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	<p>2002 COST OF PRODUCING ALFALFA HAY UNDER CENTER PIVOT IRRIGATION IN THE COLUMBIA BASIN OF WASHINGTON STATE</p>	
	<p>Herbert Hinman, John Kugler and William Woodward</p>	
<p>COOPERATIVE EXTENSION WASHINGTON STATE  UNIVERSITY</p>	<p>Online at: http://farm.mngt.wsu.edu/</p>	

NOTE

Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Variability stems from differences in:

- Capital, labor, land, and management resources
- Type and size of machinery complement
- Cultural practices
- Size of farm and enterprise
- Crop yields
- Input prices
- Commodity prices

Costs can also be calculated differently depending on the intended use of the cost estimate. The information in this publication serves as a general guide for alfalfa grown on a modern, well-managed Columbia Basin farm. To avoid drawing unwarranted conclusions, the reader must closely examine the assumptions used. If they are not appropriate for the situation at hand, you should adjust the costs and/or returns.

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2002 COST OF PRODUCING ALFALFA HAY UNDER CENTER PIVOT IRRIGATION IN THE COLUMBIA BASIN OF WASHINGTON STATE

Herbert Hinman, John Kugler, William Woodward¹

INTRODUCTION

The enterprise budgets presented in this publication are based on alfalfa produced in the Bureau of Reclamation's Columbia Basin Project. The project area is in the "big bend" of the Columbia River in south central Washington. Rainfall ranges from 6 to 10 inches annually; thus, crops depend on irrigation water pumped from behind the Grand Coulee Dam. Irrigation water availability, coupled with a growing season of 150 to 200 days, make it possible to grow numerous crops.

Alfalfa hay is one of the most important agricultural crops grown in the Columbia Basin. The combined irrigated production of Adams, Benton, Franklin, Grant and Yakima counties in 2000 totaled 1.7 million tons valued at greater than \$190 million.² Approximately 18% of this production is exported as cubes and "double-compressed" hay to Pacific Rim markets. Domestic sales are primarily to the \$7.2 million dairy industry and the \$7 million livestock market of Washington.

The general objective of this study is to develop enterprise budgets for both 1-ton and 3-tie bale alfalfa production. The specific objectives are to provide:

1. Production practices representative of well-managed alfalfa enterprises grown under center pivot irrigation systems within the Columbia Basin from Stratford south to the Tri-Cities.
2. Estimates of capital requirements, production costs and returns.
3. Current and prospective producers with a procedure for analyzing the potential profitability of growing alfalfa hay.

¹ Authorship is equally shared among the three authors. Herbert Hinman is an Extension Economist; John Kugler is an area educator (agronomy), Grant/Adams counties; William Woodward is an area educator (agronomy), Benton/Franklin counties, Cooperative Extension, Washington State University.

²2001 Washington Agricultural Statistics.

SOURCES OF INFORMATION

Data for the study was obtained from a group of Columbia Basin producers from the Moses Lake, Warden, Othello, and Pasco areas who are considered representative of well managed farms. Local farm service agencies and farm suppliers provided material costs. Machinery costs for crop establishment were based on current purchase prices and custom rates.

Harvesting costs were based on current custom rates. The producer committee felt that their cost of owning, maintaining and operating this equipment was approximately equal to those of custom operators when the value of operator labor is included in the cost of owning and operating farm machinery.

Costs per acre for operations will vary for producers based on their environment and cutting schedules, as cutting frequency ranges from three to four harvests in northern Grant County to five and occasionally six harvests in southern Benton and Franklin counties.

BUDGET ASSUMPTIONS

The following assumptions were made in developing the alfalfa enterprise budget:

1. The enterprise budget is for alfalfa grown under one or more 125-acre center pivot irrigation systems.
2. The land rental rate is assumed to be \$250/acre.
3. The landowner furnishes the center pivot system and the operator pays the irrigation charge amounting to \$35/acre, along with annual repairs of about \$20 per acre per year. The operator also pays the irrigation power charge of approximately \$40 per acre, pumping out of the irrigation canal. Power costs are higher for those producers pumping from deep wells.
4. Irrigation labor is estimated at .85 hour per acre per year.
5. All labor costs are estimated at \$14.50/hour.
6. Estimated yields are between 7 and 9 tons per acre. There are four cuttings of hay per year.

7. Estimated hay prices received at the farm are between \$95 and \$135 per ton; average, \$118/ton. Tables 7 and 13 show break-even prices at differing yield levels.
8. 3-tie bales command a \$15 per ton price premium over 1-ton bales.
9. The interest rate is 9% for operating and machinery loans, and for the use of equity capital.
10. Hay preservative applied when baled cost \$3/ton.

DISCUSSION OF BUDGET INFORMATION

The budget information for alfalfa is reported in a set of twelve tables. A summary of the information in each table follows.

Tables 1, 4 and 9: Schedule of Operations and Costs per Acre

Tables 1, 4 and 9 outline the schedule of field operations by month, type of machinery and labor use, hours of machine use per acre, and total production costs. Table 1 is for the establishment year. Table 4 is for production years of 1-ton bales and Table 9 is for the production years of 3-tie bales.

Production costs are divided into two categories: (1) fixed costs, which include machinery ownership, land costs, and management; and (2) variable costs, which are associated with operating machinery, hiring labor, and purchasing services and materials. Total cost is the sum of fixed and variable costs.

Machinery fixed costs include depreciation, interest on the investment, property taxes, insurance, and housing costs. These costs are incurred whether or not a crop is grown and do not vary with the size of the enterprise, given the ownership of a specific machinery complement. Machinery fixed costs for a specific field operation are determined by multiplying the machine hours per acre times the per-hour fixed cost. The per-hour fixed costs, shown in Table 15, are determined by dividing the total annual fixed cost by the annual hours of machinery use over all enterprises for the representative farm.

