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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2003

SAMPLE COSTS TO  
ESTABLISH AND PRODUCE  
**ALFALFA**



**SACRAMENTO VALLEY**

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## SAMPLE COSTS TO ESTABLISH AND PRODUCE ALFALFA

Sacramento Valley 2003

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### INTRODUCTION

Sample costs to establish an alfalfa stand and produce alfalfa in the Sacramento Valley are shown in this study. The 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, 4 and 5 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) 752-3589 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) 752-3589. 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 11 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 and row crops of which 400 acres are in alfalfa (300 in production and 100 being established) and the remaining 2,500 acres are planted to other crops such as cotton, corn, grains, processing tomatoes, wheat, and dry beans. 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 and establishing an alfalfa stand. Land preparation and planting are done in the fall. The establishment year ends after the herbicide application in December.

**Land Preparation.** Stand establishment begins by discing down the residue from the previous crop. The ground is chiseled to a depth of 18 to 24 inches to fracture the soil. The fields are laser leveled by a custom operator once every 7th new crop year. (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 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 20 pounds of seed per acre. The seed is planted in October and the stand life is four years. The field is harrowed and ring rolled after planting.

**Fertilization.** Nitrogen (N) and phosphorus (P) as 11-52-0 at 300 pounds per acre of material are applied by a custom operator in October prior to planting. 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. Soil sulfur at 250 pounds per acre is also applied by a custom operator prior to planting.

**Irrigation.** Water for seed germination is sprinkled immediately after planting (6 acre-inches). The water is supplied by an irrigation district, although some growers may use or supplement with well water. Water prices vary among irrigation districts and for this study is \$24 per acre-foot. The 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 .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 for broadleaf weed and grass control.

**Overhead Costs.** One-half of the cash and non-cash overhead costs for the 100 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 four 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 \$24 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 January of the third year and is assumed to be sufficient for the remaining stand life. Therefore, the cost is allocated over two years. The allocated fertilizer from the establishment year and the third years equates to 100 pounds of 11-52-0 per year.

**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 Karmex) for control of winter weeds are applied in January of the second and third years and a contact herbicide (Gramoxone) in the fourth year. A preemergence herbicide (Treflan TR-10) is applied in January of the third year 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 alfalfa weevil, aphids, alfalfa caterpillar, and armyworms are the major economic pests in this study. Weevils and aphids are assumed to reach population levels requiring a single treatment for control for which an insecticide (Warrior or Baythroid) is applied by air 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, ground squirrels, and meadow mice are the main vertebrate pests that can cause damage in alfalfa stands. 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 six times; April, May, June, July, 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 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 \$28 per ton to swath, rake, bale and roadside. Many harvesting companies swath, rake, bale, and roadside (pickup bales and stack) the harvested alfalfa for a single fee. Fees to swath, rake, bale, and roadside, range from \$25 to \$32 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, swathing ranges 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 7.00 tons of hay per acre at 90% dry matter (DM). Annual yields range from 5 to 9 tons of hay per acre in this region.

**Returns.** A price of \$100 per ton for hay is based on USDA California 2002 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 use or a total of 712 miles per vehicle per year. Costs are estimated and not based on any specific data.

**Labor.** Labor rates of \$14.60 per hour for machine operators and \$9.86 for general labor includes payroll overhead of 46%. The basic hourly wages are \$10.00 for machine operators and \$6.75 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, 2003 (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 \$1.11 and \$1.58 per gallon, respectively. The fuel prices are a January 2003 average based on four California delivery locations. The cost includes a 2.25% sales tax (effective September 2001) on diesel fuel and 7.25% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in the “Cost Per Acre to Produce” table is determined by multiplying the total hourly operating cost in the “Hourly Equipment Costs” table for each piece of equipment used from the Operation Time (Hrs/A) column 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.

**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 7.14% 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.

**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, not to a particular operation. These costs include property taxes, interest, office expense, liability and property insurance, and investment repairs (buildings and irrigation equipment). Employee benefits, payroll taxes and workers’ compensation insurance are included in labor costs and not under cash overhead. A portion of the overhead costs in the establishment year is allocated to the previous crop.

**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 0.676% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,327 for the entire farm or \$0.46 per acre.

**Office.** Costs are estimated at \$35 per acre for the ranch and are not based on any specific information, except that there is a cost involved for bookkeeping, payroll, tax preparation, and telephone.

**Share Rent.** The grower pays 20% of the gross income to the landlord. The grower pays all cultural costs and the landlord maintains the irrigation system and related land improvements.

