



Eastern Idaho: Lower Rainfall Dryland

Feed Barley

Ben Eborn and Terrell Sorensen

Background and Assumptions

The University of Idaho's costs and returns estimates are based on economic costs, not accounting costs. All resources are valued at a market rate or "opportunity cost". Input prices are taken from the U of I's annual survey of agricultural supply companies. The selling price is a historical average, not a current year's price. The cost estimate shown here is representative of growing dryland spring barley in lower rainfall areas of eastern Idaho, typically less than 15 inches annually. Production practices are based on data from farmers, crop consultants, and extension personnel in eastern Idaho. Production practices most closely represent those in Bannock, Oneida, and Power counties. Although production practices may be similar for individual farms, each farm has a unique set of resources with different levels of productivity, different production problems, and therefore different costs. Farm size, crop rotation, age and type of equipment, and the quality and intensity of management are all crucial factors that influence production costs.

The Model Farm

The model farm for this costs and returns estimate is a 4,000-acre dryland farm following a traditional winter wheat-summer fallow rotation, or a winter wheat-spring grain fallow rotation. The rotation can vary by field and moisture availability. On average, 2,200 acres are planted. The assumed acreage for the enterprise budgets includes 1,800 acres planted to winter wheat 400 acres planted to spring feed barley, and 1,800 acres left in summer fallow. An oil seed crop may substitute for the spring barley.

Production Practices

The field is sprayed with glyphosate in the fall several weeks after harvest to kill weeds and volunteer grain. The field is chisel plowed in late fall. The field is worked with a field cultivator prior

to planting in May. All fertilizer is applied at planting using an air-seeder drill.

A two-way tank mix herbicide to control broadleaf weeds and wild oats is ground applied in late May or early June. No post-planting insecticides or fungicides are included because treatment is infrequent and unpredictable. Barley is harvested by the farm operator in August and hauled to an elevator and sold. No storage costs are included.

Machinery

Equipment used to produce dryland spring grain is shown in Tables 4 and 5. Table 4 lists the equipment and their hourly operating and ownership costs, while Table 5 lists the equipment and their annual ownership costs. Machinery ownership cost (capital recovery) is based on 75% of the replacement cost of a new piece of equipment, except for trucks. Field truck prices are for a used vehicle with a new bed. Capital recovery combines depreciation and interest into a single value. To keep machinery prices current between years in which a comprehensive survey is conducted, machinery prices are adjusted using USDA's Farm Machinery Prices Paid Index. Equipment prices are collected approximately every five years.

The University of Idaho uses the budget generator program *Budget Planner* from the University of California-Davis to produce the various tables shown in this publication. Machinery operating and ownership costs are calculated based on engineering equations in this program. Machinery operating costs include fuel, lubricants and repairs.

Labor and Management

The cost of labor used in this study includes a base wage, plus a percentage to account for various payroll taxes (FICA, SUTA & FUTA), and workman's compensation, as well as benefits such as paid

vacation/personal leave days, health insurance and bonuses. Labor is classified by the type of work performed. Labor classifications, labor rates and payroll overhead are shown below.

Labor Values

Labor Class	Base Rate	Payroll Overhead	Effective Rate
General Farm Labor	\$9.85	15%	\$11.35
Truck Drivers	\$13.35	15%	\$15.35
Equipment Operators	\$15.75	25%	\$19.70

Based on the speed, width and overall field efficiency, *Budget Planner* calculates equipment operator labor hours for all field operations except those performed on a custom basis. Custom operations are listed separately. General farm labor accounts for extra field labor used during planting or harvest. A management fee based on approximately 5% of the total production costs is included. Prior to 2013, the basis of the 5% charge was expected revenue.

Capital, Land and Overhead Costs

Interest on operating capital is charged from the time an input is applied until harvest and is calculated at a nominal rate of 6.25 percent. Interest on intermediate term capital, primarily equipment, is calculated using a nominal rate of 6.0% percent. A general overhead charge, calculated at approximately 2.5 percent of operating expenses, is included to cover unallocated whole-farm costs such as office expenses, legal and accounting fees, cell phones, internet service and utilities. Irrigation power is not included as part of general farm utilities.