Land fixed cost is equal to the cash rent typical of the area. Much of the land used for production is rented. Even if a producer was to produce a crop on owned land, the prevailing rental rate is an opportunity cost or foregone return for not

renting out the land. Although individual rental arrangements vary, in most situations the tenant pays a cash rent and the landowner pays the property taxes. In Table 1, for the establishment year, all fixed costs associated with land are allocated to the preceding crop.

An opportunity cost for management is also included in Tables 1, 4 and 9. For management, a cost of \$50 per acre was considered reasonable and fair by the producer committee. For the establishment year, only 20% of the management fee was applied; 80% being applied to the preceding crop. In Tables 4 and 9, an amortized establishment cost is included. This cost represents establishment year costs that must be recaptured during the following four production years.

Variable costs depend directly on the number of crop acres and type of enterprise. These costs include labor, fuel, oil, repairs, fertilizer, chemicals, custom work, interest on operating capital, and overhead (telephone, utilities, legal, accounting, organization dues, etc.).

Tables 2, 5 and 10: Materials and Services Used by Operation

Tables 1, 4 and 9 list the "Schedule of Operations and Estimated Cost Per Acre...", for the establishment year and for a typical production year for alfalfa baled into 1-ton and 3-tie bales, respectively. The "Service" and "Materials" columns of these tables list dollar amounts spent on services and materials used with individual operations. Tables 2, 5 and 10 list, by operation, the specific services and/or materials used, the quantities used, and the estimated prices paid during the establishment year and the respective production years.

Tables 3, 6 and 11: Itemized Cost per Acre

Tables 3, 6 and 11 are itemized summaries of the costs presented by field operation in Tables 1, 4 and 9, respectively. Most items are self-explanatory. However, "Tractor Interest" and "Machinery Interest" warrant explanation. These costs represent the opportunity cost (returns foregone by investing in machinery rather than in alternative investments) or interest paid to finance this equipment. The cost is calculated on the average annual value of the machinery multiplied times a 9% interest rate:

$$\begin{array}{r}
 \text{Purchase Price + Salvage Value} \\
 \text{-----} \quad \times \quad 9\% \\
 2
 \end{array}$$

Tables 7 and 12: Break-Even Selling Prices per Ton of Alfalfa Produced

Tables 7 and 12 present four selling price levels needed for different levels of cost recovery for producing alfalfa in 1-ton bales and 3-tie bales, assuming an 8-ton-per-acre average yield, respectively.

The first break-even price is that necessary to cover total variable costs - those costs that occur only if the crop is produced. If the price is below this level, the crop is uneconomic to produce, even in the short run, because the added costs of production are greater than the added returns.

The second break-even price is that price necessary to cover total cash costs, including land rent. If the land is owned, its rental value would not be listed as a cash cost, but as an opportunity cost as previously discussed. This price may be viewed as that price necessary to survive in the short run.

The third break-even price is the price required to cover total cash costs plus depreciation on machinery. This price allows the producer to stay in business over the long run. However, when farmers fail to include the opportunity costs associated with the investment in land and machinery when calculating their total cost break-even price, they are overstating the profitability of farming relative to alternative uses of their own resources.

The fourth break-even price is the price the owner-operator must receive to cover all out-of-pocket expenses, plus realize a fair return to labor, operating capital, and equity capital invested in land and machinery. At prices below this level the owner-operator will not earn a return on labor and capital contributions equivalent to that assumed for this study. Realization of a price above this break-even level means that in addition to covering all cash and opportunity costs, the operator will get a return to the risk taken in producing the crop.

Tables 8 and 13: Break-Even Selling Price per Ton of Alfalfa Produced at Different Yield Levels

Tables 8 and 13 are summaries of prices producers would need to receive at different yield levels if they were to break even by covering all cash and opportunity costs.

Table 14: Machinery Complement

Table 14 identifies the machinery complement used to derive machinery costs. It includes the type of machines used on the representative farm, their current replacement value (new or used), years of use before trade-in, salvage value at trade-in, annual repair cost and annual hours of use. In this study, all machinery was assumed to be purchased new with the exception of the pickup used for irrigating and other field operations. This pickup is considered to be the pickup previously used by management.

Table 15: Hourly Machinery Costs

The data in Table 14 are used to estimate per-hour fixed and variable costs appearing in Table 15. Machinery fixed costs include depreciation and interest on investment, property taxes, and insurance - costs that do not vary with the crop grown or the number of acres produced. Current replacement costs are used for all machinery and equipment. While this assumption may result in an overstatement of production costs, it is an indication of the enterprise's ability to generate the earnings needed to replace depreciable assets. Continuing increases in prices paid for machinery and equipment mean that depreciation claimed on assets purchased before price advances understates the amount of capital currently required to replace assets. When an enterprise is evaluated to determine its long-run viability, it is important to consider its ability to replace depreciable assets. Note that interest on investment represents a 9% opportunity cost to the enterprise. These are earnings foregone by investing money in the machinery complement rather than the next best alternative. This may also represent the interest paid on funds borrowed to finance machinery purchases.

Machinery variable costs include machine repair, fuel, and lubrication - costs that vary with the crop grown or the number of acres of crop produced.

Table 16: Input Prices

Prices used for fuel, fertilizer, chemicals, seed, custom services, and other inputs are listed in Table 16.

