



Eastern Idaho: Higher Rainfall Dryland

Malting Barley

Ben Eborn, Jon Hogge and Steve Harrison

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 the higher rainfall areas of eastern Idaho, typically greater 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 Caribou, Fremont, Madison, and Bonneville 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 2,500-acre dryland farm following a typical continuous cropping rotation that includes spring barley and spring wheat. The rotation can vary by field and moisture availability. The assumed acreage for the enterprise budgets includes 1,000 acres planted to spring wheat and 1,500 acres planted to spring malting barley.

Production Practices

The field is disked in the fall just after the previous grain crop is harvested. The ground is also sprayed with glyphosate in the fall to control weeds and volunteer grain. Most fertilizer is custom applied in the spring and incorporated with a field cultivator prior to planting. In April wheat is planted and a starter fertilizer is applied 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. Storage costs are not included.

Machinery

Equipment used to produce 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 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 as 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.

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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 MALTING BARLEY

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Malting Barley	55.00	bu	4.50	247.50	
TOTAL GROSS RETURNS	55.00	bu		247.50	
OPERATING COSTS					
Seed:				15.00	
Malting Barley Seed - Spring	60.00	lb	0.25	15.00	
Fertilizer:				33.10	
Dry Nitrogen - Pre-plant	50.00	lb	0.40	20.00	
Sulfur	10.00	lb	0.22	2.20	
Liquid Nitrogen	5.00	lb	0.50	2.50	
Liquid P2O5	15.00	lb	0.56	8.40	
Pesticides/Chemicals:				28.10	
Roundup Power Max 4.5	16.00	fl oz	0.18	2.88	
Ammonium Sulfate	3.00	lb	0.70	2.10	
Bronate Advanced	1.20	pint	5.60	6.72	
Axial XL	16.40	fl oz	1.00	16.40	
Custom:				15.50	
Custom Fertilize: 0 - 400 lbs	1.00	acre	7.25	7.25	
Custom Haul: barley	55.00	bu	0.15	8.25	
Other:				12.00	
Crop Insurance	1.00	acre	12.00	12.00	
Labor				19.03	
Equipment Operator Labor	0.80	hrs	19.70	15.79	
General Farm Labor	0.28	hrs	11.35	3.23	
Machinery				25.54	
Fuel-Gas	0.83	gal	2.40	2.00	
Fuel-Diesel	4.39	gal	2.15	9.44	
Fuel-Road Diesel	0.18	gal	2.70	0.49	
Lube				1.79	
Machinery Repair				11.82	
Interest on Operating Capital @ 6.25%				4.58	
TOTAL OPERATING COSTS/ACRE				152.85	
TOTAL OPERATING COSTS/BU				2.78	
NET RETURNS ABOVE OPERATING COSTS				94.65	

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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				5.00	
Land Rent				70.00	
Management Fee				17.00	
Property Taxes				0.00	
Property Insurance				1.30	
Investment Repairs				0.00	
TOTAL CASH OVERHEAD COSTS/ACRE				93.30	
TOTAL CASH OVERHEAD COSTS/BU				1.70	
TOTAL CASH COSTS/ACRE				246.15	
TOTAL CASH COSTS/BU				4.48	
NET RETURNS ABOVE CASH COSTS				1.35	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Equipment				46.68	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				46.68	
TOTAL NON-CASH OVERHEAD COSTS/BU				0.85	
TOTAL COST/ACRE				292.83	
TOTAL COST/BU				5.32	
NET RETURNS ABOVE TOTAL COST				-45.83	

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TABLE 2. COSTS PER ACRE TO PRODUCE MALTING 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:								
Tillage	0.12	4.16	4.07	2.61	0.00	0.00	10.83	
Ground Spray	0.04	1.35	0.61	0.47	4.98	0.00	7.42	
Crop Insurance	0.00	0.00	0.00	0.00	12.00	0.00	12.00	
Apply Fertilizer	0.00	0.00	0.00	0.00	22.20	7.25	29.45	
Seed Hauling	0.01	0.24	0.09	0.09	0.00	0.00	0.41	
Plant	0.06	2.28	1.82	4.53	25.90	0.00	34.54	
Applying Herbicides	0.04	1.35	0.61	0.47	23.12	0.00	25.56	
Pickup Use	0.25	5.91	2.00	0.82	0.00	0.00	8.73	
Service Truck Use	0.06	1.42	0.41	0.17	0.00	0.00	1.99	
TOTAL PREHARVEST COSTS	0.57	16.70	9.61	9.16	88.20	7.25	130.93	
Harvest:								
Harvest	0.10	2.32	2.32	4.44	0.00	8.25	17.34	
TOTAL HARVEST COSTS	0.10	2.32	2.32	4.44	0.00	8.25	17.34	
Interest on Operating Capital at 6.25%							4.58	
TOTAL OPERATING COSTS/ACRE	0.67	19.03	11.93	13.61	88.20	15.50	152.85	

