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Dryland Wheat Production and Marketing Costs in Oregon's Columbia Plateau, 1982-1983



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DRYLAND WHEAT PRODUCTION AND MARKETING COSTS IN OREGON'S COLUMBIA PLATEAU

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Oregon growers produced 77.4 million bushels of wheat in 1981 with an estimated total farm value of \$290 million, making wheat the highest valued farm crop in the state. Wheat production in Oregon's Columbia Plateau is an equally important agricultural enterprise; in 1981, five counties in the Plateau accounted for 66 percent of all the wheat produced in Oregon.¹

The primary purpose of this study is to present estimated costs of producing and marketing wheat in the Columbia Plateau counties of Gilliam, Morrow, Sherman, Umatilla and Wasco. Cost information for a summer fallow and winter wheat rotation grown under mold-board plow is detailed. Growers, agricultural lenders, and others concerned with the wheat industry will find this information useful in estimating the physical and financial requirements of producing dryland wheat in the area.

A secondary objective is to use these and other estimated cost data to analyze the economic feasibility of two important wheat production decisions: participation in the 1983 wheat program, and the use of chemical fallow.

Sources of Information

Wheat growers provided the basic information regarding the size of the study farm; production practices followed; machinery, labor, and material requirements; land values; and overhead expenses. Additional information was

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¹Source: Extension Economic Information Office, Oregon State University, 1981 preliminary figures.

obtained from local suppliers, machinery dealers, and lenders. The data were then summarized and reviewed by wheat growers, county agents, and others familiar with dryland wheat production in the study area.

Given these procedures, the figures reported in this study should be viewed as "typical" or "representative" rather than averages. Because soil types, rainfall, farm size, machinery use, and cultural practices followed vary from farm to farm and greatly influence costs of production, growers are encouraged to estimate costs for their own operations.

Study Assumptions

The following assumptions underlie the costs reported in this study.

1. The owner-operator-manager of the study farm has 2,500 acres of cropland with 1,250 acres in winter wheat and 1,250 acres in fallow each year.
2. Normal Wheat yield is 34 bushels per acre.
3. Production inputs such as fertilizer, seed, and chemicals are charged at October 1982 prices.
4. Machinery values are based on October 1982 replacement costs assuming the equipment is half depreciated. (See Appendix tables for detailed machinery costs.) While this assumption may overstate machinery ownership costs for some producers, it provides an indication of earnings needed to replace depreciable assets. When an enterprise is being evaluated to determine its long-run viability, it is important to consider the ability of the enterprise to replace depreciable assets on a new cost basis.
5. The labor and managerial input of the operator is treated as an opportunity cost, that is, the operator has an alternative use for these inputs which would earn an equivalent amount.
6. Marketing costs are included and cover put-through charges at the elevator, storage for an average of six months, transportation to Portland, and the Oregon Wheat Commission assessment.
7. A charge for land is included and is based on farm use value market rental rates, and a charge for land taxes. There are many ways of determining a charge for land, for example, share rent, cash rent, and current market value. Many arguments have arisen over which

method, if any, should be used. It is not our intent to resolve this problem. But since land is a resource used in the production of wheat (just like labor, seed, and fertilizer), some charge should be made.

These assumptions should be carefully reviewed and evaluated when interpreting the costs presented in this study.

Production Costs

The approach taken in developing cost estimates was to identify a schedule of field operations (Table 1). Next, the labor required, machines used, and materials applied were estimated. Costs identified for each operation include (1) labor, (2) machinery operation, (3) machinery ownership, and (4) materials. The number of times-over for each operation (e.g., 1.5X) is indicated if it is other than one. The total estimated production cost for the 1982-83 crop is \$183.36 per planted acre (Table 1).

Table 2 provides a summary of these costs and space for growers to enter their own costs. With a normal yield of 34 bushels per acre, the total cost of producing, hauling to storage, and marketing the grain in Portland is \$5.39 ✓ per bushel. Cash costs are \$2.20 per bushel (cash cost for land expense omitted). Notice that these budgets include costs for 2 acres - one summer fallow and one winter wheat. Machinery costs and assumptions are given in detail in the Appendix tables.