TABLE 1. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR ESTABLISHING ALFALFA HAY FOLLOWING WHEAT OR BARLEY IN THE COLUMBIA BASIN CENTER PIVOT IRRIGATION.*

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						\$	\$	\$	\$	\$	\$	\$	
IRRIGATE (4X)**	CENTER PIVOT; 4 TIMES OVER	AUG	2001	.00	.17	.00	.00	2.47	19.00	.00	.32	21.79	21.79
DISC & PACK	150HP-WT, 13' TANDUM DISC&PACK	AUG	2001	.20	.24	6.53	3.69	3.48	.00	.00	.11	7.28	13.81
SOIL TEST	CUSTOM	AUG	2001	.00	.00	.00	.00	.00	.50	.00	.01	.51	.51
FERTILIZE	CUSTOM GROUND APPLICATION	AUG	2001	.00	.00	.00	.00	.00	6.50	47.85	.81	54.96	54.96
DISC & PACK	150HP-WT, 13' TANDUM DISK&PACK	AUG	2001	.20	.24	6.53	3.69	3.48	.00	.00	.11	7.28	13.81
DISK RIP & PACK	CHALL., 13' DISC RIPPER&PACKER	AUG	2001	.15	.17	5.85	4.35	2.47	7.70	.00	.22	14.73	20.58
HARROW & PACK	150HP-WT, 20' HARROW W/21' PK	AUG	2001	.10	.11	2.43	1.50	1.60	.00	.00	.05	3.15	5.57
PLANT	150HP-WT, 15' DBL DISC DRILL	AUG	2001	.20	.30	6.82	4.61	4.35	.00	53.20	.93	63.09	69.92
SPRAY	CUSTOM GROUND APPLICATION	SEP	2001	.00	.00	.00	.00	.00	6.50	15.28	.16	21.94	21.94
PICKUP**	MANAGER'S PICKUP	ANN	2001	.16	.00	1.03	.55	.00	.00	.00	.02	.57	1.60
PICKUP**	LABOR'S PICKUP	ANN	2001	.08	.00	.55	.35	.00	.00	.00	.02	.36	.91
MANAGEMENT**	MANAGEMENT COST	ANN	2001	.00	.00	10.00	.00	.00	.00	.00	.00	.00	10.00
OVERHEAD	UTILITIES,LEGAL,ACCT.,ETC.	ANN	2001	.00	.00	.00	.00	.00	9.78	.00	.00	9.78	9.78
TOTAL PER ACRE				1.09	1.23	39.74	18.74	17.84	49.98	116.13	2.76	205.44	245.18

* ALL FIXED COSTS ASSOCIATED WITH LAND ARE ALLOCATED TO THE PRECEDING CROP AND ALL STRAW HAS BEEN REMOVED.

** 20% ALLOCATED TO ALFALFA ESTABLISHMENT, 80% ALLOCATED TO PRECEDING CROP.

TABLE 2. MATERIALS AND SERVICES USED BY OPERATION FOR **ESTABLISHING AN ALFALFA FIELD.**

OPERATION	MONTH	MATERIAL AND/OR SERVICE
IRRIGATE (4X)	AUG.-SEPT.	20% OF THE ANNUAL IRRIGATION WATER CHARGE @ \$35.00/ACRE, IRRIGATION POWER @ \$40.00/ ACRE, AND IRRIGATION REPAIR @ \$20.00/ACRE
SOIL TEST	AUGUST	CUSTOM HIRED @ \$0.50/ACRE
FERTILIZE	AUGUST	CUSTOM GROUND APPLICATION @ \$6.50/ACRE 25 LBS. NITROGEN (DRY) @ \$.23/LB. 100 LBS. PHOSPHORUS (DRY) @ \$.22/LB. 100 LBS. POTASH (DRY) @ \$.17/LB. 1 LB. BORON (DRY) @ \$2.90/LB.
DISK RIP & PACK	AUGUST	0.154 HOUR OF RENTED CHALLENGER @ \$50.00/HOUR
PLANT	AUGUST	19 LBS. ALFALFA SEED @ \$2.80/LB.
SPRAY	SEPTEMBER	CUSTOM GROUND APPLICATION @ \$6.50/ACRE 8 OZ. OF SELECT @ \$1.91/OZ.*
OVERHEAD	ANNUAL	5% OF VARIABLE COST

* SELECT IS USED WHEN FOLLOWING WHEAT. WHEN FOLLOWING POTATOES, 4 OUNCES OF PURSUIT @ \$4.57/OZ. WOULD BE USED.

TABLE 3. ITEMIZED COST PER ACRE FOR ESTABLISHING ALFALFA HAY
 FOLLOWING WHEAT OR BARLEY IN THE COLUMBIA BASIN, CENTER
 PIVOT IRRIGATION.

		PRICE OR		VALUE OR	YOUR
	UNIT	COST/UNIT	QUANTITY	COST	FARM

VARIABLE COSTS		\$		\$	
SOIL TEST	ACRE	.50	1.00	.50	_____
NITROGEN (DRY)	LB.	.23	25.00	5.75	_____
PHOSPHATE (DRY)	LB.	.22	100.00	22.00	_____
BORON	LB.	2.90	1.00	2.90	_____
POTASH	LB.	.17	100.00	17.00	_____
CUSTOM FERTILIZATION	ACRE	6.50	1.00	6.50	_____
RENTED CHALLENGER	HOUR	50.00	.15	7.70	_____
ALFALFA SEED	LB.	2.80	19.00	53.20	_____
SELECT	OZ.	1.91	8.00	15.28	_____
CUSTOM SPRAY	ACRE	6.50	1.00	6.50	_____
IRRIGATION POWER*	ACRE	40.00	.20	8.00	_____
IRRIGATION REPAIR*	ACRE	20.00	.20	4.00	_____
IRRIGATION WATER*	ACRE	35.00	.20	7.00	_____
TRACTOR REPAIR	ACRE	2.92	1.00	2.92	_____
TRACTOR FUEL/LUBE	ACRE	6.50	1.00	6.50	_____
MACHINERY REPAIRS	ACRE	6.39	1.00	6.39	_____
MACHINE FUEL/LUBE	ACRE	2.93	1.00	2.93	_____
LABOR	HOUR	14.50	1.23	17.84	_____
INTEREST ON OP. CAP.	ACRE	2.76	1.00	2.76	_____
OVERHEAD	ACRE	9.78	1.00	9.78	_____

