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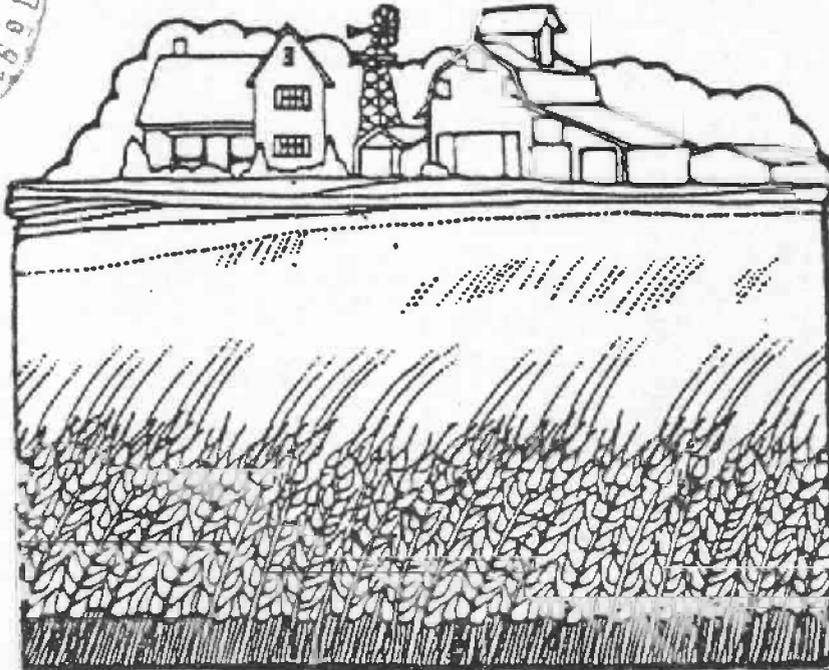


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Wheat Production and Marketing Costs in Oregon's Columbia Plateau, 1988-1989



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OREGON STATE UNIVERSITY EXTENSION SERVICE

DRYLAND WHEAT PRODUCTION AND MARKETING COSTS IN
OREGON'S COLUMBIA PLATEAU, 1988-89

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Oregon growers produced 50.6 million bushels of wheat in 1988 with an estimated farm value of about \$193 million, making wheat among the highest valued farm crops in the state. Wheat production is a particularly important agricultural enterprise in Oregon's Columbia Plateau. In 1988, five counties in the Columbia Plateau accounted for \$112 million of wheat sales from 540,550 harvested acres.²

The 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 - winter wheat rotation is detailed for a mold-board plow tillage system. 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.

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

¹The authors are, respectively, Wasco County Extension Agent, Umatilla County Extension Agent, Sherman County Extension Agent, Gilliam County Extension Agent, and Extension Agricultural Economist. The assistance of wheat growers, county extension agents, and others who helped develop these data is gratefully acknowledged.

²Source: Extension Economic Information Office, Oregon State University, 1988 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. These assumptions should be carefully reviewed and evaluated when interpreting the costs presented 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. Long-term average wheat yield is 34 bushels per acre.
3. Production inputs such as fertilizer, seed, and chemicals are charged at October 1988 prices.
4. Machinery values are based on October 1988 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 operator's labor (\$9/hr.) and managerial input (\$5.80/ac.) is treated as an opportunity cost--that is, the operator has an alternative use for these inputs that could earn the budgeted amount.
6. Marketing costs include put-through charges at the elevator, storage for an average of six months, transportation to Portland, and the Oregon Wheat Commission assessment. Thus, the total cost estimates are on a "delivered to Portland" basis.

7. A charge for land is included and is based on farm use value market rental rates, and includes a charge for land taxes. There are a number of ways of determining a charge for land--share rent, cash rent, and current market value, for example. 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.
8. No assumptions are made regarding participation in USDA wheat and feed grain programs.

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 (a) labor, (b) machinery operation, (c) machinery ownership, and (d) 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 1988-89 crop is \$175.60 per planted acre for a mold-board plow tillage system (table 1).

Table 2 provides a summary of these costs and space for growers to enter their own costs. With a long term average yield of 34 bushels per acre, the total cost of producing, hauling to storage, and marketing the grain in Portland is \$5.16 per bushel. Cash costs are \$1.59 per bushel (cash cost for land expense omitted). Notice that these budgets include costs for 2 acres--one acre of summer fallow and one acre of winter wheat. Machinery costs and assumptions are given in detail in the appendix tables.

Wheat yields in the Columbia Plateau may be affected by adverse or beneficial growing conditions. The bottom section of table 2 compares the total wheat production cost per bushel at the assumed yield of 34 bushels per acre with yields above and below the long term average. These costs assume

that the costs of cultural operations are held constant, while harvesting and marketing costs vary according to yield. Thus, an illustration of the sensitivity of wheat production costs to changes in yields caused by varying growing conditions is provided.

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 expenses. Each year the wheat farm business must generate sufficient cash receipts to meet these cash requirements. Besides meeting these cash costs each year, over a number of years the business must generate sufficient income to cover other noncash costs indicated in table 2. Cash requirements will vary with leasing arrangements, mortgage and debt levels, and family living needs. Here again, growers should determine their own cash requirements.

