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**2007**

**UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION**

**SAMPLE COSTS TO ESTABLISH AND PRODUCE**

***ORGANIC ALFALFA HAY***



Picture by Rachael F. Long

**CALIFORNIA – 2007**



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UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION  
SAMPLE COSTS TO ESTABLISH AND PRODUCE ORGANIC ALFALFA HAY  
IN CALIFORNIA – 2007

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**INTRODUCTION**

Organic alfalfa production involves growing, labeling, and marketing the crop according to National Organic Program (NOP) standards as defined by the United States Department of Agriculture (USDA). These standards require that alfalfa be produced with approved inputs given in the national materials list with brand names listed by the Washington State Department of Agriculture or the Organic Materials Review Institute. Farmers must also take precautions against pesticide drift and other sources of prohibited contaminants. In addition, hay handling equipment as well as storage areas must be designated organic or properly cleaned between conventional and organic use, with documentation. Fields must be managed organically for at least three years prior to being certified as organic.

Federal laws regulating organic products require producers to be certified organic through a USDA accredited certifier (public or private) and they must also register with the California Department of Food and Agriculture's (CDFA) Organic Program. This registration process is handled through the County Agricultural Commissioners' Offices throughout the state. The certification process requires that the producer develop a written organic farm plan that describes how the farm is to be managed in accordance with USDA-NOP rules and subsequent approval of the plan by the certifier. In addition, yearly updates to the farm plan are required as well as yearly on-site farm audits by certifiers to ensure compliance with federal regulations. There are many organic certifiers and costs and fees vary with each. Sample fees are included in this study.

The detailed costs for organic alfalfa hay establishment and production in California are presented in this study. The hypothetical farm used in this report consists of 500 acres, with 100 acres in organic alfalfa hay production, 395 acres in other organic field and row crops such as melons, beans, processing tomatoes, mixed vegetables, and fruit and nut crops, and 5 acres to roads, buildings, and unused land.

Crops that can be rotated with alfalfa hay vary considerably throughout the state depending on location, soil type, climate, and marketing opportunities.

This cost study provides guidelines on how to establish and produce organic alfalfa hay to help make production decisions, determine potential returns, prepare budgets, and evaluate production loans. Practices described are based on the production practices considered typical for organically grown alfalfa in California. However, due to the diversity of environments in California, actual production practices can vary widely from one location to another. The “*Your Costs*” columns in Tables 1-4 allow growers to pencil in their own costs based on their individual farming practices. Sample costs for labor, materials, equipment, and custom services are based on current figures.

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

Sample Cost of Production Studies for many commodities can be downloaded at <http://coststudies.ucdavis.edu>, requested through the Department of Agricultural and Resource Economics, UC Davis, 530-752-1517 or obtained from the local county UC Cooperative Extension offices. Some archived studies are also available on the website.

## ASSUMPTIONS

The following assumptions pertain to sample costs to establish and produce organic alfalfa in California. The costs are based on the cultural practices used by growers in the state, some of which may not be used during every establishment or production year. The cultural practices and production inputs for growing organic alfalfa vary considerably among growers and fields throughout the state. 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.

**Land Costs & Setup.** This study is based on a 500 acre organic field, row, fruit, and nut crop farm, of which 100 acres are dedicated to growing alfalfa hay, 395 acres are used to grow other crops, and five acres are occupied by roads and the farmstead. Typically, the grower will rotate a portion of the alfalfa crop each year and establish a new stand on land previously occupied by rotation crops. Land that is suitable for growing alfalfa in California ranges from \$2,500 to \$8,000 per acre. In this study, the land is valued at \$5,000 per acre.

**Labor.** Basic hourly wages for workers are \$9.53 per hour for machine and \$8.00 per hour for non-machine (field workers) labor. Adding 48% for the employers' share of federal and state payroll taxes, insurance, and other benefits increases the labor rates to \$14.10 per hour for machine and \$11.84 per hour for non-machine labor. The current minimum wage is \$7.50 per hour. On January 1, 2008 it will increase to \$8.00 per hour and this cost study uses the wage increase to account for a known cost change. The labor for operations involving machinery are 20% higher than the operation time to account for the extra labor involved in equipment set up, moving, maintenance and repair. Any returns above total costs are considered a return to management and investment.