TOTAL VARIABLE COST				205.44	_____
FIXED COSTS		\$		\$	
TRACTOR DEPRECIATION	ACRE	5.68	1.00	5.68	_____
TRACTOR INTEREST	ACRE	5.62	1.00	5.62	_____
TRACTOR INSURANCE	ACRE	.37	1.00	.37	_____
TRACTOR TAXES	ACRE	1.12	1.00	1.12	_____
TRACTOR HOUSING	ACRE	.62	1.00	.62	_____
MACHINE DEPRECIATION	ACRE	9.50	1.00	9.50	_____
MACHINE INTEREST	ACRE	4.96	1.00	4.96	_____
MACHINE INSURANCE	ACRE	.33	1.00	.33	_____
MACHINE TAXES	ACRE	.99	1.00	.99	_____
MACHINE HOUSING	ACRE	.55	1.00	.55	_____
MANAGEMENT FEE*	ACRE	50.00	.20	10.00	_____

TOTAL FIXED COST				39.74	_____
TOTAL COST				245.19	_____

* 20% ALLOCATED TO ALFALFA ESTABLISHMENT, 80% ALLOCATED TO THE
 PRECEDING CROP.

TABLE 4. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCTION OF ALFALFA HAY RAISED IN THE COLUMBIA BASIN UNDER CENTER PIVOT IRRIGATION AND BALED INTO 1-TON BALES.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.		
							\$	\$	\$	\$	\$	\$	\$
SOIL TEST	CUSTOM	FEB	2002	.00	.00	.00	.00	.00	.50	.00	.03	.53	.53
FERT/WEED CONT.	CUSTOM GROUND APPLICATION	MAR	2002	.00	.00	.00	.00	.00	6.50	56.71	3.32	66.53	66.53
IRRIGATE/FERT.	CENTER PIVOT	SEA	2002	.00	.85	.00	.00	12.32	95.00	42.55	6.74	156.62	156.62
SWATH HAY	CUSTOM SWATH	MAY	2002	.00	.00	.00	.00	.00	15.00	.00	.56	15.56	15.56
RAKE HAY	CUSTOM RAKE	MAY	2002	.00	.00	.00	.00	.00	6.00	.00	.23	6.23	6.23
BALE 1-TON BALES	CUSTOM BALE	MAY	2002	.00	.00	.00	.00	.00	30.00	6.00	1.35	37.35	37.35
HAUL & STACK	CUSTOM (1-TON BALES)	MAY	2002	.00	.00	.00	.00	.00	7.00	.00	.26	7.26	7.26
SWATH HAY	CUSTOM SWATH	JUL	2002	.00	.00	.00	.00	.00	15.00	.00	.34	15.34	15.34
RAKE HAY	CUSTOM RAKE	JUL	2002	.00	.00	.00	.00	.00	6.00	.00	.14	6.13	6.13
BALE 1-TON BALES	CUSTOM BALE	JUL	2002	.00	.00	.00	.00	.00	30.00	6.00	.81	36.81	36.81
HAUL & STACK	CUSTOM (1-TON BALES)	JUL	2002	.00	.00	.00	.00	.00	7.00	.00	.16	7.16	7.16
SWATH HAY	CUSTOM SWATH	AUG	2002	.00	.00	.00	.00	.00	15.00	.00	.23	15.22	15.22
RAKE HAY	CUSTOM RAKE	AUG	2002	.00	.00	.00	.00	.00	6.00	.00	.09	6.09	6.09
BALE 1-TON BALES	CUSTOM BALE	AUG	2002	.00	.00	.00	.00	.00	30.00	6.00	.54	36.54	36.54
HAUL & STACK	CUSTOM (1-TON BALES)	AUG	2002	.00	.00	.00	.00	.00	7.00	.00	.11	7.11	7.11
SWATH HAY	CUSTOM SWATH	SEP	2002	.00	.00	.00	.00	.00	15.00	.00	.11	15.11	15.11
RAKE HAY	CUSTOM RAKE	SEP	2002	.00	.00	.00	.00	.00	6.00	.00	.05	6.05	6.05
BALE 1-TON BALES	CUSTOM BALE	SEP	2002	.00	.00	.00	.00	.00	30.00	6.00	.25	36.27	36.27
HAUL & STACK	CUSTOM (1-TON BALES)	SEP	2002	.00	.00	.00	.00	.00	7.00	.00	.05	7.05	7.05
GOPHER CONTROL	COST OF ANNUAL GOPHER CONTROL	ANN	2002	.00	.00	.00	.00	.00	.00	2.00	.09	2.09	2.09
INSURANCE ON HAY	\$2 PER \$1000 VALUE	ANN	2002	.00	.00	.00	.00	.00	1.96	.00	.09	2.05	2.05
PICKUP	MANAGER'S PICKUP	ANN	2002	.80	.00	5.16	2.73	.00	.00	.00	.12	2.86	8.01
PICKUP	LABOR'S PICKUP	ANN	2002	.40	.00	2.73	1.74	.00	.00	.00	.08	1.82	4.55
OVERHEAD	UTILITIES, LEGAL, ACCT., ETC.	ANN	2002	.00	.00	.00	.00	.00	24.69	.00	.00	24.69	24.69
LAND COST	LAND RENT	ANN	2002	.00	.00	250.00	.00	.00	.00	.00	.00	.00	250.00
MANAGEMENT	COST OF MANAGEMENT	ANN	2002	.00	.00	50.00	.00	.00	.00	.00	.00	.00	50.00
ESTABLISHMENT*	PRORATED ESTABLISHMENT COST	ANN	2002	.00	.00	75.68	.00	.00	.00	.00	.00	.00	75.68
TOTAL PER ACRE				1.20	.85	383.58	4.48	12.32	360.65	125.26	15.75	518.46	902.04

* \$245.19 ESTABLISHMENT COST AMORTIZED OVER 4 YEARS AT 9% INTEREST.

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TABLE 5. MATERIALS AND SERVICES USED BY OPERATION FOR PRODUCING ALFALFA HAY THAT IS BALEDED INTO 1-TON BALES.

