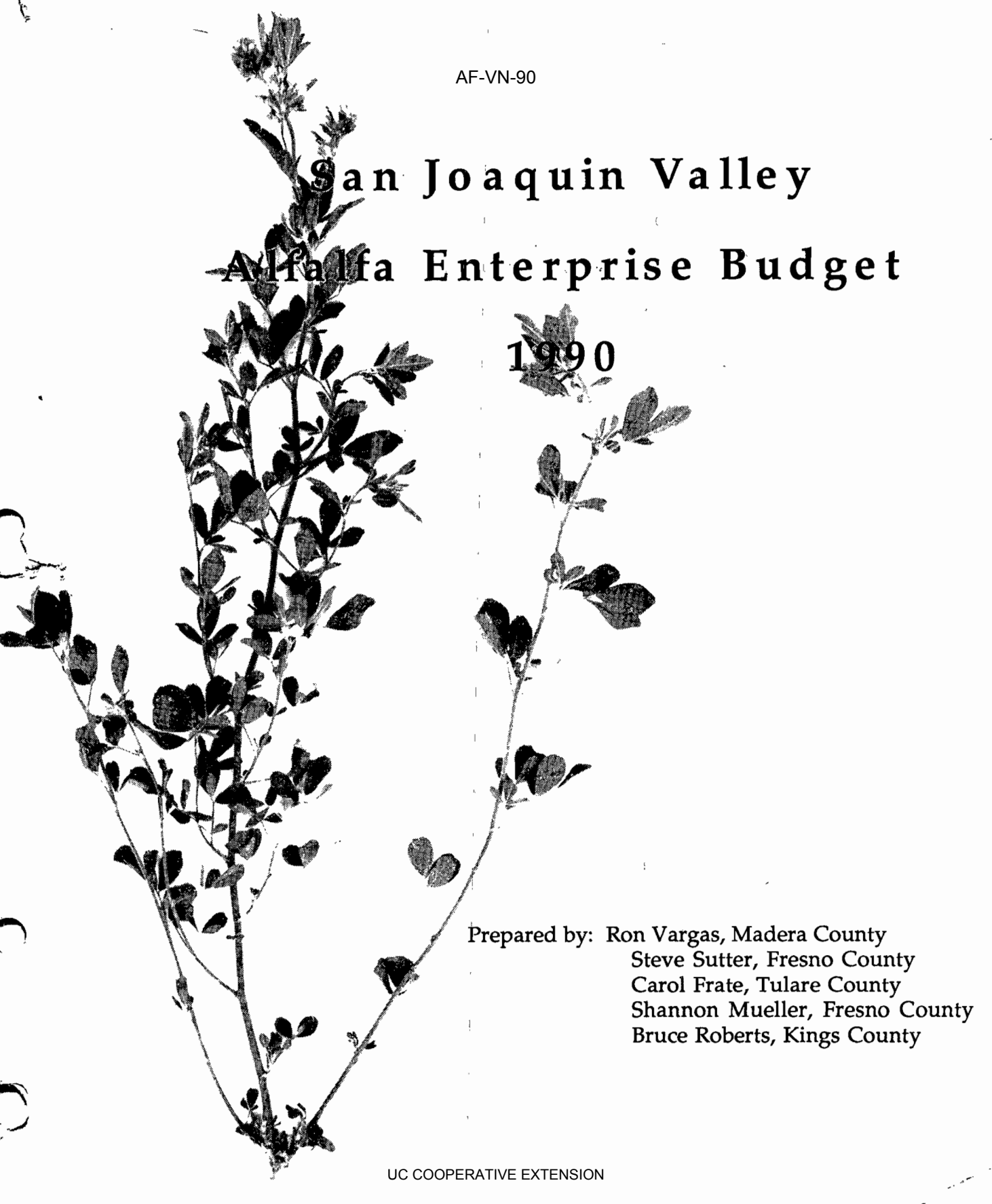


AF-VN-90



**San Joaquin Valley  
Alfalfa Enterprise Budget**

**1990**

Prepared by: Ron Vargas, Madera County  
Steve Sutter, Fresno County  
Carol Frate, Tulare County  
Shannon Mueller, Fresno County  
Bruce Roberts, Kings County