Land rent is based on a one-year cash lease for grain.

Budget Format

In addition to the Background and Assumption pages, this publication has six tables presenting a variety of cost and returns information.

Table 1 shows both expected revenue, based on a specified yield and price, and expenses. Expenses are broken into two main categories: operating and ownership. Operating expenses are those that typically vary with the level of production and involve inputs that are used in a single production cycle. Ownership expenses include a systematic cost recovery over the useful life for inputs used in the production process that have a useful life of more than one year. Machinery and land fall into this category. Operating inputs are organized by category. In addition to the cost per unit and cost per acre for each input, a total cost is given for each category. Table 1 also gives a total of all operating, ownership and total costs per acre, as well as these same categories on a yield basis (per bushel, cwt, ton, etc.).

Table 2 has most of the same cost information presented in Table 1 but the data is organized by operation for both pre-harvest and harvest costs. Operations can define a single activity, such as seed hauling, or multiple activities as in the case of tillage. The quantity of labor is shown for each operation. The cash costs per acre for labor, machinery costs, materials and custom are also specified. Cash overhead expenses are listed separately as are the non-cash overhead.

Table 3 is a monthly cash flow of expenses based on when the operation occurs and when inputs are applied. Field operations are classified as pre-harvest, harvest and post-harvest.

Table 4 lists the equipment used to produce this crop and the costs per hour to operate this equipment. Total annual hours of use for the current crop and for all crops on the farm is also shown.

Table 5 lists the purchase price and salvage value of equipment used to produce this crop, as well annual capital recovery and cash overhead expenses.

Table 6 provides a ranging analysis, sometime referred to as a sensitivity analysis. It shows how the costs and returns per acre will vary as the yield

and/or price ranges above and below the base values from Table 1.

Authors

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Disclaimer

The practices and chemicals specified in the publication are not recommendations. Always read and follow the directions printed on the pesticide label. Due to constantly changing pesticide laws and labels, some pesticides may have been cancelled or had certain uses prohibited. The use of trade names for various products simplifies presentation of this material and should not be considered an endorsement, nor is any criticism implied of similar products not mentioned.

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TABLE 1. COSTS AND RETURNS PER ACRE TO PRODUCE SPRING FEED BARLEY

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Feed Barley	35.00	bu	3.00	105.00	
TOTAL GROSS RETURNS	35.00	bu		105.00	
OPERATING COSTS					
Seed:				13.20	
Feed Barley Seed - Spring	60.00	lb	0.22	13.20	
Fertilizer:				22.00	
Dry Nitrogen - Pre-plant	40.00	lb	0.40	16.00	
Dry P2O5	10.00	lb	0.38	3.80	
Sulfur	10.00	lb	0.22	2.20	
Pesticides/Chemicals:				9.03	
Roundup Power Max 4.5	16.00	fl oz	0.18	2.88	
Ammonium Sulfate	3.00	lb	0.70	2.10	
2,4-D Amine (4 lb)	1.00	pt	2.10	2.10	
Banvel 4L	3.00	fl oz	0.65	1.95	
Custom:				5.25	
Custom Haul: barley	35.00	bu	0.15	5.25	
Other:				5.00	
Crop Insurance	1.00	acre	5.00	5.00	
Labor				19.45	
Equipment Operator Labor	0.83	hrs	19.70	16.30	
General Farm Labor	0.28	hrs	11.35	3.15	
Machinery				28.65	
Fuel-Gas	0.78	gal	2.40	1.86	
Fuel-Diesel	5.50	gal	2.15	11.83	
Fuel-Road Diesel	0.19	gal	2.70	0.52	
Lube				2.13	
Machinery Repair				12.31	
Interest on Operating Capital @ 6.25%				2.66	
TOTAL OPERATING COSTS/ACRE				105.25	
TOTAL OPERATING COSTS/BU				3.01	
NET RETURNS ABOVE OPERATING COSTS				-0.25	