## STAND ESTABLISHMENT PRACTICES AND MATERIAL INPUTS

**Land Preparation.** The ground is ripped to a depth of 20 to 32 inches to fracture the soil to improve water infiltration. The field is disced to break up large clods, creating better seed-to-soil contact for good seed germination. Composted is spread over the ground and incorporated by a second discing. The land is leveled and the fields are floated to remove high and low spots that may affect stand establishment due to too much or too little water. Healthy alfalfa stands compete well against weeds, insects, and diseases, so it is important to spend time on land preparation to ensure a dense and vigorous stand. This is particularly important for organic production.

**Planting.** A custom operator does the planting with a pneumatic broadcast planter. A cultipacker is used to firm the seedbed prior to and after planting. Certified alfalfa seed is recommended for nematode and weed management. In addition, select a variety with the appropriate fall dormancy rating and pest resistance for your area. USDA standards require the use of organic seeds, but if not available, conventionally produced seeds may be used as long as they are not genetically modified and there is clear documentation of non-availability of organic seed that is adapted to the growing area. The seed should be inoculated with the appropriate organically approved nitrogen-fixing bacteria if alfalfa has not been grown in the area for at least ten years.

The best planting times vary in different regions in the state. For example, in the Intermountain area seeding should be done from mid to late-August. In the Southern San Joaquin planting may occur from mid-September to mid-October. In this study, alfalfa is planted in September at 25 pounds per acre to a depth of 1/4 inch. The optimal planting date is important to minimize weed competition and maximize

alfalfa vigor. Early fall is the best time to plant alfalfa when summer weeds are less aggressive and before winter weeds germinate to minimize weed competition. The life of an organic alfalfa stand varies from the north state to the southern area. The Intermountain region will have a longer productive life than the southern San Joaquin Valley, but will have less hay cuttings annually than a stand further south. The Sacramento Valley usually ranges from three to four years, with three years given in this study.

**Fertilization.** Sample and analyze soils as required by the National Organic Program to determine crop needs, such as pH and nutrient levels. Incorporate the recommended amounts of nutrients using compost or other approved materials. Alfalfa frequently needs supplemental phosphorus (P), and sometimes sulfur (S), and potassium (K), depending on inherent soil characteristics and previous crop fertilization. Alfalfa does not need nitrogen because the plant fixes its own from the atmosphere via nitrogen-fixing nodules on the roots. In this study four tons of manure (90% dry matter, 1% P or 2.29% P<sub>2</sub>O<sub>5</sub>) is applied per acre prior to planting. This should provide about 165 lbs of P<sub>2</sub>O<sub>5</sub> and sufficient sulfur and potassium for several years of production. If the soil is too acidic (pH less than 6.3), add an organically approved liming material such as ash or limestone to ensure optimum nitrogen fixation by the rhizobia bacteria that colonize the alfalfa roots. The compost is custom spread by a fertilizer company at a cost of \$6.50 – \$8.00 per acre, then disced and incorporated by the grower during field preparation. Use plant tissue sampling and analysis during the summer of the first year's growth to assess plant nutrient needs for the second and third year's production.

**Irrigation.** Water use ranges from about 24-30 acre-inches in Northern California up to greater than 50 acre-inches in the Southern San Joaquin, but for this cost study 42 acre-inches is used. Water is applied by sprinkler irrigation before seeding the new alfalfa stand and twice after planting. Water is applied using solid set sprinklers. Fields are irrigated twice in September and once in October for a total of six acre-inches applied to the new planting. Once fields are established they are flood irrigated with a total of 42 acre-inches of water per acre per year.

**Pest Management.** The organic pesticides, rates, and procedures mentioned in this cost study are listed in UC *Integrated Pest Management Guidelines: Alfalfa*. For more information on other available organic pesticides, pest identification, monitoring, and management visit the UC IPM website at <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>. Other sources of organically approved inputs include the Washington State Department of Agriculture materials lists (<http://agr.wa.gov/FoodAnimal/Organic/MaterialsLists.htm>) or the Organic Materials Review Institute (<http://www.omri.org>). For information and specific pesticide use, contact your Farm Advisor or organic certifier.

A fall planting will help reduce weed competition because the alfalfa seedlings emerge after summer weeds are dead or dormant and before winter weeds have a chance to emerge and compete. There is not an effective method for selectively controlling emerged weeds in organically-grown seedling alfalfa but a strong stand will help the alfalfa suppress weeds by out-competing them. If the weed pressure is severe and weeds overtop the alfalfa, it may be beneficial to graze the field with sheep or cut early to allow sunlight to reach the young alfalfa plants.

