

U.C. COOPERATIVE EXTENSION

SAMPLE COSTS TO

ESTABLISH AN ALFALFA STAND AND PRODUCE

~ALFALFA HAY~



Flood Irrigated
IN YOLO COUNTY - 1994

by:

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U. C. COOPERATIVE EXTENSION

GENERAL INFORMATION FOR ESTABLISHING AN ALFALFA STAND AND PRODUCING ALFALFA HAY *Flood Irrigated* Yolo County - 1994

The detailed costs to establish an alfalfa stand and produce alfalfa hay in Sacramento Valley of California are presented in this study. The hypothetical farm used in this report consists of 2,900 acres of which 400 acres of alfalfa hay production.

This study consists of Assumptions for Establishing an Alfalfa Hay Stand and Producing Alfalfa Hay and nine tables. It is intended as a guide only. It can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices detailed in this study may not be applicable to every situation. A blank, **Your Cost**, column is provided to enter your actual costs on **Table 1 and 4 Costs Per Acre to Establish An Alfalfa Stand and Costs Per Acre To Produce Alfalfa Hay**.

This study condits of **General Assumptions fo Establishing an Alfalfa Stand and Producing Alflafa Hay** and nine tables.

Table 1.	Costs Per Acre To Establish An Alfalfa Stand
Table 2.	Costs And Returns Per Acre To Establish An Alfalfa Stand
Table 3.	Monthly Cash Costs Per Acre To Establish An Alfalfa Stand
Table 4.	Costs Per Acre To Produce Alfalfa Hay
Table 5.	Costs And Returns Per Acre To Produce Alfalfa Hay
Table 6.	Monthly Cash Costs Per Acre To Produce Alfalfa Hay
Table 7.	Whole Farm Annual Equipment, Investment And Business Overhead Costs For Alfalfa Hay Establishment And Production
Table 8.	Hourly Equipment Costs For Alfalfa Hay Production
Table 9.	Ranging Analysis

For an explanation of calculations used in this study refer to the attached General Assumptions or call the Department of Agricultural Economics, Cooperative Extension, University of California, Davis, California, (916) 752-3589 or call the alfalfa farm advisor Yolo County.

U.C. COOPERATIVE EXTENSION

GENERAL ASSUMPTIONS FOR ESTABLISHING AN ALFALFA STAND AND PRODUCING ALLFALFA HAY *Flood Irrigated* Yolo County - 1994

The following is a description of some general assumptions pertaining to sample costs of alfalfa hay establishment and production in Yolo County. Practices described should not be considered recommendations by the University of California, but rather represent production procedures considered typical for this crop and area. Some of these costs and practices may not be applicable to your situation nor used during every production year. Additional ones not indicated may be needed. Cultural practices for the production of cotton vary by grower and region. Variations can be significant. The practices and inputs used in this cost study serve only as a sample or guide. These costs are represented on an annual, per acre basis. *The use of trade names 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.*

1. LAND AND ROTATION:

This report is based on a 2,900 acre field and row crop farm of which 300 acres are producing alfalfa hay, another 100 acre stand of alfalfa is being established, and the remaining 2,500 acres are planted to field corn, sugar beets, processing tomatoes, and wheat. Other rotational crops that might also be planted on Sacramento Valley farms might include safflower, sunflowers, and dry beans.

2. SHARE RENT:

Land in this study is leased on a share-rent basis with the land owner receiving 21% of the gross returns and the grower keeps the remaining share. Rental contracts and rates for land suitable for alfalfa production can range widely in Sacramento Valley. Previous land rental agreements for alfalfa in Sacramento Valley ranged from 15 to 33% of gross revenues while current rates vary from 18 to 25%. The land has developed wells, pumps, and permanent underground pipelines necessary for crop production and is considered in the land rent. Rent appears as a cash overhead cost in **Tables 1, 2, 3, 4, 5, 6, and 7.**

3. IRRIGATION SYSTEM:

The permanent irrigation system consists of a wells, pumps and motors, and buried mainline. This part of the system is already in place when the land is rented. A side roll wheel line sprinkler system is used to irrigate the stand during establishment except for the pre-irrigation. It is estimated that 2 quarter mile sections of wheel line are needed by the farm to irrigate it's acreage efficiently. Eight acre-inches are applied during the pre-irrigation and six inches are sprinkled on. The cost of the wheel line sprinklers are shown under Annual Investment Costs on **Table 7.**

During production years the stand is flood irrigated. Water is pumped through alfalfa valves at the head of the field and flows down the alfalfa check between borders. Applied water will vary year to year, but in this study four acre-feet are used. Successful water management and irrigation scheduling requires careful observation of water conditions of the soil and plant.

Proper management of irrigation can provide for strong vegetative growth and influence insect and disease pest pressures.

Water cost will vary by grower across the Sacramento Valley depending on the particular irrigation district or various well characteristics, power costs, and other irrigation factors. Water cost for irrigation represents water pumped from the farm's well. In this study, water is valued at \$18.50 per acre-foot.

4. STAND ESTABLISHMENT:

Tables 1, 2, and 3 show the costs associated with ground preparation, planting and growing an alfalfa stand until the first production year. The alfalfa stand is prepared and planted in the Fall and the establishment year ends by the next January.

