

Eastern Idaho: Lower Rainfall Dryland Hard Red Winter Wheat: After Summer Fallow

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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 winter wheat 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 grain, and 1,800 acres left in summer fallow. An oil seed crop may substitute for the spring grain.

Production Practices

The field is chisel plowed in the fall after the previous crop is harvested. In the spring of the fallow year, the ground is sprayed with glyphosate to control weeds and volunteer grain. A field

cultivator is used in September to prepare the field for planting. Wheat is planted and fertilizer is applied in a single field operation in September using an air seeder drill. Additional fertilizer is applied by a custom ground applicator the following spring.

Herbicide to control broadleaf weeds is ground applied in May. No wild oat herbicide is applied and no post planting insecticides or fungicides are included because treatment is infrequent and unpredictable. Wheat 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 winter wheat 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.

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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 HARD RED WINTER WHEAT

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Hard Red Winter Wheat	36.00	bu	4.00	144.00	
TOTAL GROSS RETURNS	36.00	bu		144.00	
OPERATING COSTS					
Seed:				12.10	
Wheat Seed: HRW	55.00	lb	0.22	12.10	
Fertilizer:				30.90	
Dry Nitrogen - Pre-plant	20.00	lb	0.40	8.00	
Dry P2O5	15.00	lb	0.38	5.70	
Sulfur	10.00	lb	0.22	2.20	
Liquid Nitrogen	30.00	lb	0.50	15.00	
Pesticides/Chemicals:				13.23	
Roundup Power Max 4.5	16.00	fl oz	0.18	2.88	
Ammonium Sulfate	3.00	lb	0.70	2.10	
Huskie	11.00	fl oz	0.75	8.25	
Custom:				13.73	
Custom Fertilize: 0 - 400 lbs	1.00	acre	7.25	7.25	
Custom Haul: wheat	36.00	bu	0.18	6.48	
Other:				5.00	
Crop Insurance	1.00	acre	5.00	5.00	
Labor				19.11	
Equipment Operator Labor	0.80	hrs	19.70	15.84	
General Farm Labor	0.29	hrs	11.35	3.27	
Machinery				27.71	
Fuel-Gas	0.78	gal	2.40	1.86	
Fuel-Diesel	5.26	gal	2.15	11.32	
Fuel-Road Diesel	0.19	gal	2.70	0.52	
Lube				2.05	
Machinery Repair				11.95	
Interest on Operating Capital @ 6.25%				5.81	
TOTAL OPERATING COSTS/ACRE				127.59	
TOTAL OPERATING COSTS/BU				3.54	
NET RETURNS ABOVE OPERATING COSTS				16.41	

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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				1.39	
Investment Repairs				0.00	
TOTAL CASH OVERHEAD COSTS/ACRE				49.39	
TOTAL CASH OVERHEAD COSTS/BU				1.37	
TOTAL CASH COSTS/ACRE				176.98	
TOTAL CASH COSTS/BU				4.92	
NET RETURNS ABOVE CASH COSTS				-32.98	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Equipment				48.82	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				48.82	
TOTAL NON-CASH OVERHEAD COSTS/BU				1.36	
TOTAL COST/ACRE				225.79	
TOTAL COST/BU				6.27	
NET RETURNS ABOVE TOTAL COST				-81.79	

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TABLE 2. COSTS PER ACRE TO PRODUCE HARD RED WINTER WHEAT

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:								
Plow	0.09	3.01	3.70	1.90	0.00	0.00	8.62	
Ground Spray	0.07	2.70	1.44	0.98	13.23	0.00	18.35	
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	28.00	0.00	37.03	
Crop Insurance	0.00	0.00	0.00	0.00	5.00	0.00	5.00	
Apply Fertilizer	0.00	0.00	0.00	0.00	15.00	7.25	22.25	
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	16.79	11.38	9.56	61.23	7.25	106.21	
Harvest:								
Harvest	0.10	2.32	2.32	4.44	0.00	6.48	15.57	
TOTAL HARVEST COSTS	0.10	2.32	2.32	4.44	0.00	6.48	15.57	
Interest on Operating Capital at 6.25%							5.81	
TOTAL OPERATING COSTS/ACRE	0.67	19.11	13.70	14.01	61.23	13.73	127.59	