**Harvest.** Fall plantings will produce a crop the following spring (not during the calendar year of establishment).

**Establishment Costs.** The establishment cost is the sum of cash costs for land preparation, planting, production expenses, and cash overhead for growing the alfalfa stand. NOTE: there will not be returns during the fall of the establishment year. The Total Accumulated Net Cash Cost in the first year as

shown in Table 2 represents the establishment cost per acre. For this study, the cost is \$497 per acre or \$49,700 for the 100 acres. The establishment cost is amortized over the remaining three years of stand life.

## PRODUCTION CULTURAL PRACTICES AND MATERIAL INPUTS

**Organic Certification:** Cost and fees will vary with all the different organic certifiers used by organic growers in California. In this study, a site visit fee is assumed to be \$55 per hour with three hours of time to certify the grower plus a crop fee of \$175. Certification and their associated costs are for the whole farm, paid annually. The state and many certification agencies have a one time fee when a grower first becomes organic. This cost is not included in this study.

**Irrigation.** Irrigation of established fields starts in April and continues through September. A total of 3.5 acre-feet of water at \$25.47 per acre-foot or \$2.12 per acre-inch are applied with flood irrigation per year. Irrigation costs shown in the tables include the water costs and labor for moving siphon tubes or setting up and taking down gated pipe. .

**Pest Management.** The organic pesticides, rates, and procedures mentioned in this cost study are listed in UC *Integrated Pest Management Guidelines: Alfalfa*. For more information on pest identification, monitoring, and management visit the UC IPM website at <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>.

*Insects:* The Egyptian alfalfa weevil is the most serious pest of alfalfa, causing yield and quality losses to the first harvest in the spring. Several organic insecticides have been evaluated for weevil control, but most have been found to be ineffective. Sheep grazing or flaming with propane in the winter may provide partial weevil control by killing the eggs that are laid in the old alfalfa stems. Most growers rely on early harvest to minimize weevil damage, but yields will be reduced. The microbial insecticides are used to control armyworms and alfalfa caterpillars during the summer months (one application per year is assumed). Aphids are managed with resistant alfalfa varieties or early harvest before economic damage occurs.

*Pathogens:* Diseases are managed through the use of resistant varieties or early harvest before the pathogens cause economic damage. Nematodes (root knot and stem) are managed primarily via resistant plant varieties. Stem nematode may further be managed by crop rotation and the use of certified seed. Maintaining soil health during crop rotations through the use of cover crops will also help improve soil and plant health, potentially mitigating pathogen problems.

*Weeds:* In January, a year after the stand has been established, the field can be lightly harrowed for weed management. Winter grazing by sheep when the alfalfa is dormant can also be used to control winter weeds in the first year of establishment as well as subsequent years. Sheep grazing may also provide some weevil control as well as the sheep feed on the old alfalfa stems where weevils often lay eggs. Avoid grazing alfalfa when soils are wet following rains or irrigation. Grazing costs or revenues are not included in this study.

**Harvest.** Alfalfa is custom harvested in this cost study. The NOP requires that organic growers use harvesting equipment that has been designated organic, or properly cleaned between organic and conventional uses, with documentation of this practice noted in the organic plan. A custom operator will cut the hay with a self-propelled swather. Once cured or dried in windrows for several days, the hay is turned with a center-delivery rake. When dried to the correct moisture, the hay will be baled with a pull-

type baler, then picked up with a harrowbed and moved to hay stacks. The costs for all of these operations are simply labeled as Harvest and shown in Tables 3, 4, and 5.

Growers may choose to own harvesting equipment, purchased either new or used, or hire a custom harvester. Many factors are important in deciding which harvesting option a grower uses. The options are discussed in "*Acquiring Alfalfa Hay Harvest Equipment: A Financial Analysis of Alternatives*". The publication can be found at <http://www.ipm.ucdavis.edu/PMG/selectnewpest.alfalfa-hay.html>.

**Yield.** Average annual yields in California range from 5.0 to 9.0 tons per acre with three to ten cuttings depending on location and alfalfa variety. Eight tons per acre over seven cuttings per year is common in the Central Valley. The crop in this study is assumed to yield 7.0 tons of hay per acre because yields of organic alfalfa are often slightly lower than conventional due to issues related to pests and their management.