Land Preparation: Stand establishment begins by discing down the previous crops residue. The ground is ripped to a depth of 20 to 30 inches to fracture any soil compaction and improve water infiltration. Nutrients are spread and disced to incorporate them into the soil. Discing also helps to break up large clods of dirt, creating better seed-to-soil contact for good germination. After the field is leveled using a triplane, borders are pulled and water is run in the checks to irrigate for planting and to germinate weeds. Once any weeds have sprouted and the ground is firm enough to run equipment on, the field is cultivated. Just prior to seeding the fields are harrowed and rolled to remove any high and low spots caused by the pre-irrigation and cultivation. Alfalfa seed is planted at a depth of 1/4 inch or less using a planter at a rate of 25 pounds of seed per acre. Firming the seedbed to improve seed to soil contact is done with a ringroller immediately after planting. One additional irrigation is applied through wheel line sprinklers.

Ripping, discing, landplaning, cultivating, and floating are performed with a 225 HP crawler, while a 110 HP wheel tractor is used to set up the borders. A 60 HP wheel tractor is used for the rolling the field, planting, rolling, raking, and baling operations. The postemergent herbicide is applied using an ATV with a small sprayer. Preplant fertilizers are custom spread by a commercial fertilizer company.

Fertilization: Several soil nutrients are spread on the field before the alfalfa is planted in order to adjust for deficiencies that commonly occur in the soils across the region. Growers should apply fertilizer or soil amendments only after soil tests determine unacceptable pH and nutrient levels. Sulfur (popcorn) is applied at a rate of 250 pounds per acre and P_2O_5 (in the form of 18-46-0) is spread at 200 pounds per acre of material, after the field has been ripped and disced in October. This is equivalent to 250 pounds of sulfur, 80 pounds of P_2O_5 , and 32 pounds of N per acre. Spreading fertilizer is accomplished by custom application. Once applied the ground is disced to incorporate fertilizers into the soil.

Irrigation: There up to four irrigation done in the establishment year, one is preplant and the other is after seeding. Since planting occurs in the Fall, winter rains may (but not always) provide much of the needed moisture until regular irrigations begin in the following production year. Eight acre-inches of water are flooded onto the bare ground during September. This irrigation is intended to not only provide moisture for crop germination, but also to settle the ground and sprout weeds for eradication before planting. The fields are harrowed and rolled afterwards in order to remove high and low spots so that standing water will not form when flood irrigated later. Areas continually flooded can weaken alfalfa plants and increase their

susceptibility to insects, weeds, and diseases and lower yields. The remaining six acre-inches are applied after planting through 2 - 3 sprinklers irrigations.

Weed Control: A variety of grasses and broadleaf weeds can compete heavily with a seedling stand of alfalfa during the establishment year. Planting time (fall or spring) can be a critical factor for managing weeds in different areas. In establishing this stand, one post emergent herbicide mix of Envy® (2,4-DB amine) and Gramoxone® is applied in January. An ATV and small sprayer are used to minimize damage to the young plants from the wheel tracks.

5. ESTABLISHMENT COST:

The cost to establish an alfalfa stand are the cash expenses required to prepare the land, plant and grow the alfalfa through the first year until a yield is produced, minus any returns. In this case it is only the first year. Establishment cost per acre is represented in **Tables 1, 2, and 3** as the Net Cash Cost/Acre. This is equal to \$427 per acre or \$128,100 for the 300 acre stand. To obtain stand establishment cost for an average production year, the Net Total Cost/Acre for the establishment year in **Table 1** is divided by 4 years. This becomes an investment cost in **Tables 4, 5, 6, and 7**. The annual production cost in the study represents an average year's production cost from the second through life of the stand.

6. PRODUCTION CULTURAL PRACTICES AND INPUTS:

Vertebrate Pest Control: Alfalfa is attractive to many rodents and stands can suffer serious damage by the foraging of these pests. Several species of pocket gophers (*Thomomys spp.*) and ground squirrels (*Spermophilus spp.*) are the main vertebrate pests that cause problems in alfalfa stands. Control strategies depend on the animal causing the damage. Poison bait is most commonly used to control gophers and squirrels; it can be applied in several methods depending on conditions. In this study, vertebrate pest treatment occurs in March with the use of poison bait.

Irrigation: The price of irrigation includes water cost and labor expense. Irrigation begins in April and continues through the season until September. Four acre-feet of water are applied using flood irrigation in each check. While in this study water is applied in seven irrigations over six months, actual water needs will vary considerably due to soil, plant physiological, and climatic factors. To avoid water stressing plants or creating conditions favorable for disease and weed problems, growers need to schedule irrigations based on plant requirements.

Fertilization: Alfalfa should only be fertilized after either a soil or plant tissue test has determined a need. Phosphorous and sulfur are essential for good alfalfa production in this region, but are applied infrequently as a need occurs. In this study, no fertilizers are applied during the production years of the stand.

Weed Control: A variety of weeds invade alfalfa as fall arrives and the stand become dormant. Soil residual herbicides (Velpar® and Treflan®) for control of winter weeds are applied in February to established alfalfa stands. Velpar® is used to treat 40% of the acreage, while Treflan® is spread on 100% of the fields. Summer grass control is usually not needed on the entire acreage and in this study, only 25% of the alfalfa fields are treated with an herbicide. This treatment consists of one application of Poast® during June.