In addition to the cash costs of producing wheat, it is also important to recognize that cash is required to replace machinery, meet mortgage payments, pay income taxes, and provide for family living. Each year the wheat farm business must generate sufficient cash receipts to meet these cash requirements. Besides meeting these cash costs each year, over the long-run, (a number of years) the business must have income to cover both the cash and

Table 1. Estimated Inputs and Costs per Planted Acre (including fallow costs) for Dryland Wheat, Oregon Columbia Plateau, 1982-1983.

	Labor		Machinery Costs ^{a/}		Other		Total Cost
	Hours	Value	Operating	Ownership	Item	Cost	
		(\$)	(\$)	(\$)		(\$)	
Cultural Operations							
Mold-board plow, 10-16'							
Cultivator, 40' (1.5X)	.181	1.64	2.29	5.23			9.16
Rod weed, 48' (3X)	.111	1.00	1.48	3.40			5.89
Fertilize ^{b/}	.20	1.80	3.02	5.36			10.18
Drill seed, 4-8' (1.1X)	.066	.60	.68	1.17	30 lb N	6.75	9.20
Haul seed ^{c/}	.084	.76	1.24	4.08	55 lb seed	6.22	12.30
Spray herbicide ^{d/}	.008	.07	.08	.19			.34
					chemicals	5.73	
					custom	3.00	8.73
Harvest Operations							
Combine, 20' hillside	.142	1.29	3.47	14.79			19.54
Haul grain ^{c/e/}	.284	1.58	2.05	4.65			8.27
Other Charges							
Other labor ^{f/}	.50	3.63					3.63
Pickup truck ^{c/}			1.86	1.95			3.82
Other machinery			1.00	3.90			4.90
Conservation practices						.75	.75
Crop insurance ^{g/}						4.85	4.85
Marketing ^{h/}						17.00	17.00
Operating capital int 15.5%						4.50	4.50
Miscellaneous ^{i/}						4.50	4.50
Land charge ^{j/}						50.00	50.00
Management						5.80	5.80
TOTAL COST PER PLANTED ACRE		12.37	17.17	44.72		109.10	183.36 ✓

- ^{a/} Machinery operating costs include repairs (parts and labor), maintenance, oil and lubrication. Machinery ownership costs include depreciation, interest on average investment @ 16.25% and insurance.
- ^{b/} Fertilizer cost includes use of the application.
- ^{c/} Based on the following mileages: 250 miles on trucks hauling seed, 6,250 miles on trucks hauling grain and 10,000 miles on pickup.
- ^{d/} Where morning glory control is necessary, add \$8.25 for herbicide plus \$2.50 for applicator.
- ^{e/} Hired labor cost (wages and benefits) for hauling grain is based on 350 hours per year @ \$5.50 per hour.
- ^{f/} Other labor includes such items as moving and servicing machinery, checking fields, etc. Half of this is hired @ \$5.50 per hour
- ^{g/} Crop insurance includes hail and fire at \$1.85 and Federal crop insurance at \$3.00 per acre.
- ^{h/} Marketing costs include elevator put-through @ \$0.11/bu., storage for an average of 6 months @ \$0.12/bu., transportation to Portland @ \$0.25/bu., and wheat commission assessment @ \$0.02/bu.
- ^{i/} Miscellaneous expenses include general insurance, tools, shop, utilities, accounting fees, office supplies, etc.
- ^{j/} Land charge is based on farm use value and market rental rates.