**Investment Repairs.** Annual repairs on investments or capital recovery items that require maintenance are calculated as 2% of the purchase 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  $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$ .

*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 6.25% used to calculate capital recovery cost is the USDA-ERS's ten year average of California's agricultural sector long-run rate of return to production assets from current income.

**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. The permanent irrigation system consists of wells, pumps and motors, and buried mainline and is included in the land rental costs.

**Land.** Cropland with district water suitable for alfalfa production typically ranges in value among the counties from \$1,500 to \$5,000 per acre. Being the land producing the alfalfa is rented and absorbs all of the land costs for alfalfa production, land owned by the grower is not included as an investment cost.

**Hay Barn.** The open barn with 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.

**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 represents the establishment cost per acre. For this study, the cost is \$264 per acre or \$26,400 for the 100 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 60% 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.



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UC COOPERATIVE EXTENSION  
**Table 1. COSTS PER ACRE to ESTABLISH ALFALFA**  
 SACRAMENTO VALLEY 2003

Operation	Operation	Cash and Labor Cost per acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Disc Stubble 2X	0.27	4	8	0	0	13		
Chisel Field	0.19	3	5	0	0	8		
Laser Level 1X/7 Yrs	0.00	0	0	0	11	11		
Disc	0.10	1	3	0	0	4		
Triplane 3X	0.36	6	7	0	0	12		
Border Preparation 3X	0.09	1	1	0	0	2		
Fertilize (11-52-0) 33% Cost	0.00	0	0	16	2	18		
Fertilize (Sulfur)	0.00	0	0	11	6	17		
Plant	0.26	4	3	54	0	61		
Harrow and Ring Roll	0.09	1	1	0	0	3		
Irrigate - Sprinkle	0.80	8	0	12	0	20		
Weed (Raptor/Buctril)	0.07	1	0	46	0	47		
Pickup	0.12	2	1	0	0	3		
ATV Use	0.12	2	0	0	0	2		
<b>TOTAL CULTURAL COSTS</b>	<b>2.45</b>	<b>34</b>	<b>29</b>	<b>139</b>	<b>18</b>	<b>220</b>		
Interest on operating capital @ 7.14%						4		
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>34</b>	<b>29</b>	<b>139</b>	<b>18</b>	<b>224</b>		
CASH OVERHEAD:*								
Liability Insurance						1		
Office Expense						34		
Property Taxes						1		
Property Insurance						1		
Investment Repairs						3		
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>39</b>		
<b>TOTAL CASH COSTS/ACRE</b>						<b>264</b>		
NON-CASH OVERHEAD *(Investments)								
		Per producing acre		-- Annual Cost --				
				Capital Recovery				
Irrigation - Hand Line Sprinkler		4		1		1		
Forklift		7		1		1		
Buildings		20		2		2		
Shop Tools		4		0		0		
Fuel Tanks		1		0		0		
Hay Barn		98		9		9		
Equipment		125		16		16		
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>260</b>		<b>28</b>		<b>28</b>		
<b>TOTAL COSTS/ACRE</b>						<b>292</b>		

\*1/2 cost allocated of 100 acres allocated to previous crop

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**Table 2. MATERIAL and INPUT COSTS to ESTABLISH ALFALFA**  
 SACRAMENTO VALLEY 2003

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>OPERATING COSTS</b>					
<b>Custom:</b>					
Laser Level	0.14	acre	75.00	11	
Broadcast Fertilizer	1.34	acre	5.50	7	
<b>Fertilizer:</b>					
11-52-0	100.00	lb	0.16	16	
Soil Sulfur	250.00	lb	0.05	11	
<b>Seed:</b>					
Alfalfa Seed (raw)	20.00	lb	2.60	52	
Inoculum\$/seed lb	20.00	sdlb	0.09	2	
<b>Irrigation:</b>					
Water	6.00	acin	2.00	12	
<b>Herbicide:</b>					
Raptor	4.00	floz	4.77	19	
Buctril 4EC	1.50	pint	16.23	24	
Crop Oil	1.00	pint	2.70	3	
Labor (machine)	1.98	hrs	13.14	26	
Labor (non-machine)	0.80	hrs	9.86	8	
Fuel - Gas	0.53	gal	1.58	1	
Fuel - Diesel	15.15	gal	1.11	17	
Lube				3	
Machinery repair				9	
Interest on operating capital @ 7.14%				4	
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>224</b>	