Insect Control: Several insect species attack alfalfa, but alfalfa weevil (*Hypera postica*), alfalfa caterpillar (*Colias eurytheme*), and armyworms (*Spodoptera spp.*) are the major pests in this

study, that are assumed to cause economic damage. However, several species of aphids and other insects can cause damage that may require treatment. Monitoring pest populations is essential for good control. Field sweeps coupled with recommended threshold guidelines can help growers determine when or if to treat.

Both adults and juvenile weevils feed on plants, though it is in the larval stage that damage is most severe. Weevils are presumed to reach population levels requiring two treatment for control. In this study, they are sprayed with Imidan[®] mixed with Pounce[®] (for aphids) followed by a second application of Malathion. The first treatment covers 100% of the acreage while the second is applied to 25% of the acres. Both sprays are applied by aircraft in March.

Worms are injurious to plants only in their larval state, but have multiple generations during the growing season. Plant damage caused by armyworms is characterized by skeletonization of leaves, marked by the large veins remaining. Alfalfa caterpillars on the other hand defoliate large sections of leaves but do also eat the veins. The armyworm spray consists of two application of Lannate[®] in July and August while alfalfa caterpillars are treated with twice with Javelin[®].

The pesticides and rates mentioned in this cost study are a few of those that are listed in the [UC IPM Alfalfa Pest Management Guidelines](#) and [Integrated Pest Management For Alfalfa Hay](#). Written recommendations are required for many pesticides and are made by licensed pest control advisors. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. Contact your local farm advisor for advice on production practices.

7. HARVEST:

Harvesting is a crucial operation for alfalfa hay. Timing of harvest can have a drastic impacts on stand vigor, hay quality, yield, and pest populations. Growers have often based cutting decisions on market considerations or the number of blooming plants. But time and number of blooms is strongly affected by many factors which may not denote optimum plant maturity. Research suggests that a more reliable indicator for harvest timing may be plant bud regrowth. This is a measure of bud growth at the crown as the plant begins to store nutrients in the roots. While growers will always harvest hay when demand or price is high in order to maximize returns, when the market is poor and harvest considerations are based largely on agronomic factors, plant bud regrowth may be a better gauge to use.

Hay is harvested seven times in established stands; once in the months of April, May, June, July, and September and twice in August. In this study, the grower has their alfalfa custom harvested. Alfalfa is cut with a swather and left to dry for several days before it is turned and windrowed by a rake. Once the hay has dried to the correct moisture content it is baled by a baler into 90 to 120 pound bales. The bales are then picked up with a balewagon which moves them from the field and roadsides them in a stack.

Since the farm has its hay custom harvested, there are no costs incurred for owning this equipment. If a grower harvested their hay custom using their own equipment, harvest expense (the custom harvest charge) should be subtracted from harvest costs in **Table 4** and all equipment for harvest operations should be added to the investment costs in **Table 7**. A cash harvesting cost based on owned equipment would then be added to harvest costs in **Table 4**.

Growers may choose to own swathers, rakes, balers and tractors, and balewagons, purchased

either new or used, or hire a custom harvester to perform the harvest. Many factors are important in deciding which harvesting option a grower uses. These considerations and appropriate method of analysis is discussed in "[Acquiring alfalfa hay harvest equipment: A financial analysis of alternatives](#)".

8. YIELDS & RETURNS:

Yields: The crop is assumed to yield seven tons of hay per acre over seven cuttings per year once the stand is established. Annual yield variations can range from 5 to 10 tons per acre in this region.

Returns: An estimated price of a \$90 per ton of hay is used to calculate returns above several levels of cost. Returns may range from \$55 to \$130 per ton; the \$90 used in the cost study is, at best, an estimate taking into consideration current situations. Additionally, in some areas, alfalfa going into dormancy may be grazed with livestock with a fee charged per head. Income from this source may help growers increase their return per acre, but is not assumed in this study.

Table 9 indicates the effects on grower returns based on varying yields and returns. Breakeven points based on estimated costs are calculated for both yields and return prices in **Table 10**.

9. RISK:

The risks associated with alfalfa production 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.

Risk is caused by uncontrollable factors such as a decrease in the demand for alfalfa hay, an oversupply, or crop losses. Because of the risk involved, access to a market is crucial. A grower should identify potential markets before any alfalfa production begins.

10. LABOR:

Basic hourly wages for workers are \$6.00 and \$4.25 per hour for machine operators and field workers (irrigator), respectively. Adding 34% for SDI, FICA, insurance and other benefits increases the labor rates shown to \$8.04 per hour for machine labor and \$5.70 per hour for non-machine labor. The labor hours for operations involving machinery are 10% higher than the machine hours to account for extra labor involved in equipment set-up, moving, maintenance and repair. Wages for managers are not included as a cash cost. However, farms with supervisors or managers, regardless of whether they are the owners, should include their wages in order to account for them as a cash overhead cost. Any returns above total costs are considered returns to investment.

11. CASH OVERHEAD:

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, and equipment repairs.

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.

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 7.89% per year. A nominal interest rate is the going market cost of borrowed funds.

