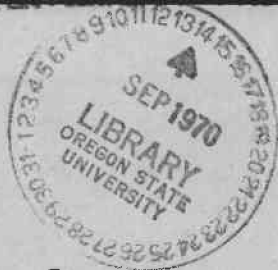


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Estimated Costs of Wheat Production in the Columbia Basin of Oregon



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ESTIMATED COSTS OF WHEAT PRODUCTION IN THE
COLUMBIA BASIN OF OREGON

A. Gene Nelson and Stanley D. Miles

The value of wheat production in Oregon has ranged from 38 to 45 million dollars over the past five years, representing a significant contribution to the state's agricultural economy. Of Oregon's field crops, wheat ranks second only to hay in value of production. Preliminary estimates indicate that Oregon wheat production exceeded 30 million bushels in 1969. About two-thirds of Oregon's wheat is produced in the Columbia Basin area. Umatilla County has the largest wheat acreage and production of any county in Oregon (Table 1).

Table 1. Oregon Wheat Acreage and Production
by Counties (1969) a/

County	Harvested for grain	Yield per acre	Total production
	<u>Acres</u>	<u>Bushels</u>	<u>Bushels</u>
Umatilla	190,000	39.4	7,493,000
Morrow	112,000	25.9	2,896,000
Sherman	93,000	29.7	2,760,000
Gilliam	86,800	29.8	2,586,000
Wasco	63,000	36.1	2,274,000
Union	37,000	57.3	2,119,000
OREGON	788,000	38.1	30,030,000

a/ Preliminary estimates by Oregon Crop and Livestock Reporting Service, Portland, Oregon, April 9, 1970.

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A DESCRIPTION OF THE ENTERPRISE COST STUDIES

Enterprise cost studies are conducted by the Extension Farm Management staff at Oregon State University in cooperation with the county Extension agents and local producers. This publication reports on enterprise cost studies for wheat production and land diversion in the Columbia Basin of Oregon.

The purpose of the enterprise cost studies is to provide an estimate of the costs involved in the production of agricultural products. These cost estimates are not expected to reflect the average costs in an area, since production situations vary. Rather, the studies report the costs generally expected over time by experienced commercial producers using accepted production practices. They represent the consensus among one group of commercial producers in an area.

The enterprise data sheets which report these studies are useful as guides to both present and potential producers. The present producer can use the sheets for comparing his costs with those of other producers in the area and for budgeting proposed changes in his farm organization. The sheets also are used by producers and their lenders in preparing cash flow budgets. The potential producer can use the data sheets to determine the profitability of entering into a particular enterprise. However, because an enterprise is profitable does not mean that it is the most profitable enterprise for a particular situation. Various enterprises must be compared for each farm to determine the most profitable combination.

PROCEDURE FOR THE STUDIES

The enterprise cost studies are conducted in response to requests from county Extension agents. A group of about five or six experienced commercial producers is asked to cooperate in the study. A meeting is arranged, with the farm management specialist and/or the county agent leading the discussion. First, the typical size of the enterprise and the farm is determined. Then the production practices generally followed in the area are listed. The amount of labor, machine time, and materials required for each of the operations then are estimated. Labor wages, material costs, machinery costs, land charges, and overhead costs also are determined. Cost calculations are made, and a preliminary draft of the enterprise data sheet is reviewed by those participating in the study. Following this review, the sheet is revised and duplicated for distribution.

ORGANIZATION OF THE RESULTS

The description of the enterprise is very important to the interpretation of the results. The size of the enterprise is shown along with the yield which is normally expected in the area. Hourly rates on the major pieces of machinery and labor wages also are listed. This information is the basis for the cost calculations.