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TABLE 1. CONTINUED

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
General Overhead				3.00	
Land Rent				35.00	
Management Fee				10.00	
Property Taxes				0.00	
Property Insurance				1.42	
Investment Repairs				0.00	
TOTAL CASH OVERHEAD COSTS/ACRE				49.42	
TOTAL CASH OVERHEAD COSTS/BU				1.41	
TOTAL CASH COSTS/ACRE				154.67	
TOTAL CASH COSTS/BU				4.42	
NET RETURNS ABOVE CASH COSTS				-49.67	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Equipment				50.02	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				50.02	
TOTAL NON-CASH OVERHEAD COSTS/BU				1.43	
TOTAL COST/ACRE				204.68	
TOTAL COST/BU				5.85	
NET RETURNS ABOVE TOTAL COST				-99.68	

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TABLE 2. COSTS PER ACRE TO PRODUCE SPRING FEED BARLEY

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
Preharvest:								
Ground Spray	0.07	2.58	1.44	0.98	9.03	0.00	14.03	
Plow	0.09	3.01	3.70	1.90	0.00	0.00	8.62	
Crop Insurance	0.00	0.00	0.00	0.00	5.00	0.00	5.00	
Field Cultivation	0.04	1.54	1.71	1.05	0.00	0.00	4.30	
Seed Hauling	0.01	0.24	0.09	0.09	0.00	0.00	0.41	
Plant	0.06	2.28	2.14	4.60	35.20	0.00	44.23	
Pickup Use	0.23	5.52	1.86	0.76	0.00	0.00	8.14	
Service Truck Use	0.06	1.50	0.43	0.18	0.00	0.00	2.11	
TOTAL PREHARVEST COSTS	0.57	16.67	11.38	9.56	49.23	0.00	86.83	
Harvest:								
Harvest	0.12	2.79	2.83	4.88	0.00	5.25	15.75	
TOTAL HARVEST COSTS	0.12	2.79	2.83	4.88	0.00	5.25	15.75	
Interest on Operating Capital at 6.25%							2.66	
TOTAL OPERATING COSTS/ACRE	0.69	19.45	14.21	14.44	49.23	5.25	105.25	

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TABLE 2. CONTINUED

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube &Repairs	Material Cost	Custom/ Rent		
CASH OVERHEAD:								
General Overhead							3.00	
Land Rent							35.00	
Management Fee							10.00	
Property Taxes							0.00	
Property Insurance							1.42	
Investment Repairs							0.00	
TOTAL CASH OVERHEAD COSTS/ACRE							49.42	
TOTAL CASH COSTS/ACRE							154.67	
NON-CASH OVERHEAD:								
		Per Producing Acre		Annual Cost Capital Recovery				
Equipment		497.42		50.02			50.02	
TOTAL NON-CASH OVERHEAD COSTS							50.02	
TOTAL COSTS/ACRE							204.68	

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TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE SPRING FEED BARLEY

	SEP 14	OCT 14	NOV 14	DEC 14	JAN 15	FEB 15	MAR 15	APR 15	MAY 15	JUN 15	JUL 15	AUG 15	Total
Preharvest:													
Ground Spray	7.48									6.55			14.03
Plow		8.62											8.62
Crop Insurance								5.00					5.00
Field Cultivation								4.30					4.30
Seed Hauling									0.41				0.41
Plant									44.23				44.23
Pickup Use	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	8.14
Service Truck Use	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	2.11
TOTAL PREHARVEST COSTS	8.33	9.47	0.85	0.85	0.85	0.85	0.85	10.16	45.49	7.40	0.85	0.85	86.83
Harvest:													
Harvest												15.75	15.75
TOTAL HARVEST COSTS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.75	15.75
Interest on Operating Capital @6.25%	0.04	0.09	0.10	0.10	0.11	0.11	0.11	0.17	0.40	0.44	0.45	0.53	2.66
TOTAL OPERATING COSTS/ACRE	8.38	9.56	0.95	0.96	0.96	0.96	0.97	10.33	45.90	7.85	1.30	17.14	105.25
CASH OVERHEAD													
General Overhead	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	3.00
Land Rent							35.00						35.00
Management Fee	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	10.00
Property Taxes													0.00
Property Insurance								1.42					1.42
Investment Repairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OVERHEAD COSTS	1.08	1.08	1.08	1.08	1.08	1.08	36.08	2.50	1.08	1.08	1.08	1.08	49.42
TOTAL CASH COSTS/ACRE	9.46	10.65	2.03	2.04	2.04	2.05	37.05	12.83	46.98	8.93	2.39	18.22	154.67