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**Table 3. WHOLE FARM ANNUAL EQUIPMENT COSTS - ESTABLISHMENT YEAR**  
 SACRAMENTO VALLEY 2003

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
03	115HP 7420 MFWD Tractor	75,874	10	22,412	8,751	332	491	9,574
03	150HP 7810 4WD Tractor	102,012	10	30,133	11,765	447	661	12,873
03	235HP 8340T Track Tractor	157,000	10	46,375	18,107	687	1,017	19,812
03	ATV	7,800	5	3,496	1,247	38	56	1,342
03	Brillion Seeder 18'	1,800	7	459	271	8	11	290
03	Chisel - Heavy 15'	8,000	12	1,108	903	31	46	979
03	Disc - Offset 26'	25,071	12	3,472	2,829	96	143	3,068
03	Disc - Stubble 18'	45,045	5	14,673	8,176	202	299	8,677
03	Disc Border 6'	2,100	12	291	237	8	12	257
03	Harrow - Spike 32'	9,891	12	1,370	1,116	38	56	1,210
03	Pickup 3/4 Ton	28,000	5	12,549	4,477	137	203	4,817
03	Ringroller - 21'	3,699	10	654	460	15	22	496
03	Sprayer 200 G 30' Boom	3,800	10	672	472	15	22	510
03	Triplane - 16'	20,109	12	2,785	2,269	77	114	2,461
	<b>TOTAL</b>	<b>490,201</b>		<b>140,449</b>	<b>61,080</b>	<b>2,132</b>	<b>3,153</b>	<b>66,365</b>
	60% of New Cost *	294,121		84,269	36,648	1,279	1,892	39,819

UC COOPERATIVE EXTENSION  
**Table 4. COSTS PER ACRE to PRODUCE ALFALFA**  
 SACRAMENTO VALLEY 2003

Operation	Operation	Cash and Labor Cost per acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Weed-(Treflan)	0.06	1	0	21	0	22		
Insect-Aphid/Weevil(Warrior)	0.00	0	0	11	9	20		
Irrigate	1.26	12	0	96	0	108		
Insect-Worm (Lannate)	0.00	0	0	20	9	29		
Insect-Worm (Steward)	0.00	0	0	13	9	22		
Fertilize 1X/2Yr (11-52-0)	0.00	0	0	16	3	19		
Weed-Winter (Velpar/Karmex)	0.00	0	0	27	9	36		
Pickup Use	0.40	6	3	0	0	9		
ATV Use	0.24	4	1	0	0	4		
<b>TOTAL CULTURAL COSTS</b>	<b>1.96</b>	<b>23</b>	<b>4</b>	<b>205</b>	<b>38</b>	<b>270</b>		
Harvest:								
Harvest	0.00	0	0	0	196	196		
<b>TOTAL HARVEST COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>196</b>	<b>196</b>		
Interest on operating capital @ 7.14%						12		
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>23</b>	<b>4</b>	<b>205</b>	<b>234</b>	<b>479</b>		
CASH OVERHEAD:								
Liability Insurance						0		
Office Expense						35		
Crop Share 20% of Gross						140		
Property Taxes						1		
Property Insurance						1		
Investment Repairs						3		
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>180</b>		
<b>TOTAL CASH COSTS/ACRE</b>						<b>659</b>		
NON-CASH OVERHEAD:								
		Per producing acre		-- Annual Cost --				
				Capital Recovery				
Buildings		21		2		2		
Hay Barn		123		11		11		
Forklift		7		1		1		
Fuel Tanks		1		0		0		
Shop Tools		5		0		0		
Alfalfa Establishment Costs		264		77		77		
Equipment		25		4		4		
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>445</b>		<b>94</b>		<b>94</b>		
<b>TOTAL COSTS/ACRE</b>						<b>753</b>		