Appendix tables A-1 through A-3 show the complement of machinery used on the representative study farm and the method used for calculating the ownership and operating costs for each piece of machinery.

Fifteen Year Summary

This study has been conducted for 15 consecutive years. Table 3 summarizes the costs of producing wheat on a per acre basis for each of these years. All values are reported on a nominal basis and have not been adjusted for inflation. This section will briefly examine several trends apparent in this data.

Cash costs have increased from \$49.80 to \$70.76, representing an increase of \$20.96 per acre. Cash costs peaked in 1982 at \$74.74. Comparing the individual components of cash costs in 1974 to 1988, we see that the major increases have occurred in herbicide, fuel, repairs, and marketing.

Fixed costs have increased at approximately the same rate as cash costs, rising from \$72.15 in 1974 to \$104.84 in 1988. In figure 1, we see that land accounted for 56% of fixed costs in 1974, operator labor and management accounted for 16% of fixed costs, and machinery interest and depreciation represented 28% of fixed costs. Figure 2 shows that in 1988 land has declined to 46% of fixed costs, operator labor and management has remained approximately the same, and machinery interest and depreciation has risen to 40% of fixed costs. This indicates that over the last 15 years, land costs have declined relative to machinery. Possible explanations for this include declining land values, increasing machinery values, or a combination of these factors.

Land costs changed drastically from 1980 to 1981, due to a change in the method of determining land expenses. Prior to 1981, property taxes and interest on land investment were used to determine land expenses. Since 1981, market rental rates have been used.

Total costs per acre have risen from \$121.95 in 1974 to \$175.60 in 1988. Figure 3 displays total costs graphically, and identifies total cash and fixed costs in each year. Total costs were fairly steady from 1974 to 1977. High interest rates and fuel prices drove total costs upward from 1978 to 1980. Since 1981, total costs have again remained fairly steady, with slight declines in 1986 and 1987.

Total cost per bushel is calculated in table 3, and ranges from \$3.81 in 1974 to \$5.16 in 1988, with a peak cost of \$6.09 in 1980. Cost per bushel has been greater than \$5.00 in 8 out of the last 15 years. However, these costs are based on assumed yields of 32 to 34 bushels per acre.

In figure 4, the assumed yields in the study are compared to "actual" yields. The "actual" yields are 5-county averages (Gilliam, Morrow, Sherman,

Umatilla, and Wasco counties) based on data collected by the Office of Economic Information, Oregon State University. The "actual" yields are equal to or greater than the study yields in 14 out of 15 years. One explanation for this is that the "actual" yields include both dryland and irrigated yields, thus pulling up average yields. Also, the original focus for this study included only the 32 bushel zone of Sherman, Gilliam, and Morrow counties. Recently, the study has expanded its scope to include higher yield areas of Wasco and Umatilla counties.

Another factor to be considered is government programs. These programs have typically encouraged producers to remove less productive ground from production, thus increasing average yields. Finally, we must recognize the contributions of Warren Kronstad and the Oregon State University wheat research and breeding programs in the provision of higher yielding wheat varieties.

Concluding Note

The cost estimates presented in this report are based on a number of assumptions. The situation described is not characteristic of all farm operations. It is essential to use the figures reported primarily as a guide. The "Your Cost" column of table 2 should be used to calculate your own estimated cost of production. Considerable judgment should be exercised in generalizing costs to situations differing from those identified above.

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

	Labor		Machinery costs ^(a)		Other		Total Cost
	Hours	Value (\$)	Operating (\$)	Ownership (\$)	Item	Cost (\$)	
Cultural operations							
Mold-board plow, 10-16"	0.18	1.64	2.01	4.98			8.63
Cultivator, 40' (1.5X)	0.11	1.00	1.31	3.36			5.68
Rod weed, 48' (3X)	0.20	1.80	2.71	5.17			9.68
Fertilize ^(b)	0.07	0.60	0.58	1.11	30 # N	6.00	8.29
Drill seed, 4-8' (1.1X)	0.08	0.76	1.11	3.60	55 # seed	6.60	12.07
Haul seed ^(c)	0.01	0.07	0.07	0.17			0.31
Spray herbicide ^(d)					chemicals custom	6.50	
						4.00	10.50
Harvest operations							
Combine, 20' hillside	0.14	1.29	3.65	14.34			19.28
Haul grain ^(e)	0.14	0.86	1.73	4.20			6.79
Other charges							
Other labor ^(f)	0.50	3.75					3.75
Pickup truck ^(c)	1.51	2.82					4.32
Other machinery			1.00	3.51			4.51
Conservation practices						0.30	0.30
Crop insurance ^(g)						2.61	2.61
Marketing ^(h)						16.66	16.66
Operating capital interest						3.44	3.44
Miscellaneous ⁽ⁱ⁾						5.00	5.00
Land charge ^(j)						48.00	48.00
Management						5.80	5.80
TOTAL COST PER PLANTED ACRE		11.77	15.68	43.25		104.91	175.60