# Budgeting Resource Needs for Establishing and Producing Alfalfa Hay

Planning labor and capital needs requires cost and return estimates for each commodity you are considering. The farm advisors in Fresno, Kings, Madera, and Tulare counties developed this cost sheet to provide production costs and information that will help in your planning process. It includes all costs involved from land preparation through seeding, and production in subsequent years. The information should only be used as a guide to help analyze costs and practices that might improve production efficiency. The data used in this budget reflects management practices recommended for this area. Tractor size, tillage operations, fertilization, and pest management will differ for individual growers and seasons. The expense descriptions correspond to Federal Schedule 1040-F filed with most farm tax returns.

A budget for producing 300 acres of alfalfa is presented in this example. Included are expenses associated with establishing an additional 100 acres of alfalfa in the fall to reflect crop replacement. Yield is the most important factor affecting costs per ton and subsequent profit per acre. The cost of production per ton of hay is greatly reduced as the yield per acre increases. The 7.7 ton yield per acre estimated here is average in this area for typical, well-managed stands. The value of the hay in this example was set at \$100 per ton. You can adjust cost and profit values in this budget if you have good yield and cost records for your operation.

## Budget Calculations - Table 1

Several useful measures are shown in the budget presented in Table 1. The **Gross Income** from this operation is the first value shown: \$231,000. **Operating Expenses** are subtracted from the Gross Income to give **Net Revenue**, or the income over operating expenses. The **Net Revenue** value is often used in linear programming to determine the profit-maximizing mix of crop and livestock activities, based on available labor, capital, and land.

In any enterprise, there are both fixed and variable costs. **Variable Costs** (Operating Expenses) include items such as pesticides, fuel, and seed, which will vary as the number of acres in the operation changes. **Fixed Expenses** include items such as insurance and taxes, which do not change much as a function of changes in acreage.

Operating Expenses and Fixed Cash Expenses combine to give you the **Total Cash Expenses**. When you subtract this total from the Gross Income, you arrive at the **Net Cash Income**. This is a measure of the debt servicing capacity of the enterprise, and is of vital interest to creditors financing the operation.

Estimates for **Depreciation** are added to the Total Cash Expenses to calculate **Total Expenses** for the enterprise. To determine **Net Farm Income**, the Total Expenses are subtracted from Gross Income. Net Farm Income is the profit from operations before accounting for interest expense.

Operations are financed with either borrowed (debt) or owned (equity) capital. Economists include an **Interest Cost** on the money invested in the growing crop and equipment. This additional cost component gives a better estimate of the full cost of production. Money invested in the growing crop and equipment could have been invested in an interest-bearing savings account or CD. The interest rates used reflect current financial markets. To estimate the **Total Costs** of the operation, add the Total Expenses and Interest together.

**Net Return** is calculated by subtracting Total Costs from Gross Income. This would be income available to pay owned or rented land costs, management, and unallocated overhead.

- In this budget, we have not made the assumption that the land is rented or owned. Land ownership or rental costs would have to be subtracted from Net Return.
- No income from sheep grazing or winter greenchopping has been included in this budget, although it is sometimes an option for area growers.
- Expenses unallocated to a specific enterprise could include liability insurance, accounting fees, dues and subscriptions, for example.

## **Equipment and Structures Inventory - Table 2**

To construct an enterprise statement, you must first inventory owned equipment and real estate improvements available to produce alfalfa, such as those listed in Table 2. To help orient yourself in the table, column labels are provided in the text and are abbreviated as C1, C2, C3, etc. The cost of the equipment is specified in (C2) and the number of years the equipment is expected to last is given in (C3). These values are used to calculate annual depreciation (C4). In C5, we have estimated the fraction of time which each item is used in the alfalfa enterprise. Ownership costs, such as depreciation (C6), are allocated to the alfalfa crop based on these fractions.