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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							5.00	
Land Rent							70.00	
Management Fee							17.00	
Property Taxes							0.00	
Property Insurance							1.30	
Investment Repairs							0.00	
TOTAL CASH OVERHEAD COSTS/ACRE							93.30	
TOTAL CASH COSTS/ACRE							246.15	
NON-CASH OVERHEAD:								
		Per Producing Acre		Annual Cost Capital Recovery				
Equipment		453.41		46.68			46.68	
TOTAL NON-CASH OVERHEAD COSTS							46.68	
TOTAL COSTS/ACRE							292.83	

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TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE MALTING 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	SEP 15	Total
Preharvest:														
Tillage	6.77							4.05						10.83
Ground Spray		7.42												7.42
Crop Insurance								12.00						12.00
Apply Fertilizer								29.45						29.45
Seed Hauling								0.41						0.41
Plant								34.54						34.54
Applying Herbicides									25.56					25.56
Pickup Use	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	8.73
Service Truck Use	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	1.99
TOTAL PREHARVEST COSTS	7.60	8.24	0.82	0.82	0.82	0.82	0.82	81.28	26.38	0.82	0.82	0.82	0.82	130.93
Harvest:														
Harvest													17.34	17.34
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	0.00	17.34	17.34
Interest on Operating Capital @6.25%	0.04	0.08	0.09	0.09	0.10	0.10	0.10	0.53	0.66	0.67	0.67	0.68	0.77	4.58
TOTAL OPERATING COSTS/ACRE	7.64	8.33	0.91	0.92	0.92	0.92	0.93	81.80	27.05	1.49	1.50	1.50	18.94	152.85
CASH OVERHEAD														
General Overhead	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	5.00
Land Rent							70.00							70.00
Management Fee	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	17.00
Property Taxes														0.00
Property Insurance								1.30						1.30
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	0.00
TOTAL CASH OVERHEAD COSTS	1.69	1.69	1.69	1.69	1.69	1.69	71.69	2.99	1.69	1.69	1.69	1.69	1.69	93.30
TOTAL CASH COSTS/ACRE	9.33	10.02	2.60	2.61	2.61	2.62	72.62	84.80	28.74	3.19	3.19	3.19	20.63	246.15

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TABLE 4. HOURLY EQUIPMENT COSTS

Yr	Description	Malting Barley	Total	Cash Overhead			Operating		Total Oper.	Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insur- ance	Taxes	Lube& Repairs	Fuel		
15	Tandem Disk - 26'	112	200	27.17	0.65	0.00	12.00	0.00	12.00	39.82
15	Sprayer - 50' 1,000 gallon Tank	109	185	14.79	0.33	0.00	8.86	0.00	8.86	23.98
15	F. Cultivator -36'	62	125	41.27	1.14	0.00	16.79	0.00	16.79	59.21
15	Truck 10-Wheeler	15	75	69.31	2.40	0.00	8.66	8.99	17.65	89.36
15	Tractor 300 HP WT	192	300	60.26	2.03	0.00	7.92	31.82	39.74	102.04
15	Tractor 145 HP - Used	120	200	28.25	0.95	0.00	3.84	15.39	19.23	48.43
15	Air Seeder Grain Drill 35'	92	165	116.67	2.70	0.00	66.71	0.00	66.71	186.09
15	Tractor 255 HP Rubber Track	101	200	86.27	3.05	0.00	6.64	27.05	33.69	123.01
15	Pickup 1 - 3/4 ton	225	800	8.47	0.16	0.00	3.28	7.99	11.27	19.90
15	Pickup 2 - 3/4 ton	150	800	8.47	0.16	0.00	3.28	7.99	11.27	19.90
15	Service Truck	90	90	34.93	1.10	0.00	2.65	6.75	9.40	45.43
15	SP Combine: 30' Dryland	162	300	127.63	3.12	0.00	41.13	21.50	62.63	193.38

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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	Tandem Disk - 26'	49,300.00	10	8,718.28	6,036.85	145.05	0.00	6,181.90
15	Sprayer - 50' 1,000 gallon Tank	22,000.00	8	4,967.30	3,040.92	67.42	0.00	3,108.33
15	F. Cultivator -36'	58,000.00	15	5,568.37	5,732.61	158.92	0.00	5,891.53
15	Truck 10-Wheeler	75,000.00	25	5,000.00	5,775.87	200.00	0.00	5,975.87
15	Tractor 300 HP WT	240,000.00	20	30,794.76	20,087.15	676.99	0.00	20,764.14
15	Tractor 145 HP - Used	75,000.00	20	9,623.36	6,277.23	211.56	0.00	6,488.79
15	Air Seeder Grain Drill 35'	165,000.00	9	32,970.43	21,389.51	494.93	0.00	21,884.43
15	Tractor 255 HP Rubber Track	250,000.00	25	21,141.94	19,171.33	677.85	0.00	19,849.19
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 - 3/4 ton	42,000.00	5	13,750.00	7,531.45	139.38	0.00	7,670.82
15	Service Truck	41,000.00	20	3,000.00	3,493.01	110.00	0.00	3,603.01
15	SP Combine: 30' Dryland	350,000.00	10	66,020.78	42,544.92	1,040.05	0.00	43,584.98
TOTAL		1,409,300.00	-	215,305.23	148,612.30	4,061.51	0.00	152,673.82
90% of New Cost*		1,268,370.00	-	193,774.70	133,751.07	3,655.36	0.00	137,406.44

