
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2008

SAMPLE COSTS TO
ESTABLISH AND PRODUCE

ALFALFA



SAN JOAQUIN VALLEY

300 Acre Planting

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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 1-3)

Tables 1 through 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 (stubble disc) 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 discing. 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. Preplant soil testing for phosphorous (P) and potassium (K) is recommended. In this study, the PCA collects one soil sample per 20 acres and the cost shown in Table 1 is the analysis or lab fee.

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 \$36 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 establishment year costs for the 300 acres are allocated to the previous crop.

Production Operating Costs (Tables 4-11)

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. Water costs will vary considerably depending upon the irrigation district. A cost of \$3 per acre inch (\$36 per acre foot) is used in this study.

Fertilization. Once the stand is established, plant tissue tests should be taken to determine nutrient requirements. Tissue testing in this study is done each year to determine the levels of P and K. Costs shown are for the analysis based on one sample per 20 acres collected by the PCA. Tissue samples should be scheduled once during the growing season and your ag consultant (PCA) may recommend this be done either in the spring or fall. Being fertilizer is applied in the establishment year and/or every two to three years, in this study, an allocation of phosphorous as 11-52-0, at 75 pounds per acre is charged to the field each year. The fertilizer is applied in November.

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.

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 PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. It is assumed in this study that PCA services are provided by the 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 at the end of the first year and a contact herbicide (Gramoxone) at the end of the second year. In May of the third year, a post emergence herbicide (SelectMax) 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 pests that cause the most economic damage. 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. 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 pound bales. For growers using their own equipment, see Table 10. 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, haylage is for a dairy enterprise and is harvested by the buyer.

Custom Harvest. Some harvesting companies swath, rake, bale, and roadside (pickup bales and stack) the harvested alfalfa for a single fee based on a one ton per acre yield. In this study, the custom harvester charges are swathing \$12 per acre, raking \$7 per acre, baling \$17 per ton, and roadsiding \$5.00 per large bale (\$6.65 per ton).

Yields. The crop is assumed to yield 9.00 tons of hay per acre at 90% dry matter (DM). In this study 8 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 \$185 per ton for premium hay is based on USDA California 2007 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 haylage 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. $(\$185 - \$45) \times (30\%DM/90\%DM) = \46.67 . (The common "rule of thumb" is to subtract the harvest costs from the hay market price and divide by 3). Table 7 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) are used for business purposes as needed. Costs are estimated and not based on any specific data.

Labor, Equipment and Interest

Labor. Labor rates of \$14.28 per hour for machine operators and \$10.88 for general labor includes payroll overhead of 36%. The basic hourly wages are \$10.50 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 (personal email from California Department of Insurance, March 2008, unreferenced). Labor costs for operations involving machinery are 20% higher than the operation time given in Tables 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 power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$4.05 and \$3.45 per gallon, respectively. The costs are based on 2007-2008 (November to April) American Automobile Association (AAA) and Department of Energy (DOE) 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 costs per acre for each operation in Tables 1 and 4 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.

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. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of April 2008.

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. 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 0.740% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,350 for the entire farm.

Office. Costs are estimated at \$30 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. An interest rate of 4.25% is used to calculate capital recovery. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic rate suggested by a farm lending agency as of April 2008.

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 \$2,500 to \$20,000 per acre (2007 Trends & Leases). The land in this study is owned by the grower and cost \$7,200 per acre. Land rents for cropland with district water range from \$125 to \$300 per acre and may vary according to value or type of crop planted.

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 \$478 per acre or \$143,400 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 2008

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:								
Fertilize: Soil Sample (P&K)	0.00	0	0	0	2	2		
Land Prep: Disc Stubble 2X	0.27	5	14	0	0	19		
Land Prep: Chisel Field	0.19	3	9	0	0	13		
Land Prep: Laser Level Field	0.00	0	0	0	75	75		
Land Prep: Border Preparation 3X	0.09	1	3	0	0	5		
Fertilize 50% of cost. 1X per 2 yrs. (11-52-0)	0.00	0	0	60	5	65		
Land Prep: Finish Disc and Harrow	0.15	3	8	0	0	11		
Plant	0.33	6	13	90	0	109		
Irrigate	0.18	2	0	24	0	26		
Weed: winter weeds (Raptor, Butyrac)	0.00	0	0	39	9	48		
Pickup Truck Use	0.12	2	2	0	0	4		
ATV Use	0.12	2	0	0	0	2		
TOTAL CULTURAL COSTS	1.45	23	50	213	91	377		
Interest on operating capital @ 6.75%						8		
TOTAL OPERATING COSTS/ACRE		23	50	213	91	385		
CASH OVERHEAD:								
Liability Insurance						1		
Office Expense						24		
Property Taxes						60		
Property Insurance						2		
Investment Repairs						6		
TOTAL CASH OVERHEAD COSTS						93		
TOTAL CASH COSTS/ACRE						478		
NON-CASH OVERHEAD (Capital Recovery):		Per producing		-- Annual Cost --				
		acre		Capital Recovery				
Land		5,800		247		247		
Irrigation System		250		19		19		
Building 2400 sqft		53		4		4		
Shop Tools		10		1		1		
Fuel Overhead		2		0		0		
Equipment		97		11		11		
TOTAL NON-CASH OVERHEAD COSTS		6,213		282		282		
TOTAL COSTS/ACRE						760		