UC COOPERATIVE EXTENSION  
**Table 5. COSTS AND RETURNS PER ACRE to PRODUCE ALFALFA**  
 SACRAMENTO VALLEY 2003

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Hay	7.00	ton	100.00	700	
<b>OPERATING COSTS</b>					
<b>Herbicide:</b>					
Treflan TR 10	20.00	lb	1.05	21	
Velpar L	2.00	pint	9.50	19	
Karmex	1.50	lb	5.59	8	
<b>Insecticide:</b>					
Warrior T	3.80	floz	3.01	11	
Lannate 90 SP	1.00	lb	20.00	20	
Steward	7.00	floz	1.91	13	
<b>Custom:</b>					
Air Application	3.00	acre	9.00	27	
Swath, Rake, Bale, Roadside	7.00	ton	28.00	196	
Ground Application	1.00	acre	8.50	9	
Broadcast Fertilizer 1X/2Yr	0.50	acre	5.50	3	
<b>Irrigation:</b>					
Water	48.00	acin	2.00	96	
<b>Fertilizer:</b>					
11-52-0	100.00	lb	0.16	16	
Labor (machine)	0.84	hrs	13.14	11	
Labor (non-machine)	1.26	hrs	9.86	12	
Fuel - Gas	1.37	gal	1.58	2	
Fuel - Diesel	0.11	gal	1.11	0	
Lube				0	
Machinery repair				1	
Interest on operating capital				12	
<b>TOTAL OPERATING COSTS/ACRE</b>				479	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				221	
<b>CASH OVERHEAD COSTS:</b>					
Liability Insurance				0	
Office Expense				35	
Crop Share 20% of Gross				140	
Property Taxes				1	
Property Insurance				1	
Investment Repairs				3	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				180	
<b>TOTAL CASH COSTS/ACRE</b>				659	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery):</b>					
Buildings				2	
Hay Barn				11	
Forklift				1	
Fuel Tanks				0	
Shop Tools				0	
Alfalfa Establishment Costs				77	
Equipment				4	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				94	
<b>TOTAL COSTS/ACRE</b>				753	
<b>NET RETURNS ABOVE TOTAL COSTS</b>				-53	

UC COOPERATIVE EXTENSION  
**Table 6. MONTHLY CASH COSTS PER ACRE to PRODUCE ALFALFA**  
 SACRAMENTO VALLEY 2003

Beginning JAN 03	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 03	03	03	03	03	03	03	03	03	03	03	03	03	
Weed-(Treflan)	22												22
Weed-Winter (Velpar/Karmex)	36												36
Fertilize 1X/2Yr (11-52-0)	19												19
Insect-Aphid/Weevil (Warrior)			20										20
Irrigate				16	16	16	30	16	16				108
Insect-Worm (Lannate)							29						29
Insect-Worm (Steward)								22					22
Pickup Use	1	1	1	1	1	1	1	1	1				9
ATV Use	0	0	0	0	0	0	0	0	0				4
<b>TOTAL CULTURAL COSTS</b>	<b>78</b>	<b>2</b>	<b>22</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>60</b>	<b>40</b>	<b>17</b>				<b>270</b>
Harvest:													
Harvest				28	28	37	37	38	28				196
<b>TOTAL HARVEST COSTS</b>				<b>28</b>	<b>28</b>	<b>37</b>	<b>37</b>	<b>38</b>	<b>28</b>				<b>196</b>
Interest on operating capital	0	0	1	1	1	1	2	2	3				12
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>79</b>	<b>2</b>	<b>23</b>	<b>46</b>	<b>46</b>	<b>56</b>	<b>99</b>	<b>80</b>	<b>48</b>				<b>479</b>
OVERHEAD:													
Liability Insurance		0											0
Office Expense	3	3	3	3	3	3	3	3	3	3	3	3	35
Crop Share 20% of Gross										140			140
Property Taxes	0						0						1
Property Insurance	0						0						1
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	3
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>143</b>	<b>3</b>	<b>3</b>	<b>180</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>83</b>	<b>6</b>	<b>26</b>	<b>49</b>	<b>50</b>	<b>59</b>	<b>103</b>	<b>83</b>	<b>51</b>	<b>143</b>	<b>3</b>	<b>3</b>	<b>659</b>

UC COOPERATIVE EXTENSION  
**Table 7. RANGING ANALYSIS**  
 SACRAMENTO VALLEY 2003

COSTS PER ACRE TO PRODUCE ALFALFA AT VARYING YIELDS

Total Yield:	YIELD (ton/acre)						
	4.00	5.00	6.00	7.00	8.00	9.00	10.00
<b>OPERATING COSTS:</b>							
Cultural Cost	270	270	270	270	270	270	270
Harvest Cost	112	140	168	196	224	252	280
Interest on operating capital	11	11	12	12	13	13	14
<b>TOTAL OPERATING COSTS/acre</b>	<b>393</b>	<b>421</b>	<b>450</b>	<b>478</b>	<b>507</b>	<b>535</b>	<b>564</b>
Operating Cost/ton	98	84	75	68	63	59	56
<b>CASH OVERHEAD COSTS</b>							
<b>TOTAL CASH COSTS/acre</b>	<b>573</b>	<b>601</b>	<b>630</b>	<b>658</b>	<b>687</b>	<b>715</b>	<b>744</b>
Cash Costs/ton	143	120	105	94	86	79	74
<b>NON-CASH OVERHEAD COSTS</b>							
<b>TOTAL COSTS/acre</b>	<b>667</b>	<b>695</b>	<b>724</b>	<b>752</b>	<b>781</b>	<b>809</b>	<b>838</b>
Total Costs/ton	167	139	121	107	98	90	84