Insurance: Insurance for farm investments vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$960 for the entire farm or \$0.56 per acre.

Office Expense: Office and business expenses are estimated at \$30 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc. Cash overhead costs are found in **Tables 1, 2, 3, 4, 5, and 6.**

12. NON-CASH OVERHEAD:

Non-cash overhead is comprised of depreciation and interest charged on equipment and other investments. Although farm equipment on typical farm in the Sacramento Valley is often purchased used, this study shows the current purchase price for new equipment adjusted to 50% of new value to indicate a mix of new and used equipment. Annual equipment and investments costs are shown in **Tables 1, 2, 4, 5, and 7.** They represent depreciation and opportunity cost for each investment on an annual per acre basis.

Depreciation: Depreciation is a reduction in market value of investments due to wear, obsolescence, and age, and is on a straight line basis. Annual depreciation is calculated as purchase price minus salvage value divided by years the investment is held. The purchase price and years of life are shown in **Table 7.**

Interest On Investment: Interest is charged on investments to account for income foregone (opportunity cost) that could be received from an alternative investment. The investments are assumed to be owned outright. Therefore, interest on investments is a non-cash cost. Investments include land, buildings, and equipment. Interest is calculated as the average value of the investment during its useful life, multiplied by 3.72% per year. Average value for equipment and buildings equals new cost plus salvage value divided by 2 on a per acre basis.

Average Value: The interest rate used to calculate opportunity cost is estimated as a ten year average of the agricultural sector longrun rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector.

13. EQUIPMENT CASH COSTS:

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 fuel, lubrication, and repairs.

In allocating the equipment costs on a per acre basis, the following hourly charges are calculated first and shown in **Table 8.** 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 hp, and type of fuel used. The fuel and repair cost per acre for each operation in

Tables 1 and 4 is determined by multiplying the total hourly operating cost in **Table 8** for each piece of equipment used for the cultural practice by the number of hours per acre for that operation. Tractor time is 10% higher than implement time for a given operation to account for setup time. Prices for on-farm delivery of diesel and gasoline are \$0.85 and \$1.17 per gallon, respectively.

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Table 1.

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE TO ESTABLISH AN ALFALFA STAND
 SACRAMENTO VALLEY - 1994

Labor Rate: \$8.04/hr. machine labor Interest Rate: 7.89%
 \$5.70/hr. non-machine labor Yield per Acre: 6.00 Ton

Operation	Operation Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Cash and Labor Costs per Acre		Total Cost	Your Cost
				Material Cost	Custom/ Rent		
Cultural:							
Disc 2X	0.26	2.51	9.43	0.00	0.00	11.93	
Subsoil	0.40	3.86	13.21	0.00	0.00	17.07	
Disc	0.26	2.51	10.63	0.00	0.00	13.14	
Triplane 3X	0.51	4.92	18.05	0.00	0.00	22.97	
Pull Borders	0.10	0.96	1.48	0.00	0.00	2.44	
Fertilize - Preplant	0.18	1.72	2.89	64.75	0.00	69.36	
Open Ditch	0.05	0.48	0.83	0.00	0.00	1.31	
Pre-irrigation	1.25	7.13	0.00	12.39	0.00	19.52	
Cultivate	0.08	0.77	2.82	0.00	0.00	3.60	
Harrow & Ring Roll Ground	0.07	0.69	2.82	0.00	0.00	3.52	
Plant Alfalfa	0.25	2.41	3.22	49.00	0.00	54.63	
Ring Roll	0.08	0.77	0.83	0.00	0.00	1.60	
Irrigate - Sprinkler	1.25	7.13	0.00	9.25	0.00	16.38	
Weed Control - Winter Dormant Spray	0.05	0.48	0.00	36.80	0.00	37.28	
Pickup Truck Use	0.10	2.85	2.92	0.00	0.00	5.77	
TOTAL CULTURAL COSTS	4.89	39.19	69.14	172.19	0.00	280.52	
Interest on operating capital @ 7.89%						13.14	
TOTAL OPERATING COSTS/ACRE		39.19	69.14	172.19	0.00	293.66	
TOTAL OPERATING COSTS/TON						48.94	
CASH OVERHEAD:							
Liability Insurance						0.30	
Office Expense						30.00	
Field Sanitation						0.52	
Share Rent @ 21% Of Gross Returns						94.50	
Property Taxes						3.63	
Property Insurance						2.59	
Investment Repairs						1.84	
TOTAL CASH OVERHEAD COSTS						133.38	
TOTAL CASH COSTS/ACRE						427.04	
TOTAL CASH COSTS/TON						71.17	
NON-CASH OVERHEAD:							
Investment	Per producing Acres	Depreciation	Annual Cost		Interest @ 3.72%		
ATV - 4WD	2.81	0.51	0.06	0.06	0.56		
Pipe - Wheel Lines	11.11	1.00	0.23	0.23	1.23		
Fuel Tanks & Pumps	181.52	8.17	3.71	3.71	11.88		
Fuel Wagon	0.62	0.06	0.01	0.01	0.07		
Truck Tractor	15.42	0.92	0.32	0.32	1.24		
Trailer - Pipe	0.66	0.09	0.01	0.01	0.10		
Shop Building	20.58	0.74	0.42	0.42	1.16		
Shop Tools	4.12	0.19	0.08	0.08	0.27		
Storage Building	8.30	0.37	0.17	0.17	0.54		
Closed Mix System	1.26	0.11	0.03	0.03	0.14		
Tool Carrier	4.77	0.29	0.10	0.10	0.38		
Forklift - 5000 Lb	3.88	0.35	0.08	0.08	0.43		
Implement Carrier	3.07	0.18	0.06	0.06	0.25		
Equipment	401.67	34.90	8.22	8.22	43.11		
TOTAL NON-CASH OVERHEAD COSTS	659.80	47.87	13.50	13.50	61.37		
TOTAL COSTS/ACRE					488.41		
TOTAL COSTS/TON					81.40		