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Table 2. MATERIAL and INPUT COSTS to ESTABLISH ALFALFA
 SAN JOAQUIN VALLEY 2008

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
OPERATING COSTS					
Custom:					
Soil Analysis (P)	0.05	each	18.00	1	
Soil Analysis (K)	0.05	each	18.00	1	
Laser Level	1.00	acre	75.00	75	
Broadcast Fertilizer	0.50	acre	9.50	5	
Ground Application	1.00	acre	9.00	9	
Fertilizer:					
11-52-0	150.00	lb	0.40	60	
Seed:					
Alfalfa Seed (coated)	30.00	lb	3.00	90	
Irrigation:					
Water	8.00	acin	3.00	24	
Herbicide:					
Raptor	4.00	floz	5.56	22	
Butyrac (2,4-DB)	2.00	pint	4.94	10	
Adjuvant:					
No Foam A	3.37	7	3.37	7	
Labor (machine)	14.28	22	14.28	22	
Labor (non-machine)	10.88	2	10.88	2	
Fuel - Gas	3.45	1	3.45	1	
Fuel - Diesel	4.05	36	4.05	36	
Lube		6		6	
Machinery repair		7		7	
Interest on operating capital @ 6.75%		8		8	
TOTAL OPERATING COSTS/ACRE		385		385	

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Table 3. WHOLE FARM ANNUAL EQUIPMENT COSTS - ESTABLISHMENT YEAR
 SAN JOAQUIN VALLEY 2008

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
08 115HP 7420 MFWD Tractor	75,874	10	22,412	7,626	364	491	8,481
08 150HP 78104 WD Tractor	114,342	10	33,775	11,493	548	741	12,781
08 ATV	7,800	5	3,496	1,122	42	56	1,220
08 Brillion Seeder 12'	14,169	7	3,615	1,928	66	89	2,083
08 Chisel - Heavy 15'	14,166	12	1,962	1,403	60	81	1,543
08 Disc - Finish 18'	22,534	12	3,121	2,231	95	128	2,454
08 Disc - Stubble 18'	29,000	5	9,446	4,825	142	192	5,159
08 Disc - Border	2,800	12	388	277	12	16	305
08 Harrow - Spike 14'	772	12	107	76	3	4	84
08 Pickup 3/4 Ton	32,000	5	14,342	4,604	171	232	5,007
TOTAL	313,457		92,664	35,586	1,503	2,031	39,119
60% of New Cost *	188,074		55,598	21,351	902	1,218	23,471

*Used to reflect a mix of new and used equipment

UC COOPERATIVE EXTENSION
Table 4. COSTS PER ACRE to PRODUCE ALFALFA HAY
 SAN JOAQUIN VALLEY 2008

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	22	9	31	
Irrigate: Make Semi-permanent Drain	0.01	0	0	0	0	0	
Insect: Aphid, Weevil (Lorsban)	0.00	0	0	11	11	22	
Irrigate: 10X	1.80	20	0	162	0	182	
Weed: Summer Grasses (SelectMax)	0.00	0	0	20	9	29	
Insect; Worm (Lannate)	0.00	0	0	10	11	21	
Fertilizer: Tissue Sampling (analysis)	0.00	0	0	0	1	1	
Fertilize: (11-52-0)	0.00	0	0	30	10	40	
Weed: Winter (Velpar, Karmex)	0.00	0	0	29	9	38	
Pickup Truck Use	0.24	4	3	0	0	7	
ATV Use	0.24	4	1	0	0	5	
TOTAL CULTURAL COSTS	2.29	28	4	283	60	375	
HARVEST:							
Haylage 2X (harvested by buyer)	0.02	0	0	0	0	0	
Hay 7X (swath, rake, bale, roadside)	0.00	0	0	0	322	322	
TOTAL HARVEST COSTS	0.00	0	0	0	322	322	
Interest on operating capital @ 6.75%						11	
TOTAL OPERATING COSTS/ACRE		28	4	283	382	708	
CASH OVERHEAD:							
Liability Insurance						1	
Office Expense						30	
Property Taxes						76	
Property Insurance						2	
Investment Repairs						13	
TOTAL CASH OVERHEAD COSTS						122	
TOTAL CASH COSTS/ACRE						830	
NON-CASH OVERHEAD:							
		Per producing acre		-- Annual Cost -- Capital Recovery			
Land		7,250		308		308	
Building(s)		67		5		5	
Hay Barn		63		5		5	
Fuel Tanks		3		0		0	
Shop Tools		13		1		1	
Irrigation System		500		38		38	
Alfalfa Establishment		478		173		173	
Equipment		16		2		2	
TOTAL NON-CASH OVERHEAD COSTS		8,389		532		532	
TOTAL COSTS/ACRE						1,362	