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE \$/ton	YIELD (ton/acre)						
	4.00	5.00	6.00	7.00	8.00	9.00	10.00
70.00	-113	-71	-30	12	53	95	136
80.00	-73	-21	30	82	133	185	236
90.00	-33	29	90	152	213	275	336
100.00	7	79	150	222	293	365	436
110.00	47	129	210	292	373	455	536
120.00	87	179	270	362	453	545	636
130.00	127	229	330	432	533	635	736
140.00	167	279	390	502	613	725	836

NET RETURN PER ACRE ABOVE CASH COST

PRICE \$/ton	YIELD (ton/acre)						
	4.00	5.00	6.00	7.00	8.00	9.00	10.00
70.00	-293	-251	-210	-168	-127	-85	-44
80.00	-253	-201	-150	-98	-47	5	56
90.00	-213	-151	-90	-28	33	95	156
100.00	-173	-101	-30	42	113	185	256
110.00	-133	-51	30	112	193	275	356
120.00	-93	-1	90	182	273	365	456
130.00	-53	49	150	252	353	455	556
140.00	-13	99	210	322	433	545	656

NET RETURNS PER ACRE ABOVE TOTAL COST

PRICE \$/ton	YIELD (ton/acre)						
	4.00	5.00	6.00	7.00	8.00	9.00	10.00
70.00	-387	-345	-304	-262	-221	-179	-138
80.00	-347	-295	-244	-192	-141	-89	-38
90.00	-307	-245	-184	-122	-61	1	62
100.00	-267	-195	-124	-52	19	91	162
110.00	-227	-145	-64	18	99	181	262
120.00	-187	-95	-4	88	179	271	362
130.00	-147	-45	56	158	259	361	462
140.00	-107	5	116	228	339	451	562

UC COOPERATIVE EXTENSION  
**Table 8. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,  
and BUSINESS OVERHEAD COSTS**  
SACRAMENTO VALLEY 2003

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
03 37HP 4WD Tractor	22,000	10	6,498	2,537	96	142	2,776
03 ATV	7,800	5	3,496	1,247	38	56	1,342
03 Pickup 1/2 Ton	24,000	5	10,756	3,838	117	174	4,129
03 Pickup 3/4 Ton	28,000	5	12,549	4,477	137	203	4,817
03 Spreader-Double Spinner	10,000	10	1,768	1,242	40	59	1,341
<b>TOTAL</b>	<b>91,800</b>		<b>35,067</b>	<b>13,342</b>	<b>429</b>	<b>634</b>	<b>14,405</b>
60% of New Cost *	55,080		21,040	8,005	257	381	8,643

\*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	
Building 2,400 sqft	60,000	20		5,338	203	300	1,200	7,041
Alfalfa Establishment	26,400	4		7,662	0	0	0	7,662
Forklift	21,500	15		2,250	73	108	430	2,860
Fuel Tanks	3,500	20		311	12	18	70	411
Hay Barn	49,000	20		4,359	166	245	980	5,750
Shop Tools	13,072	20	1,307	1,128	49	72	131	1,380
<b>TOTAL INVESTMENT</b>	<b>173,472</b>		<b>1,307</b>	<b>21,049</b>	<b>502</b>	<b>742</b>	<b>2,811</b>	<b>25,103</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Crop Share 20% of Gross	100.00	acre	140.00	14,000
Liability Insurance	2,900.00	acre	0.46	1,334
Office Expense	2,900.00	acre	35.00	101,500