Table 2.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS PER ACRE TO ESTABLISH AN ALFALFA STAND
 SACRAMENTO VALLEY - 1994

Labor Rate: \$8.04/hr. machine labor Interest Rate: 7.89%
 \$5.70/hr. non-machine labor

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
OPERATING COSTS					
Fertilizer:					
18-46-0	200.00	Lb	0.15	30.00	
Popcorn Sulfur	250.00	Lb	0.139	34.75	
Irrigation:					
Water	1.17	AcFt	18.50	21.65	
Seed:					
Alfalfa Seed	20.00	Lb	2.45	49.00	
Herbicide:					
Envy	6.50	Pint	4.41	28.67	
Gramoxone Extra	1.50	Pint	5.42	8.13	
Labor (machine)	3.10	Hrs	8.04	24.94	
Labor (non-machine)	2.50	Hrs	5.70	14.25	
Fuel - Gas	0.84	Gal	1.17	0.98	
Fuel - Diesel	28.65	Gal	0.85	24.36	
Lube				3.80	
Machinery repair				40.00	
Interest on operating capital @ 7.89%				13.14	
				293.66	
TOTAL OPERATING COSTS/ACRE				293.66	
TOTAL OPERATING COSTS/TON				48.94	
CASH OVERHEAD COSTS:					
Liability Insurance				0.30	
Office Expense				30.00	
Field Sanitation				0.52	
Share Rent @ 21%				94.50	
Property Taxes				3.63	
Property Insurance				2.59	
Investment Repairs				1.84	
				133.38	
TOTAL CASH OVERHEAD COSTS/ACRE				133.38	
TOTAL CASH COSTS/ACRE				427.04	
TOTAL CASH COSTS/TON				71.17	

Table 3.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO ESTABLISH AN ALFALFA STAND
SACRAMENTO VALLEY - 1994

Beginning SEP 93	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Ending AUG 94	93	93	93	93	94	94	94	94	94	94	94	94	
=====													
Cultural:													
Disc 2X	11.93												11.93
Subsoil	17.07												17.07
Disc	13.14												13.14
Triplane 3X	22.97												22.97
Pull Borders	2.44												2.44
Fertilize - Preplant	69.36												69.36
Open Ditch	1.31												1.31
Pre-irrigation	19.52												19.52
Cultivate	3.60												3.60
Harrow & Ring Roll Ground		3.52											3.52
Plant Alfalfa		54.63											54.63
Ring Roll		1.60											1.60
Irrigate - Sprinkler		16.38											16.38
Weed Control - Winter Dormant					37.28								37.28
Pickup Truck Use	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72					5.77
TOTAL CULTURAL COSTS	162.06	76.85	0.72	0.72	38.00	0.72	0.72	0.72					280.52

Interest on oper. capital	1.07	1.57	1.58	1.58	1.83	1.83	1.84	1.84					13.14
TOTAL OPERATING COSTS/ACRE	163.13	78.42	2.30	2.30	39.83	2.56	2.56	2.57					293.66
TOTAL OPERATING COSTS/TON	27.19	13.07	0.38	0.38	6.64	0.43	0.43	0.43					48.94

OVERHEAD:													
Liability Insurance					0.30								0.30
Office Expense	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75					30.00
Field Sanitation					0.52								0.52
Share Rent @ 21%					94.50								94.50
Property Taxes					1.81						1.81		3.63
Property Insurance					1.29						1.29		2.59
Investment Repairs	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	1.84
TOTAL CASH OVERHEAD COSTS	3.90	3.90	3.90	3.90	102.33	3.90	3.90	3.90	0.15	0.15	3.26	0.15	133.38

TOTAL CASH COSTS/ACRE	167.03	82.33	6.20	6.21	142.16	6.46	6.46	6.47	0.15	0.15	3.26	0.15	427.04
TOTAL CASH COSTS/TON	27.84	13.72	1.03	1.03	23.69	1.08	1.08	1.08	0.03	0.03	0.54	0.03	71.17
=====													

Table 4.