X = number of times as 2X = 2 passes or times

UC COOPERATIVE EXTENSION
Table 5. COSTS AND RETURNS PER ACRE to PRODUCE ALFALFA HAY
 SAN JOAQUIN VALLEY 2008

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Hay	8.00	ton	185.00	1,480	
Silage	3.00	ton	46.67	140	
TOTAL GROSS RETURNS				1,620	
OPERATING COSTS					
Insecticide:					
Lorsban 4 E	2.00	pint	5.63	11	
Lannate 90 SP	0.50	lb	20.00	10	
Custom:					
Air Application	2.00	acre	11.00	22	
Buyer Harvests	3.00	ton	0.00	0	
Ground Application	3.00	acre	9.00	27	
Swath, Rake	7.00	acre	19.00	133	
Bale (1,500 lb bale)	8.00	ton	17.00	136	
Roadside Hay	8.00	ton	6.65	53	
Tissue Analysis (P, K)	0.05	each	20.50	1	
Broadcast Fertilizer	1.00	acre	9.50	10	
Herbicide:					
Treflan TR-10	20.00	lb	1.10	22	
SelectMax	16.00	floz	1.22	20	
Velpar L	2.00	pint	10.18	20	
Karmex	1.50	lb	5.44	8	
Irrigation:					
Water	54.00	acin	3.00	162	
Fertilizer:					
11-52-0	75.00	lb	0.40	30	
Labor (machine)	0.58	hrs	14.28	8	
Labor (non-machine)	1.82	hrs	10.88	20	
Fuel (Gas)	0.83	gal	3.45	3	
Fuel (Diesel)	0.08	gal	4.05	0	
Lube				0	
Machinery repair				1	
Interest on operating capital @ 6.75%				11	
TOTAL OPERATING COSTS/ACRE				708	
NET RETURNS ABOVE OPERATING COSTS				912	
CASH OVERHEAD COSTS:					
Liability Insurance				1	
Office Expense				30	
Property Taxes				76	
Property Insurance				2	
Investment Repairs				13	
TOTAL CASH OVERHEAD COSTS/ACRE				122	
TOTAL CASH COSTS/ACRE				830	
NON-CASH OVERHEAD COSTS (Capital Recovery):					
Land				308	
Building(s)				5	
Hay Barn				5	
Fuel Tanks				0	
Shop Tools				1	
Irrigation System				38	
Alfalfa Establishment				173	
Equipment				2	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				532	
TOTAL COSTS/ACRE				1,362	
NET RETURNS ABOVE TOTAL COSTS				258	

UC COOPERATIVE EXTENSION

**Table 6. MONTHLY CASH COSTS PER ACRE to PRODUCE ALFALFA
SAN JOAQUIN VALLEY 2008**

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	
CULTURAL:													
Weed: Grasses (TR-10)		31											31
Irrigate: Make Semi-permanent Drain			1										1
Insect: Aphid, Weevil (Lorsban)			22										22
Irrigate: 10X				18	18	36	36	36	18	18			182
Weed: Summer Grasses (SelectMax)					29								29
Insect; Worm (Lannate)							21						21
Fertilizer: Tissue Sampling (analysis)								1					1
Fertilize: (11-52-0)											40		40
Weed: Winter (Velpar, Karmex)												38	38
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1	7
ATV Use	0	0	0	0	0	0	0	0	0	0	0	0	5
TOTAL CULTURAL COSTS	1	32	24	19	48	37	58	38	19	19	41	39	375
HARVEST:													
Haylage 2X (harvested by buyer)			0								0		0
Hay 7X (swath, rake, bale, roadside)				43	43	43	54	54	43	43			322
TOTAL HARVEST COSTS	0	0	0	43	43	43	54	54	43	43	0	0	322
Interest on operating capital @ 6.75%	0	0	0	1	1	2	2	3	3	-1	0	0	11
TOTAL OPERATING COSTS/ACRE	1	32	24	62	92	82	115	96	65	61	40	38	708
TOTAL OPERATING COSTS/TON (9 ton)	0	4	3	7	10	9	13	11	7	7	4	4	79
CASH OVERHEAD:													
Liability Insurance								1					1
Office Expense	3	3	3	3	3	3	3	3	3	3	3	3	30
Property Taxes	38						38						76
Property Insurance	1						1						2
Investment Repairs	1	1	1	1	1	1	1	1	1	1	1	1	13
TOTAL CASH OVERHEAD COSTS	43	4	4	4	4	4	43	5	4	4	4	4	122
TOTAL CASH COSTS/ACRE	44	36	28	66	95	85	158	100	69	65	44	42	830
TOTAL CASH COSTS/TON (9 ton)	5	4	3	7	11	9	18	11	8	7	5	5	92