Table 2. Dryland Wheat Production Costs Per Planted Acre (including fallow costs) Oregon Columbia Plateau, 1982-83

Expense Category	Unit Cost	Study Costs	Your Cost
----\$ per planted acre----			
Cash Operating Costs			
Fertilizer	.225 \$/lb	6.75	-----
Wheat seed	.113 \$/lb	6.22	-----
Herbicide and application		8.73	-----
Diesel fuel	1.06 \$/gal	5.54	-----
Gasoline	1.26 \$/gal	2.43	-----
Lubricants		1.12	-----
Machinery repair		8.09	-----
Crop insurance		4.85	-----
Conservation practices		.75	-----
Hired labor	5.50 \$/hr	2.95	-----
Miscellaneous		4.50	-----
Operating capital interest	15.5%	<u>4.50</u>	-----
Subtotal		56.43	-----
Cash Ownership Costs			
Machinery insurance and fees		<u>1.31</u>	-----
Subtotal		1.31	
Other Ownership Costs			
Land charge		50.00	-----
Interest on machinery	16.25%	27.57	-----
Machinery depreciation		<u>15.84</u>	-----
Subtotal		93.41	-----
Operator Labor and Management			
Operator labor	9.00 \$/hr	9.41	-----
Management		<u>5.80</u>	-----
Subtotal		15.21	-----
Marketing 34 bu/ac @ .5 per bu		17.00	-----
TOTAL COST PER ACRE		183.36	-----
Total cost per bushel at 34 bu/ac		5.39 ✓	-----

Study costs are based on a normal yield of 34 bushels per acre.

non-cash costs as indicated in Table 2. Cash requirements will vary with leasing arrangements, mortgage and debt levels, and family living needs. Here again, growers need to determine their own positions.

Partial Budgets for Chemical Fallow and 1983 Wheat Program

Partial budgeting is a management tool useful for evaluating selected changes in farm business operations. With partial budgeting, the enterprise cost analysis, such as illustrated in Tables 1 and 2, is adjusted just for the additional returns, reduced costs, added costs, and reduced returns created by the potential change. Two such changes, or partial budgets, are examined below; a chemical fallow system, and participation in the 1983 Wheat Program. The resulting net changes in income -- in this case both are positive net returns -- form a basis for adapting these alternatives. Just as with basic cost of production estimates, however, these partial budget figures are based on specific assumptions that may not be representative of all Columbia Plateau wheat farms.

In Table 3, a partial budget analysis for chemical fallowing is presented. Research findings, over a five-year period, have shown that a five to ten bushel per acre increase in wheat production can be expected in a ten to fourteen inch rainfall area. The herbicide is flown on in the stubble, in the fall or early spring. The additional 6,250 bushels of wheat produced (5 bushels/acre increase on 1,250 acres) is forward contracted for delivery after harvest. There is no storage cost for this additional wheat. Using a chemical fallow operation has the advantage of decreasing the amount of tillage operations, helps prevent soil erosion, and helps in the management of weedy grass and volunteer grain. The main consideration is the effect of the

Table 3. Chemical Fallow.

Assumptions

1. Established research findings for a five-year period show a 5-10 bu/acre increase in wheat production with chemical fallow in a 10"-14" rainfall area. A 5 bu. increase is used.
2. Assume normal tillage treatment in the spring with one less rod weeding.
3. Spray herbicide in the fall or early spring in the stubble.
4. Aerial application of herbicide.
5. Sell the additional 5 bu. of wheat at harvest.
6. No storage cost for the additional 5 bushels of wheat.
7. Wheat is forward contracted for delivery after harvest.

	<u>Study Values</u>	<u>Your Estimate</u>
<u>Additional Returns</u>		
a) Increase wheat production by 5 bu/acre x 1,250 acres x \$4.40/bu	= \$27,500	_____
<u>Reduced Cost</u>		
a) Rod weeding (1 operation) \$1.61/acre ^{a/} x 1,250 acres	= 2,012	_____
Total Advantages	= <u>\$29,512</u>	_____
<u>Added Cost</u>		
a) Marketing Cost		
1) Put-through \$0.11/bu x 5 bu x 1,250 acres	= 687	_____
2) Transportation \$0.25/bu x 5 bu x 1,250 acres	= 1,562	_____
3) Wheat Commission Assessment \$0.02/bu x 5 bu x 1,250 acres	= 125	_____
b) Herbicide and Application		
1) Herbicide \$11.03/acre x 1,250 acres	= 13,787	_____
2) Application \$3.25/acre x 1,250 acres	= 4,062	_____
3) Interest on herbicide and application at 15.5% for 21 mo.	= 4,842	_____
<u>Reduced Returns</u>		
Total Disadvantages	= <u>0</u>	_____
	= <u>\$25,065</u>	_____
NET CHANGE OF RETURNS = \$29,512 - 25,065	= \$ 4,447	_____

^{a/} From Table 1.

herbicide application; it can reduce the amount of spring tillage operations, depending upon local soil and environmental conditions. The added increase in wheat yield and decrease in tillage operations should offset the cost of the herbicide and application.

