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UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

SAMPLE COSTS TO ESTABLISH AND PRODUCE

ORCHARD GRASS HAY



INTERMOUNTAIN REGION SHASTA – LASSEN COUNTIES

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INTRODUCTION

The detailed costs for orchardgrass hay establishment and production in the Intermountain Region, Fall River Valley and Big Valley area of Shasta and Lassen Counties, are presented in this study. The hypothetical farm used in this report consists of 320 acres with 300 acres of orchardgrass hay production and 20 acres dedicated to roads, buildings, and unused land.

This study consists of Assumptions to Establish and Produce Orchardgrass Hay and is intended as a guide only. It 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 a well-managed orchardgrass hay crop in this region. Sample costs for labor, materials, equipment, and custom services are based on current figures. “*Your Costs*” columns in Table 1 Costs Per Acre To Establish An Orchardgrass Hay Stand, Table 2 Costs and Returns Per Acre to Establish An Orchardgrass Hay Stand, Table 3 Costs Per Acre to Produce Orchardgrass Hay, and Table 4 Costs And Returns Per Acre to Produce Orchardgrass Hay.

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, 530-752-4424 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 following assumptions pertain to sample costs to establish and produce orchardgrass hay in Shasta and Lassen Counties in the Intermountain Region. Practices described are not recommendations by the University of California, but represent production practices considered typical of a well-managed farm for this crop and area. The costs are based on the cultural practices used by growers in the region, some of which may not be used during every establishment or production year. The cultural practices and production inputs for growing orchardgrass hay vary considerably amongst growers and fields. 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 and Rent. The study is based on a 320 acre field and row crop farm, of which 300 acres are dedicated to growing orchardgrass hay and 20 acres are occupied by roads and farmstead. Other crops that may be grown on the farm are small grains, alfalfa, Timothy hay, sudangrass hay, and pasture.

Rental agreements for orchardgrass hay can include combinations of rent and cost. Rent for land is usually a cash payment between \$100 and \$200 depending on the quality of the land. This study uses a rent of \$100 per acre. The tenant pays all production costs. The long-term interest rate used in this study is 6.25% and the short-term rate is 9.25%. Your interest rates will vary depending on many factors.

Labor. Basic hourly wages for workers are \$9.00 per hour for machine and \$7.50 per hour for non-machine (field workers) labor. Adding 48% for the employers' share of federal and state payroll taxes (13.95%), insurance (20.14%), and other unspecified benefits (14.00%) increases the labor rates to \$13.32 per hour for machine and \$11.10 per hour for non-machine labor. 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. A farm manager is paid \$2,500 per month or \$30,000 per year. Adding the employers' share of payroll taxes and benefits brings the cost to \$40,201 and is included as cash overhead. In addition, the farm manager is furnished a leased pickup for personal and business use. The pickup is valued at \$1,000 per month, which includes license, insurance, and fuel, is included as cash overhead. Any returns above total costs are considered a return to management and investment.

STAND ESTABLISHMENT, PRODUCTION CULTURAL PRACTICES, AND MATERIAL INPUTS

Site Preparation. The seedbed preparation begins in late August when the hard ground is subsoiled to a depth of three feet by a custom operator using a chisel. The ground is then disced three times and smoothed with a roller harrow. Planting occurs in September with an airseeder and paced with a roller harrow. Small broadleaves are controlled with 2, 4-D sprayed in the fall and again in the spring.

Fertilization. In the establishment year, a custom application of elemental sulfur is incorporated into the ground preplant at 200 pounds per acre. Ammonium sulfate (21-0-0-24) is applied in the operation as planting providing 40 pounds of nitrogen (N) per acre. Urea is applied three times in the growing season, 100 pounds of N in April and 50 pounds of N after each cutting in June and August for a total of 200 pounds of acre of N. Leaf analysis, costing \$1.00 per acre, is done in June prior to harvest to determine if the N levels are adequate.