UC COOPERATIVE EXTENSION

Table 7. RANGING ANALYSIS

SAN JOAQUIN VALLEY 2008

COSTS PER ACRE TO PRODUCE ALFALFA AT VARYING YIELDS

	Total Yield as Hay:	YIELD (ton/acre)						
		5.00	6.00	7.00	8.00	9.00	10.00	11.00
OPERATING COSTS:								
Cultural Cost		375	375	375	375	375	375	375
Harvest Cost – Hay (swath, rake, bale, roadside)		251	275	299	322	346	370	393
Interest on operating capital @ 6.75%		10	10	10	11	11	11	12
TOTAL OPERATING COSTS/ACRE		636	660	684	708	732	756	780
Operating Cost/ton		127	110	98	88	81	76	71
CASH OVERHEAD COSTS								
TOTAL CASH COSTS/ACRE		758	782	806	830	854	878	902
Cash Costs/ton		152	130	115	104	95	88	82
NON-CASH OVERHEAD COSTS								
TOTAL COSTS/ACRE		1,290	1,314	1,338	1,362	1,386	1,410	1,434
Total Costs/ton		258	219	191	170	154	141	130

NET RETURNS PER ACRE ABOVE OPERATING COSTS

\$/ton	YIELD (ton/acre)						
Hay	5.00	6.00	7.00	8.00	9.00	10.00	11.00
125.00	-11	90	191	292	393	494	595
135.00	39	150	261	372	483	594	705
145.00	89	210	331	452	573	694	815
155.00	139	270	401	532	663	794	925
165.00	189	330	471	612	753	894	1,035
175.00	239	390	541	692	843	994	1,145
185.00	289	450	611	772	933	1,094	1,255
195.00	339	510	681	852	1,023	1,194	1,365
205.00	389	570	751	932	1,113	1,294	1,475
215.00	439	630	821	1,012	1,203	1,394	1,585
225.00	489	690	891	1,092	1,293	1,494	1,695
235.00	539	750	961	1,172	1,383	1,594	1,805

NET RETURNS PER ACRE ABOVE CASH COSTS

\$/ton	YIELD (ton/acre)						
Hay	5.00	6.00	7.00	8.00	9.00	10.00	11.00
125.00	-133	-32	69	170	271	372	473
135.00	-83	28	139	250	361	472	583
145.00	-33	88	209	330	451	572	693
155.00	17	148	279	410	541	672	803
165.00	67	208	349	490	631	772	913
175.00	117	268	419	570	721	872	1,023
185.00	167	328	489	650	811	972	1,133
195.00	217	388	559	730	901	1,072	1,243
205.00	267	448	629	810	991	1,172	1,353
215.00	317	508	699	890	1,081	1,272	1,463
225.00	367	568	769	970	1,171	1,372	1,573
235.00	417	628	839	1,050	1,261	1,472	1,683

UC COOPERATIVE EXTENSION

Table 7. CONTINUED

NET RETURNS PER ACRE ABOVE TOTAL COSTS

\$/ton	YIELD (ton/acre)						
	5.00	6.00	7.00	8.00	9.00	10.00	11.00
Hay							
125.00	-665	-564	-463	-362	-261	-160	-59
135.00	-615	-504	-393	-282	-171	-60	51
145.00	-565	-444	-323	-202	-81	40	161
155.00	-515	-384	-253	-122	9	140	271
165.00	-465	-324	-183	-42	99	240	381
175.00	-415	-264	-113	38	189	340	491
185.00	-365	-204	-43	118	279	440	601
195.00	-315	-144	27	198	369	540	711
205.00	-265	-84	97	278	459	640	821
215.00	-215	-24	167	358	549	740	931
225.00	-165	36	237	438	639	840	1,041
235.00	-115	96	307	518	729	940	1,151