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TABLE 4. HOURLY EQUIPMENT COSTS

Yr	Description	Spring Feed Barley	Total	Cash Overhead			Operating		Total Oper.	Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insur- ance	Taxes	Lube& Repairs	Fuel		
15	Sprayer - 50' 1,000 gallon Tank	29	150	16.16	0.39	0.00	8.82	0.00	8.82	25.37
15	Truck 10-Wheeler	4	75	69.31	2.40	0.00	8.66	8.99	17.65	89.36
15	Service Truck	25	80	39.29	1.24	0.00	2.86	6.75	9.61	50.14
15	Chisel Plow - 27'	36	150	27.99	0.72	0.00	12.61	0.00	12.61	41.31
15	F. Cultivator -36'	17	100	44.77	1.37	0.00	16.78	0.00	16.78	62.92
15	Tractor 300 HP WT - Used	58	250	60.26	2.03	0.00	7.80	37.43	45.24	107.53
15	Tractor 145 HP - Used	32	200	28.25	0.95	0.00	4.25	18.09	22.34	51.54
15	Tractor 255 HP Rubber Track	27	225	76.68	2.71	0.00	7.68	31.82	39.50	118.89
15	Air Seeder Grain Drill 35'	24	150	121.22	2.91	0.00	66.69	0.00	66.69	190.83
15	SP Combine: 25'	52	300	115.60	2.83	0.00	37.61	21.84	59.44	177.87
15	Pickup 1 - 3/4 ton	53	800	8.47	0.16	0.00	3.28	7.99	11.27	19.90
15	Pickup 2 - 3/4ton	40	220	16.22	0.48	0.00	3.23	7.99	11.22	27.92

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TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
15	Sprayer - 50' 1,000 gallon Tank	22,000.00	10	3,890.51	2,693.93	64.73	0.00	2,758.66
15	Truck 10-Wheeler	75,000.00	25	5,000.00	5,775.87	200.00	0.00	5,975.87
15	Service Truck	41,000.00	20	3,000.00	3,493.01	110.00	0.00	3,603.01
15	Chisel Plow - 27'	42,000.00	12	5,817.28	4,664.80	119.54	0.00	4,784.35
15	F. Cultivator -36'	58,000.00	20	3,023.04	4,974.52	152.56	0.00	5,127.08
15	Tractor 300 HP WT - Used	200,000.00	20	25,662.30	16,739.29	564.16	0.00	17,303.45
15	Tractor 145 HP - Used	75,000.00	20	9,623.36	6,277.23	211.56	0.00	6,488.79
15	Tractor 255 HP Rubber Track	250,000.00	25	21,141.94	19,171.33	677.85	0.00	19,849.19
15	Air Seeder Grain Drill 35'	165,000.00	10	29,178.83	20,204.47	485.45	0.00	20,689.92
15	SP Combine: 25'	317,000.00	10	59,795.97	38,533.54	941.99	0.00	39,475.53
15	Pickup 1 - 3/4 ton	42,000.00	5	13,750.00	7,531.45	139.38	0.00	7,670.82
15	Pickup 2 - 3/4ton	41,000.00	15	6,000.00	3,963.70	117.50	0.00	4,081.20
TOTAL		1,328,000.00	-	185,883.23	134,023.17	3,784.71	0.00	137,807.87
90% of New Cost*		1,195,200.00	-	167,294.91	120,620.85	3,406.24	0.00	124,027.09

*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								
TOTAL INVESTMENT	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
General Overhead	400	acre	3.00	1,200.00
Land Rent	400	acre	35.00	14,000.00
Management Fee	400	acre	10.00	4,000.00