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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							1.39	
Investment Repairs							0.00	
TOTAL CASH OVERHEAD COSTS/ACRE							49.39	
TOTAL CASH COSTS/ACRE							176.98	
NON-CASH OVERHEAD:								
		Per Producing Acre		Annual Cost Capital Recovery				
Equipment		487.53		48.82			48.82	
TOTAL NON-CASH OVERHEAD COSTS							48.82	
TOTAL COSTS/ACRE							225.79	

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TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE HARD RED WINTER WHEAT

	OCT 13	NOV 13	DEC 13	JAN 14	FEB 14	MAR 14	APR 14	MAY 14	JUN 14	JUL 14	AUG 14	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:																								
Plow	8.62																							8.62
Ground Spray								7.54												10.81				18.35
Field Cultivation												4.30												4.30
Seed Hauling												0.41												0.41
Plant												37.03												37.03
Crop Insurance																			5.00					5.00
Apply Fertilizer																				22.25				22.25
Pickup Use	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	8.14
Service Truck Use	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	2.11
TOTAL PREHARVEST COSTS	9.06	0.45	0.45	0.45	0.45	0.45	0.45	7.99	0.45	0.45	0.45	42.19	0.45	0.45	0.45	0.45	0.45	0.45	5.45	33.51	0.45	0.45	0.45	106.21
Harvest:																								
Harvest																								15.57
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.57	15.57
Interest on Operating Capital @6.25%	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.10	0.11	0.11	0.11	0.33	0.33	0.33	0.34	0.34	0.34	0.34	0.37	0.55	0.55	0.55	0.63	5.81
TOTAL OPERATING COSTS/ACRE	9.11	0.50	0.50	0.50	0.50	0.50	0.51	8.09	0.55	0.55	0.56	42.52	0.78	0.78	0.78	0.78	0.79	0.79	5.82	34.05	0.99	1.00	16.65	127.59
CASH OVERHEAD																								
General Overhead	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	3.00
Land Rent																				35.00				35.00
Management Fee	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	10.00
Property Taxes																								0.00
Property Insurance							1.39												1.39					1.39
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL CASH OVERHEAD COSTS	0.57	0.57	0.57	0.57	0.57	0.57	1.95	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	35.57	1.95	0.57	0.57	0.57	0.57	49.39
TOTAL CASH COSTS/ACRE	9.68	1.06	1.06	1.06	1.07	1.07	2.46	8.66	1.12	1.12	1.12	43.08	1.34	1.34	1.35	1.35	1.35	36.35	7.77	34.62	1.56	1.56	17.21	176.98

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TABLE 4. HOURLY EQUIPMENT COSTS

Yr	Description	Hard Red Winter Wheat	Total	Cash Overhead			Operating		Total Oper.	Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insurance	Taxes	Lube& Repairs	Fuel		
15	Sprayer - 50' 1,000 gallon Tank	131	150	16.16	0.39	0.00	8.82	0.00	8.82	25.37
15	Truck 10-Wheeler	18	75	69.31	2.40	0.00	8.66	8.99	17.65	89.36
15	Pickup 1 - 3/4 ton	240	800	8.47	0.16	0.00	3.28	7.99	11.27	19.90
15	Service Truck	114	114	27.58	0.87	0.00	2.31	6.75	9.06	37.50
15	Chisel Plow - 27'	162	162	25.96	0.67	0.00	11.69	0.00	11.69	38.32
15	F. Cultivator -36'	75	100	44.77	1.37	0.00	16.78	0.00	16.78	62.92
15	Tractor 300 HP WT - Used	260	260	57.94	1.95	0.00	7.72	37.43	45.15	105.04
15	Tractor 145 HP - Used	144	200	28.25	0.95	0.00	4.25	18.09	22.34	51.54
15	Tractor 255 HP Rubber Track	121	225	76.69	2.71	0.00	7.68	31.82	39.50	118.90
15	Air Seeder Grain Drill 35'	110	150	121.23	2.91	0.00	66.69	0.00	66.69	190.84
15	SP Combine: 30'	194	300	127.64	3.12	0.00	41.13	21.50	62.63	193.39
15	Pickup 2 - 3/4ton	180	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	Pickup 1 - 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	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: 30'	350,000.00	10	66,020.78	42,544.92	1,040.05	0.00	43,584.98
15	Pickup 2 - 3/4ton	41,000.00	15	6,000.00	3,963.70	117.50	0.00	4,081.20
TOTAL		1,361,000.00	-	192,108.05	138,034.54	3,882.77	0.00	141,917.31
90% of New Cost*		1,224,900.00	-	172,897.24	124,231.09	3,494.49	0.00	127,725.58

