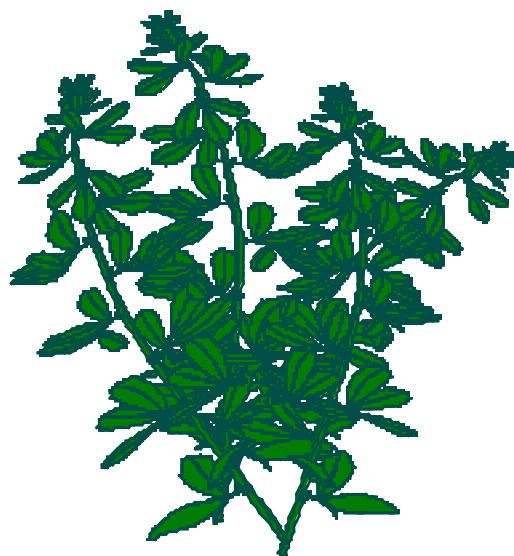

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2003

**SAMPLE COSTS TO
ESTABLISH AND PRODUCE**

ALFALFA



**SAN JOAQUIN VALLEY
300 Acre Planting**

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COSTS TO ESTABLISH AND PRODUCE ALFALFA

300 acres

San Joaquin Valley 2003

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INTRODUCTION

Sample costs to establish an alfalfa stand and produce alfalfa in the San Joaquin 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 hay and haylage in the San Joaquin Valley. Practices described represent production practices and materials considered typical of a well-managed alfalfa stand in the San Joaquin 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 1,200 non-contiguous acres of field and row crops of which 300 acres are alfalfa and the remaining 900 acres are planted to other crops such as cotton, corn, grains, processing tomatoes, and dry beans. It is assumed that a portion of the alfalfa is planted in a quarter section (160 acres). The farm is owned and 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 disking down the residue from the previous crop. The ground is chiseled to a depth of 18 to 24 inches to fracture the soil, which improves root penetration and water infiltration. The fields are laser leveled by a custom operator. Borders (levees) for irrigation checks are made at periodic intervals (60 feet in this study) through the field. The fields are then disced and harrowed to prepare the seedbed.

Planting. Alfalfa seed is planted with a Brillion seeder 1/4 inch to 1/2 inch deep at 25 to 30 pounds of seed per acre. The seed is planted in September and the stand life is expected to be three years.

Fertilization. Nitrogen (N) and phosphorus (P) as 11-52-0 at 300 pounds per acre of material are applied by a custom operator in September prior to the final disking. The fertilizer application in this study is assumed to be sufficient for 2 years; therefore one-half of the cost is allocated to the establishment year and one-half to the first production year. Depending upon preplant soil analysis results, potassium (K) may also be required.

Irrigation. Water for seed germination is applied immediately after planting (8 acre-inches). If winter rains do not occur, a second irrigation in October or early November may be necessary. Water is supplied by an irrigation district, although some growers may use or supplement with well water. Water prices vary among irrigation districts. The authors agreed that \$30 per acre-foot is a fair value for this study, based upon information from their respective counties.

Pest Management. For pest identification, monitoring, management and pesticide information, visit the UC IPM website at 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 2,4-DB herbicide (Butyrac) are applied in December for broadleaf weed and grass control. A custom applicator applies the herbicides.

Overhead Costs. One-half of the cash and non-cash overhead costs for the 300 acres are allocated to the previous crop.

Production Operating Costs

Irrigation. Irrigation includes the water cost and labor expense. From April to October, ten irrigations totaling 4.5 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. A semi-permanent drain ditch is made at the end of the field. All field operations turn inside the field and do not cross the drain.

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 150 pounds per acre, is applied in November of the second year and is assumed to be sufficient for the remaining stand life. Therefore, the cost is allocated over two years.

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. **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. During the first two years, a preemergence herbicide (Treflan TR-10) is applied in February for grass control or in February and April if dodder is expected. Residual herbicides (Velpar and Karmex) for control of winter weeds are applied in December of the first year and a contact herbicide (Gramoxone) in the second year. In April of the third year, a post emergence herbicide (Prism) is applied to control summer grasses. The stand is removed at the end of the third production year, hence no winter herbicide application. 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 (Lorsban) is applied by air in March. Worms (alfalfa caterpillar and armyworms) are controlled in July with an aerial insecticide (Lannate) application.