Irrigation. Irrigation begins in May in both the establishment and average production years. No irrigation is done in April because stored soil moisture from winter rainfall. A total of 33 acre-inches are applied to the field in 11 irrigations to match California Irrigation Management Information System (CIMIS) evapotranspiration (ET_o) from April to September. CIMIS data can be found on the internet at <http://www.cimis.water.ca.gov/cimis/welcome.jsp>. A automatic linear irrigation system is used to not only precision apply the water with little or no runoff, but also to reduce labor costs normally found using a typical side roll wheel line system. The water is pumped from the well using a 100 hp electric pump with a 150 foot lift. The pumping cost is \$3.00 per acre inch. After the last harvest operation, the field is irrigated with three acre inches of water. The postharvest irrigation is included in the 33 acre-inch irrigation amount.

Stand Establishment. Orchardgrass seed is planted at a rate of 15 pounds per acre. Planting occurs in August in this study, but can range from July through October depending on cultural practices. Once planted, the stand is kept for 10 years. Growers normally have their certified seed planted by a custom operator who applies 100 pounds of N using urea (46-0-0) at the same time. The seed and fertilizer is placed directly on top of the ground by the custom airseeder followed by the grower rolling the seed firmly into the ground to a depth of 1/8 to 1/4 inches. Alternative seeding practices use a Brillion type seeder/roller or conventional drilling.

Pest Management. Pest management consists of herbicide treatments only. For information and specific pesticide use, contact your pest control advisor. Written recommendations are required for many pesticides and are written by licensed pest control advisors. For additional information contact the Shasta-Lassen County field crop Farm Advisor. Pesticide use permits are available at the county Agricultural Commissioner Office. Although control for insect damage is not common and not used in this study, some scouting for insects should be done by the manager in the late winter (grain mites) and in the summer (armyworms).

Weeds. Prior to planting the ground is tilled for broadleaf weed control. Most weeds in the stand are controlled with 2, 4-D sprayed after planting in October at a rate of 1.5 pints per acre. After establishment, 2, 4-D is sprayed at 2 pints per acre for winter annuals (April) and field bindweed (June, and August). Borders are also sprayed to manage any weeds that are invasive to the stand. The field edges need to be maintained clean of weeds for quality hay. This is done by spraying twice with Roundup at a rate one quart per acre on 10% of the acreage during April and June to control broadleaf and annual grass weeds. Many growers have removed permanent fencing to control weeds, but are unable to graze off the stand to livestock in the fall unless an electric fence is used.

Establishment Costs. The establishment cost is the sum of cash costs for land preparation, planting, production expenses, and cash overhead for growing orchardgrass hay through the first 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 \$478 per acre or \$142,500 for the 300 acre field. The establishment cost is amortized over the remaining 10 years of the stand life.

Harvest. Orchardgrass hay is usually cut three times during the growing season on an approximate 50 day schedule. A swather with a 14 foot header is used to cut the hay and lay into windrows. In this study, all windrows are raked once with windrows merged in the second and third cuttings so that two windrows become one. Because almost rain damage of the first cutting occurs in almost 25% of the years, 25% of the first cutting is re-raked. Due to slower speeds two balers and tractors are used. The balers are “chambered” for small bales allowing bottom bales to stand on edge for easier squeeze

handling during loading and reduce weights to less than 100 pounds each. Bales are picked up and removed from the field by a harrowbed and placed on plastic sheets or tarps in the hay barns.

A hay squeeze is used to place hay in the barns and load trucks. Loading hay is negotiated and may be by either the buyer or seller. In this study loading is provided by the hay seller/grower for \$3 per ton. Growers pay for weighing the hay load for \$0.50 per ton and the buyer pays for hay testing.

If growers have their hay custom harvested then the equipment for the required operations should be deleted in the investments on Tables 1, 2, 3, 4, 6, and 7. Labor, fuel, repairs, depreciation and interest on investment would need to be removed from the harvest operations and custom charges added.

Postharvest. After the last hay cutting the fields are irrigated once.

Yields & Returns. The crop yield used in this study are seven tons per acre annually with 3.5 tons the first cutting, 2.0 tons the second cutting and 1.5 tons the third cutting. Hay is normally cut and baled three times each growing season. Orchardgrass hay is harvested in June, August, and September with approximately 50 days between cuttings. Orchardgrass hay is mostly sold for horse market so an average return price of \$140 per ton of hay is used. This is less than the premium price because of grassy weeds, rain damaged, and mechanically damaged hay on headlands. The first cutting may be lower in quality, but demand may be higher because of lack of availability of other hay for horse feed. Returns will vary according to quality and market. The yields and prices used in this cost study are estimates based on the current market. Current market prices can be found on the internet at <http://www.ams.usda.gov/LSMNPubs/Hay.htm>. Many of the Intermountain hay growers advertise at <http://www.intermountainhaygrowers.com/>.