OPERATION	MONTH	MATERIAL AND/OR SERVICE
SOIL TEST	AUGUST	CUSTOM HIRED @ \$0.50/ACRE
FERTILIZE/ WEED CONTROL	AUGUST	CUSTOM GROUND APPLICATION @ \$6.50/ACRE 40 LBS. PHOSPHORUS (LIQ) @ \$.34/LB. 40 LBS. POTASH (LIQ) @ \$.28/LB. 1.6 LBS. ZINC (LIQ) @ \$1.43/LB. 0.4 LB. BORON (LIQ) @ \$3.19/LB. 2 PINTS VELPAR @ \$60.92/GAL.* 2 PINTS GRAMOXONE-MAX @ \$38.82/GAL. 2 PINTS STICKER @ \$10.94/GAL. 3.4 LBS. 21-0-0-24 @ \$.20/LB.
IRRIGATE/FERTILIZE	SEASON	IRRIGATION WATER CHARGE @ \$35.00/ACRE IRRIGATION POWER @ \$40.00/ACRE IRRIGATION REPAIR @ \$20.00/ACRE 60 LBS. PHOSPHORUS (LIQ) @ \$.34/LB. 60 LBS. POTASH (LIQ) @ \$.28/LB. 2.4 LBS. ZINC (LIQ) @ \$1.43/LB. 0.6 LB. BORON (LIQ) @ \$3.19/LB.
SWATH HAY (4 TIMES)	MAY-OCT	\$15.00/ACRE EACH TIME SWATHED.
RAKE HAY (4 TIMES)	MAY-OCT	\$6.00/ACRE EACH TIME RAKED.
BALE HAY (4 TIMES)	MAY-OCT	2 TONS @ \$15.00/TON FOR EACH TIME BALEDED.
HAUL/STACK (4 TIMES)	MAY-OCT	2 TONS @ \$3.50/TON FOR EACH TIME BALEDED.
GOPHER CONTROL	ANNUAL	\$2.00/ACRE
HAY INSURANCE	ANNUAL	\$2.00/\$1000 VALUE**
OVERHEAD	ANNUAL	5% OF VARIABLE COST

* SINCE THE USE OF VELPAR WOULD MOST LIKELY HAVE A CARRYOVER EFFECT ON THE SUBSEQUENT CROP, IN THE LAST PRODUCTION YEAR 0.67 POUND PER ACRE OF SENCOR, AT A COST OF \$21.50 PER POUND, WOULD BE USED IN PLACE OF VELPAR.

**1-TON BALES VALUED AT \$120/TON.

TABLE 6. ITEMIZED COST PER ACRE FOR PRODUCTION OF ALFALFA HAY
 RAISED IN THE COLUMBIA BASIN UNDER CENTER PIVOT
 IRRIGATION AND BALED INTO 1-TON BALES.

		PRICE OR		VALUE OR	YOUR
	UNIT	COST/UNIT	QUANTITY	COST	FARM

VARIABLE COSTS		\$		\$	
SOIL TEST	ACRE	.50	1.00	.50	_____
PHOSPHATE (LIQ)	LB.	.34	100.00	34.00	_____
POTASH (LIQ)	LB.	.28	100.00	28.00	_____
ZINC (LIQ)	LB.	1.43	4.00	5.72	_____
BORON (LIQ)	LB.	3.19	1.00	3.19	_____
VELPAR	GAL.	60.92	.25	15.23	_____
GRAMOXONE-MAX	GAL.	38.82	.25	9.71	_____
STICKER	GAL.	10.94	.25	2.73	_____
21-0-0-24	LB.	.20	3.40	.68	_____
CUSTOM GROUND APPLIC.	ACRE	6.50	1.00	6.50	_____
CUSTOM SWATH	ACRE	15.00	4.00	60.00	_____
CUSTOM RAKE	ACRE	6.00	4.00	24.00	_____
CUSTOM BALE (1TON)	TON	15.00	8.00	120.00	_____
PRESERVATIVE	TON	3.00	8.00	24.00	_____
HAUL & STACK	TON	3.50	8.00	28.00	_____
INSURANCE*	\$1K	2.00	.98	1.96	_____
GOPHER CONTROL	ACRE	2.00	1.00	2.00	_____
IRRIGATION POWER	ACRE	40.00	1.00	40.00	_____
IRRIGATION REPAIR	ACRE	20.00	1.00	20.00	_____
IRRIGATION WATER	ACRE	35.00	1.00	35.00	_____
MACHINERY REPAIRS	ACRE	.75	1.00	.75	_____
MACHINE FUEL/LUBE	ACRE	3.73	1.00	3.73	_____
LABOR	HOURL	14.50	.85	12.32	_____
INTEREST ON OP. CAP.	ACRE	15.75	1.00	15.75	_____
OVERHEAD	ACRE	24.69	1.00	24.69	_____
TOTAL VARIABLE COST				518.46	_____

FIXED COSTS		\$		\$	
MACHINE DEPRECIATION	ACRE	4.60	1.00	4.60	_____
MACHINE INTEREST	ACRE	2.39	1.00	2.39	_____
MACHINE INSURANCE	ACRE	.16	1.00	.16	_____
MACHINE TAXES	ACRE	.48	1.00	.48	_____
MACHINE HOUSING	ACRE	.27	1.00	.27	_____
LAND RENT	ACRE	250.00	1.00	250.00	_____
MANAGEMENT FEE	ACRE	50.00	1.00	50.00	_____
PRORATED ESTAB COST**	ACRE	75.68	1.00	75.68	_____
TOTAL FIXED COST				383.58	_____
TOTAL COST				902.04	_____

* 8 TONS VALUED @ \$120/TON.

**\$245.19 ESTABLISHMENT COST AMORTIZED OVER 4 YEARS AT 9% INTEREST.

TABLE 7. BREAK-EVEN SELLING PRICE PER TON OF 1-TON BALES OF ALFALFA PRODUCED IN THE COLUMBIA BASIN UNDER CENTER PIVOT IRRIGATION.