Harvest. In this study, the alfalfa is custom harvested for hay seven times; April, May, June, July, August, September, and October, and for haylage two times, March and November. (See Table 10 for hay harvested by the grower). 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 1,500-pound bales (47" W x 35" H x 98" L). The bales are picked up with a balewagon that moves them from the field and roadsides them in a stack. A conversion kit is attached to the standard balewagon to handle 1,500 bales. For haylage, the alfalfa is cut and wilted in the field, then chopped into a truck or trailer and taken to the dairy where it is placed in a bag, pile, or bunker for ensiling. Normally, these cuttings are for a dairy enterprise and are harvested by the buyer.

Custom Harvest. In this study, the custom harvester charges \$25 per ton to swath, rake, and bale and \$2.50 per 1,500 pound bale (\$3.33 per ton) to 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 8.00 tons of hay per acre at 90% dry matter (DM). In this study 7 tons is harvested as hay (90% DM) and 3.03 green tons (30% DM) or 1-ton hay equivalent, is harvested as haylage. Annual yields range from 5 to 11 tons of hay per acre in this region.

Returns. A price of \$125 per ton for premium hay is based on USDA California 2002 averages for the San Joaquin 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. The hay price in this study is based on 90% dry matter and the haylage on 30% dry matter. The buyer pays a price per green ton relative to the current hay market price less harvesting costs. In this study, the haylage return equals market price less harvest cost (buyer harvests haylage) times % haylage dry matter divided by % hay dry matter. $(\$125 - \$28) \times (30\% \text{ DM} / 90\% \text{ DM}) = \32.30 . (The common "rule of thumb" is to subtract the harvest costs from the hay market price and divide by 3). Table 9 shows grower returns based on hay yields ranging from 8 to 11 tons per acre with 87.5% of the hay yield harvested as hay and 12.5% harvested as haylage.

Pickup/ATV. The pickup and the all terrain vehicle (ATV) each travel 7.12 miles per acre for alfalfa production use or a total of 2,137 miles per vehicle per year. Costs are estimated and not based on any specific data.

Labor. Labor rates of \$13.14 per hour for machine operators and \$9.86 for general labor includes payroll overhead of 46%. The basic hourly wages are \$9.00 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 \$1,246 for the entire farm or \$1.04 per acre.

Office. Costs are estimated at \$25 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.

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 consists of underground lines with alfalfa valves. The cost for the 300 acres is based on a quarter section (160 acres) with one-quarter mile runs. There are two 18-inch mainlines each approximately 2,625 feet with 10 or 12-inch alfalfa valves every 60 feet and a quarter mile intertie line (connects two mainlines) with 12-inch PVC. The permanent irrigation system consists of wells, pumps and motors, and buried mainline included in the land purchase price.

Land. Cropland with district water suitable for alfalfa production typically ranges in value among counties from \$2,000 to \$5,500 per acre, except for Stanislaus County, which ranges from \$3,000 to \$8,500. The land in this study is owned by the grower and cost \$3,500 per acre.

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 \$346 per acre or \$103,800 for the 300 acres. The alfalfa stand establishment cost is amortized over the 3-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
 SAN JOAQUIN 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:								
Stubble Disc 2X	0.27	4	6	0	0	10		
Chisel Field	0.19	3	3	0	0	6		
Laser Level Field	0.00	0	0	0	75	75		
Make Borders	0.09	1	1	0	0	2		
Fertilize-1X/2Yrs (11-52-0)	0.00	0	0	24	3	26		
Finish Disc and Harrow	0.15	2	3	0	0	5		
Plant	0.26	4	3	81	0	88		
Irrigate 1X	0.18	2	0	20	0	22		
Weed-Winter (Raptor, 2,4-DB)	0.00	0	0	34	9	42		
Pickup Truck Use	0.12	2	1	0	0	3		
ATV Use	0.12	2	0	0	0	2		
TOTAL CULTURAL COSTS	1.37	21	17	158	86	283		
Interest on operating capital @ 7.14%						6		
TOTAL OPERATING COSTS/ACRE		21	17	158	86	289		
CASH OVERHEAD:*								
Liability Insurance						1		
Office Expense						20		
Property Taxes						30		
Property Insurance						1		
Investment Repairs						5		
TOTAL CASH OVERHEAD COSTS						57		
TOTAL CASH COSTS/ACRE						346		
NON-CASH OVERHEAD:*								
		Per producing acre		-- Annual Cost --				
				Capital Recovery				
Land		2,800		175		175		
Irrigation System		226		20		20		
Building		40		4		4		
Shop Tools		9		1		1		
Fuel Tanks		2		0		0		
Equipment		77		10		10		
TOTAL NON-CASH OVERHEAD COSTS		3,153		210		210		
TOTAL COSTS/ACRE						556		