Cost calculations are made for each of the cultural and harvest operations associated with the crop and are listed in chronological order. Machinery requirements are indicated by the hours required per acre for that operation. For example, if five acres can be plowed in one hour, the plowing operation requires 0.20 hours of machine and labor time per acre. The labor requirement is multiplied times the labor wage to get the labor charge

per acre for plowing. If the labor wage is \$3.00 per hour, then \$0.60 ($0.20 \times \$3.00$) is the labor cost for plowing one acre. The same method is used to determine machinery cost. If the rate per hour for tractor use is \$5.25 and the rate per hour for the plow is \$1.75, the machine cost per acre for plowing would be \$1.40 ($0.20 \times \7.00). For certain operations, charges for materials such as seed, fertilizer and chemicals also must be included.

The charges not associated with any particular operation also are itemized on an acre basis. The charge for land is based on its opportunity cost. If the land has a market value of \$125 per acre and there exists an opportunity of a 6% return if this capital were invested elsewhere, then \$7.50 (6% of \$125) is the opportunity cost of the land. In the case of the wheat-fallow farms in the Columbia Basin, it takes two years to produce a crop, so \$15 ($2 \times \7.50) would be charged for the use of the land. Costs such as taxes on land, crop insurance, and interest on operating capital are calculated on an acre basis. General overhead costs covering such expenses as service buildings, utilities, general insurance, vehicular costs, tools, office supplies, accounting fees, and dues are included.

The various cost items are then totaled by column so that the cost of labor, machinery and other items and the total cost per acre are shown. The cost per bushel of wheat produced then can be calculated by dividing the total cost per acre by the normal yield per acre. The cost per bushel can be calculated for higher and lower yields to indicate how the level of production influences the cost per unit.

RESULTS OF THE ENTERPRISE COST STUDIES

Estimated wheat production costs have been developed based on four recent studies in the Columbia Basin. These represent operations with varying wheat acreages and yields. Because of the importance of the wheat program to producers in this area, studies were made of the costs associated with land diversion under the government wheat program.

Four studies of wheat enterprise costs were made, two in Sherman County, one in Gilliam County, and one in Morrow County (Tables 4-7). Table 2 presents the estimated costs found in each of these studies. The costs have been classified as fixed or variable. Variable costs are those which vary between the enterprises and levels of production. These are the costs which can be affected by appropriate decisions. Conversely, fixed costs do not vary and cannot be affected within the planning period.

A comparison of the seed and fertilizer costs per acre indicates that these costs tend to be associated with yield levels. The costs per acre of machine operation (fuel and repairs) did not vary greatly between the four studies. The hired labor costs per acre were higher on the large operations, reflecting a substitution of hired labor for operator labor. However, the total labor costs (hired and operator) per acre decreased as the wheat acreage increased.

The fixed costs (those over which the producer has less control) are important in wheat production. Because the more productive land is worth more per acre, tax and interest charges were larger on the higher yielding land. Machine ownership costs including depreciation, interest, taxes, and insurance are related to the size of the wheat acreage. As wheat acreage increases, the fixed cost of machine ownership is spread over more

Table 2. Estimated Costs for Wheat Production in the Columbia Basin of Oregon

Cost Item	County, wheat acreage, and normal yield			
	Sherman	Sherman	Gilliam	Morrow
	250 acres 30 bu./A	250 acres 40 bu./A	900 acres 30 bu./A	2,000 acres 25 bu./A
(dollars per harvested acre)				
<u>Variable costs per acre</u>				
Seed	\$ 1.32	\$ 1.80	\$ 1.80	\$ 1.20
Fertilizer	3.00	4.00	2.70	2.10
Weed spray . . . . .	.75	3.00	2.00	2.00
Machine operation	2.70	2.86	3.15	3.10
Int. on operating capital .	.63	.99	.65	1.30
Crop insurance . . . . .	.88	1.17	1.80	1.50
Hired labor . . . . .	.66	.75	1.70	1.75
Total variable costs . .	9.94	14.57	13.80	12.95
<u>Fixed costs per acre</u>				
Operator labor	3.78	3.75	1.30	.50
Machine ownership	13.44	13.50	4.75	4.60
Interest on land	15.00	24.00	15.00	14.40
Taxes on land	4.00	6.25	4.00	4.50
General overhead	1.39	2.08	1.85	1.70
Total fixed costs	37.61	49.58	26.90	25.70
<u>TOTAL WHEAT PRODUCTION</u>				
COST PER ACRE	\$47.55	\$64.15	\$40.70	\$38.65