	COST PER ACRE	YOUR FARM	BREAK-EVEN PRICE (\$/TON)	YOUR FARM
	\$	\$	(8 TONS)	\$
1. TOTAL VARIABLE COST	518.46	_____	64.81	_____
PLUS: MACHINERY INSURANCE	0.16	_____		
MACHINERY TAXES	0.48	_____		
LAND RENT	250.00	_____		
2. TOTAL CASH COSTS	769.10	_____	96.14	_____
PLUS: MACHINERY DEPRECIATION	4.60	_____		
3. TOTAL CASH COST & DEPRECIATION	773.70	_____	96.71	_____
PLUS: MACHINERY INTEREST	2.39	_____		
MACHINERY HOUSING	0.27	_____		
MANAGEMENT	50.00	_____		
PRORATED ESTAB COST	75.68	=====		
4. TOTAL COST	902.04	_____	112.75	_____

TABLE 8. BREAK-EVEN SELLING PRICE PER TON OF 1-TON BALE OF ALFALFA PRODUCED AT DIFFERENT YIELD LEVELS.

YIELD LEVEL (TONS/ACRE)	BREAK-EVEN PRICE (\$/TON)
6	142.66
7	125.57
8	112.75
9	102.79
10	94.81

TABLE 9. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCTION OF ALFALFA HAY RAISED IN THE COLUMBIA BASIN UNDER CENTER PIVOT IRRIGATION AND BALED INTO 3-TIE BALES.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.		
						\$	\$	\$	\$	\$	\$	\$	
SOIL TEST	CUSTOM	FEB	2002	.00	.00	.00	.00	.00	.50	.00	.03	.53	.53
FERT/WEED CONT.	CUSTOM GROUND APPLICATION	MAR	2002	.00	.00	.00	.00	.00	6.50	56.71	3.32	66.53	66.53
IRRIGATE/FERT.	CENTER PIVOT	SEA	2002	.00	.85	.00	.00	12.32	95.00	42.55	6.74	156.62	156.62
SWATH HAY	CUSTOM SWATH	MAY	2002	.00	.00	.00	.00	.00	15.00	.00	.56	15.56	15.56
RAKE HAY	CUSTOM RAKE	MAY	2002	.00	.00	.00	.00	.00	6.00	.00	.23	6.23	6.23
BALE 3-TIE BALES	CUSTOM BALE	MAY	2002	.00	.00	.00	.00	.00	33.00	6.00	1.46	40.46	40.46
HAUL & STACK	CUSTOM (3-TIE BALES)	MAY	2002	.00	.00	.00	.00	.00	10.00	.00	.38	10.38	10.38
SWATH HAY	CUSTOM SWATH	JUL	2002	.00	.00	.00	.00	.00	15.00	.00	.34	15.34	15.34
RAKE HAY	CUSTOM RAKE	JUL	2002	.00	.00	.00	.00	.00	6.00	.00	.14	6.13	6.13
BALE 3-TIE BALES	CUSTOM BALE	JUL	2002	.00	.00	.00	.00	.00	33.00	6.00	.88	39.88	39.88
HAUL & STACK	CUSTOM (3-TIE BALES)	JUL	2002	.00	.00	.00	.00	.00	10.00	.00	.23	10.22	10.22
SWATH HAY	CUSTOM SWATH	AUG	2002	.00	.00	.00	.00	.00	15.00	.00	.23	15.22	15.22
RAKE HAY	CUSTOM RAKE	AUG	2002	.00	.00	.00	.00	.00	6.00	.00	.09	6.09	6.09
BALE 3-TIE BALES	CUSTOM BALE	AUG	2002	.00	.00	.00	.00	.00	33.00	6.00	.59	39.59	39.59
HAUL & STACK	CUSTOM (3-TIE BALES)	AUG	2002	.00	.00	.00	.00	.00	10.00	.00	.15	10.15	10.15
SWATH HAY	CUSTOM SWATH	SEP	2002	.00	.00	.00	.00	.00	15.00	.00	.11	15.11	15.11
RAKE HAY	CUSTOM RAKE	SEP	2002	.00	.00	.00	.00	.00	6.00	.00	.05	6.05	6.05
BALE 3-TIE BALES	CUSTOM BALE	SEP	2002	.00	.00	.00	.00	.00	33.00	6.00	.29	39.29	39.29
HAUL & STACK	CUSTOM (3-TIE BALES)	SEP	2002	.00	.00	.00	.00	.00	10.00	.00	.07	10.07	10.07
GOPHER CONTROL	COST OF ANNUAL GOPHER CONTROL	ANN	2002	.00	.00	.00	.00	.00	.00	2.00	.09	2.09	2.09
INSURANCE ON HAY	\$2 PER \$1000 VALUE	ANN	2002	.00	.00	.00	.00	.00	2.16	.00	.10	2.26	2.26
PICKUP	MANAGER'S PICKUP	ANN	2002	.80	.00	5.16	2.73	.00	.00	.00	.12	2.86	8.01
PICKUP	LABOR'S PICKUP	ANN	2002	.40	.00	2.73	1.74	.00	.00	.00	.08	1.82	4.55
OVERHEAD	UTILITIES, LEGAL, ACCT., ETC.	ANN	2002	.00	.00	.00	.00	.00	25.92	.00	.00	25.92	25.92
LAND COST	LAND RENT	ANN	2002	.00	.00	250.00	.00	.00	.00	.00	.00	.00	250.00
MANAGEMENT	COST OF MANAGEMENT	ANN	2002	.00	.00	50.00	.00	.00	.00	.00	.00	.00	50.00
ESTABLISHMENT*	PRORATED ESTABLISHMENT COST	ANN	2002	.00	.00	75.68	.00	.00	.00	.00	.00	.00	75.68
TOTAL PER ACRE				1.20	.85	383.58	4.48	12.32	386.08	125.26	16.26	544.40	927.98

* \$245.19 ESTABLISHMENT COST AMORTIZED OVER 4 YEARS AT 9% INTEREST.

