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**ESTIMATED PER ACRE
COSTS & RETURNS
FOR A 100-ACRE
ALFALFA HAY ENTERPRISE
COLUMBIA BASIN
WASHINGTON**

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ESTIMATED PER ACRE COSTS AND RETURNS
FOR A 100-ACRE ALFALFA HAY ENTERPRISE
COLUMBIA BASIN, WASHINGTON

by
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The irrigated areas of central Washington produce a major portion of Washington's alfalfa hay. The Columbia Basin area is one of the principle suppliers. Alfalfa hay acres have led all crops in the Basin since 1961. More than 100,000 acres of Basin land have been in alfalfa hay annually since 1963, as shown below.

Alfalfa Hay Production in the Columbia Basin

<u>Year</u>	<u>Total Acres</u>	<u>% of Area</u>	<u>Average Yield</u>	<u>Average Price</u>	<u>Value Per Acre</u>
1963	113,407	30.6%	4.7	\$ 22.50	\$ 105.75
1964	128,517	33.1	4.9	21.50	105.35
1965	136,787	33.3	5.0	21.60	108.00
1966	137,927	31.4	5.3	22.15	117.40
1967	129,123	28.1	5.4	22.40	120.83

Data from U. S. Bureau of Reclamation annual crop reports.

Most of the Columbia Basin's alfalfa hay is utilized by western Washington dairy operators. Local use is rapidly expanding due to the increasing numbers of cattle being fed in the area.

Alfalfa is well suited to the soil and climatic conditions of the Basin. Yields commonly range from a low of five tons to a high of nine tons per acre. However, both greater and lesser yields are also produced. From three to five cuttings of alfalfa are made each year. Alfalfa prices currently range from about \$20 to \$25 per ton, depending on time of the sale and condition of the hay. Good yields and prices and its wide adaptability have made alfalfa a popular crop in the area.

Alfalfa acreage on Columbia Basin farms ranges from less than 20 acres to over 300 acres. Limited acreages of alfalfa are commonly included in crop rotations on intensive farm operations for disease and insect control, to improve soil tilth, to utilize irregular shaped fields and land with lower quality soil.

Operators of some large farms grow alfalfa because of limited resources or as a way of diversifying their operations. Farmers with large acreages of less productive soil commonly devote most of their land to alfalfa with limited amounts in other crops.

Alfalfa is frequently included in large diversified farm operations along with two or three other crops. On these farms it is often planted in the fall after grain. Weeds and disease problems commonly cause the stand to be plowed out after four or five years of production.

Farmers with 100 acres of alfalfa usually own their mowing and baling machinery. Normally the operator does this portion of the harvest. Until recent years he

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usually owned the hay removal equipment and hired someone to do the work. With the advent of newer hay removal equipment, however, most farmers with alfalfa enterprises of this size are hiring custom operators to do the job.

OBJECTIVE OF THIS ENTERPRISE STUDY

What does it cost to produce alfalfa hay in the Columbia Basin? How does a change in yield affect the cost of producing a ton of hay? What affect does a change in the yield or the selling price of alfalfa have on the operator's income? These questions are frequently asked by growers, prospective growers, credit representatives and purchasers of Columbia Basin hay.

This study was conducted to determine expected costs and operator's labor and management income due to producing 100 acres of alfalfa hay on a 300-acre diversified farming operation in the Columbia Basin.

Specific objectives of the study were:

1. Determine the costs and operator's labor and management income per acre when producing 6-1/2 tons of alfalfa hay per acre on a 100-acre alfalfa enterprise.
2. Determine the cost of producing a ton of hay for yields ranging from 5 to 9 tons per acre.
3. Determine the operator's labor and management income for selected yield and price situations.

METHOD OF OBTAINING DATA

Data for the analysis were compiled from information supplied by a selected group of Basin hay growers who include a substantial acreage of alfalfa in their diversified cropping program. After the data were assembled they were reviewed by the growers, county agents and other interested persons who are familiar with Columbia Basin agriculture.

The cost and returns information in the tables are not averages, but represent a consensus of the group about the expected costs and returns. Therefore, growers should use the information only as a basic guide until more factual data are available from their own records. Space is provided in each table so operators can insert their own data as they become available.