Risk. The risks associated with the production of orchardgrass hay 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 orchardgrass hay production. Because of the risks involved, access to a market is crucial. A grower should identify potential markets and, where possible, have a contract for their hay before an orchardgrass 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 9.25% 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 0.700% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$836 for the entire farm or \$2.63 per acre.

Office Expense. Various farm and office expenses are estimated at \$20 per acre for the ranch. These expenses include office supplies, utilities, telephones, bookkeeping, accounting, legal fees, and maintenance, etc.

Safety Equipment. Farms are required to have a safety program in place to meet legal requirements. This includes such things as training, equipment for employees, signage, etc., and is assumed to cost \$1.00 per acre. Many farms have small separate and lockable storage for pesticides. These costs are included in the cost of buildings.

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 \$2.00 and \$2.45 per gallon, respectively. Costs are based on current delivery prices quoted by distributors and 2006 monthly price data. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Diesel is bought in shipments of 7,400 gallons and stored in a 10,000 above ground storage tank with a spill containment pad and uses an electric pump to fill equipment. Gasoline is also stored above ground in a 100 gallon tank on a riser in a spill containment pad, but uses gravity flow to fill equipment. Gasoline also includes federal and state excise taxes that are refundable for on-farm use when filing income tax return.

The fuel, lube, and repair cost per acre for each operation in Table 1, 2, 3, and 4 is determined by multiplying the total hourly operating cost in Table 7 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 orchardgrass hay operation. Costs of investments such as tractors, trucks, buildings, etc. can be spread over the whole farm. Annual investments shown in Tables 1 and 3 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 mint farms might be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 40% 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.

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

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 4.

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 years of life of the equipment.

Interest Rate. The interest rate of 6.25% used to calculate capital recovery cost is the USDA-ERS's ten year average of California's agricultural sector long-run rate of return to production assets from current income. 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 inventory on a typical Orchardgrass Hay farm in Shasta and Lassen counties have high hours of use which reduces its value. This study shows current purchase prices for new equipment with an adjustment of 40% of new value to indicate a mix of new and used equipment.

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

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

Acknowledgment. Appreciation is expressed to those growers and other cooperators who provided information for this study.

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Table 1.

UC COOPERATIVE EXTENSION
COST PER ACRE TO ESTABLISH AN ORCHARDGRASS HAY STAND
INTERMOUNTAIN REGION
SHASTA & LASSEN COUNTIES - 2006

Labor Rate: \$13.32/hr. machine labor
\$11.10/hr. non-machine labor

Short Term Interest Rate: 9.25%

Operation	Operation Time (Hrs/A)	----- Cash and Labor Costs per Acre -----				Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent		
Preplant:							
Subsoil Fields	0.00	0	0	0	50	50	
Disc Fields - 3X	0.65	10	9	0	0	19	
Roller Harrow Fields	0.19	3	1	0	0	4	
Fertilize - Sulfur	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>12</u>	<u>6</u>	<u>18</u>	
TOTAL PREPLANT COSTS	0.84	13	10	12	56	92	
Cultural:							
Plant Orchardgrass & Fertilize	0.00	0	0	43	8	51	
Roller Harrow Seed	0.19	3	1	0	0	4	
Irrigate 4X	0.40	4	0	18	0	22	
Weed Control - Winter Herbicide Spray	0.11	2	0	4	0	6	
Pickup Truck Use	0.57	9	6	0	0	15	
ATV Use	<u>0.45</u>	<u>7</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>8</u>	
TOTAL CULTURAL COSTS	1.72	25	9	65	8	107	
Interest on Operating Capital @ 9.25%						6	
TOTAL OPERATING COSTS/ACRE		39	19	77	64	206	
CASH OVERHEAD:							
Office Expense						34	
Liability Insurance						3	
Manager's Salary						126	
Safety Equipment						1	
Property Taxes						47	
Property Insurance						33	
Investment Repairs						<u>29</u>	
TOTAL CASH OVERHEAD COSTS						272	
TOTAL CASH COSTS/ACRE						478	
NON-CASH OVERHEAD:							
Investment		Per producing Acre		-- Annual Cost -- Capital Recovery			
Hay Land		4,000		250		250	
Fuel Tanks & Pumps (2 Each)		29		3		3	
Fuel Wagon		6		1		1	
Shop Building		145		11		11	
Shop Tools		36		5		5	
Linear Irrigation System (2 Each)		618		53		53	
Hay Barns - 500 Tons Each (2)		313		27		27	
Equipment		<u>117</u>		<u>13</u>		<u>13</u>	
TOTAL NON-CASH OVERHEAD COSTS		5,264		362		362	
TOTAL COSTS/ACRE						839	