TABLE 10. MATERIALS AND SERVICES USED BY OPERATION FOR PRODUCING ALFALFA HAY THAT IS BALEDED INTO 3-TIE BALES.

OPERATION	MONTH	MATERIAL AND/OR SERVICE
SOIL TEST	AUGUST	CUSTOM HIRED @ \$0.50/ACRE
FERTILIZE/ WEED CONTROL	AUGUST	CUSTOM GROUND APPLICATION @ \$6.50/ACRE 40 LBS. PHOSPHORUS (LIQ) @ \$.34/LB. 40 LBS. POTASH (LIQ) @ \$.28/LB. 1.6 LBS. ZINC (LIQ) @ \$1.43/LB. 0.4 LB. BORON (LIQ) @ \$3.19/LB. 2 PINTS VELPAR @ \$60.92/GAL.* 2 PINTS GRAMOXONE-MAX @ \$38.82/GAL. 2 PINTS STICKER @ \$10.94/GAL. 3.4 LBS. 21-0-0-24 @ \$.20/LB.
IRRIGATE/FERTILIZE	SEASON	IRRIGATION WATER CHARGE @ \$35.00/ACRE IRRIGATION POWER @ \$40.00/ACRE IRRIGATION REPAIR @ \$20.00/ACRE 60 LBS. PHOSPHORUS (LIQ) @ \$.34/LB. 60 LBS. POTASH (LIQ) @ \$.28/LB. 2.4 LBS. ZINC (LIQ) @ \$1.43/LB. 0.6 LB. BORON (LIQ) @ \$3.19/LB.
SWATH HAY (4 TIMES)	MAY-OCT	\$15.00/ACRE EACH TIME SWATHED.
RAKE HAY (4 TIMES)	MAY-OCT	\$6.00/ACRE EACH TIME RAKED.
BALE HAY (4 TIMES)	MAY-OCT	2 TONS @ \$16.50/TON FOR EACH TIME BALEDED.
HAUL/STACK (4 TIMES)	MAY-OCT	2 TONS @ \$5.00/TON FOR EACH TIME BALEDED.
GOPHER CONTROL	ANNUAL	\$2.00/ACRE
HAY INSURANCE	ANNUAL	\$2.00/\$1000 VALUE**
OVERHEAD	ANNUAL	5% OF VARIABLE COST

* SINCE THE USE OF VELPAR WOULD MOST LIKELY HAVE A CARRYOVER AFFECT ON THE SUBSEQUENT CROP, IN THE LAST PRODUCTION YEAR 0.67 POUND PER ACRE OF SENCOR, AT A COST OF \$21.50 PER POUND, WOULD BE USED IN PLACE OF VELPAR.

**1-TON BALES VALUED AT \$135/TON.

TABLE 11. ITEMIZED COST PER ACRE FOR PRODUCTION OF ALFALFA HAY
 RAISED IN THE COLUMBIA BASIN UNDER CENTER PIVOT
 IRRIGATION AND BALED INTO 3-TIE BALES.

		PRICE OR		VALUE OR	YOUR
	UNIT	COST/UNIT	QUANTITY	COST	FARM

VARIABLE COSTS		\$		\$	
SOIL TEST	ACRE	.50	1.00	.50	_____
PHOSPHATE (LIQ)	LB.	.34	100.00	34.00	_____
POTASH (LIQ)	LB.	.28	100.00	28.00	_____
ZINC (LIQ)	LB.	1.43	4.00	5.72	_____
BORON (LIQ)	LB.	3.19	1.00	3.19	_____
VELPAR	GAL.	60.92	.25	15.23	_____
GRAMOXONE-MAX	GAL.	38.82	.25	9.71	_____
STICKER	GAL.	10.94	.25	2.73	_____
21-0-0-24	LB.	.20	3.40	.68	_____
CUSTOM GROUND APPLIC.	ACRE	6.50	1.00	6.50	_____
CUSTOM SWATH	ACRE	15.00	4.00	60.00	_____
CUSTOM RAKE	ACRE	6.00	4.00	24.00	_____
CUSTOM BALE (3-TIE)	TON	16.50	8.00	132.00	_____
PRESERVATIVE	TON	3.00	8.00	24.00	_____
HAUL & STACK	TON	5.00	8.00	40.00	_____
INSURANCE*	\$1K	2.00	1.08	2.16	_____
GOPHER CONTROL	ACRE	2.00	1.00	2.00	_____
IRRIGATION POWER	ACRE	40.00	1.00	40.00	_____
IRRIGATION REPAIR	ACRE	20.00	1.00	20.00	_____
IRRIGATION WATER	ACRE	35.00	1.00	35.00	_____
MACHINERY REPAIRS	ACRE	.75	1.00	.75	_____
MACHINE FUEL/LUBE	ACRE	3.73	1.00	3.73	_____
LABOR	HOURL	14.50	.85	12.32	_____
INTEREST ON OP. CAP.	ACRE	16.26	1.00	16.26	_____
OVERHEAD	ACRE	25.92	1.00	25.92	_____

TOTAL VARIABLE COST				544.40	_____
FIXED COSTS		\$		\$	
MACHINE DEPRECIATION	ACRE	4.60	1.00	4.60	_____
MACHINE INTEREST	ACRE	2.39	1.00	2.39	_____
MACHINE INSURANCE	ACRE	.16	1.00	.16	_____
MACHINE TAXES	ACRE	.48	1.00	.48	_____
MACHINE HOUSING	ACRE	.27	1.00	.27	_____
LAND RENT	ACRE	250.00	1.00	250.00	_____
MANAGEMENT FEE	ACRE	50.00	1.00	50.00	_____
PRORATED ESTAB COST**	ACRE	75.68	1.00	75.68	_____

TOTAL FIXED COST				383.58	_____
TOTAL COST				927.98	_____

* 8 TONS VALUED @ \$135/TON.