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE TO PRODUCE ALFALFA HAY
 SACRAMENTO VALLEY - 1994

Labor Rate: \$8.04/hr. machine labor Interest Rate: 7.89%
 \$5.70/hr. non-machine labor Yield per Acre: 8.00 Ton

Operation	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Cash and Labor Material Cost	Costs per Acre Custom/Rent	Total Cost	Your Cost
Cultural:							
Weed Control - Dormant	0.20	1.93	1.68	29.00	0.00	32.61	
Weed Control - Dormant - 40% Of Acreage	0.08	0.77	0.00	12.61	0.00	13.38	
Insect Control - Weevils	0.00	0.00	0.00	27.34	9.38	36.72	
Rodent Control	0.27	4.18	0.56	5.88	0.00	10.62	
Open Ditch	0.15	1.45	2.89	0.00	0.00	4.34	
Irrigate - 7X	8.75	49.88	0.00	73.63	0.00	123.50	
Weed Control - Summer - 25% Of Acreage	0.05	0.48	0.00	7.18	0.00	7.66	
Insect Control - Worms 2X - 25% Of Acreage	0.00	0.00	0.00	43.53	3.75	47.28	
Pull & Close Ditch	0.15	1.45	2.70	0.00	0.00	4.14	
Pickup Truck Use	0.07	2.13	2.19	0.00	0.00	4.33	
TOTAL CULTURAL COSTS	9.73	62.27	10.02	199.18	13.13	284.60	
Harvest:							
Swath & Rake 7X	0.00	0.00	0.00	0.00	59.50	59.50	
Bale Hay 7X	0.00	0.00	0.00	0.00	87.50	87.50	
Roadside Hay 7X	0.00	0.00	0.00	0.00	28.00	28.00	
TOTAL HARVEST COSTS	0.00	0.00	0.00	0.00	175.00	175.00	
Interest on operating capital @ 7.89%							2.17
TOTAL OPERATING COSTS/ACRE		62.27	10.02	199.18	188.13	461.76	
TOTAL OPERATING COSTS/TON							57.72
CASH OVERHEAD:							
Liability Insurance							0.43
Office Expense							43.50
Field Sanitation							0.75
Share Rent @ 21% Of Gross Returns							151.20
Property Taxes							5.42
Property Insurance							3.87
Investment Repairs							2.73
TOTAL CASH OVERHEAD COSTS							207.91
TOTAL CASH COSTS/ACRE							669.67
TOTAL CASH COSTS/TON							83.71
NON-CASH OVERHEAD:							
Investment	Per producing Acre		Annual Cost		Interest @ 3.72%		
Alfalfa Stand Establishment	427.00		106.75		7.94		114.69
Fuel Tanks & Pumps	45.38		2.04		0.93		2.97
Fuel Wagon	0.90		0.08		0.02		0.10
Shop Building	29.84		1.07		0.61		1.68
Shop Tools	5.97		0.27		0.12		0.39
Storage Building	12.04		0.54		0.25		0.79
ATV - 4WD	4.07		0.73		0.08		0.82
Closed Mix System	1.82		0.16		0.04		0.20
Tool Carrier	6.92		0.42		0.14		0.56
Forklift - 5000 lb	28.15		2.53		0.58		3.11
Implement Carrier	3.43		0.21		0.07		0.28
Equipment	458.97		45.87		9.39		55.26
TOTAL NON-CASH OVERHEAD COSTS	1024.50		160.68		20.17		180.85
TOTAL COSTS/ACRE							850.52
TOTAL COSTS/TON							106.31

Table 6.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE ALFALFA HAY
SACRAMENTO VALLEY - 1994

Beginning JAN 94	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 94	94	94	94	94	94	94	94	94	94	94	94	94	
=====													
Cultural:													
Weed Control - Dormant	32.61												32.61
Weed Control - Dormant 40%	13.38												13.38
Insect Control - Weevils			36.72										36.72
Rodent Control			10.62										10.62
Open Ditch				4.34									4.34
Irrigate - 7X				17.86	17.86	17.86	34.23	17.86	17.86				123.51
Weed Control - Summer 25%						7.66							7.66
Insect Control - Armyworm 25%							23.64	23.64					47.28
Pull & Close Ditch									4.14				4.14
Pickup Truck Use	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	4.33
TOTAL CULTURAL COSTS	46.35	0.36	47.70	22.55	18.22	25.88	58.23	41.86	22.36	0.36	0.36	0.36	284.60

Harvest:													
Swath & Rake 7X				8.50	8.50	8.50	8.50	8.50	17.00				59.50
Bale Hay 7X				12.50	12.50	12.50	12.50	12.50	25.00				87.50
Roadside Hay 7X				4.00	4.00	4.00	4.00	4.00	8.00				28.00
TOTAL HARVEST COSTS				25.00	25.00	25.00	25.00	25.00	50.00				175.00

Interest on oper. capital	0.30	0.31	0.62	0.93									2.17
TOTAL OPERATING COSTS/ACRE	46.66	0.67	48.33	48.49	43.22	50.88	83.23	66.86	72.36	0.36	0.36	0.36	461.76
TOTAL OPERATING COSTS/TON	5.83	0.08	6.04	6.06	5.40	6.36	10.40	8.36	9.05	0.05	0.05	0.05	57.72

OVERHEAD:													
Liability Insurance	0.43												0.43
Office Expense	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83				43.50
Field Sanitation				0.75									0.75
Share Rent @ 21%				151.20									151.20
Property Taxes	2.71						2.71						5.42
Property Insurance	1.93						1.93						3.87
Investment Repairs	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	2.73
TOTAL CASH OVERHEAD COSTS	10.14	5.06	5.06	157.01	5.06	5.06	9.70	5.06	5.06	0.23	0.23	0.23	207.91

TOTAL CASH COSTS/ACRE	56.80	5.73	53.39	205.50	48.28	55.94	92.93	71.92	77.42	0.59	0.59	0.59	669.67
TOTAL CASH COSTS/TON	7.10	0.72	6.67	25.69	6.03	6.99	11.62	8.99	9.68	0.07	0.07	0.07	83.71
=====													

Table 7.