UC COOPERATIVE EXTENSION
 Table 2. COST AND RETURNS PER ACRE TO ESTABLISH AN ORCHARDGRASS HAY STAND
 INTERMOUNTAIN REGION
 SHASTA & LASSEN COUNTIES - 2006

Labor Rate: \$13.32/hr. machine labor
 \$11.10/hr. non-machine labor

Short Term Interest Rate: 9.25%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
OPERATING COSTS					
Custom:					
Subsoil	1.00	Acre	50.00	50	
Ground Application - Sulfur	1.00	Ton	6.26	6	
Fertilizer:					
Elemental Sulfur	200.00	Lb	0.06	12	
21-0-0-24	100.00	Lb N	0.631	63	
Rent:					
Airseeder Planting	1.00	Acre	8.00	8	
Seed:					
Seed - Orchardgrass	15.00	Lb	1.20	18	
Irrigation:					
Water	6.00	AcIn	3.00	18	
Herbicide:					
2,4-D	1.50	Pint	2.50	4	
Labor (machine)	2.59	Hrs	13.30	34	
Labor (non-machine)	0.40	Hrs	11.10	4	
Fuel - Gas	2.07	Gal	2.55	5	
Fuel - Diesel	4.02	Gal	2.00	8	
Lube				2	
Machinery repair				4	
Interest on Operating Capital @ 9.25%				6	
TOTAL OPERATING COSTS/ACRE				206	
CASH OVERHEAD COSTS:					
Office Expense				34	
Liability Insurance				3	
Manager's Salary				126	
Safety Equipment				1	
Property Taxes				47	
Property Insurance				33	
Investment Repairs				29	
TOTAL CASH OVERHEAD COSTS/ACRE				272	
TOTAL CASH COSTS/ACRE					
				478	
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):					
Hay Land				250	
Fuel Tanks & Pumps (2 Each)				3	
Fuel Wagon				1	
Shop Building				11	
Shop Tools				5	
Linear Irrigation System (2 Each)				53	
Hay Barns - 500 Tons Each (2)				27	
Equipment				13	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				362	
TOTAL COSTS/ACRE				839	

Table 3.

UC COOPERATIVE EXTENSION
 COSTS PER ACRE TO PRODUCE ORCHARDGRASS HAY
 INTERMOUNTAIN REGION
 SHASTA & LASSEN COUNTIES - 2006