UC COOPERATIVE EXTENSION
**Table 8. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,
and BUSINESS OVERHEAD COSTS**
SAN JOAQUIN VALLEY 2008

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes		
08 150HP 7810 4WDTractor	114,342	10	33,775	11,493	548	741		12,781
08 ATV	7,800	5	3,496	1,122	42	56		1,220
08 Ditcher - V	8,500	12	1,177	842	36	48		926
08 Pickup 3/4 Ton	32,000	5	14,342	4,604	171	232		5,007
TOTAL	162,642		52,790	18,060	797	1,077		19,935
60% of New Cost*	97,585		31,674	10,836	478	646		11,961

*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	80,000	20		6,018	296	400	1,600	8,314
Alfalfa Establishment	143,400	3		51,919	0	0	0	51,919
Fuel Tanks	3,500	20		263	13	18	70	364
Hay Barn	75,000	20		5,641	278	375	1,500	7,794
Irrigation System	150,000	25		11,283	555	750	3,000	15,588
Land	8,700,000	20	8,700,000	369,750	0	87,000	0	456,750
Shop Tools	15,000	20	1,307	1,086	60	82	131	1,358
TOTAL INVESTMENT	9,166,900		8,701,307	445,960	1,202	88,624	6,301	542,087

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Price/ Unit	Total Cost
Liability Insurance	1,200.00	acre 1.13	1,356
Office Expense	1,200.00	acre 30.00	36,000

UC COOPERATIVE EXTENSION
Table 9. HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY 2008

Yr Description	Actual Hours Used	COSTS PER HOUR						
		Cash Overhead			Operating			
		Capital Recovery	Insur- ance	Taxes	Fuel & Repairs	Lube	Total Oper.	Total Costs/Hr.
08 150HP 7810 4WDTractor	1,600	4.31	0.21	0.28	3.07	40.55	43.62	48.42
08 ATV	284	2.37	0.09	0.12	0.51	1.98	2.49	5.07
08 Ditcher - V	166	3.05	0.13	0.18	2.39	0	2.39	5.75
08 Pickup 3/4 Ton	400	6.90	0.26	0.35	2.39	11.9	14.29	21.80

UC COOPERATIVE EXTENSION
Table 10. GROWER COSTS PER ACRE to HARVEST ALFALFA HAY
 SAN JOAQUIN VALLEY 2008

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	18	7	0	0	25
Raking	0.60	10	8	0	0	18
Baling	0.72	12	43	4	0	59
Roadsiding	0.20	3	16	0	0	20
TOTAL HARVEST COSTS	2.55	44	74	4	0	122
Interest on operating capital @ 6.75%						2
TOTAL OPERATING COSTS/ACRE		44	74	4	0	124
CASH OVERHEAD:						
Property Taxes						6
Property Insurance						4
TOTAL CASH OVERHEAD COSTS						10
TOTAL CASH COSTS/ACRE						133
NON-CASH OVERHEAD:						
Equipment						99
TOTAL NON-CASH OVERHEAD COSTS						99
TOTAL COSTS/ACRE						232

SUMMARY OF COSTS PER ACRE TO HARVEST ALFALFA

Operation	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Bale Twine (5 twine/bale)	1,043.00	ft	0.004	4
Labor (machine)	3.07	hrs	14.280	44
Fuel - Diesel	9.96	gal	4.050	40
Lube				6
Machinery repair				27
Interest on operating capital @ 6.75%				2
TOTAL OPERATING COST/ACRE				124

ANNUAL HARVEST EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
08 150HP 7810 4WD Tractor	114,342	10	33,775	11,493	548	741	12,781
08 37HP 4WD Tractor	22,000	10	6,498	2,211	105	142	2,459
08 Baler 3/4 Ton bale	81,000	10	13,369	9,011	349	472	9,832
08 Bale Wagon + 1500 bale attachment	148,625	10	24,531	16,533	641	866	18,040
08 Hay Rake 20'	19,500	10	3,448	2,150	85	115	2,350
08 Swather 14' Header	71,545	10	12,652	7,889	312	421	8,622
	457,012		94,273	49,287	2,040	2,756	54,083
60% of New Cost*	274,207		56,564	29,572	1,224	1,654	32,450

UC COOPERATIVE EXTENSION
Table 11. OPERATIONS WITH EQUIPMENT
 SAN JOAQUIN VALLEY 2008

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: SelectMax	May	Ground-Custom		SelectMax	16.00	floz
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: Tissue Sampling	Aug	Custom		Analysis	.05	each
Fertilize:	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				