TABLE 1. COSTS AND RETURNS SUMMARY

Returns: Returns in this table were based on 3-1/3 cuttings of alfalfa and a yield of 6-1/2 tons per acre. Therefore value of the crop is \$143.00 per acre when hay sells for \$22 per ton.

Pre-Harvest Expenses: The usual production practices were determined by the committee of growers. Expenses were then determined for the necessary labor, machinery use and materials.

Cost of fertilizing, weed control and insect control are the major pre-harvest expense items. They amount to \$13.10 per acre, or approximately 85 percent of the pre-harvest cash costs.

The costs in this study are based on the farm being surface irrigated.

Harvest Expenses: Mowing and baling costs are charged on the basis of the operator doing the work. Hay removal and stacking, however, are charged on a custom basis.

The number of alfalfa cuttings during the season depends partly on the stage of maturity at the time of cutting. It will also vary from year to year and according to the farm's location in the Basin. The growers involved in the study agreed to base the harvest costs on 3-1/3 cuttings per year.

Cash Overhead: Cash overhead consists of real estate and personal property taxes, rent, water charges, a general overhead charge, and interest on operating capital.

Real estate and personal property TAXES in the Columbia Basin currently range from less than \$5.00 to over \$10.00 per acre. The amount depends on the farm location, its stage of development and the equipment owned by the operator.

The growers indicated their WATER charges ranged from about \$8.00 to \$14.00 per acre.

A charge of 5 percent of the CASH COSTS was included as GENERAL OVERHEAD to cover such unitemized expenses as utilities, insurance, social security, office, travel, etc. No charge was made for RENT but a charge was made for real estate TAXES and INTEREST ON INVESTMENT in the land. Those renting land should adjust their costs accordingly.

The cash overhead charges were \$23.00 per acre.

Non-Cash Costs: Included as non-cash costs are operator's labor, interest and depreciation on buildings and equipment, interest on the land investment, and interest and depreciation of the alfalfa stand.

OPERATOR'S LABOR is shown as a non-cash cost; hired labor costs would be a cash expense item.

Details of the DEPRECIATION and INTEREST ON INVESTMENT charges for the equipment, buildings and land are shown in Table 2.

Investment overhead charges for the alfalfa stand are based on an establishment cost of \$40 per acre and the stand lasting five years.

Return for Operator's Labor and Management: The non-cash charge for operator's labor (\$10.16 per acre) is included in the TOTAL COSTS. Therefore, it must be deducted from the TOTAL COSTS when determining RETURN FOR OPERATOR'S LABOR AND MANAGEMENT. This amount, of course, does not include the operator's return for his financial investment in the business.

TABLE 2. CAPITAL INVESTMENT

Table 2 lists the equipment and buildings normally needed for a 100-acre alfalfa hay enterprise. It assumes that some items are also used for other farm enterprises, so only a portion of their annual depreciation and interest on investment is charged to alfalfa. This table also includes the interest on investment in the land.

Also shown are expected cash costs per hour of operation for the various items of equipment.

TABLE 3. MONTHLY CASH FLOW

The cash income and expenses, taken from Table 1, are shown by operation and the expected month of their occurrence. This table is provided to help farmers budget their financial needs by months.

Income from the first cutting of hay (40 percent of the annual crop) is shown as being received in September. One-half the remainder is sold in November and one-half in December. However, an individual farmer's income flow may be quite different. Each operator can indicate expected income according to his usual selling practices.

TABLE 4. COSTS PER ACRE AND PER TON

Table 4 groups all the production costs on a per acre basis and by ton of hay produced. Costs were computed for yields ranging from 5 to 9 tons per acre.

The growers indicated the principle factors that determine their hay yields are fertilizer application rates, irrigation practices, weed control measures, timeliness of insect control practices and timeliness of harvest. The only significant variable costs were for fertilizer application. The other pre-harvest costs did not change with yields. But the cash costs for harvesting did change with yield. Also the non-cash costs change with yield because of the operator's labor.

The cost of producing alfalfa at the 5-ton yield level was determined to be \$129.78 per acre, or \$25.95 per ton. It was \$146.51 per acre, or \$16.27 per ton, at the 9-ton yield level.

TABLE 5. OPERATOR'S RETURN AT SELECTED YIELDS AND PRICES

Table 5 shows the operator's labor and management income for hay yields ranging from 5 tons to 9 tons per acre. And for hay prices ranging from \$18 to \$27 per ton.