Estimates of property taxes, insurance, and interest are computed based on the rates shown at the top of the column. To calculate these values, assume each item has a salvage value of 25% of cost. For example, a 130 HP tractor which costs \$45,000 new would have an assumed salvage value of 25% or \$11,250. So, the average value is calculated as follows:

$$\$45,000 - [(\$45,000 - \$11,250)/2]$$

which equals \$28,125, or 62.5% of original cost. Like depreciation, costs of taxes (C7), insurance (C8), and interest (C9) are allocated based on the percentage of the asset's use in alfalfa. These values are transferred to Table 1. Ownership costs are totalled for each asset (C10).

## **Equipment Operation Expenses - Tables 3 & 4**

In addition to expenses for owning equipment, there are also expenses associated with operating the equipment. In Table 3, estimates for repairs and maintenance are linked to the use of each piece of equipment (C1) in alfalfa. The tractor used with each implement is also listed (C5). Formulas are used to estimate average repairs per hour based on initial cost (C2), wear out hours (C3), and the total lifetime repairs (C4) of both the tractor (C6) and the implement (C7). Tractor repairs per hour and equipment repairs per hour are summed in C8.

Table 4 completes the estimates of machine operating expenses with calculations for repairs, labor, fuel, lubrication, and utilities. The equipment list (C1) includes the horsepower of the power source (C2). The implement width (C3) is included to estimate hours used per acre (C7). Calculating hours of use per acre requires the speed (C5) and field efficiency (C6). The formula for hours per acre is  $1/((\text{width} \times \text{speed} \times \text{efficiency})/8.25)$ . Repairs per acre (C8) are repairs per hour (C4) multiplied by the hours of machine use per acre.

Amounts of labor hours per acre (C9) are 1.2 times machine hours per acre, accommodating breaks and servicing stops. Labor cost per acre (C10) is the example hourly wage rate (\$7) times

the labor hours per acre. The hourly wage rate includes Social Security taxes, workers' compensation, and unemployment taxes.

Gallons of diesel fuel use per acre (C11) are computed as  $(0.044 \times \text{HP} \times \text{machine hours per acre})$ . Fuel cost per acre (C12) is gallons per acre times the standard fuel cost (\$0.72/gallon). Lubrication cost per acre (C13) is 15% of fuel cost per acre.

To sum the several cost categories, you must specify the number of acres involved (C14) and the number of times the operation is performed on those acres (C15). For example, the harvesting operations take place as many as seven times each year. Then you can sum repairs (C16), labor (C17), fuel and lubrication (C18), and utilities (C19) to transfer to Table 1.

Machine operating costs for the total enterprise are subtalled in Table 4 for establishment, harvest, and irrigation activities. Table 5 shows all operating expenses on a per acre and per ton basis.

## Operating Expenses by Activity - Table 5

### Harvest

Information in Table 5 is helpful when you are considering the option to custom hire for harvest, or to lease instead of own harvest equipment. In this budget example, we assume the grower does all of his/her own harvesting. The cash harvest costs per acre and per ton are \$94.49 and \$12.27 respectively. Ownership costs of the tractors and equipment needed for harvest total \$49,013.83, or \$163.38 per acre or \$21.22 per ton (Table 2). Of this total, \$19,631.41 is attributed to the two tractors used in the harvest operation. These costs would not be avoided if the hay harvest equipment is sold as part of a plan to use custom harvest operators since the tractors are required in other activities. Combining operating and ownership costs raises the **Total Harvest Costs** to \$257.87 per acre or \$33.49 per ton, in our example. These costs can be compared with local custom rates to determine the least-cost option.

### Establishment

Operating costs for establishment, shown in Table 5, represent the annual requirements to replace the 300 acres of production. So, the figures represent costs per 1/3 acre of production, since 100 acres are established annually. Actual operating expenses per acre established are 3 times the values shown in Table 5. In other words, \$135.39 per acre. Neither equipment ownership nor irrigation costs are reflected in this total cost per established acre.

