261	209	174	149	130	116	104

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ALFALFA HAY							
PRICE (DOLLARS/TONS)	YIELD (TONS/ACRE)						
	4.0	5.0	6.0	7.0	8.0	9.0	10.0
ALFALFA HAY							
160	58	218	378	538	698	858	1,018
180	138	318	498	678	858	1,038	1,218
200	218	418	618	818	1,018	1,218	1,418
220	298	518	738	958	1,178	1,398	1,618
240	378	618	858	1,098	1,338	1,578	1,818
260	458	718	978	1,238	1,498	1,758	2,018
280	538	818	1,098	1,378	1,658	1,938	2,218

NET RETURNS PER ACRE ABOVE CASH COSTS FOR ALFALFA HAY							
PRICE (DOLLARS/TONS)	YIELD (TONS/ACRE)						
	4.0	5.0	6.0	7.0	8.0	9.0	10.0
ALFALFA HAY							
160	-280	-120	40	200	360	520	680
180	-200	-20	160	340	520	700	880
200	-120	80	280	480	680	880	1,080
220	-40	180	400	620	840	1,060	1,280
240	40	280	520	760	1,000	1,240	1,480
260	120	380	640	900	1,160	1,420	1,680
280	200	480	760	1,040	1,320	1,600	1,880

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR ALFALFA HAY							
PRICE (DOLLARS/TONS)	YIELD (TONS/ACRE)						
	4.0	5.0	6.0	7.0	8.0	9.0	10.0
ALFALFA HAY							
160	-403	-243	-83	77	237	397	557
180	-323	-143	37	217	397	577	757
200	-243	-43	157	357	557	757	957
220	-163	57	277	497	717	937	1,157
240	-83	157	397	637	877	1,117	1,357
260	-3	257	517	777	1,037	1,297	1,557
280	77	357	637	917	1,197	1,477	1,757

Table 11.

UC COOPERATIVE EXTENSION  
 COSTS AND RETURNS/BREAKEVEN ANALYSIS  
 SACRAMENTO VALLEY – 2008  
 Flood Irrigation

COSTS AND RETURNS - PER ACRE BASIS							
Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Alfalfa Hay	1,540	582	958	920	620	1,043	497

COSTS AND RETURNS - TOTAL ACREAGE							
Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Alfalfa Hay	677,600	255,920	421,680	404,645	272,955	458,847	218,753

BREAKEVEN PRICES PER YIELD UNIT					
CROP	Base Yield (Units/Acre)	Yield Units	----- Breakeven Price To Cover -----		
			Operating Costs	Cash Costs	Total Costs
Alfalfa Hay	7.0	Ton	83.09	131.38	148.98

BREAKEVEN YIELDS PER ACRE					
CROP	Yield Units	Base Price (\$/Unit)	----- Breakeven Yield To Cover -----		
			Operating Costs	Cash Costs	Total Costs
Alfalfa Hay	Ton	220.00	2.6	4.2	4.7

Table 12.

UC COOPERATIVE EXTENSION  
 DETAIL BY OPERATIONS  
 SACRAMENTO VALLEY – 2008  
 Flood Irrigation

Operation	Operation Month	Tractor/ Power Unit	Implement	Material	Broadcast Rate/acre	Material Unit
Cultural:						
Weed Control - Dormant Spray on 50% of Acres	January	ATV - 4WD	100 Gallon Sprayer for ATV	Treflan TR 10	3.33	Lb
Weed Control - Dormant Spray	February	ATV - 4WD	100 Gallon Sprayer for ATV	Gromoxone Max	1.50	Pint
				Velpar 90 S	0.33	Lb
				Crop Oil	4.26	FLOz
Fertilize - 11-52-0 (& sulfur costs)	April	Custom		11-52-0	66.67	Lb
				Sulfur	66.67	Lb
Insect Control - Weevil	April	ATV - 4WD	100 Gallon Sprayer for ATV	Warrior T	3.80	Fl Oz
Irrigate	April	Labor		Water	6.00	AcIn
	May	Labor		Water	6.00	AcIn
	June	Labor		Water	6.00	AcIn
	July	Labor		Water	12.00	AcIn
	August	Labor		Water	6.00	AcIn
	September	Labor		Water	6.00	AcIn
Insect Control - Worms 2X	July		Air Application	Lannate	1.00	Lb
	August		Air Application	Steward	7.00	FLOz
Harvest - Custom 7X	April	Custom				
	May	Custom				
	June	Custom				
Rake Hay 3X	July 2X	Custom				
	August	Custom				
	September	Custom				
Pickup Truck Use	All Months					
ATV Use	All Months					