acres, resulting in a lower charge per acre. However, there is little difference between the machine ownership cost per acre for the 900 and 2,000 acre operations. This indicates that most of the savings in machine ownership costs can be achieved with 900 or less acres of wheat.

The costs on the diverted acreage required for participation in the wheat program are added to the wheat production costs to provide an estimate of the total costs per harvested acre (Table 3). The land diversion costs assume the land is fallowed. The total cost per harvested acre was highest for the Sherman County operation with the 40-bushel yield. The lowest cost per harvested acre was on the 2,000-acre operation in Morrow County. On

a bushel basis, the costs for the two smaller Sherman County operations are highest. The 900-acre Gilliam County operation had the lowest cost per bushel.

Table 3. Estimated Costs for Wheat Production and Land Diversion in the Columbia Basin of Oregon

Cost Item	County, wheat acreage, and normal yield			
	Sherman	Sherman	Gilliam	Morrow
	250 acres 30 bu./A	250 acres 40 bu./A	900 acres 30 bu./A	2,000 acres 25 bu./A
	(dollars per harvested acre)			
Wheat production cost per acre	\$47.55	\$64.15	\$40.70	\$38.65
Land diversion cost per acre <u>a/</u>	8.49	11.81	7.14	6.89
Total cost per acre . . .	56.04	75.96	47.84	45.54
Cost per bushel with normal yield	1.87	1.90	1.59	1.82

a/ This represents the costs of fallowing diverted land (Tables 4-7). The land diversion costs per harvested acre are calculated assuming that the diverted acreage requirement is 30 percent of the harvested acreage.

Table 4. Estimated Costs of Wheat Production
and Diversion, Sherman County a/

HARVESTED WHEAT LAND	INPUTS PER ACRE					Total Cost
	Labor <u>b/</u>		Machinery <u>c/</u>	Other		
	Hrs.	Value		Qty.	Value	
<u>Cultural Operations</u>						
Disk (0.3x)	.06	\$.18	\$.83			\$1.01
Plow	.29	.87	2.15			3.02
Springtooth	.10	.30	.73			1.03
Fertilize	.10	.30	.45	30 lbs.	3.00	3.75
Rodweed (3x)	.25	.75	2.09			2.84
Seed (1.1x)	.19	.57	1.50	44 lbs.	1.32	3.39
Spray weeds (2-4D)	.05	.15	.48	Chem.	.75	1.38
<u>Harvest</u>						
Combine	.22	.66	7.30			7.96
Haul grain	.22	.66	.61			1.27
<u>Other Charges</u>						
Interest on land (\$125/acre @ 6% for 2 years)					15.00	15.00
Taxes on land (1.5% for 2 years)					4.00	4.00
General overhead					1.39	1.39
Crop insurance					.88	.88
Interest on operating capital (8%)					.63	.63
Total costs per acre		\$4.44	\$16.14		\$26.97	\$47.55
<u>DIVERTED WHEAT LAND</u>						
<u>Cultural Operations</u>						
Disk (0.3x)	.06	\$.18	\$.83			\$1.01
Plow	.29	.87	2.15			3.02
Springtooth	.10	.30	.73			1.03
Rodweed (3x)	.25	.75	2.09			2.84
<u>Other Charges</u>						
Interest on land (\$125/acre @ 6% for 2 years)					15.00	15.00
Property taxes (1.5% for 2 years)					4.00	4.00
General overhead					1.39	1.39
Total costs per acre		\$2.10	\$ 5.80		\$20.39	\$28.29

a/ 250 acres harvested; normal yield of 30 bushels per acre.

b/ Labor @ \$3.00 per hour.

c/ 55 h.p. crawler tractor @ \$4.50 per hour.