*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	1500	acre	5.00	7,500.00
Land Rent	1500	acre	70.00	105,000.00
Management Fee	1500	acre	17.00	25,500.00

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TABLE 6. RANGING ANALYSIS - MALTING BARLEY
COSTS PER ACRE AND PER BU AT VARYING YIELDS TO PRODUCE MALTING BARLEY

	YIELD(BU)						
	49.00	51.00	53.00	55.00	57.00	59.00	61.00
OPERATING COSTS/ACRE:							
Preharvest	130.93	130.93	130.93	130.93	130.93	130.93	130.93
Harvest	17.34	17.34	17.34	17.34	17.34	17.34	17.34
Interest on Operating Capital @ 6.25%	4.58	4.58	4.58	4.58	4.58	4.58	4.58
TOTAL OPERATING COSTS/ACRE	152.85	152.85	152.85	152.85	152.85	152.85	152.85
TOTAL OPERATING COSTS/BU	3.12	3.00	2.88	2.78	2.68	2.59	2.51
CASH OVERHEAD COSTS/ACRE	93.30	93.30	93.30	93.30	93.30	93.30	93.30
TOTAL CASH COSTS/ACRE	246.15	246.15	246.15	246.15	246.15	246.15	246.15
TOTAL CASH COSTS/BU	5.02	4.83	4.64	4.48	4.32	4.17	4.04
NON-CASH OVERHEAD COSTS/ACRE	46.68	46.68	46.68	46.68	46.68	46.68	46.68
TOTAL COSTS/ACRE	292.83	292.83	292.83	292.83	292.83	292.83	292.83
TOTAL COSTS/BU	5.98	5.74	5.53	5.32	5.14	4.96	4.80

Net Return Per Acre Above Operating Costs For Malting Barley

PRICE (\$/bu)	YIELD (bu/acre)						
Malting Barley	49.00	51.00	53.00	55.00	57.00	59.00	61.00
3.75	30.90	38.40	45.90	53.40	60.90	68.40	75.90
4.00	43.15	51.15	59.15	67.15	75.15	83.15	91.15
4.25	55.40	63.90	72.40	80.90	89.40	97.90	106.40
4.50	67.65	76.65	85.65	94.65	103.65	112.65	121.65
4.75	79.90	89.40	98.90	108.40	117.90	127.40	136.90
5.00	92.15	102.15	112.15	122.15	132.15	142.15	152.15
5.25	104.40	114.90	125.40	135.90	146.40	156.90	167.40

Net Return Per Acre Above Cash Costs For Malting Barley

PRICE (\$/bu)	YIELD (bu/acre)						
Malting Barley	49.00	51.00	53.00	55.00	57.00	59.00	61.00
3.75	-62.40	-54.90	-47.40	-39.90	-32.40	-24.90	-17.40
4.00	-50.15	-42.15	-34.15	-26.15	-18.15	-10.15	-2.15
4.25	-37.90	-29.40	-20.90	-12.40	-3.90	4.60	13.10
4.50	-25.65	-16.65	-7.65	1.35	10.35	19.35	28.35
4.75	-13.40	-3.90	5.60	15.10	24.60	34.10	43.60
5.00	-1.15	8.85	18.85	28.85	38.85	48.85	58.85
5.25	11.10	21.60	32.10	42.60	53.10	63.60	74.10

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TABLE 6. RANGING ANALYSIS CONTINUED

Net Return Per Acre Above Total Costs For Malting Barley

PRICE (\$/bu)	YIELD (bu/acre)						
Malting Barley	49.00	51.00	53.00	55.00	57.00	59.00	61.00
3.75	-109.08	-101.58	-94.08	-86.58	-79.08	-71.58	-64.08
4.00	-96.83	-88.83	-80.83	-72.83	-64.83	-56.83	-48.83
4.25	-84.58	-76.08	-67.58	-59.08	-50.58	-42.08	-33.58
4.50	-72.33	-63.33	-54.33	-45.33	-36.33	-27.33	-18.33
4.75	-60.08	-50.58	-41.08	-31.58	-22.08	-12.58	-3.08
5.00	-47.83	-37.83	-27.83	-17.83	-7.83	2.17	12.17
5.25	-35.58	-25.08	-14.58	-4.08	6.42	16.92	27.42