The data indicate a wide range in possible returns to the operator, depending on the selling price of hay and the amount of hay produced per acre. It is apparent that a 100-acre alfalfa enterprise can be profitable when it is properly managed.

Two other alfalfa hay enterprise studies have also been conducted in the Basin. One considered a 45-acre alfalfa enterprise on a 180-acre intensive farming operation. The other was a study of a 250-acre enterprise on a 300-acre extensive farming operation. The table below summarizes the results of the three studies.

Cost of Producing a Ton of Alfalfa Hay in the Columbia Basin
for Selected Size and Yield Conditions

Acres of Alfalfa	Total Acres in the Farm	Yield, Tons per Acre				
		5	6	7	8	9
45	180	\$ 27.55	\$ 24.07	\$ 21.59	\$ 19.73	\$ 18.28
100	300	25.95	22.33	19.73	17.80	16.27
250	300	24.34	20.75	18.18	16.26	14.88

Results of the other studies are available in E.M. 2929, "Estimated Per Acre Costs and Returns for a 45-Acre Alfalfa Hay Enterprise, Columbia Basin, Washington" and E.M. 2931, "Estimated Per Acre Costs and Returns for a 250-Acre Alfalfa Hay Enterprise, Columbia Basin, Washington".

TABLE 1. ESTIMATED ANNUAL COSTS AND RETURNS PER ACRE
COLUMBIA BASIN, WASHINGTON
(1967)

	Hours Per Acre	Labor ^{1/}	Machinery Fuel and Repairs	Material & Other	Total	Your Estimate
RETURNS		\$	\$	\$	\$	\$
6.5 tons @ \$22 per ton					143.00	
COSTS						
<u>Pre-harvest^{2/}</u>						
Ditch repair, cleanup	.1	.18	.16	.75 [†]	1.09	
Fertilizer (65P ₂ O ₅ , 1B) ^{3/}				7.00 [†]	7.00	
Custom apply				1.75 [†]	1.75	
Weed control				2.85 [†]	2.85	
Corrugate, 2x	.8	1.40	1.36		2.76	
Irrigation, 6x	3.0	5.25			5.25	
Insect control ^{5/}				1.50 [†]	1.50	
Gopher control ^{6/}						
<u>Harvest (3-1/3 cuttings)</u>						
Swathing	1.0	1.75	2.50		4.25	
Baling (150 b/hr) ^{7/}	.9	1.58	2.12	wire=4.00 [†]	7.70	
Remove & stack (20 ba/T @ 10¢) ^{7/}				13.00 [†]	13.00	
<u>Cash Overhead^{8/}</u>						
Taxes				8.00	8.00	
Rent						
Water				10.00	10.00	
General Overhead (5% of cash costs)				3.00	3.00	
Int. on Oper. Capital (6 mo. @ 7%)				2.00	2.00	
TOTAL CASH COSTS			6.14	53.85	59.99	
Operator's Labor		10.16			10.16	
<u>Investment Overhead-Equip., bldgs., land</u>						
Depreciation of bldgs., equip.				15.73	15.73	
Int. on Ave. Inv. bldgs., equip., land				40.83	40.83	
<u>Investment Overhead-Alfalfa stand</u>						
Depreciation of stand (\$40 ÷ 5 yrs)				8.00	8.00	
Interest on Ave. Inv. (\$20 @ 7%)				1.40	1.40	
TOTAL NON-CASH COSTS		10.16		65.96	76.12	
TOTAL COSTS PER ACRE		10.16	6.14	119.81	136.11	
RETURN FOR OPERATOR'S LABOR & MANAGEMENT					17.05	

Based on 100 acres of alfalfa on a 300-acre surface irrigated farm.

[†]These operations usually hired.

^{1/}Labor charged at \$1.75 per hour.

^{2/}Check with your county agent for local recommendations on specific cultural practices.

^{3/}Based on applying 10 lbs. P₂O₅ per ton of hay.

^{4/}Spring weed control can be either mechanical or chemical; chemicals usually are less damaging to alfalfa. New stands do not usually need weed control, so only 60% of estimated cost is charged annually.

^{5/}Based on treating 40% of the stand annually.

^{6/}When needed, estimated cost is \$2.00 per acre.

^{7/}Based on 90 lbs. bales.