**Returns.** Based on current organic markets for premium to rain damaged hay, an estimated price of \$180 per ton of hay is used to calculate returns. Returns will vary during the season, depending upon the market and quality of the hay, but are approximately 20% higher than conventionally grown alfalfa. In some areas in the state, additional revenue is generated by charging a per head fee for grazing livestock on alfalfa that is going into dormancy, a practice that will also help control winter weeds. However, this income is not included in this study. Table 8 shows a range of yields over a range of returns.

**Risk.** The risks associated with the production of organic alfalfa hay should not be minimized. Weather and other risks are a continual concern for conventional growers, but organic growers face additional risks such as pest outbreaks that cannot be adequately controlled with organic methods. 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 organic alfalfa hay production. Because of the risks involved, access to a market is crucial. A grower should identify potential markets and, where possible, have a market for their hay before an organic alfalfa hay stand is established.

## CASH OVERHEAD COSTS

*Property Tax.* 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. Salvage value for investments will vary.

*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 10.00% per year. A nominal interest rate is the going market cost of borrowed funds.

*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 0.714% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$935 for the entire farm or \$1.87 per acre.



*Office Expense.* Various farm and office expenses are estimated at \$10.83 per acre for the ranch. These expenses include office supplies, utilities, telephones, computers, bookkeeping, accounting, legal fees, and maintenance, etc.

*Equipment Operating Costs.* Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power-take-off (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$2.30 and \$2.80 per gallon, respectively. Fuel costs are derived from American Automobile Association (AAA) and Energy Information Administration (EIA) 2006 monthly data. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Tables 1, 2, 3, and 4 are determined by multiplying the total hourly operating cost in Table 6 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.

### NON-CASH OVERHEAD COSTS

**Investment.** The investments shown in Table 6 are those that are partially or completely allocated to the organic alfalfa hay operation. Costs of investments such as tractors, trucks, buildings, etc. can be spread over the whole farm. Annual investments shown in Tables 1, 2, 3, and 4 represent depreciation and opportunity cost for each investment on an annual per acre basis.

*Capital Recovery.* Capital recovery cost is calculated for equipment and other farm investments. Although farm equipment used on hay farms might be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 50% to indicate a mix of new and used equipment. Annual ownership costs (Equipment and Investments) are shown in Tables 1-4, and 6. They represent the capital recovery cost for investments on an annual per acre basis.

Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase prices and salvage value (unrecovered capital). Put another way, it is 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 calculation for the annual capital recovery costs is as follows.

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

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its life. For farm machinery (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The life in years is estimated by dividing the wear-out life, as given by American Society of Agricultural Engineers (ASAE) by the annual use in hours. Salvage value is calculated as

$$\text{New Price} \times \% \text{ Remaining Value}$$



Salvage value for other investments including irrigation systems, buildings, and miscellaneous equipment is zero. The salvage value for land is equal to the purchase price because land does not depreciate from use. The purchase price and salvage value for certain equipment and investments are shown in Table 6.

*Capital Recovery Factor.* Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. It is the function of the interest rate and equipment years of life.

*Interest Rate.* The interest rate of 7.25% used to calculate capital recovery cost is an interest rate from an agricultural lender. 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. In other words, the next best alternative use for these resources is in another agricultural enterprise.

*Non-Cash Equipment Costs.* Much of the equipment used on a typical organic alfalfa hay farm in California have high hours of use, which reduces its value. This study shows current purchase prices for new equipment with an adjustment of 50% of new value to indicate a mix of new and used equipment.

The equipment listed in Tables 6 and 7 indicates only that equipment which is used in the organic alfalfa hay enterprise and does not necessarily include all of the equipment that would be found on a typical organic farm growing alfalfa hay.

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

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For information concerning the above mentioned University of California publications contact UC DANR Communications Services (1-800-994-8849), <http://anrcatalog.ucdavis.edu/InOrder/Shop/Shop.asp>, or your local county Cooperative Extension office.

Table 1.