U.C. COOPERATIVE EXTENSION
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
SACRAMENTO VALLEY - 1994

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Non-Cash Over.		Cash Overhead		Total
				Depre- ciation	Interest	Insur- ance	Taxes	
EQUIPMENT FOR ESTABLISHMENT YEARS ONLY:								
94	110 HP 2WD Tractor	68,010	10	6,120.90	1,391.48	266.70	374.06	8,153.14
94	250 HP Crawler	166,238	10	14,961.40	3,401.23	651.90	914.31	19,928.84
94	Brillion Seeder	7,668	7	985.86	156.89	30.07	42.17	1,214.99
94	Disc - Border	916	15	54.93	18.75	3.59	5.04	82.31
94	Disc - Offset 26'	21,033	15	1,262.00	430.33	82.48	115.68	1,890.49
94	Disc - Stubble 14'	11,326	15	679.53	231.74	44.42	62.30	1,017.99
94	Harrow - Spike 32'	9,323	15	559.40	190.74	36.56	51.28	837.98
94	Ringroller - 32'	8,211	15	492.67	168.00	32.20	45.16	738.03
94	Subsoiler - 8'	4,572	15	274.33	93.54	17.93	25.15	410.95
94	Triplane - 16'	18,769	10	1,689.20	384.02	73.60	103.23	2,250.05
Subtotal:		316,066		27,080.22	6,466.72	1,239.45	1,738.38	36,524.77
EQUIPMENT FOR PRODUCTION YEARS ONLY:								
94	130 HP 2WD Tractor	81,793	10	7,361.40	1,673.48	320.75	449.86	9,805.49
94	Bait Applicator	2,045	12	153.33	41.85	8.02	11.25	214.45
94	Rear Blade - 8'	1,834	15	110.07	37.52	7.19	10.08	164.86
Subtotal:		85,672		7,624.80	1,752.85	335.96	471.19	10,184.80
EQUIPMENT FOR ESTABLISHMENT AND PRODUCTION YEARS:								
94	62 HP 2WD Tractor	29,060	10	2,615.40	594.57	113.96	159.83	3,483.76
94	ATV & Pull Sprayer	9,413	10	847.20	192.58	36.91	51.77	1,128.46
94	Pickup - 1/2 Ton	13,125	7	1,687.43	268.55	51.47	72.19	2,079.64
94	Pickup - 3/4 Ton	16,698	7	2,146.86	341.64	65.48	91.84	2,645.82
94	Spinner Spreader	1,915	10	172.30	39.19	7.51	10.53	229.53
94	Truck - 2 Ton	23,200	7	2,982.86	474.67	90.98	127.60	3,676.11
94	V-Ditcher	4,505	15	270.27	92.18	17.67	24.78	404.90
Subtotal:		97,916		10,722.32	2,003.38	383.98	538.54	13,648.22
TOTAL		499,654		45,427.34	10,222.95	1,959.39	2,748.11	60,357.79
60% of New Cost *		299,792		27,256.40	6,133.77	1,175.63	1,648.87	36,214.67

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

ANNUAL INVESTMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. -		Cash Overhead		Total
				Depre- ciation	Interest	Insur- ance	Taxes Repairs	
INVESTMENT								
	ATV - 4WD	8150	5	1467.00	166.75	31.96	44.82	1818.53
	Closed Mix System	3649	10	328.40	74.66	14.31	20.07	639.44
	Forklift - 5000 Lb	11261	10	1013.50	230.40	44.16	61.94	1913.00
	Fuel Tanks & Pumps	18152	20	816.85	371.39	71.18	99.84	1418.26
	Fuel Wagon	1808	10	162.70	37.00	7.09	9.94	268.23
	Implement Carrier	8915	15	534.87	182.41	34.96	49.04	1247.28
	Pipe - Wheel Lines	32207	10	2898.60	658.96	126.30	177.14	4110.00
	Shop Building	59682	25	2148.56	1221.09	234.04	328.25	4527.94
	Shop Tools	11936	20	537.10	244.22	46.81	65.65	1012.78
	Storage Building	24076	20	1083.40	492.60	94.42	132.42	2043.84
	Tool Carrier	13835	15	830.07	283.07	54.26	76.09	1934.49
	Trailer - Pipe	1925	7	247.43	39.39	7.55	10.59	359.96
	Truck Tractor	44704	15	2682.27	914.64	175.31	245.87	4327.09
TOTAL INVESTMENT		240300		14750.75	4916.58	942.35	1321.66	25620.84

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Field Sanitation	2900.00	Acre	0.52	1508.00
Liability Insurance	2900.00	Acre	0.30	870.00
Office Expense	2900.00	Acre	30.00	87000.00
Share Rent @ 21% Of Gross Returns	100.00	Acre	94.50	9450.00

Table 8.