**\$245.19 ESTABLISHMENT COST AMORTIZED OVER 4 YEARS AT 9% INTEREST.

TABLE 12. BREAK-EVEN SELLING PRICE PER TON OF 3-TIE BALES OF ALFALFA PRODUCED IN THE COLUMBIA BASIN UNDER CENTER PIVOT IRRIGATION.

	COST PER ACRE	YOUR FARM	BREAK-EVEN PRICE (\$/TON)	YOUR FARM
	\$	\$	(8 TONS)	\$
1. TOTAL VARIABLE COST	544.40	_____	68.05	_____
PLUS: MACHINERY INSURANCE	0.16	_____		
MACHINERY TAXES	0.48	_____		
LAND RENT	250.00	_____		
2. TOTAL CASH COSTS	795.04	_____	94.31	_____
PLUS: MACHINERY DEPRECIATION	4.60	_____		
3. TOTAL CASH COST & DEPRECIATION	799.64	_____	99.96	_____
PLUS: MACHINERY INTEREST	2.39	_____		
MACHINERY HOUSING	0.27	_____		
MANAGEMENT	50.00	_____		
PRORATED ESTAB COST	75.68	_____		
4. TOTAL COST	927.98	_____	116.00	_____

TABLE 13. BREAK-EVEN SELLING PRICE PER TON OF 3-TIE BALES OF ALFALFA PRODUCED AT DIFFERENT YIELD LEVELS.

YIELD LEVEL (TONS/ACRE)	BREAK-EVEN PRICE (\$/TON)
6	145.91
7	128.82
8	116.00
9	106.03
10	98.05

Table 14. Machine Data

Machine Name	Purchase Price	Years of Use	Salvage Value	Annual Repair Cost	Annual Hours of Use	Gallons of Fuel Use per Hour
150HP-WT (new)	90,000	15	17,000	2,500	600	8.5 Diesel
13' Packer (new)	3,600	8	640	175	250	
21' Packer (new)	4,700	8	840	230	250	
20' Harrow (new)	2,100	15	420	100	150	
13' Tandem Disc (new)	14,000	10	2,000	860	200	
15' Double Disc Drill (new)	12,000	10	2,000	1,200	125	
13' Disc Ripper (new)	24,500	5	7,000	2,000	150	
Pickup, Managment (new)	26,000	5	12,000	250	800	2 Gasoline
Pickup, Labor (5 yrs)	12,000	5	3,000	500	400	2 Gasoline

TABLE 15. HOURLY MACHINERY COSTS

MACHINERY	PURCHASE PRICE	YEARS TO TRADE	ANNUAL HOURS	DEPREC- IATION	INTER- EST	INSUR- ANCE	TAXES	HOUSING	COST PER HOUR			TOTAL VARIABLE COST	TOTAL COST
									TOTAL FIXED COST	REPAIR	FUEL AND LUBE		
	\$												
150HP-WT	90,000.00	15	600	8.11	8.03	.54	1.61	.89	19.17	4.17	9.29	13.45	32.62
13' PACKER	3,600.00	8	250	1.48	.76	.05	.15	.08	2.53	.70	.00	.70	3.23
21' PACKER	4,700.00	8	250	1.93	1.00	.07	.20	.11	3.30	.92	.00	.92	4.22
20' HARROW	2,100.00	15	150	.75	.76	.05	.15	.08	1.79	.67	.00	.67	2.45
13' TANDEM DISC	14,000.00	10	200	6.00	3.60	.24	.72	.40	10.96	4.30	.00	4.30	15.26
15' DBL DISC DRILL	12,000.00	10	125	8.00	5.04	.34	1.01	.56	14.94	9.60	.00	9.60	24.54
13' DISC RIPPER	24,000.00	5	150	22.67	9.30	.62	1.86	1.03	35.48	13.33	14.20	27.54	63.02
MANAGER'S PICKUP	26,000.00	5	800	3.50	2.14	.14	.43	.24	6.45	.31	3.11	3.42	9.86
LABOR'S PICKUP	12,000.00	5	400	4.50	1.69	.11	.34	.19	6.83	1.25	3.11	4.36	11.18

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Table 16. Input Prices

Input	Unit	Price \$
<u>Fuel</u>		
Gasoline	Gallon	1.35
Diesel	Gallon	0.95
<u>Fertilizer</u>		
Nitrogen (dry)	Pound	0.229
Phosphate (dry)	Pound	0.22
Phosphate (liquid)	Pound	0.34
Potash (dry)	Pound	0.169
Potash (liquid)	Pound	0.284
Zinc (liquid)	Pound	1.43
Boron (dry)	Pound	2.90
Boron (liquid)	Pound	3.19
21-0-0-24	Pound	0.20
<u>Chemicals</u>		
Velpar	Gallon	60.92
Gramoxone-Max	Gallon	38.82
Sticker	Gallon	10.94
Hay preservative	Per ton of hay	3.00
Select	Ounce	1.91
Sencor	Pound	21.50
<u>Custom Rates</u>		
Fertilize	Acre	6.50
Spray	Acre	6.50
Swath	Acre	15.00
Rake	Acre	6.00
Bale (1-ton bales)	Ton	15.00
Bale (3-tie bales)	Ton	16.50
Haul & stack (1-ton bales)	Ton	3.50
Haul & stack (3-tie bales)	Ton	5.00
<u>Irrigation</u>		
Irrigation water	Acre	35.00
Irrigation power	Acre	40.00
Irrigation repair	Acre	20.00
<u>Other. Inputs</u>		
Labor	Hour	14.50
Soil test	Acre	0.50
Alfalfa seed	Pound	2.80
Rent of Challenger	Hour	50.00
Insurance on hay	Per \$1000 value	2.00
Land rent	Acre	200.00
Management	Acre	50.00

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is violation of law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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