Labor Rate: \$13.32/hr. machine labor
 \$11.10/hr. non-machine labor

Short Term Interest Rate: 9.25%

Operation	----- Cash and Labor Costs per Acre -----						Total Cost	Your Cost
	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Weed Control - In Stand Spray - 3X	0.32	5	1	15	0		22	
Weed Control - Borders - 10% Of Acreage - 2X	0.10	2	0	4	0		6	
Fertilize - 3X	0.00	0	0	81	19		100	
Irrigate 11X	1.10	12	0	99	0		111	
Leaf Analysis	0.00	0	0	0	1		1	
Pickup Truck Use	0.57	9	6	0	0		15	
ATV Use	<u>0.45</u>	<u>7</u>	<u>1</u>	<u>0</u>	<u>0</u>		<u>8</u>	
TOTAL CULTURAL COSTS	2.54	35	9	199	20		263	
Harvest:								
Cut Hay	0.30	5	1	0	0		6	
Rake Hay 1.25X (1st Cutting Only)	0.14	2	1	0	0		3	
Rake Hay (2nd & 3rd Cuttings)	0.21	3	2	0	0		5	
Bale Hay	0.17	11	9	13	0		33	
Roadside, Store, & Load Hay	<u>0.30</u>	<u>11</u>	<u>17</u>	<u>2</u>	<u>2</u>		<u>31</u>	
TOTAL HARVEST COSTS	1.11	32	30	14	2		77	
Interest on Operating Capital @ 9.25%							8	
TOTAL OPERATING COSTS/ACRE		67	39	214	21		349	
CASH OVERHEAD:								
Office Expense							20	
Liability Insurance							3	
Manager's Salary							126	
Safety Equipment							1	
Property Taxes							53	
Property Insurance							37	
Investment Repairs							<u>30</u>	
TOTAL CASH OVERHEAD COSTS							269	
TOTAL CASH COSTS/ACRE							618	
NON-CASH OVERHEAD:								
		Per producing		-- Annual Cost --				
Investment		<u>Acres</u>		<u>Capital Recovery</u>				
Hay Land		4,000		250			250	
Orchardgrass Hay Stand Establishment Cost		475		30			30	
Fuel Tanks & Pumps (2 Each)		66		6			6	
Fuel Wagon		6		1			1	
Shop Building		145		11			11	
Shop Tools		36		5			5	
Linear Irrigation System (2 Each)		618		53			53	
Hay Barns - 500 Tons Each (2)		313		27			27	
Equipment		<u>256</u>		<u>31</u>			<u>31</u>	
TOTAL NON-CASH OVERHEAD COSTS		5,915		413			413	
TOTAL COSTS/ACRE							1,031	

Table 4.

UC COOPERATIVE EXTENSION
 COSTS AND RETURNS PER ACRE TO PRODUCE ORCHARDGRASS HAY
 INTERMOUNTAIN REGION
 SHASTA & LASSEN COUNTIES - 2006

Labor Rate: \$13.32/hr. machine labor
 \$11.10/hr. non-machine labor

Short Term Interest Rate: 9.25%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Orchardgrass Hay	7.0	Ton	140.00	<u>980</u>	
TOTAL GROSS RETURNS FOR ORCHARDGRASS HAY				980	
OPERATING COSTS					
Herbicide:					
2,4-D	6.00	Pint	2.50	15	
Roundup Ultra Max	0.50	Pint	8.58	4	
Fertilizer:					
Urea 46-0-0	200.00	Lb N	0.406	81	
Custom:					
Ground Application - N Fertilizer	3.00	Acre	6.25	19	
Weigh Hay Truckload	3.00	Load	0.50	2	
Leaf Analysis	1.00	Acre	1.00	1	
Irrigation:					
Water	33.00	AcIn	3.00	99	
Harvest Aid:					
Hay Bale Twine	7.00	Ton	1.80	13	
Tarp/Plastic	7.50	Ton	0.20	2	
Labor (machine)	4.03	Hrs	13.30	54	
Labor (non-machine)	1.20	Hrs	11.10	13	
Fuel - Gas	3.25	Gal	2.55	8	
Fuel - Diesel	5.90	Gal	2.00	12	
Lube				3	
Machinery repair				16	
Interest on Operating Capital @ 9.25%				<u>8</u>	
TOTAL OPERATING COSTS/ACRE				349	
NET RETURNS ABOVE OPERATING COSTS				631	
CASH OVERHEAD COSTS:					
Office Expense				20	
Liability Insurance				3	
Manager's Salary				126	
Safety Equipment				1	
Property Taxes				53	
Property Insurance				37	
Investment Repairs				<u>30</u>	
TOTAL CASH OVERHEAD COSTS/ACRE				269	
TOTAL CASH COSTS/ACRE				618	
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):					
Hay Land				250	
Orchardgrass Hay Stand Establishment Cost				30	
Fuel Tanks & Pumps (2 Each)				6	
Fuel Wagon				1	
Shop Building				11	
Shop Tools				5	
Linear Irrigation System (2 Each)				53	
Hay Barns - 500 Tons Each (2)				27	
Equipment				<u>31</u>	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				413	
TOTAL COSTS/ACRE				1,031	
NET RETURNS ABOVE TOTAL COSTS				<u>-51</u>	

Table 5.