UC COOPERATIVE EXTENSION  
COST PER ACRE TO ESTABLISH ORGANIC ALFALFA HAY  
CALIFORNIA – 2007

Labor Rate: \$14.10/hr. machine labor  
\$11.84/hr. non-machine labor

Short Term Interest Rate: 10.00%

Operation	Operation Time (Hrs/A)	----- Cash and Labor Costs per Acre -----					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
<b>Preplant:</b>								
Subsoil/Rip Ground	0.39	7	13	0	0	20		
Disc Field	0.17	3	6	0	0	9		
Level Field	0.14	2	4	0	0	6		
Fertilize: Compost @ 4.0 Tons/Acre	0.00	0	0	87	82	169		
Disc Field – Incorporate Compost	0.17	3	6	0	0	9		
Float Field	0.12	2	1	0	0	4		
Pull Borders	<u>0.21</u>	<u>4</u>	<u>7</u>	<u>0</u>	<u>0</u>	<u>10</u>		
<b>TOTAL PREPLANT COSTS</b>	<b>1.19</b>	<b>20</b>	<b>36</b>	<b>87</b>	<b>82</b>	<b>225</b>		
<b>Cultural:</b>								
Roll Field with Cultipacker 2X	0.20	3	2	0	0	6		
Pre-irrigate - Sprinklers	0.50	6	0	4	0	10		
Plant: 25 Lbs/Acre	0.00	0	0	65	8	73		
Irrigate – Sprinklers 2X	0.20	2	0	8	0	11		
Pickup Truck Use	<u>0.57</u>	<u>10</u>	<u>7</u>	<u>0</u>	<u>0</u>	<u>16</u>		
<b>TOTAL CULTURAL COSTS</b>	<b>1.47</b>	<b>21</b>	<b>9</b>	<b>78</b>	<b>8</b>	<b>117</b>		
<b>Organic Certification:</b>								
Organic Certification	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>		
<b>TOTAL ORGANIC CERTIFICATION COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>		
<b>Interest on Operating Capital @ 10.00%</b>						<b>45</b>		
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>42</b>	<b>45</b>	<b>165</b>	<b>91</b>	<b>387</b>		
<b>CASH OVERHEAD:</b>								
Office Expense						11		
Liability Insurance						2		
Property Taxes						53		
Property Insurance						38		
Investment Repairs						<u>6</u>		
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>110</b>		
<b>TOTAL CASH COSTS/ACRE</b>						<b>497</b>		
<b>NON-CASH OVERHEAD:</b>								
Investment		Per producing <u>Acre</u>		-- Annual Cost -- <u>Capital Recovery</u>				
Organic Hay Land		5,000		363		363		
Fuel Tanks & Pumps		19		2		2		
Fuel Wagon		4		1		1		
Shop Building		101		8		8		
Shop Tools		25		3		3		
Sprinkler Pipe		52		5		5		
Siphon Tubes		32		3		3		
Hay Barn		104		10		10		
Equipment		<u>140</u>		<u>18</u>		<u>18</u>		
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>5,477</b>		<b>412</b>		<b>412</b>		
<b>TOTAL COSTS/ACRE</b>						<b>909</b>		

Table 2.

UC COOPERATIVE EXTENSION  
COST AND RETURNS PER ACRE TO ESTABLISH ORGANIC ALFALFA HAY  
CALIFORNIA – 2007

Labor Rate: \$14.10/hr. machine labor  
\$11.84/hr. non-machine labor

Short Term Interest Rate: 10.00%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>OPERATING COSTS</b>					
Fertilizer:					
Compost - Chicken	4.00	Ton	21.75	87	
Custom:					
Compost Hauling	4.00	Ton	13.00	52	
Compost Spreading	4.00	Ton	7.50	30	
Airseeder Planting	1.00	Acre	8.25	8	
Organic Site Visit	1.00	Acre	0.313	0	
Organic Crop Fee	1.00	Acre	0.354	0	
Irrigation:					
Water	6.00	AcIn	2.12	13	
Seed:					
Seed - Alfalfa	25.00	Lb	2.60	65	
Labor (machine)	2.36	hrs	14.10	33	
Labor (non-machine)	0.70	hrs	11.84	8	
Fuel - Gas	1.71	gal	2.80	5	
Fuel - Diesel	12.05	gal	2.30	28	
Lube				5	
Machinery repair				8	
Interest on Operating Capital @ 10.00%				45	
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>387</b>	
<b>NET RETURNS ABOVE OPERATING</b>				<b>-387</b>	
<b>CASH OVERHEAD COSTS:</b>					
Office Expense				11	
Liability Insurance				2	
Property Taxes				53	
Property Insurance				38	
Investment Repairs				6	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>110</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>497</b>	
<b>NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):</b>					
Organic Hay Land				363	
Fuel Tanks & Pumps				2	
Fuel Wagon				1	
Shop Building				8	
Shop Tools				3	
Sprinkler Pipe				5	
Siphon Tubes				3	
Hay Barn				10	
Equipment				18	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>412</b>	
<b>TOTAL COSTS/ACRE</b>				<b>909</b>	

Table 3.