*1/2 of alfalfa acres Overhead is allocated to previous crop

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Table 2. MATERIAL and INPUT COSTS to ESTABLISH ALFALFA
 SAN JOAQUIN VALLEY 2003

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
OPERATING COSTS					
Custom:					
Laser Level	1.00	acre	75.00	75	
Broadcast Fertilizer	0.50	acre	5.50	3	
Ground Application	1.00	acre	8.50	9	
Fertilizer:					
11-52-0	150.00	lb	0.16	24	
Seed:					
Alfalfa Seed (raw)	30.00	lb	2.60	78	
Inoculum (\$/seed lb)	30.00	sdlb	0.09	3	
Irrigation:					
Water	8.00	acin	2.50	20	
Herbicide:					
Raptor	4.00	floz	4.77	19	
Butyrac (2,4-DB)	2.00	pint	4.75	10	
Adjuvant:					
No Foam A	2.00	pint	2.70	5	
Labor (machine)	1.43	hrs	13.14	19	
Labor (non-machine)	0.18	hrs	9.86	2	
Fuel - Gas	0.47	gal	1.58	1	
Fuel - Diesel	8.39	gal	1.11	9	
Lube					2
Machinery repair					6
Interest on operating capital @ 7.14%					6
TOTAL OPERATING COSTS/ACRE					289

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Table 3. WHOLE FARM ANNUAL EQUIPMENT COSTS - ESTABLISHMENT YEAR
 SAN JOAQUIN 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 78104 WD Tractor	102,012	10	30,133	11,765	447	661	12,873
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 - Finish 18'	17,100	12	2,368	1,929	66	97	2,092
03 Disc - Stubble 18'	45,045	5	14,673	8,176	202	299	8,677
03 Disc - Border	2,100	12	291	237	8	12	257
03 Harrow - Spike 18'	772	12	107	87	3	4	94
03 Pickup 3/4 Ton	28,000	5	12,549	4,477	137	203	4,817
TOTAL	288,503		87,596	37,844	1,271	1,880	40,996
60% of New Cost *	173,102		52,558	22,706	763	1,128	24,597

*Used to reflect a mix of new and used equipment

UC COOPERATIVE EXTENSION
Table 4. COSTS PER ACRE to PRODUCE ALFALFA
 SAN JOAQUIN VALLEY 2003

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre				Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent		
Cultural:							
Weed-Grasses (TR-10)	0.00	0	0	21	9	30	
Make Semi-permanent Drain	0.01	0	0	0	0	1	
Insect-Aphid/Weevil (Lorsban)	0.00	0	0	12	9	21	
Weed-Spring (Prism)	0.00	0	0	20	9	28	
Irrigate - 10X	1.80	18	0	135	0	153	
Insect-Worm (Lannate)	0.00	0	0	10	9	19	
Fertilize 1X/2Yr	0.00	0	0	12	3	15	
Weed-Winter (Velpar/Karmex)	0.00	0	0	27	9	36	
Pickup Truck Use	0.24	4	2	0	0	6	
ATV Use	0.24	4	1	0	0	4	
TOTAL CULTURAL COSTS	2.28	25	2	237	46	311	
Harvest:							
Harvest - Haylage 2X*	0.00	0	0	0	0	0	
Harvest - Hay 7X	0.00	0	0	0	198	198	
TOTAL HARVEST COSTS	0.00	0	0	0	198	198	
Interest on operating capital @ 7.14%						9	
TOTAL OPERATING COSTS/ACRE		26	2	237	245	519	
CASH OVERHEAD:							
Liability Insurance						1	
Office Expense						25	
Property Taxes						38	
Property Insurance						2	
Investment Repairs						11	
TOTAL CASH OVERHEAD COSTS						77	
TOTAL CASH COSTS/ACRE						596	
NON-CASH OVERHEAD:							
		Per producing acre		-- Annual Cost -- Capital Recovery			
Land		3,500		219		219	
Building		50		4		4	
Hay Barn		41		4		4	
Fuel Tanks		3		0		0	
Shop Tools		11		1		1	
Irrigation System		451		40		40	
Alfalfa Establishment		346		130		130	
Equipment		14		2		2	
TOTAL NON-CASH OVERHEAD COSTS		4,416		400		400	
TOTAL COSTS/ACRE						996	