*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	1800	acre	3.00	5,400.00
Land Rent	1800	acre	35.00	63,000.00
Management Fee	1800	acre	10.00	18,000.00

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TABLE 6. RANGING ANALYSIS - HARD RED WINTER WHEAT

COSTS PER ACRE AND PER BU AT VARYING YIELDS TO PRODUCE HARD RED WINTER WHEAT

	YIELD(BU)						
	30.00	32.00	34.00	36.00	38.00	40.00	42.00
OPERATING COSTS/ACRE:							
Preharvest	106.21	106.21	106.21	106.21	106.21	106.21	106.21
Harvest	15.57	15.57	15.57	15.57	15.57	15.57	15.57
Interest on Operating Capital @ 6.25%	5.81	5.81	5.81	5.81	5.81	5.81	5.81
TOTAL OPERATING COSTS/ACRE	127.59	127.59	127.59	127.59	127.59	127.59	127.59
TOTAL OPERATING COSTS/BU	4.25	3.99	3.75	3.54	3.36	3.19	3.04
CASH OVERHEAD COSTS/ACRE	49.39	49.39	49.39	49.39	49.39	49.39	49.39
TOTAL CASH COSTS/ACRE	176.98	176.98	176.98	176.98	176.98	176.98	176.98
TOTAL CASH COSTS/BU	5.90	5.53	5.21	4.92	4.66	4.42	4.21
NON-CASH OVERHEAD COSTS/ACRE	48.82	48.82	48.82	48.82	48.82	48.82	48.82
TOTAL COSTS/ACRE	225.79	225.79	225.79	225.79	225.79	225.79	225.79
TOTAL COSTS/BU	7.53	7.06	6.64	6.27	5.94	5.64	5.38

Net Return Per Acre Above Operating Costs For Hard Red Winter Wheat

PRICE (\$/bu)	YIELD (bu/acre)						
	30.00	32.00	34.00	36.00	38.00	40.00	42.00
Hard Red Winter Wheat							
4.85	17.91	27.61	37.31	47.01	56.71	66.41	76.11
5.10	25.41	35.61	45.81	56.01	66.21	76.41	86.61
5.35	32.91	43.61	54.31	65.01	75.71	86.41	97.11
5.60	40.41	51.61	62.81	74.01	85.21	96.41	107.61
5.85	47.91	59.61	71.31	83.01	94.71	106.41	118.11
6.10	55.41	67.61	79.81	92.01	104.21	116.41	128.61
6.35	62.91	75.61	88.31	101.01	113.71	126.41	139.11

Net Return Per Acre Above Cash Costs For Hard Red Winter Wheat

PRICE (\$/bu)	YIELD (bu/acre)						
	30.00	32.00	34.00	36.00	38.00	40.00	42.00
Hard Red Winter Wheat							
4.85	-31.48	-21.78	-12.08	-2.38	7.32	17.02	26.72
5.10	-23.98	-13.78	-3.58	6.62	16.82	27.02	37.22
5.35	-16.48	-5.78	4.92	15.62	26.32	37.02	47.72
5.60	-8.98	2.22	13.42	24.62	35.82	47.02	58.22
5.85	-1.48	10.22	21.92	33.62	45.32	57.02	68.72
6.10	6.02	18.22	30.42	42.62	54.82	67.02	79.22
6.35	13.52	26.22	38.92	51.62	64.32	77.02	89.72

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TABLE 6. RANGING ANALYSIS CONTINUED

Net Return Per Acre Above Total Costs For Hard Red Winter Wheat

PRICE (\$/bu)	YIELD (bu/acre)						
Hard Red Winter Wheat	30.00	32.00	34.00	36.00	38.00	40.00	42.00
4.85	-80.29	-70.59	-60.89	-51.19	-41.49	-31.79	-22.09
5.10	-72.79	-62.59	-52.39	-42.19	-31.99	-21.79	-11.59
5.35	-65.29	-54.59	-43.89	-33.19	-22.49	-11.79	-1.09
5.60	-57.79	-46.59	-35.39	-24.19	-12.99	-1.79	9.41
5.85	-50.29	-38.59	-26.89	-15.19	-3.49	8.21	19.91
6.10	-42.79	-30.59	-18.39	-6.19	6.01	18.21	30.41
6.35	-35.29	-22.59	-9.89	2.81	15.51	28.21	40.91