UC COOPERATIVE EXTENSION  
COSTS PER ACRE TO PRODUCE ORGANIC ALFALFA HAY  
CALIFORNIA – 2007

Labor Rate: \$14.10/hr. machine labor  
\$11.84/hr. non-machine labor

Short Term Interest Rate: 10.00%  
Yield per Acre: 7.0 Tons

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Weed Control - Harrow Weeds	0.08	1	1	0	0	3		
Irrigate - 6 Months	1.50	18	0	89	0	107		
Insect Control - Worms - 2X	0.11	2	0	38	0	40		
Pickup Truck Use	<u>0.57</u>	<u>10</u>	<u>7</u>	<u>0</u>	<u>0</u>	<u>16</u>		
TOTAL CULTURAL COSTS	2.26	31	9	127	0	166		
Harvest:								
Harvest - 7X	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>280</u>	<u>280</u>		
TOTAL HARVEST COSTS	0.00	0	0	0	280	280		
Organic Certification:								
Organic Certification	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>		
TOTAL ORGANIC CERTIFICATION COSTS	0.00	0	0	0	1	1		
Interest on Operating Capital @ 10.00%								
TOTAL OPERATING COSTS/ACRE		31	9	127	281	460	13	
CASH OVERHEAD:								
Office Expense							11	
Liability Insurance							2	
Property Taxes							54	
Property Insurance							39	
Investment Repairs							<u>5</u>	
TOTAL CASH OVERHEAD COSTS							111	
TOTAL CASH COSTS/ACRE							571	
NON-CASH OVERHEAD:								
		Per producing Acre		-- Annual Cost -- Capital Recovery				
Investment								
Organic Hay Land		5,000		363		363		
Establishment Cost		497		190		190		
Fuel Tanks & Pumps		19		2		2		
Fuel Wagon		4		1		1		
Shop Building		101		8		8		
Shop Tools		25		3		3		
Siphon Tubes		32		3		3		
Hay Barn		104		10		10		
Equipment		<u>45</u>		<u>6</u>		<u>6</u>		
TOTAL NON-CASH OVERHEAD COSTS		5,828		586		586		
TOTAL COSTS/ACRE							1,157	

Table 4.

UC COOPERATIVE EXTENSION  
COSTS AND RETURNS PER ACRE TO PRODUCE ORGANIC ALFALFA HAY  
CALIFORNIA – 2007

Labor Rate: \$14.10/hr. machine labor  
\$11.84/hr. non-machine labor

Short Term Interest Rate: 10.00%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Organic Alfalfa Hay	7.0	Ton	180.00	<u>1,260</u>	
<b>TOTAL GROSS RETURNS FOR ORGANIC ALFALFA HAY</b>				1,260	
<b>OPERATING COSTS</b>					
Custom:					
Organic Site Visit	1.00	Acre	0.31	0	
Organic Crop Fee	1.00	Acre	0.35	0	
Hay Harvest	7.00	Cutting	40.00	280	
Irrigation:					
Water	42.00	AcIn	2.12	89	
Insecticide:					
XenTari	2.00	Lb	19.10	38	
Labor (machine)	0.91	Hrs	14.10	13	
Labor (non-machine)	1.50	Hrs	11.84	18	
Fuel - Gas	1.78	Gal	2.80	5	
Fuel - Diesel	0.39	Gal	2.30	1	
Lube				1	
Machinery repair				2	
Interest on Operating Capital @ 10.00%				<u>13</u>	
<b>TOTAL OPERATING COSTS/ACRE</b>				460	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				800	
<b>CASH OVERHEAD COSTS:</b>					
Office Expense				11	
Liability Insurance				2	
Property Taxes				54	
Property Insurance				39	
Investment Repairs				<u>5</u>	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				111	
<b>TOTAL CASH COSTS/ACRE</b>				571	
<b>NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):</b>					
Organic Hay Land				363	
Establishment Cost				190	
Fuel Tanks & Pumps				2	
Fuel Wagon				1	
Shop Building				8	
Shop Tools				3	
Siphon Tubes				3	
Hay Barn				10	
Equipment				<u>6</u>	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				586	
<b>TOTAL COSTS/ACRE</b>				1,157	
<b>NET RETURNS ABOVE TOTAL COSTS</b>				103	



Table 5.