*Harvested by buyer

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

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Hay	7.00	ton	125.00	875	
Haylage	3.00	ton	32.30	97	
TOTAL GROSS RETURNS				972	
OPERATING COSTS					
Insecticide:					
Lorsban 4 E	2.00	pint	6.19	12	
Lannate 90 SP	0.50	lb	20.00	10	
Custom:					
Air Application	2.00	acre	9.00	18	
Buyer Harvests	3.00	ton	0.00	0	
Ground Application	3.00	acre	8.50	25	
Swath, Rake, Bale	7.00	ton	25.00	175	
Roadside Hay 1500 lb bale	7.00	ton	3.33	23	
Broadcast Fertilizer 1X/2Yr	0.50	acre	5.50	3	
Herbicide:					
Treflan TR-10	20.00	lb	1.05	21	
Prism	1.00	pint	19.62	20	
Velpar L	2.00	pint	9.50	19	
Karmex DF	1.50	lb	5.59	8	
Irrigation:					
Water	54.00	acin	2.50	135	
Fertilizer:					
11-52-0	75.00	lb	0.16	12	
Labor (machine)	0.58	hrs	13.14	8	
Labor (non-machine)	1.82	hrs	9.86	18	
Fuel - Gas	0.95	gal	1.58	2	
Fuel - Diesel	0.08	gal	1.11	0	
Lube				0	
Machinery repair				1	
Interest on operating capital @ 7.14%				9	
TOTAL OPERATING COSTS/ACRE				519	
NET RETURNS ABOVE OPERATING COSTS				453	
CASH OVERHEAD COSTS:					
Liability Insurance				1	
Office Expense				25	
Property Taxes				38	
Property Insurance				2	
Investment Repairs				11	
TOTAL CASH OVERHEAD COSTS/ACRE				77	
TOTAL CASH COSTS/ACRE				596	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Land				219	
Building				4	
Hay Barn				4	
Fuel Tanks				0	
Shop Tools				1	
Irrigation System				40	
Alfalfa Establishment				130	
Equipment				2	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				400	
TOTAL COSTS/ACRE				996	
NET RETURNS ABOVE TOTAL COSTS				-24	

UC COOPERATIVE EXTENSION
Table 6. MONTHLY CASH COSTS PER ACRE to PRODUCE ALFALFA
 SAN JOAQUIN 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-Grasses (TR-10)		30											30
Make Semi-permanent Drain			1										1
Insect-Aphid/Weevil (Lorsban)			21										21
Weed-Spring (Prism)				28									28
Irrigate - 10X				15	15	31	31	31	15	15			153
Insect-Worm (Lannate)							19						19
Fertilize 1X/2Yr											15		15
Weed-Winter (Velpar/Karmex)												36	36
Pickup Truck Use	0	0	0	0	0	0	0	0	0	0	0	0	6
ATV Use	0	0	0	0	0	0	0	0	0	0	0	0	4
TOTAL CULTURAL COSTS	1	30	22	44	16	31	50	31	16	16	15	37	311
Harvest:													
Harvest - Haylage*			0								0		0
Harvest - Hay				28	28	28	28	28	28	28			198
TOTAL HARVEST COSTS			0	28	28	28	28	28	28	28	0		198
Interest on operating capital	0	0	0	1	1	1	2	2	2	-1	0	0	9
TOTAL OPERATING COSTS/ACRE	1	30	23	73	45	61	80	61	46	44	15	36	519
TOTAL OPERATING COSTS/ton**	€	4	€	5	€	€	10	€	€	€	2	€	65
OVERHEAD:													
Liability Insurance			1										1
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2	25
Property Taxes	19							19					38
Property Insurance	1							1					1
Investment Repairs	1	1	1	1	1	1	1	1	1	1	1	1	11
TOTAL CASH OVERHEAD COSTS	23	4	3	3	3	3	23	3	3	3	3	3	77
TOTAL CASH COSTS/ACRE	24	5	26	76	48	64	103	64	50	47	18	39	596
TOTAL CASH COSTS/ton**	€	1	€	10	€	€	1€	€	€	€	2	€	75