A partial budget for participation in the 1983 Wheat Program is outlined in Table 4. It is assumed that the farm has a 1,258 acre base. To be eligible for farm program benefits, 20 percent of the base (250 acres) is diverted from wheat and planted into barley (15% reduced acreage plus 5% paid diversion). Harvest cost, herbicide cost, fertilizer cost, and fire and hail insurance remain the same on the acreage planted to barley. The barley yield is 0.85 tons per acre, and is sold at the end of harvest; therefore, there will be no storage cost for the barley. The per bushel marketing costs for wheat remain the same, no assumptions are made regarding participation in the farm owned reserve. The net change in income resulting from participation is \$9,769, and this change is mainly due to the projected diversion and deficiency payment and income generated from planting set aside acreage to barley. Generally, participation in the farm program will prove to be advantageous if cash prices remain below the reserve loan rate and the target price.

Concluding Note

The cost estimates presented in this report are based on many assumptions. It is fully recognized that the situation described is not characteristic of all farm operations. It is essential to use the figures reported as a guide, and considerable judgment should be exercised in generalizing costs to situations differing from those identified above.

Table 4. Farm Program.

Assumptions

1. Total cost for herbicide, fertilizer, harvest, and fire and hail insurance will be the same.
2. Sell barley at harvest - no storage cost.
3. Participation incentives include both deficiency payment and diversion payment.
4. 1,250 acre base.
5. Divert 250 acres from wheat (15% reduced acreage plus 5% paid diversion) and plant 250 acres to barley.
6. Assume maximum possible deficiency payment, \$.65/bu.
7. Wheat is forward contracted for delivery 6 months after harvest, and barley is delivered at harvest. Pricing decisions are made based on Portland prices in July prior to harvest.
8. Barley yield of 0.85 ton/acre.

	<u>Study Values</u>	<u>Your Estimate</u>
<u>Additional Returns</u>		
a) Payments from 1983 wheat program		
1) Diversion payment @ \$2.70/bu x 62.5 acres x 34 bu/acre	= \$ 5,737	_____
2) Deficiency payment @ \$0.65/bu x 1,000 acres x 34 bu/acre	= 22,100	_____
b) Barley receipts		
0.85 ton/acre x 250 acres x \$93/ton	= 19,762	_____
<u>Reduced Cost</u>		
a) Wheat seed @ 55 lb/acre x \$0.113/lb x 250 acres	= 1,553	_____
b) Federal crop insurance @ \$3.00/acre x 250 acres	= 750	_____
c) Marketing Cost		
1) Put-through @ \$0.11/bu x 34 bu x 250 acres	= 935	_____
2) Storage - average 6 mo @ \$0.12/bu x 34 bu x 250 acres	= 1,020	_____
3) Transportation @ \$0.25/bu x 34 bu x 250 acres	= 2,125	_____
4) Wheat commission assessment @ \$0.02/bu x 34 bu x 25 acres	= 170	_____
Total Advantages	= <u>\$54,152</u>	_____
<u>Added Cost</u>		
a) Barley seed @ \$0.12/lb x 70 lb/acre x 250 acres	= \$ 2,100	_____
b) Marketing Cost		
1) Transportation @ \$10.40/ton x 0.85 ton/acre x 250 acres	= 2,210	_____
2) Put-through @ \$4.58/ton x 0.85 ton/acre x 250 acres	= 973	_____
<u>Reduced Returns</u>		
a) Wheat @ 34 bu x 250 acres x \$4.60	= 39,100	_____
Total Disadvantages	= <u>\$44,383</u>	_____
NET CHANGE OF RETURNS = \$54,152 - 44,383	= \$ 9,769	_____

APPENDIX A

Table A-1. Machinery Assumptions for the 2,500 Acre Dryland Wheat Farm, Oregon Columbia Plateau, 1982-83.