U.C. COOPERATIVE EXTENSION
 HOURLY EQUIPMENT COSTS
 SACRAMENTO VALLEY - 1994

Yr Description	Actual Hours Used	COSTS PER HOUR							Total Costs/Hr.
		-Non-Cash Depre- ciation	Over- Interest	- Cash Insur- ance	Overhead Taxes	Repairs	Operating Fuel & Lube	Total Oper.	
94 110 HP 2WD Tractor	1199.1	5.10	1.16	0.22	0.31	6.80	6.24	13.04	19.84
94 130 HP 2WD Tractor	132.0	55.77	12.68	2.43	3.41	8.18	7.37	15.55	89.83
94 250 HP Crawler	1199.0	12.48	2.84	0.54	0.76	13.85	14.18	28.03	44.65
94 62 HP 2WD Tractor	1200.3	2.18	0.50	0.09	0.13	2.91	2.98	5.89	8.79
94 ATV & Pull Sprayer	200.0	4.24	0.96	0.18	0.26	0.00	0.00	0.00	5.64
94 Bait Applicator	109.6	1.40	0.38	0.07	0.10	2.05	0.00	2.05	4.01
94 Brillion Seeder	171.0	5.77	0.92	0.18	0.25	6.40	0.00	6.40	13.51
94 Disc - Border	166.0	0.33	0.11	0.02	0.03	0.44	0.00	0.44	0.94
94 Disc - Offset 26'	166.0	7.60	2.59	0.50	0.70	10.07	0.00	10.07	21.46
94 Disc - Stubble 14'	166.0	4.09	1.40	0.27	0.38	5.42	0.00	5.42	11.55
94 Harrow - Spike 32'	165.2	3.39	1.15	0.22	0.31	4.46	0.00	4.46	9.53
94 Pickup - 1/2 Ton	284.8	5.92	0.94	0.18	0.25	3.97	3.36	7.33	14.63
94 Pickup - 3/4 Ton	284.8	7.54	1.20	0.23	0.32	5.05	4.04	9.09	18.38
94 Rear Blade - 8'	60.0	1.83	0.63	0.12	0.17	0.88	0.00	0.88	3.63
94 Ringroller - 32'	165.2	2.98	1.02	0.19	0.27	3.93	0.00	3.93	8.40
94 Spinner Spreader	119.8	1.44	0.33	0.06	0.09	1.92	0.00	1.92	3.84
94 Subsoiler - 8'	166.0	1.65	0.56	0.11	0.15	2.19	0.00	2.19	4.67
94 Triplane - 16'	250.0	6.76	1.54	0.29	0.41	4.55	0.00	4.55	13.55
94 Truck - 2 Ton	284.8	10.47	1.67	0.32	0.45	9.29	4.04	13.33	26.24
94 V-Ditcher	166.0	1.63	0.56	0.11	0.15	2.16	0.00	2.16	4.60

Table 9.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SACRAMENTO VALLEY - 1994

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ALFALFA HAY

	YIELD (TON/ACRE)						
	5	6	7	8	9	10	11
OPERATING COSTS/ACRE:							
Cultural Cost	285	285	285	285	285	285	285
Harvest Cost	109	131	153	175	197	219	241
Interest on operating capital	2	2	2	2	2	2	2
TOTAL OPERATING COSTS/ACRE	396	418	440	462	484	506	527
TOTAL OPERATING COSTS/TON	79.22	69.66	62.84	57.72	53.74	50.56	47.95
CASH OVERHEAD COSTS/ACRE	208	208	208	208	208	208	208
TOTAL CASH COSTS/ACRE	604	626	648	670	692	713	735
TOTAL CASH COSTS/TON	120.80	104.31	92.54	83.71	76.84	71.35	66.85
NON-CASH OVERHEAD COSTS/ACRE	181	181	181	181	181	181	181
TOTAL COSTS/ACRE	785	807	829	851	872	894	916
TOTAL COSTS/TON	156.97	134.45	118.37	106.31	96.93	89.43	83.29

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ALFALFA HAY

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	5	6	7	8	9	10	11
70.00	-46	2	50	98	146	194	243
80.00	4	62	120	178	236	294	353
90.00	54	122	190	258	326	394	463
100.00	104	182	260	338	416	494	573
110.00	154	242	330	418	506	594	683
120.00	204	302	400	498	596	694	793
130.00	254	362	470	578	686	794	903

NET RETURNS PER ACRE ABOVE CASH COSTS FOR ALFALFA HAY

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	5	6	7	8	9	10	11
70.00	-254	-206	-158	-110	-62	-13	35
80.00	-204	-146	-88	-30	28	87	145
90.00	-154	-86	-18	50	118	187	255
100.00	-104	-26	52	130	208	287	365
110.00	-54	34	122	210	298	387	475
120.00	-4	94	192	290	388	487	585
130.00	46	154	262	370	478	587	695

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR ALFALFA HAY

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	5	6	7	8	9	10	11
70.00	-435	-387	-339	-291	-242	-194	-146
80.00	-385	-327	-269	-211	-152	-94	-36
90.00	-335	-267	-199	-131	-62	6	74
100.00	-285	-207	-129	-51	28	106	184
110.00	-235	-147	-59	29	118	206	294
120.00	-185	-87	11	109	208	306	404
130.00	-135	-27	81	189	298	406	514