### Irrigation

The alfalfa in this example is all surface flood irrigated. Sample costs for irrigation are based on a pumping system with pipeline. In our example, irrigation operating costs (utilities, labor, and repairs) are estimated as \$25.00 per acre foot to apply 5 acre-feet on the 300 acres producing alfalfa and 1 acre-foot on the 100 acres being established.

$$(5 \text{ acre-feet} \times 300 \text{ producing acres}) + (1 \text{ acre-foot} \times 100 \text{ acres establishing}) = 1600 \text{ acre-feet} \\ 1600 \text{ acre-feet} \times \$25 = \$40,000$$

The components of the \$40,000 of irrigation operating costs are estimated as \$7,000 labor, \$23,000 utilities, and \$10,000 for system repairs. Table 5 shows this total on a per acre produced basis ( $\$133.33 = \$40,000 \div 300 \text{ producing acres}$ ).

Depreciation taxes, insurance, and interest on the irrigation system (Table 2), allocated to alfalfa, totals \$9994.50, or \$6.25 per acre foot, raising **Total Irrigation Costs** to \$31.25 per acre foot. Not included, but significant, are water use charges and annual irrigation assessments. Use charges (if any) should be included as an operating expense, the annual assessment as a fixed cash expense.

## **Production - Table 6**

Production operating costs presented in Table 5 are detailed in Table 6. This table shows the materials and services used in alfalfa establishment and production. The totals are transferred to Table 5 and to Table 1 to complete the budget summary. **Although the trade names of materials are used in this example, there are a number of other materials available which work equally well, and these examples should not be taken as a recommendation of one material over another.**

## **Fertilization**

Fertilizer recommendations can only be made following a soil or tissue analysis. However, most soils in this area require the addition of phosphorus for optimum alfalfa hay production. Because phosphorus is not very mobile in the soil, a three year supply can be applied and incorporated during seedbed preparation, or annual applications can be made. In this example, a preplant application of 100 lbs./acre phosphorus is recommended. Depending upon soil or plant analysis, this can be followed by annual broadcast applications of phosphorus. Alkaline soil will require the addition of sulfur or gypsum to improve water penetration. These costs are not included in this example.

## **Pest Management**

Pest management costs include materials and application for control of insect and weed problems throughout the season. Pest management programs and costs vary depending on pest pressure, location, and selected material. The costs presented in this crop budget represent average conditions and a well-managed integrated pest management program. The University of California has published an Integrated Pest Management Manual for alfalfa, available at your local Extension office.

## **Reference**

Boehlje, Michael D., and Vernon R. Eidman, "Farm Management," John C. Wiley and Sons, P.O. Box 63, Somerset, NJ 08873, 1984.

UC COOPERATIVE EXTENSION

**TABLE 1. San Joaquin Valley Cost and Return Estimates for an Alfalfa Enterprise.<sup>1</sup>**

	TOTAL (\$)	PER ACRE (\$)	PER TON (\$)
<b>Gross Income</b>	<b>231,000</b>	<b>770.00</b>	<b>100.00</b>
Operating (Variable) Expenses:			
Chemicals	14,480	48.27	6.27
Custom Hire	8,775	29.25	3.80
Fertilizer	11,800	39.33	5.11
Fuel, Oil	3,413	11.38	1.48
Labor (2,300 Hours/Year)	16,313	54.38	7.06
Repairs	24,408	81.36	10.57
Seeds	5,000	16.67	2.16
Supplies	4,200	14.00	1.82
Utilities	<u>23,000</u>	<u>76.67</u>	<u>9.96</u>
Total Operating Expenses	111,389	371.30	48.22
<b>Net Revenue</b>	<b>119,611</b>	<b>398.70</b>	<b>51.78</b>
Fixed Cash Expenses			
Insurance	1,976	6.59	0.86
Taxes	<u>2,569</u>	<u>8.56</u>	<u>1.11</u>
Total Fixed Cash Expenses	4,545	15.15	1.97
<b>Total Cash Expenses</b>	<b>115,934</b>	<b>386.45</b>	<b>50.19</b>
<b>Net Cash Income</b>	<b>115,066</b>	<b>383.55</b>	<b>49.81</b>
Depreciation	43,109	143.70	18.66
<b>Total Expenses</b>	<b>159,043</b>	<b>530.14</b>	<b>68.85</b>
<b>Net Farm Income</b>	<b>71,957</b>	<b>239.86</b>	<b>31.15</b>
Interest Cost (11%)			
Equipment and Buildings	21,736	72.45	9.41
Operating Capital (6 Mos.)	<u>6,126</u>	<u>20.42</u>	<u>2.65</u>
Total Interest Cost	27,862	92.87	12.06
<b>Total Costs</b>	<b><u>186,905</u></b>	<b><u>630.02</u></b>	<b><u>80.91</u></b>
<b>Net Return</b>	<b>44,095</b>	<b>146.98</b>	<b>19.09</b>