UC COOPERATIVE EXTENSION
MONTHLY CAST COSTS PER ACRE TO PRODUCE ORCHARDGRASS HAY
INTERMOUNTAIN REGION
SHASTA & LASSEN COUNTIES - 2006

Beginning APR 06	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
Ending MAR 07	06	06	06	06	06	06	06	06	06	07	07	07	
Cultural:													
Weed Control - In Stand Spray - 3X	7		7		7								22
Weed Control - Borders - 10% Of Acreage - 2X	3		3										6
Fertilize - 3X	47		27		27								100
Irigate 11X		20	20	30	30	10							111
Leaf Analysis			1										1
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1	15
ATV Use	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>8</u>
TOTAL CULTURAL COSTS	59	22	60	32	66	12	2	2	2	2	2	2	263
Harvest:													
Cut Hay - 3X			2		2	2							6
Rake Hay - 1.25X (1st Cutting Only)			3										3
Rake Hay - 2X (2nd & 3rd Cuttings)					2	2							5
Bale Hay - 3X			13		10	9							33
Roadside, Store, & Load Hay - 3X			<u>10</u>		<u>10</u>	<u>10</u>							<u>31</u>
TOTAL HARVEST COSTS			28		25	24							77
Interest on Operating Capital @ 9.25%	0	1	1	2	2	3	0	0	0	0	0	0	8
TOTAL OPERATING COSTS/ACRE	60	23	90	34	93	39	2	2	2	2	2	2	349
OVERHEAD:													
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2	20
Liability Insurance	0	0	0	0	0	0	0	0	0	0	0	0	3
Manager's Salary	10	10	10	10	10	10	10	10	10	10	10	10	126
Safety Equipment	0	0	0	0	0	0	0	0	0	0	0	0	1
Property Taxes	26								26				53
Property Insurance	18								18				37
Investment Repairs	<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>2</u>	<u>2</u>	<u>2</u>	<u>30</u>
TOTAL CASH OVERHEAD COSTS	60	15	15	15	15	15	15	15	60	15	15	15	269
TOTAL CASH COSTS/ACRE	119	38	105	49	108	54	17	17	62	17	17	17	618

Table 6.

UC COOPERATIVE EXTENSION
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
INTERMOUNTAIN REGION
SHASTA & LASSEN COUNTIES - 2006

ANNUAL EQUIPMENT COSTS								
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
05	42 HP 2WD Tractor	23,083	12	5,771	2,454	101	144	2,699
05	90 HP 4WD Tractor	81,962	16	14,680	7,690	338	483	8,511
05	ATV 100 Gallon Sprayer With 20' Boom	5,218	10	923	648	21	31	700
05	ATV	6,459	7	2,450	878	31	45	953
05	Baler - Engine	60,000	10	9,903	7,506	245	350	8,101
05	Baler - Engine	60,000	10	9,903	7,506	245	350	8,101
05	Forklift with Hay Squeeze Attachment	40,000	10	6,602	5,004	163	233	5,400
05	GPS Light Bar Unit	1,800	10	318	224	7	11	242
05	Harrowbed	125,000	10	20,631	15,638	510	728	16,876
05	Pickup - 4WD 3/4 Ton	35,600	7	13,504	4,837	172	246	5,255
05	Rake - V 20'	18,000	10	3,183	2,236	74	106	2,416
05	Swather - SP 14'	75,000	15	7,200	7,545	288	411	8,244
TOTAL		532,122		95,068	62,167	2,195	3,136	67,498
40% of New Cost *		212,849		38,027	24,867	878	1,254	26,999

* 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								
Orchardgrass Hay Stand Establishment Cost	142,500	10	142,500	8,906	998	1,425	0	11,329
Fuel Tanks & Pumps (2 Each)	21,000	20	2,100	1,813	81	116	578	2,587
Fuel Wagon	2,000	10	200	260	8	11	55	334
Hay Barns - 500 Tons Each (2)	100,000	20	10,000	8,632	385	550	2,750	12,317
Hay Land	1,280,000	40	1,280,000	80,000	8,960	12,800	0	101,760
Linear Irrigation System (2 Each)	197,857	20	19,786	17,078	762	1,088	5,441	24,369
Shop Building	46,332	30	4,633	3,400	178	255	450	4,284
Shop Tools	11,583	10	1,158	1,506	45	64	318	1,932
TOTAL INVESTMENT	1,801,272		1,460,377	121,595	11,416	16,308	9,592	158,911

ANNUAL BUSINESS OVERHEAD COSTS				
Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Liability Insurance	320	Acre	2.61	835
Manager's Salary	320	Acre	125.63	40,202
Office Expense	320	Acre	20.00	6,400
Safety Equipment	320	Acre	1.00	320

Table 7.