Machine	Current Value (a)	Salvage Value	Remaining life (b)	Annual Use	Fuel Consumption
	(\$)	(\$)	(yrs)		
Crawler tractor, 90 DBHP	60,700	31,400	7.5	805 hrs	7 gal/hr
Mold-board plow, 10-16'	11,750	7,000	7.5	227 hrs	--
Cultivator, 40'	7,350	2,700	7.5	139 hrs	--
Rod weeder, 48'	7,750	2,500	5	250 hrs	--
Grain drills, 4-8' (c)	12,850	4,200	7.5	106 hrs	--
Combine, 20' hillside	68,500	27,000	6	179 hrs	5 gal/hr
Trucks, 2-ton (d)	19,650	8,300	5	6,500 ml	5 ml/gal
Pickup, 3/4 ton, 4x4	6,800	3,500	3	10,000 ml	9 ml/gal
Other machinery (e)	16,750	6,000	5	1,250 ac	--

(a) Calculated by adding the estimated purchase cost to the salvage value and dividing the sum by two.

(b) Assumes machine is at one-half its useful life.

(c) There are two sets of drills, one deep furrow and one older disc type.

(d) There are two 2-ton trucks, one relatively new and one older.

(e) Includes items such as: trap wason, disc, rotary hoe, and harrow.

Table A-2. Machinery Ownership Costs for the 2,500 Acre Dryland Wheat Farm, Oregon Columbia Plateau, 1982-82.

Machine	Depreciation (a)	Interest (b) 16.25%	Insurance	Total Annual Ownership Costs
	(\$/yr)	(\$/yr)	(\$/yr)	(\$/yr)
Crawler tractor, 90 DBHP	3,907	9,864	385	14,155
Mold-board plow, 10-16"	633	1,909	---	2,543
Cultivator, 40'	620	1,194	---	1,814
Rod weeder, 48'	1,050	1,259	---	2,309
Grain drills, 4-8'	1,153	2,088	---	3,241
Combine, 20' hillside	6,917	11,131	434	18,482
Trucks, 2-ton	2,270	3,193	580 (c)	6,043
Pickup, 3/4 ton, 4x4	1,100	1,105	235 (c)	2,440
Other machinery	<u>2,150</u>	<u>2,722</u>	<u>---</u>	<u>4,872</u>
TOTAL	19,800	34,466	1,634	55,900

(a) Calculated by subtracting the salvage value from the current value and dividing the difference by the remaining life of the machine (see Table A-1).

(b) Calculated as interest on the current value from Table A-1.

(c) Also includes appropriate license fees.

Table A-3. Machinery Operating Costs for the 2,500 Acre Dryland Wheat Farm, Oregon Columbia Plateau, 1982-83.

Machine	Repairs (a)	Fuel (b)	Lube	Total Annual Operating Costs	Total annual Costs (c)
	(\$/yr)	(\$/yr)	(\$/yr)	(\$/yr)	(\$/yr)
Crawler tractor, 90 DBHP	1,449	5,975	781	8,206	22,361
Mold-board plow, 10-16"	545	---	---	545	3,088
Cultivator, 40'	437	---	---	437	2,252
Rod weeder, 48'	1,225	---	---	1,225	3,534
Grain drills, 4-8'	476	---	---	476	3,717
Combine, 20' hillside	3,214	946	173	4,334	22,816
Trucks, 2-ton	813	1,638	215	2,665	8,708
Pickup, 3/4 ton, 4x4	700	1,400	230	2,330	4,770
Other machinery	<u>1,250</u>	<u>---</u>	<u>---</u>	<u>1,250</u>	<u>6,122</u>
TOTAL	10,110	9,959	1,399	21,468	77,369

(a) Includes costs for parts and labor, both paid and unpaid.

(b) Based on: 1.06 per gallon for diesel fuel and
1.26 per gallon for gas

(c) Calculated by adding total annual ownership costs presented in Table A-2 and the total annual operations cost presented here.



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