<sup>1</sup>300 Acres in Production, 7.7 Tons/Acre Yield  
100 Acres established annually to reflect crop replacement

**TABLE 2. Inventory of Owned Equipment and Real Estate Improvements, Ownership Costs Allocated to Alfalfa, Example Alfalfa Enterprise.**

Equipment List	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
	Cost Years	Annual Deprec.	Allocation To Alfalfa	Depreciation	1.3% Taxes	1.0% Insurance	11.0% Interest	Total Ownership Costs/Year		
	(\$)	(\$)	(%)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
Tractor (130 HP)	45000	6429	15	964.29	54.84	42.19	464.06	1525.38		
Tractor (80 HP)	23000	3286	20	657.14	37.38	28.75	316.25	1039.52		
Tractor (50 HP)	19000	2714	65	1764.29	100.34	77.19	849.06	2790.88		
Chisel	3000	429	20	85.71	4.88	3.75	41.25	135.59		
Disc	11800	1686	20	337.14	19.18	14.75	162.25	533.32		
Flex Harrow	525	75	20	15.00	0.85	0.66	7.22	23.73		
Land Plane	8000	1143	30	342.86	19.50	15.00	165.00	542.36		
Float	2500	357	30	107.14	6.09	4.69	51.56	169.49		
Border Implement	1500	214	30	54.29	3.66	2.81	30.94	101.69		
Drill Planter	6000	857	60	514.29	29.25	22.50	247.50	813.54		
Cultipacker	2500	357	20	71.43	4.06	3.13	34.38	112.99		
SP Swather <sup>1</sup>	49000	7000	100	7000.00	398.13	306.25	3368.75	11073.13		
SD Rake <sup>2</sup>	9000	1286	100	1285.71	73.13	56.25	618.75	2033.84		
Baler	33000	4714	100	4714.29	268.13	206.25	2268.75	7457.41		
Baler	33000	4714	100	4714.29	268.13	206.25	2268.75	7457.41		
SP Roadsider	78000	11143	100	11142.86	633.75	487.50	5362.50	17626.61		
Irrigation Pump	30000	4286	20	857.14	48.75	37.50	412.50	1355.89		
Irrigation Pump	30000	4286	20	857.14	48.75	37.50	412.50	1355.89		
Irrigation Well	21600	1440	20	288.00	35.10	27.00	297.00	647.10		
Irrigation Well	21600	1440	20	288.00	35.10	27.00	297.00	647.10		
Return System	1500	214	100	214.29	12.19	9.38	103.13	338.97		
Valves/Pipe	25000	3571	100	3571.43	203.13	156.25	1718.75	5649.55		
Pickup Truck	15000	3000	15	450.00	18.28	14.06	154.69	637.03		
Hay Bldg.	25000	2500	100	2500.00	203.13	156.25	1718.75	4578.13		
Shop	35000	1750	10	175.00	28.44	21.88	240.63	465.94		
Storage Bldg.	7000	350	20	70.00	11.38	8.75	96.25	186.38		
Shop Tools	4000	571	10	57.14	3.25	2.50	27.50	90.39		
<b>Total</b>	<b>\$540525</b>	<b>\$69812</b>		<b>\$43108.86</b>	<b>\$2568.76</b>	<b>\$1975.97</b>	<b>\$21735.66</b>	<b>\$69389.24</b>		