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TABLE 6. RANGING ANALYSIS - SPRING FEED BARLEY

COSTS PER ACRE AND PER BU AT VARYING YIELDS TO PRODUCE SPRING FEED BARLEY

	YIELD(BU)						
	29.00	31.00	33.00	35.00	37.00	39.00	41.00
OPERATING COSTS/ACRE:							
Preharvest	86.83	86.83	86.83	86.83	86.83	86.83	86.83
Harvest	15.75	15.75	15.75	15.75	15.75	15.75	15.75
Interest on Operating Capital @ 6.25%	2.66	2.66	2.66	2.66	2.66	2.66	2.66
TOTAL OPERATING COSTS/ACRE	105.25	105.25	105.25	105.25	105.25	105.25	105.25
TOTAL OPERATING COSTS/BU	3.63	3.40	3.19	3.01	2.84	2.70	2.57
CASH OVERHEAD COSTS/ACRE	49.42	49.42	49.42	49.42	49.42	49.42	49.42
TOTAL CASH COSTS/ACRE	154.67	154.67	154.67	154.67	154.67	154.67	154.67
TOTAL CASH COSTS/BU	5.33	4.99	4.69	4.42	4.18	3.97	3.77
NON-CASH OVERHEAD COSTS/ACRE	50.02	50.02	50.02	50.02	50.02	50.02	50.02
TOTAL COSTS/ACRE	204.68	204.68	204.68	204.68	204.68	204.68	204.68
TOTAL COSTS/BU	7.06	6.60	6.20	5.85	5.53	5.25	4.99

Net Return Per Acre Above Operating Costs For Spring Feed Barley

PRICE (\$/bu)	YIELD (bu/acre)						
Feed Barley	29.00	31.00	33.00	35.00	37.00	39.00	41.00
2.25	-40.00	-35.50	-31.00	-26.50	-22.00	-17.50	-13.00
2.50	-32.75	-27.75	-22.75	-17.75	-12.75	-7.75	-2.75
2.75	-25.50	-20.00	-14.50	-9.00	-3.50	2.00	7.50
3.00	-18.25	-12.25	-6.25	-0.25	5.75	11.75	17.75
3.25	-11.00	-4.50	2.00	8.50	15.00	21.50	28.00
3.50	-3.75	3.25	10.25	17.25	24.25	31.25	38.25
3.75	3.50	11.00	18.50	26.00	33.50	41.00	48.50

Net Return Per Acre Above Cash Costs For Spring Feed Barley

PRICE (\$/bu)	YIELD (bu/acre)						
Feed Barley	29.00	31.00	33.00	35.00	37.00	39.00	41.00
2.25	-89.42	-84.92	-80.42	-75.92	-71.42	-66.92	-62.42
2.50	-82.17	-77.17	-72.17	-67.17	-62.17	-57.17	-52.17
2.75	-74.92	-69.42	-63.92	-58.42	-52.92	-47.42	-41.92
3.00	-67.67	-61.67	-55.67	-49.67	-43.67	-37.67	-31.67
3.25	-60.42	-53.92	-47.42	-40.92	-34.42	-27.92	-21.42
3.50	-53.17	-46.17	-39.17	-32.17	-25.17	-18.17	-11.17
3.75	-45.92	-38.42	-30.92	-23.42	-15.92	-8.42	-0.92

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TABLE 6. RANGING ANALYSIS CONTINUED

Net Return Per Acre Above Total Costs For Spring Feed Barley

PRICE (\$/bu)	YIELD (bu/acre)						
Feed Barley	29.00	31.00	33.00	35.00	37.00	39.00	41.00
2.25	-139.43	-134.93	-130.43	-125.93	-121.43	-116.93	-112.43
2.50	-132.18	-127.18	-122.18	-117.18	-112.18	-107.18	-102.18
2.75	-124.93	-119.43	-113.93	-108.43	-102.93	-97.43	-91.93
3.00	-117.68	-111.68	-105.68	-99.68	-93.68	-87.68	-81.68
3.25	-110.43	-103.93	-97.43	-90.93	-84.43	-77.93	-71.43
3.50	-103.18	-96.18	-89.18	-82.18	-75.18	-68.18	-61.18
3.75	-95.93	-88.43	-80.93	-73.43	-65.93	-58.43	-50.93