UC COOPERATIVE EXTENSION
 HOURLY EQUIPMENT COSTS
 INTERMOUNTAIN REGION
 SHASTA & LASSEN COUNTIES – 2006

		----- COSTS PER HOUR -----							
		- Cash Overhead				----- Operating -----			
Yr	Description	Actual Hours Used	Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
05	42 HP 2WD Tractor	976.8	1.00	0.04	0.06	0.68	4.74	5.42	6.53
05	90 HP 4WD Tractor	870.4	3.53	0.16	0.22	1.32	10.17	11.49	15.41
05	ATV 100 Gallon Sprayer With 20' Boom	247.2	1.05	0.03	0.05	0.93	0.00	0.93	2.06
05	ATV	382.2	0.92	0.03	0.05	0.32	1.95	2.27	3.26
05	Baler - Engine	199.4	15.06	0.49	0.70	8.79	7.68	16.47	32.72
05	Baler - Engine	199.4	15.06	0.49	0.70	8.79	7.68	16.47	32.72
05	Forklift with Hay Squeeze Attachment	200.0	10.01	0.33	0.47	5.86	11.29	17.15	27.95
05	GPS Light Bar Unit	127.2	0.70	0.02	0.03	1.30	0.00	1.30	2.06
05	Harrowbed	200.0	31.28	1.02	1.46	18.31	16.02	34.33	68.08
05	Pickup - 4WD 3/4 Ton	250.0	7.74	0.27	0.39	1.74	8.80	10.54	18.95
05	Rake - V 20'	229.0	3.91	0.13	0.18	1.68	0.00	1.68	5.90
05	Swather - SP 14'	200.0	15.09	0.58	0.82	4.60	0.00	4.60	21.08

Table 8.

UC COOPERATIVE EXTENSION
RANGING ANALYSIS
INTERMOUNTAIN REGION
SHASTA & LASSEN COUNTIES - 2006

	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
COSTS PER ACRE AT VARYING YIELDS FOR ORCHARDGRASS HAY							
OPERATING COSTS/ACRE:							
Cultural Cost	263	263	263	263	263	263	263
Harvest Cost	59	65	71	77	84	90	96
Interest on operating capital	8	8	8	8	9	9	9
TOTAL OPERATING COSTS/ACRE	331	337	343	349	355	362	368
TOTAL OPERATING COSTS/TON	60	56	53	50	47	45	43
CASH OVERHEAD COSTS/ACRE	269	269	269	269	269	269	269
TOTAL CASH COSTS/ACRE	599	606	612	618	624	631	637
TOTAL CASH COSTS/TON	109	101	94	88	83	79	75
NON-CASH OVERHEAD COSTS/ACRE	409	410	412	413	414	415	416
TOTAL COSTS/ACRE	1,008	1,016	1,024	1,031	1,039	1,046	1,053
TOTAL COSTS/TON	183	169	157	147	138	131	124

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ORCHARDGRASS HAY							
PRICE (DOLLARS/TONS)	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
Orchardgrass Hay							
80	109	143	177	211	245	278	312
100	219	263	307	351	395	438	482
120	329	383	437	491	545	598	652
140	439	503	567	631	695	758	822
160	549	623	697	771	845	918	992
180	659	743	827	911	995	1,078	1,162
200	769	863	957	1,051	1,145	1,238	1,332

NET RETURNS PER ACRE ABOVE CASH COSTS FOR ORCHARDGRASS HAY							
PRICE (DOLLARS/TONS)	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
Orchardgrass Hay							
80	-159	-126	-92	-58	-24	9	43
100	-49	-6	38	82	126	169	213
120	61	114	168	222	276	329	383
140	171	234	298	362	426	489	553
160	281	354	428	502	576	649	723
180	391	474	558	642	726	809	893
200	501	594	688	782	876	969	1,063

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR ORCHARDGRASS HAY							
PRICE (DOLLARS/TONS)	YIELD (TONS/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
Orchardgrass Hay							
80	-568	-536	-504	-471	-439	-406	-373
100	-458	-416	-374	-331	-289	-246	-203
120	-348	-296	-244	-191	-139	-86	-33
140	-238	-176	-114	-51	11	74	137
160	-128	-56	16	89	161	234	307
180	-18	64	146	229	311	394	477
200	92	184	276	369	461	554	647

Table 9.