UC COOPERATIVE EXTENSION  
**Table 9. HOURLY EQUIPMENT COSTS**  
SACRAMENTO VALLEY 2003

Yr Description	COSTS PER HOUR							
	Actual Hours Used	Cash Overhead			Operating			Total Costs/Hr.
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
03 37 HP 4WD Tractor	1,600.20	0.95	0.04	0.05	0.57	2.32	2.89	3.93
03 ATV	236.80	3.16	0.10	0.14	0.50	1.82	2.32	5.75
03 Pickup 1/2 Ton	399.70	5.76	0.18	0.26	1.78	4.54	6.32	12.52
03 Pickup 3/4 Ton	373.70	7.19	0.22	0.33	2.08	5.45	7.53	15.26
03 Spreader-Double Spinner	119.60	6.23	0.20	0.30	3.83	0.00	3.83	10.56



UC COOPERATIVE EXTENSION  
**Table 10. HARVEST COSTS WITH GROWER EQUIPMENT - ALFALFA (400 acres)**  
 SACRAMENTO VALLEY 2003

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre				Total Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	
Swathing	0.88	14	6	0	0	20
Raking	0.52	8	3	0	0	11
Baling	0.83	13	23	14	0	50
Roadsiding	0.37	6	15	0	0	20
<b>TOTAL HARVEST COSTS</b>	<b>2.60</b>	<b>41</b>	<b>47</b>	<b>14</b>	<b>0</b>	<b>102</b>
Interest on operating capital @ 7.14%						2
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>41</b>	<b>47</b>	<b>14</b>	<b>0</b>	<b>104</b>
<b>CASH OVERHEAD:</b>						
Property Taxes						4
Property Insurance						2
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>6</b>
<b>TOTAL CASH COSTS/ACRE</b>						<b>110</b>
<b>NON-CASH OVERHEAD:</b>						
Equipment						
<b>TOTAL NON-CASH OVERHEAD COSTS</b>						<b>70</b>
<b>TOTAL COSTS/ACRE</b>						<b>179</b>

SUMMARY OF COSTS PER ACRE TO HARVEST ALFALFA

Operation	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Bale Twine (3 twine/bale)	3,468	ft	0.004	14
Labor (machine)	3.12	hrs	13.140	41
Fuel - Diesel	12.37	gal	1.110	14
Lube				2
Machinery repair				31
Interest on operating capital				2
<b>TOTAL OPERATING COST/ACRE</b>				<b>104</b>

ANNUAL HARVEST EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
03 150HP 7810 4WD Tractor	102,012	10	30,113	11,765	447	661	12,873
03 37HP 4WD Tractor	22,000	10	6,498	2,537	96	142	2,776
03 Baler Standard PTO	58,988	10	9,736	7,380	232	344	7,956
03 Bale Wagon NH1095	112,600	10	18,585	14,087	443	656	15,186
03 Hay Rake 20'	19,305	10	3,414	2,398	77	114	2,588
03 Swather 14' Header	69,700	10	12,326	8,658	277	410	9,346
<b>TOTAL</b>	<b>384,605</b>		<b>80,692</b>	<b>46,826</b>	<b>1,573</b>	<b>2,326</b>	<b>50,725</b>
60% of New Cost*	230,763		48,415	28,095	944	1,396	30,435

UC COOPERATIVE EXTENSION  
**Table 11. OPERATIONS WITH EQUIPMENT**  
 SACRAMENTO VALLEY 2003

Operation	Operation Month	Equipment		Material	Rate/acre	Unit
		Tractor	Implement			
Cultural:						
Weed-Grasses (Treflan)	January	37 HP Tractor		Treflan TR-10	20.00	lb
Weed-Winter (Velpar/Karmex)	January	Ground-Custom		Velpar L	2.00	pt
				Karmex DF	1.50	lb
Fertilize 1X/2yrs (11-52-0)	January			11-52-0	100.00	lb
Insect-Aphid/Weevil- (Warrior) Irrigate	March	Air-Custom		Warrior T	3.80	floz
	April			Water	7.00	acin
	May			Water	7.00	acin
	June			Water	7.00	acin
	July			Water	13.00	acin
	August			Water	7.00	acin
	September			Water	7.00	acin
	Insect-Worm Lannate	July	Air-Custom		Lannate SP	0.50
Insect-Worm (Steward)	August	Air-Custom		Steward	7.00	floz
Pickup Truck Use	Annual	Pickup 3/4 Ton				
		Pickup 1/2 Ton				
ATV Use	Annual	ATV				
Harvest - Hay 6X	April	Custom		Baled Hay	1.00	ton
	May	Custom		Baled Hay	1.00	ton
	June	Custom		Baled Hay	1.33	ton
	July	Custom		Baled Hay	1.33	ton
	August	Custom		Baled Hay	1.34	ton
	September	Custom		Baled Hay	1.00	ton