<sup>1</sup>SP = Self-Propelled

<sup>2</sup>SD = Side Delivery

**Table 3. Estimated Equipment Repairs, Example Alfalfa Enterprise.**

C1 Equipment List	C2 Initial Cost (\$)	C3 Wear Out Hours	C4 Total Repairs (% of Cost (C2))	C5 Tractor Used	C6 Tractor Repairs/Hour (\$)	C7 Equipment Repairs/Hour (\$)	C8 Total Repairs/Hour (\$)
130 HP Tractor 1	45000	12000	120		4.50		4.50
80 HP Tractor 2	23000	12000	120		2.30		2.30
50 HP Tractor 3	19000	12000	120		1.90		1.90
Chisel	3000	2500	120	1	4.50	1.44	5.94
Disc	11800	2500	120	2	2.30	5.66	7.96
Flex Harrow	525	2500	120	2	2.30	0.25	2.55
Land Plane	8000	2500	60	2	2.30	1.92	4.22
Float	2500	2500	60	2	2.30	0.60	2.90
Border Implement	1500	2500	60	2	2.30	0.36	2.66
Drill Planter	6000	1200	100	2	2.30	5.00	7.30
Cultipacker	2500	2500	120	2	2.30	1.20	3.50
SP Swather <sup>1</sup>	49000	2500	100			19.60	19.60
SD Rake <sup>2</sup>	9000	2500	100	3	1.90	3.60	5.50
Baler	33000	2500	80	2	2.30	10.56	12.86
Baler	33000	2500	80	3	1.90	10.56	12.46
SP Roadsider	78000	12000	120			7.80	7.80
Irrig. System	129700	12000	120			12.97	12.97

<sup>1</sup>SP = Self-Propelled

<sup>2</sup>SD = Side Delivery



**Table 4. Estimated Machinery and Labor Costs<sup>1</sup>, Example Alfalfa Enterprise.**

C1 Equipment List	C2 HP	C3 Width	C4 Repairs/ Hour	C5 Speed (mph)	C6 Efficiency (%)	C7 Machine Use/Acre (Hrs)	C8 Repairs/ Acre (\$)	C9 Labor/ Acre (Hrs)	C10 Labor/ Acre (\$)	C11 Fuel Use/Acre (Gal)	C12 Fuel Cost/Acre (\$)	C13 Lubri- cation/ Acre (\$)	C14 Acres	C15 Times	C16 Repairs (\$)	C17 Labor (\$)	C18 Fuel & Lubri- cation (\$)	C19 Util- ities (\$)	
Chisel-	130	11	5.94	3.0	80	0.31	1.86	0.38	2.63	1.79	1.29	0.19	100	1	185.63	262.50	148.01		
Disc	80	16	7.96	3.5	80	0.18	1.47	0.22	1.55	0.65	0.47	0.07	100	1	146.66	154.69	53.67		
Flex Harrow	80	16	2.55	3.5	80	0.18	0.47	0.22	1.55	0.65	0.47	0.07	100	1	47.00	154.69	53.67		
Land Plane	80	14	4.22	4.0	80	0.18	0.78	0.22	1.55	0.65	0.47	0.07	100	1	77.71	154.69	53.67		
Float	80	10	2.90	4.0	80	0.26	0.75	0.31	2.17	0.91	0.65	0.10	100	1	74.77	216.56	75.14		
Border																			
Implement	80	10	2.66	4.0	80	0.26	.69	0.31	2.17	0.91	0.65	0.10	100	1	68.58	216.56	75.14		
Drill Planter	80	12	7.30	4.0	70	0.25	1.79	0.29	2.06	0.86	0.62	0.09	100	1	179.24	206.25	71.56		
Cultipacker	80	14	3.50	4.0	70	0.21	0.74	0.25	1.77	0.74	0.53	0.08	100	1	73.66	176.79	61.34		
<b>Establishment Costs</b>																			
SP Swather	95	14	19.60	4.0	63	0.23	4.58	0.28	1.96	0.98	0.70	0.11	300	7	9625.00	4125.00	1699.62		
SD Rake	50	14	5.50	4.0	90	0.08	0.45	0.10	0.69	0.18	0.13	0.02	300	7	945.31	1443.75	313.09		
Baler	80	28	12.86	4.0	80	0.09	1.18	0.11	0.77	0.32	0.23	0.04	150	7	1243.30	812.11	281.78		
Baler	50	28	12.46	4.0	80	0.09	1.15	0.11	0.77	0.20	0.15	0.02	150	7	1204.63	812.11	176.11		
SP Roadsider	140	28	7.80	10.0	90	0.03	0.26	0.04	0.28	0.20	0.15	0.02	300	7	536.25	577.50	350.66		
<b>Harvest Costs</b>																			
Irrigation System																			
<b>Irrigation Costs</b>																			
<b>Totals</b>																			
														13554.49	7770.47	2821.25			
														10000.00	7000.00	0.00	23000.00		
														24407.73	16313.19	3413.46	23000.00		