UC COOPERATIVE EXTENSION
 COSTS AND RETURNS/ BREAKEVEN ANALYSIS
 INTERMOUNTAIN REGION
 SHASTA & LASSEN COUNTIES - 2006

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)
Orchardgrass Hay	980	349	631	618	362	1,031	-51

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)
Orchardgrass Hay	294,000	104,774	189,226	185,458	108,542	309,332	-15,332

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	----- Breakeven Price To Cover -----		
			Operating Costs	Cash Costs	Total Costs
----- \$ per Yield Unit -----					
Orchardgrass Hay	7.0	Ton	49.89	88.31	147.30

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	----- Breakeven Yield To Cover -----		
			Operating Costs	Cash Costs	Total Costs
----- Yield Units / Acre -----					
Orchardgrass Hay	Ton	140.00	2.5	4.4	7.4

Table 10.

UC COOPERATIVE EXTENSION
 DETAIL BY OPERATIONS
 INTERMOUNTAIN REGION
 SHASTA & LASSEN COUNTIES – 2006

Operation	Operation Month	Tractor/ Power Unit	Implement	Material	Broadcast Rate/acre	Material Unit
Cultural:						
Weed Control -	April	ATV	100 Gal ATV Sprayer w/Boom & GPS	Roundup	0.25	Pint
- Borders 10% Of Acreage -2X	June	ATV	100 Gal ATV Sprayer w/Boom & GPS	Roundup	0.25	Pint
Weed Control -	April	ATV	100 Gal ATV Sprayer w/Boom & GPS	2, 4-D	2.00	Pint
- In Stand Spray - 3X	June	ATV	100 Gal ATV Sprayer w/Boom & GPS	2, 4-D	2.00	Pint
	August	ATV	100 Gal ATV Sprayer w/Boom & GPS	2, 4-D	2.00	Pint
Fertilize - 3X	May	Custom	Ground Application - N Fertilizer	Urea 46-0-0	100.00	Lb N
	June	Custom	Ground Application - N Fertilizer	Urea 46-0-0	50.00	Lb N
	August	Custom	Ground Application - N Fertilizer	Urea 46-0-0	50.00	Lb N
Irrigate - 11X	May	Labor		Water	6.00	AcIn
	June	Labor		Water	6.00	AcIn
	July	Labor		Water	9.00	AcIn
	August	Labor		Water	9.00	AcIn
	September	Labor		Water	3.00	AcIn
Cut Hay 3X	June	Swather - 14'				
	August	Swather - 14'				
	September	Swather - 14'				
Rake Hay - 1.25X - 1st Cutting Only	June	42 HP 2WD Tractor	Hay Rake - V 20'			
Rake Hay - 2X	August	42 HP 2WD Tractor	Hay Rake - V 20'			
	September	42 HP 2WD Tractor	Hay Rake - V 20'			
Bale Hay - 3X	June	90 HP 4WD Tractor	Hay Baler	Bale Twine		
		42 HP 2WD Tractor	Hay Baler	Bale Twine		
	August	90 HP 4WD Tractor	Hay Baler	Bale Twine		
		42 HP 2WD Tractor	Hay Baler	Bale Twine		
	September	90 HP 4WD Tractor	Hay Baler	Bale Twine		
		42 HP 2WD Tractor	Hay Baler	Bale Twine		
Roadside, Store, & Load Hay - 3X	June	Harrowbed	Forklift with Hay Squeeze Attachment	Tarp/Plastic		
	August	Harrowbed	Forklift with Hay Squeeze Attachment	Tarp/Plastic		
	September	Harrowbed	Forklift with Hay Squeeze Attachment	Tarp/Plastic		
Pickup Truck Use	All Months					
ATV Use	All Months					