UC COOPERATIVE EXTENSION  
MONTHLY CASH COSTS PER ACRE TO PRODUCE ORGANIC ALFALFA HAY  
CALIFORNIA – 2007

Beginning JAN 07	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 07	07	07	07	07	07	07	07	07	07	07	07	07	
Cultural:													
Weed Control - Harrow Weeds	3												3
Irrigate - 6 Months				16	16	16	16	28	16				107
Insect Control - Worms						40							40
Pickup Truck Use	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>				<u>16</u>
<b>TOTAL CULTURAL COSTS</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>18</b>	<b>18</b>	<b>58</b>	<b>18</b>	<b>30</b>	<b>18</b>				<b>166</b>
Harvest:													
Harvest - 7X				<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>80</u>	<u>40</u>				<u>280</u>
<b>TOTAL HARVEST COSTS</b>				<b>40</b>	<b>40</b>	<b>40</b>	<b>40</b>	<b>80</b>	<b>40</b>				<b>280</b>
Organic Certification:													
Organic Certification	<u>1</u>												<u>1</u>
<b>TOTAL ORGANIC CERTIFICATION COSTS</b>	<b>1</b>												<b>1</b>
Interest on Operating Capital @ 10.00%	0	0	0	1	1	2	2	3	4				13
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>58</b>	<b>59</b>	<b>100</b>	<b>60</b>	<b>113</b>	<b>61</b>				<b>460</b>
OVERHEAD:													
Office Expense	1	1	1	1	1	1	1	1	1				11
Liability Insurance	2												2
Property Taxes	27						27						54
Property Insurance	19						19						39
Investment Repairs	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5</u>
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>50</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>48</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>111</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>55</b>	<b>4</b>	<b>4</b>	<b>60</b>	<b>60</b>	<b>101</b>	<b>108</b>	<b>115</b>	<b>63</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>571</b>

Table 6.

UC COOPERATIVE EXTENSION  
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
CALIFORNIA – 2007

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
07	100 Gal Sprayer for ATV	5,364	10	949	705	23	32	759
07	90 HP 4WD Tractor	84,264	10	24,890	10,356	390	546	11,291
07	ATV	6,640	7	2,519	954	33	46	1,032
07	Pickup 4WD - 3/4 Ton	36,599	7	13,883	5,258	180	252	5,691
07	Springtooth Harrow	15,794	10	2,793	2,075	66	93	2,234
TOTAL		148,661		45,034	19,348	692	968	21,008
50% of New Cost *		74,330		22,517	9,674	346	484	10,504

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	----- Cash Overhead -----			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Establishment Cost	49,700	3		19,025	177	249	0	19,451
Fuel Tanks & Pumps	9,576	20	958	899	38	53	256	1,245
Fuel Wagon	2,056	10	206	281	8	11	57	357
Hay Barn	51,404	20	5,140	4,825	202	283	706	6,016
Organic Hay Land	2,500,000	40	2,500,000	181,250	17,850	25,000	0	224,100
Shop Building	50,100	30	5,010	4,089	197	276	687	5,248
Shop Tools	12,241	10	1,224	1,675	48	67	336	2,127
Siphon Tubes	15,935	20	1,594	1,496	63	88	438	2,084
TOTAL INVESTMENT	2,691,012		2,514,132	213,540	18,582	26,026	2,480	260,627

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Liability Insurance	500	Acre	1.87	935
Office Expense	500	Acre	10.83	5,415

Table 7.

UC COOPERATIVE EXTENSION  
HOURLY EQUIPMENT COSTS  
CALIFORNIA – 2007

Yr	Description	Actual Hours Used	Capital Recovery	----- COSTS PER HOUR -----						Total Costs/Hr.
				- Cash Overhead -			----- Operating -----			
				Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.		
07	100 Gal Sprayer for ATV	138.8	2.54	0.08	0.11	1.18	0.00	1.18	3.92	
07	90 HP 4WD Tractor	1,599.9	3.24	0.12	0.17	1.79	11.69	13.48	17.01	
07	ATV	273.8	1.74	0.06	0.08	0.41	2.15	2.56	4.44	
07	Pickup 4WD - 3/4 Ton	285.0	9.23	0.32	0.44	2.22	9.66	11.89	21.87	
07	Springtooth Harrow	199.1	5.21	0.17	0.23	2.65	0.00	2.65	8.26	

Table 8.