These data were obtained and computed by County Agent Martin Zimmerman and Farm Management Specialist Gene Nelson in cooperation with Sherman County farmers, December 1969.

Table 5. Estimated Costs of Wheat Production
and Diversion, Sherman County a/

HARVESTED WHEAT LAND	INPUTS PER ACRE					
	Labor <u>b/</u>		Machinery <u>c/</u>	Other		Total Cost
	Hrs.	Value		Qty.	Value	
<u>Cultural Operations</u>						
Plow	.29	\$.87	\$2.15			\$3.02
Springtooth (2x)	.20	.60	1.18			1.78
Fertilize	.10	.30	.45	40 lbs.	\$4.00	4.75
Rodweed (2x)	.17	.51	1.73			2.24
Seed (1.1x)	.19	.57	1.50	60 lbs.	1.80	3.87
Spray weeds (Linuron)	.05	.15	.48	Chem.	3.00	3.63
<u>Harvest</u>						
Combine	.25	.75	7.44			8.81
Haul grain	.25	.75	.81			1.56
<u>Other Charges</u>						
Interest on land (\$200/acre @ 6% for 2 years)					24.00	24.00
Taxes on land (1.5% for 2 years)					6.25	6.25
General overhead					2.08	2.08
Crop insurance					1.17	1.17
Interest on operating capital (8%)					.99	.99
Total costs per acre		\$4.50	\$16.36		\$43.29	\$64.15
<u>DIVERTED WHEAT LAND</u>						
<u>Cultural Operations</u>						
Plow	.29	\$.87	\$ 2.15			\$ 3.02
Springtooth (2x)	.20	.60	1.18			1.78
Rodweed (2x)	.17	.51	1.73			2.24
<u>Other Charges</u>						
Interest on land (\$200/acre @ 6% for 2 years)					\$24.00	\$24.00
Property taxes (1.5% for 2 years)					6.25	6.25
General overhead					2.08	2.08
Total costs per acre		\$1.98	\$ 5.06		\$32.33	\$39.37

a/ 250 acres harvested; normal yield of 40 bushels per acre.

b/ Labor @ \$3.00 per hour.

c/ 55 h.p. crawler tractor @ \$4.50 per hour.

These data were obtained and computed by County Agent Martin Zimmerman and Farm Management Specialist Gene Nelson in cooperation with Sherman County farmers, December 1969.

Table 6. Estimated Costs of Wheat Production
and Diversion, Gilliam County a/

HARVESTED WHEAT LAND	INPUTS PER ACRE						Total Cost
	Labor <u>b/</u>		Machinery <u>c/</u>	Other			
	Hrs.	Value		Qty.	Value		
<u>Cultural Operations</u>							
Plow	.20	\$.60	\$1.40			\$2.00	
Summer fallow tillage 50 ft. (3x)	.15	.45	1.00			1.45	
Fertilize 60 ft.	.05	.15	.30	30 lbs.N	2.70	3.15	
Seed 48 ft.	.07	.20	1.00	60 lbs. seed	1.80	3.00	
Spray weeds				Custom	2.00	2.00	
<u>Harvest</u>							
Combine	.20	.60	2.90			3.50	
Haul grain	.40	1.00	1.30			2.30	
<u>Other Charges</u>							
Interest on land (\$125/acre @ 6% for 2 years)					15.00	15.00	
Taxes on land (\$2.00/acre for 2 years)					4.00	4.00	
General overhead					1.85	1.85	
Crop insurance					1.80	1.80	
Interest on operating capital (9%)					.65	.65	
Total costs per acre		\$3.00	\$7.90		\$29.80	\$40.70	
<hr/>							
<u>DIVERTED WHEAT LAND</u>							
<u>Cultural Operations</u>							
Plow	.20	\$.60	\$1.40			\$2.00	
Summer fallow tillage 50 ft. (4x)	.23	.70	1.50			2.20	
<u>Other Charges</u>							
Interest on land (\$125/acre @ 6% for 2 years)					15.00	15.00	
Taxes on land (\$2.00/acre for 2 years)					4.00	4.00	
General overhead					.60	.60	
Total costs per acre		\$1.30	\$2.90		\$19.60	\$23.80	

a/ 900 acres harvested; normal yield of 30 bushels per acre.