*Harvested by buyer **Based on 8 hay tons

UC COOPERATIVE EXTENSION
Table 7. RANGING ANALYSIS
 SAN JOAQUIN VALLEY 2003

COSTS PER ACRE TO PRODUCE ALFALFA AT VARYING YIELDS

bold in tables = data in study	YIELD (ton/acre)							
	Total Yield as Hay:	5.00	6.00	7.00	8.00	9.00	10.00	11.00
OPERATING COSTS:								
Cultural Cost		311	311	311	311	311	311	311
Harvest Cost - Hay		124	149	174	198	223	248	273
Interest on operating capital		8	9	9	9	10	10	11
TOTAL OPERATING COSTS/acre		443	469	494	518	544	569	595
Operating Cost/ton		89	78	71	65	60	57	54
CASH OVERHEAD COSTS								
TOTAL CASH COSTS/acre		520	546	571	595	621	646	672
Cash Costs/ton		104	91	82	74	69	65	61
NON-CASH OVERHEAD COSTS								
TOTAL COSTS/acre		920	946	971	995	1,021	1,046	1,072
Total Costs/ton		184	158	139	124	113	105	97

NET RETURNS PER ACRE ABOVE OPERATING COSTS

\$/ton		YIELD (ton/acre)						
Hay		4.38	5.25	6.13	7.00	7.88	8.75	9.63
	Haylage	1.88	2.25	2.63	3.00	3.38	3.75	4.13
110.00	27.31	90	170	252	334	415	496	577
120.00	30.64	140	230	323	414	505	596	687
125.00	32.30	165	260	358	454	550	646	742
130.00	33.97	190	290	393	494	595	696	797
140.00	37.30	240	350	463	574	685	796	907
150.00	40.63	290	410	533	654	775	896	1,017
160.00	43.96	340	470	603	734	865	996	1,128
170.00	47.29	390	530	673	814	955	1,096	1,238

NET RETURN PER ACRE ABOVE CASH COST

\$/ton		YIELD (ton/acre)						
Hay		4.38	5.25	6.13	7.00	7.88	8.75	9.63
	Haylage	1.88	2.25	2.63	3.00	3.38	3.75	4.13
110.00	27.31	13	93	175	257	338	419	500
120.00	30.64	63	153	246	337	428	519	610
125.00	32.30	88	183	281	377	473	569	665
130.00	33.97	113	213	316	417	518	619	720
140.00	37.30	163	273	386	497	608	719	830
150.00	40.63	213	333	456	577	698	819	940
160.00	43.96	263	393	526	657	788	919	1,051
170.00	47.29	313	453	596	737	878	1,019	1,161

NET RETURNS PER ACRE ABOVE TOTAL COST

\$/ton		YIELD (ton/acre)						
Hay		4.38	5.25	6.13	7.00	7.88	8.75	9.63
	Haylage	1.88	2.25	2.63	3.00	3.38	3.75	4.13
110.00	27.31	-387	-307	-225	-143	-62	19	100
120.00	30.64	-337	-247	-154	-63	28	119	210
125.00	32.30	-312	-217	-119	-23	73	169	265
130.00	33.97	-287	-187	-84	17	118	219	320
140.00	37.30	-237	-127	-14	97	208	319	430
150.00	40.63	-187	-67	56	177	298	419	540
160.00	43.96	-137	-7	126	257	388	519	651
170.00	47.29	-87	53	196	337	478	619	761

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

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
03 150HP 7810 4WDTractor	102,012	10	30,133	11,765	447	661	12,873
03 ATV	7,800	5	3,496	1,247	38	56	1,342
03 Ditcher - V	7,800	12	1,080	880	30	44	954
03 Pickup 3/4 Ton	28,000	5	12,549	4,477	137	203	4,817
TOTAL	145,612		47,258	18,370	652	964	19,986
60% of New Cost*	87,367		28,355	11,022	391	579	11,992