UC COOPERATIVE EXTENSION  
RANGING ANALYSIS  
CALIFORNIA – 2007

COSTS PER ACRE AT VARYING YIELDS FOR ORGANIC ALFALFA HAY							
	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
OPERATING COSTS/ACRE:							
Cultural Cost	166	166	166	166	166	166	166
Harvest Cost	220	240	260	280	300	320	340
Organic Certification Cost	1	1	1	1	1	1	1
Interest on Operating Capital	11	12	12	13	13	14	15
TOTAL OPERATING COSTS/ACRE	398	419	439	460	481	501	522
TOTAL OPERATING COSTS/TON	72	70	68	66	64	63	61
CASH OVERHEAD COSTS/ACRE							
TOTAL CASH COSTS/ACRE	509	530	550	571	592	612	633
TOTAL CASH COSTS/TON	93	88	85	82	79	77	74
NON-CASH OVERHEAD COSTS/ACRE							
TOTAL COSTS/ACRE	1,095	1,116	1,136	1,157	1,178	1,198	1,219
TOTAL COSTS/TON	199	186	175	165	157	150	143

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ORGANIC ALFALFA HAY							
PRICE (DOLLARS/TON) ORGANIC ALFALFA HAY	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
135	344	391	438	485	532	579	626
150	427	481	536	590	644	699	753
165	509	571	633	695	757	819	881
180	592	661	731	800	869	939	1,008
195	674	751	828	905	982	1,059	1,136
210	757	841	926	1,010	1,094	1,179	1,263
225	839	931	1,023	1,115	1,207	1,299	1,391

NET RETURNS PER ACRE ABOVE CASH COSTS FOR ORGANIC ALFALFA HAY							
PRICE (DOLLARS/TON) ORGANIC ALFALFA HAY	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
135	233	280	327	374	421	468	515
150	316	370	425	479	533	588	642
165	398	460	522	584	646	708	770
180	481	550	620	689	758	828	897
195	563	640	717	794	871	948	1,025
210	646	730	815	899	983	1,068	1,152
225	728	820	912	1,004	1,096	1,188	1,280

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR ORGANIC ALFALFA HAY							
PRICE (DOLLARS/TON) ORGANIC ALFALFA HAY	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
135	-353	-306	-259	-212	-165	-118	-71
150	-270	-216	-161	-107	-53	2	56
165	-188	-126	-64	-2	60	122	184
180	-105	-36	34	103	172	242	311
195	-23	54	131	208	285	362	439
210	60	144	229	313	397	482	566
225	142	234	326	418	510	602	694

Table 9.

UC COOPERATIVE EXTENSION  
COSTS AND RETURNS/ BREAKEVEN ANALYSIS  
CALIFORNIA – 2007

COSTS AND RETURNS - PER ACRE BASIS							
Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Organic Alfalfa Hay	1,260	460	800	571	689	1,157	103

COSTS AND RETURNS - TOTAL ACREAGE							
Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Organic Alfalfa Hay	126,000	46,001	79,999	57,100	68,900	115,695	10,305

BREAKEVEN PRICES PER YIELD UNIT					
CROP	Base Yield (Units/Acre)	Yield Units	Operating Costs	Cash Costs	Total Costs
Organic Alfalfa Hay	7.0	Ton	65.72	81.57	165.28

BREAKEVEN YIELDS PER ACRE					
CROP	Yield Units	Base Price (\$/Unit)	Operating Costs	Cash Costs	Total Costs
Organic Alfalfa Hay	Ton	180.00	2.6	3.2	6.4

Table 10.

UC COOPERATIVE EXTENSION  
DETAIL BY OPERATIONS  
CALIFORNIA – 2007

Operation	Operation Month	Tractor/ Power Unit	Implement	Material	Broadcast Rate/Acre	Material Unit
Organic Certification	January			Custom		
Harrow Weeds	January	90 HP 4WD Tractor	Springtooth Harrow			
Irrigate – 6 Months	April	Labor		Water	6.00	AcIn
	May	Labor		Water	6.00	AcIn
	June	Labor		Water	6.00	AcIn
	July	Labor		Water	6.00	AcIn
	August	Labor		Water	12.00	AcIn
	September	Labor		Water	6.00	AcIn
Harvest – Custom – 7X	May			Custom		
	June			Custom		
	July			Custom		
	August			Custom		
	September			Custom		
Insect Control - Worms	June	ATV	100 Gal Sprayer for ATV	XenTari	2.00	Lbs
Pickup Truck Use	All Months	Pickup 4WD - 3/4 Ton				