b/ Labor @ \$3.00 per hour.

c/ 100 h.p. crawler tractor @ \$5.20 per hour.

These data were obtained and computed by County Agent Tom Zinn and Farm Management Technologist Stanley Miles in cooperation with Gilliam County farmers, February 1970.

Table 7. Estimated Costs of Wheat Production
and Diversion, Morrow County a/

HARVESTED WHEAT LAND	INPUTS PER ACRE						Total Cost
	Labor <u>b/</u>		Machinery ^{c/}	Other			
	Hrs.	Value		Qty.	Value		
<u>Cultural Operations</u>							
Plow 30 ft. (2x)	.20	\$.50	\$1.50			\$2.00	
Rodweed 60 ft. (4x)	.16	.40	1.15			1.55	
Fertilize	.05	.15	.30	30 lbs.N	2.10	2.55	
Seed 60 ft.	.07	.20	.90	40 lbs.			
				seed	1.20	2.30	
Spray weeds				Custom	2.00	2.00	
<u>Harvest</u>							
Combine	.17	.55	3.00			3.55	
Haul grain	.17	.45	.85			1.30	
<u>Other Charges</u>							
Interest on land (\$120/acre @ 6% for 2 years)					14.40	14.40	
Taxes on land (\$2.25/acre for 2 years)					4.50	4.50	
General overhead					1.70	1.70	
Crop insurance					1.50	1.50	
Interest on operating capital (8%)					1.30	1.30	
Total costs per acre		\$2.25	\$7.70		\$28.70	\$38.65	
<hr/>							
<u>DIVERTED WHEAT LAND</u>							
<u>Cultural Operations</u>							
Plow 30 ft. (2x)	.20	\$.50	\$1.50			\$2.00	
Rodweed 60 ft. (4x)	.16	.40	1.15			1.55	
<u>Other Charges</u>							
Interest on land (\$120/acre @ 6% for 2 years)					\$14.40	\$14.40	
Taxes on land (\$2.25/acre for 2 years)					4.50	4.50	
General overhead					.50	.50	
Total costs per acre		\$.90	\$2.65		\$19.40	\$22.95	

a/ 2,000 acres harvested; normal yield of 25 bushels per acre.

b/ Labor at \$2.50 per hour, combine labor @ \$3.00 per hour.

c/ 100 h.p. crawler tractor @ \$5.70 per hour.

These data were obtained and computed by County Agent Harold Kerr and Farm Management Technologist Stanley Miles in cooperation with Morrow County farmers, December 1969.

DEFINITION OF TERMS

Variable costs: Costs which vary with the level of production and between enterprises. These costs can be influenced by the decision under consideration (Example: fertilizer costs).

Fixed costs: Costs which do not vary with the level of production or between enterprises. These costs cannot be affected by the decision under consideration (Example: land taxes).

Cash costs: Costs that require cash outlays (Example: fuel costs).

Non-cash costs: Costs that do not require cash outlays (Example: depreciation).

Machine costs: Costs of owning and operating machinery. This includes fuel, oil, repairs, taxes, insurance, depreciation, and interest on the average investment in the machine.

Labor costs: This is the total cost for labor including all social security, workman's compensation, perquisites, and other labor expenses. (The labor costs do not include a management charge.)

Overhead costs: Costs that are not readily identified or traceable to a specific enterprise. They include expenses for utilities, insurance, shop and office supplies, service buildings, pick-up, and professional fees.