<sup>1</sup>Fuel Cost/Gallon \$0.72  
Labor Cost/Hour \$7.00

**Table 5. Operating Costs By Activity, Example Alfalfa Enterprise.<sup>1</sup>**

ACTIVITY	PER ACRE (\$)	PER TON (\$)
<b>Harvest:</b>		
Repairs	45.18	5.87
Fuel	9.41	1.22
Labor	25.90	3.36
Supplies	<u>14.00</u>	<u>1.82</u>
<b>Subtotal</b>	<b>94.49</b>	<b>12.27</b>
<b>Establishment:<sup>2</sup></b>		
Repairs	2.84	0.37
Fuel	1.98	0.26
Fertilizer	9.83	1.28
Seed	16.67	2.16
Chemicals	4.17	0.54
Labor	5.14	0.67
Custom Hire	<u>4.50</u>	<u>0.58</u>
<b>Subtotal</b>	<b>45.13</b>	<b>5.86</b>
<b>Irrigation:</b>		
Repairs	33.33	4.33
Labor	23.33	3.03
Utilities	<u>76.67</u>	<u>9.96</u>
<b>Subtotal</b>	<b>133.33</b>	<b>17.32</b>
<b>Production:</b>		
Chemicals	44.10	5.73
Fertilizer	29.50	3.83
Custom Hire	<u>24.75</u>	<u>3.21</u>
<b>Subtotal</b>	<b>98.35</b>	<b>12.77</b>
<b>TOTAL</b>	<b><u>371.30</u></b>	<b><u>48.22</u></b>

<sup>1</sup>300 Acres in Production, 7.7 Tons/Acre Yield

100 Acres established annually to reflect crop replacement

<sup>2</sup>Per 1/3 Acre established. Establishment costs shown should be multiplied by 3 to determine costs per acre established.

**Table 6. Materials and Services Used in Example Alfalfa Enterprise. <sup>1</sup>**

Item	Rate/ Acre	Acres	Pesticide Cost/ Acre (\$)	Total Pesticide Costs (\$)	Application Cost/ Acre (\$)	Total Application Costs (\$)	Fertilizer Cost/ Acre (\$)	Total Fertilizer Costs (\$)	Seed Cost/ Acre (\$)	Total Seed Costs (\$)	Supplies Cost/ Acre (\$)	Total Supplies Costs (\$)	Grand Total (\$)
Fertilizer 11-52-0	100Lb	100			4.75	475	23.50	2350					3425
Herbicide Eptam	2Qt	100	12.50	1250	8.75	875							2125
Seed	25Lb	100							50.00	5000			5000
Fertilizer 11-52-0	100Lb	300			4.75	1425	29.50	8850					10275
Herbicide Karmex	2Lb	300	8.30	2490	5.00	1500							3990
Herbicide Thelan	20Lb	300	19.20	5760	5.00	1500							7260
Insecticide Lorsban	1.5Pt	300	7.10	2130	5.00	1500							3630
Insecticide Lannate	2 Pt	300	9.50	2850	5.00	1500							4350
Baling Twine	3000Ft	300									14.00	4200	4200
<b>TOTAL</b>				<u>\$14480</u>		<u>\$8775</u>		<u>\$11800</u>		<u>\$5000</u>		<u>\$4200</u>	<u>\$44255</u>

<sup>1</sup>Although the trade names of materials are used in this example, there are a number of other materials available which work equally well, and these examples should not be taken as a recommendation of one material over another.