^{8/}Rounded to the nearest dollar.

TABLE 2. CAPITAL INVESTMENT^{1/}

	Purchase Price	Salvage Value	Average Value	Percent due to Alfalfa	Method of Deprec.	Annual Costs		Annual Costs (Your Estimate)		Cash Costs Per Hour		
						Deprec.	Int. 7%	Deprec.	Int.	Fuel	Repairs	Total
Tractor, 60 HP diesel	\$7,500	\$1,500	\$4,500	20	8 SL	\$ 150.00	\$ 63.00	\$	\$	\$.52	\$.98	\$1.50
Corrugating equip., 13'	300	100	200	33	5 SL	13.20	4.61				.20	.20
Swather, SP 12'	6,500	1,000	3,750	80	6 SL	733.33	210.00			.50	2.00	2.50
Baler, 2 wire	4,000	100	2,050	100	8 SL	487.50	143.50			.70	1.65	2.35
Siphon Tubes	200	0	100	100	7 SL	28.57	7.00					
Pickup	2,700	700	1,700	33	7 SL	94.28	39.17			.03 [‡]	.03 [‡]	.06 [‡]
Shop Equipment	1,000	0	500	33	10 SL	33.33	11.55					
Shop and Buildings	2,500	0	1,250	33	25 SL	33.33	28.88					
Land, 100 acres @ \$550			55,000	100			3,575.00 ^{2/}					
TOTAL						1,573.54	4,082.82					
YOUR TOTAL												
PER ACRE						15.73	40.83					
YOUR COSTS												

‡ Expected cost per mile of operation.

^{1/} Straight line (SL) method of depreciation used; the number (8) indicates years of expected use.

^{2/} Interest on land investment based on 6.5 percent.

TABLE 4. COST PER ACRE AND PER TON
AT SELECTED YIELDS

COST PER ACRE	Yield, Tons Per Acre					Your Estimate
	5	6	7	8	9	
Cultural Costs - Fertilizer	\$ 7.25	\$ 8.25	\$ 9.25	\$ 10.25	\$ 11.25	\$
- Other	6.62	6.62	6.62	6.62	6.62	
Harvest Costs - Swath and Bale	7.15	8.09	9.03	10.03	10.91	
- Remove and stack	10.00	12.00	14.00	16.00	18.00	
Cash Overhead	23.00	23.00	23.00	23.00	23.00	
CASH COSTS PER ACRE	54.02	57.96	61.90	65.90	69.78	
CASH COSTS PER TON	10.80	9.66	8.84	8.24	7.75	
Operator's Labor	9.80	10.04	10.28	10.52	10.77	
Investment Overhead-Bldgs., equip., land	56.56	56.56	56.56	56.56	56.56	
Investment Overhead-Alfalfa stand	9.40	9.40	9.40	9.40	9.40	
NON-CASH COST PER ACRE ^{1/}	75.76	76.00	76.24	76.48	76.73	
NON-CASH COSTS PER TON ^{1/}	15.15	12.67	10.89	9.56	8.52	
TOTAL COSTS PER ACRE ^{1/}	129.78	133.97	138.14	142.38	146.51	
TOTAL COSTS PER TON ^{1/}	25.95	22.33	19.73	17.80	16.27	

^{1/} Includes non-cash cost of operator's labor and interest on investment in the land, buildings, equipment and alfalfa stand.

TABLE 5. OPERATOR'S LABOR & MANAGEMENT RETURN
PER ACRE AT SELECTED YIELDS & PRICES

Price Per Ton	Yield, Tons Per Acre					Your Estimate
	5	6	7	8	9	
\$ 18.00	\$-29.98	\$-15.92	\$-1.86	\$12.14	\$26.26	\$
19.00	-24.98	-9.92	5.14	20.14	35.26	
20.00	-19.98	-3.92	12.14	28.14	44.26	
21.00	-14.98	2.08	19.14	36.14	53.26	
22.00	-9.98	8.08	26.14	44.14	62.26	
23.00	-4.98	14.08	33.14	52.14	71.26	
24.00	.02	20.08	40.14	60.14	80.26	
25.00	5.02	26.08	47.14	68.14	89.26	
26.00	10.02	32.08	54.14	76.14	98.26	
27.00	15.02	38.08	61.14	84.14	107.26	