*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	103,800	3		39,012	0	0	0	39,012
Fuel Tanks	3,500	20		311	12	18	70	411
Hay Barn	49,000	20		4,359	166	245	980	5,750
Irrigation System	135,300	20		12,036	457	676	2,706	15,876
Land	4,200,000	20	4,200,000	262,500	0	42,000	0	304,500
Shop Tools	13,072	20	1,307	1,128	49	72	131	1,380
TOTAL INVESTMENT	4,564,672		4,201,307	324,685	886	43,311	5,087	373,969

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	1,200.00	acre	1.04	1,248
Office Expense	1,200.00	acre	25.00	30,000

UC COOPERATIVE EXTENSION
Table 9. HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY 2003

Yr Description	COSTS PER HOUR							
	Actual Hours Used	Capital Recovery	Cash Overhead			Operating		Total Costs/Hr.
			Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
03 150HP 7810 4WDTractor	1,599.70	4.41	0.17	0.25	2.65	11.11	13.76	18.58
03 ATV	284.20	3.41	0.10	0.15	0.57	1.82	2.39	6.06
03 Ditcher - V	165.50	3.19	0.11	0.16	2.11	0	2.11	5.57
03 Pickup 3/4 Ton	400.30	6.71	0.21	0.30	2.08	5.45	7.53	14.75

UC COOPERATIVE EXTENSION
Table 10. GROWER COSTS PER ACRE to HARVEST ALFALFA HAY
 SAN JOAQUIN 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	1.03	16	7	0	0	23
Raking	0.60	9	4	0	0	13
Baling	0.72	11	19	4	0	35
Roadsiding	0.20	3	9	0	0	12
TOTAL HARVEST COSTS	2.55	40	38	4	0	83
Interest on operating capital @ 7.14%						1
TOTAL OPERATING COSTS/ACRE		40	38	4	0	84
CASH OVERHEAD:						
Property Taxes						5
Property Insurance						4
TOTAL CASH OVERHEAD COSTS						9
TOTAL CASH COSTS/ACRE						93
NON-CASH OVERHEAD:						
Equipment						106
TOTAL NON-CASH OVERHEAD COSTS						106
TOTAL COSTS/ACRE						199

SUMMARY OF COSTS PER ACRE TO HARVEST ALFALFA

Operation	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Labor (machine)	3.07	hrs	13.140	40
Fuel - Diesel	9.96	gal	1.110	11
Lube				2
Machinery repair				26
Interest on operating capital				1
TOTAL OPERATING COST/ACRE				84

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 3/4 Ton bale	86,000	10	14,194	10,759	339	501	11,599
03 Bale Wagon NH1095	112,600	10	18,585	14,087	443	656	15,186
03 Bale Wagon 1500 lb Bale Attachment	21,450	10	3,540	2,684	84	125	2,893
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
	433,067		88,690	52,889	1,764	2,609	57,261
60% of New Cost*	259,840		53,214	31,733	1,058	1,565	34,357

* Used to reflect a mix of new and used equipment

UC COOPERATIVE EXTENSION
Table 11. OPERATIONS WITH EQUIPMENT
 SAN JOAQUIN VALLEY 2003

Operation	Operation Month	Equipment		Material	Rate/acre	Unit
		Tractor	Implement			
Cultural:						
Weed-Grasses (TR-10)	February	Ground-Custom		Treflan TR-10	20.00	lb
Make Semi-permanent Drain	March	150 HP 4WD	Ditcher-V			
Insect-Aphid/Weevil-Lorsban	March	Air-Custom		Lorsban 4	2.00	pt
Weed-Prism	April	Ground-Custom		Prism	1.00	pt
Irrigate - 10X	April			Water	5.40	acin
	May			Water	5.40	acin
	June			Water	10.80	acin
	July			Water	10.80	acin
	August			Water	10.80	acin
	September			Water	5.40	acin
	October			Water	5.40	acin
Insect-Worm Lannate	July	Air-Custom		Lannate SP	0.50	lb
Fertilize 1/2 cost	November	Ground-Custom		11-52-0	75.00	lb
Weed-Winter Velpar/Karmex	December	Ground-Custom		Velpar L	2.00	pt
				Karmex DF	1.50	lb
Pickup Truck Use	Annual	Pickup 3/4 Ton				
ATV Use	Annual	ATV				
Harvest - Haylage 2X	March	Buyer				
	November	Buyer				
Harvest - Hay 7X	April	Custom				
	May	Custom				
	June	Custom				
	July	Custom				
	August	Custom				
	September	Custom				
	October	Custom				