- (a) Machinery operating costs include repairs (parts and labor), maintenance, oil and lubrication. Machinery ownership costs include depreciation, interest on average investment @ 12.75 %, and insurance.
- (b) Fertilizer cost includes use of the applicator.
- (c) Based on the following mileages: 250 miles on trucks hauling seed, 6250 miles on trucks hauling grain and 10000 miles on pickup.
- (d) Where morning glory control is necessary, add \$7.05 for herbicide plus \$2.50 for application.
- (e) Hired labor cost (wages and benefits) for hauling grain is based on 175 hours per year @ \$6.00 per hour.
- (f) Other labor includes such items as moving and servicing machinery, checking fields, etc. Half of this is hired @ \$6.00 per hour.
- (g) Crop insurance includes hail and fire at \$0.86 and Multi-Peril crop insurance at \$1.75 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 @ \$0.24/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

Expense category	Unit cost	Study costs	Your cost
		—\$ per planted acre—	
Cash operating costs			
Fertilizer	0.2 \$/lb	6.00	_____
Wheat seed	0.12 \$/lb	6.60	_____
Herbicide and application		10.50	_____
Diesel fuel	0.75 \$/gal	3.92	_____
Gasoline	0.95 \$/gal	1.75	_____
Lubricants		1.08	_____
Machinery repair		8.93	_____
Crop insurance		2.61	_____
Conservation practices		0.30	_____
Hired labor	6.00 \$/hr	2.36	_____
Miscellaneous		5.00	_____
Operating capital interest	12.5 %	3.44	_____
Subtotal		52.48	_____
Cash ownership costs			
Machinery insurance and fees		1.62	_____
Subtotal		1.62	_____
Other ownership costs			
Land charge		48.00	_____
Interest on machinery	12.75 %	23.71	_____
Machinery depreciation		17.92	_____
Subtotal		89.63	_____
Operator labor and management			
Operator labor	9 \$/hr	9.41	_____
Management		5.80	_____
Subtotal		15.21	_____
Marketing 34 bu/ac @	0.49 per bu	16.66	_____
TOTAL COST PER ACRE		175.60	_____
Total cost per bushel at	34 bu/ac	5.16	_____
Total cost per bushel at	30 bu/ac	6.32	_____
Total cost per bushel at	40 bu/ac	4.90	_____
Total cost per bushel at	60 bu/ac	3.49	_____

Table 3. Dryland Wheat Production and Marketing Costs per Acre, 1974-1988

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
CASH COSTS															
Fertilizer	6.30	6.00	5.55	5.10	5.10	5.10	6.00	6.60	6.75	6.90	6.90	7.20	6.15	5.70	6.00
Wheat Seed	5.66	5.36	4.13	3.80	4.95	6.16	6.16	6.05	6.22	6.10	5.50	5.50	4.54	4.81	6.60
Herbicide	6.35	6.85	6.31	6.13	5.81	5.84	6.74	7.02	8.73	8.81	10.18	9.19	9.44	9.50	10.50
Fuel	3.12	3.51	3.55	3.77	4.03	6.84	8.18	8.35	7.97	7.19	6.81	6.79	4.33	5.66	5.67
Machinery Repairs	5.43	6.00	5.71	6.07	6.58	7.37	8.11	8.03	8.09	8.09	8.08	7.71	8.51	8.51	8.93
Marketing	8.80	8.96	9.57	10.56	11.22	13.20	15.30	16.32	17.00	16.66	16.66	16.32	16.32	16.32	16.66
Oper. Interest	1.74	2.00	1.60	2.35	2.78	3.61	4.20	4.60	4.50	3.60	4.26	3.07	2.33	2.77	3.44
Hired Labor	1.47	1.89	1.88	1.97	2.07	2.23	2.47	2.15	2.95	3.15	3.15	2.16	2.15	2.36	2.36
Other	10.93	9.60	9.70	9.50	10.13	10.55	11.16	11.43	12.53	12.12	12.24	9.68	9.55	9.56	10.60
TOTAL Cash Costs	49.80	50.17	48.00	49.25	52.67	60.90	68.32	70.55	74.74	72.62	73.78	67.62	63.32	65.19	70.76
FIXED COSTS															
Land Charge	40.45	50.16	50.54	49.20	52.34	65.04	81.90	50.00	50.00	50.00	50.00	50.00	43.00	45.00	48.00
Machinery Interest	9.79	10.05	10.19	10.90	13.16	18.98	24.25	27.22	27.57	23.78	27.23	22.35	19.63	21.84	23.71
Machinery Depreciation	10.44	11.01	11.81	12.59	13.39	14.42	16.06	14.44	15.84	16.51	16.97	17.05	15.45	16.22	17.92
Operator Labor & Mgmt.	11.47	12.37	12.50	12.87	13.73	15.08	16.58	15.16	15.21	15.21	15.22	15.21	15.21	15.21	15.21
TOTAL Fixed Costs	72.15	83.59	85.04	85.5	92.62	113.52	138.79	106.82	108.62	105.50	109.42	104.61	93.29	98.27	104.84
TOTAL Costs per acre	121.95	133.76	133.04	134.81	145.29	174.42	207.11	177.37	183.36	178.12	183.20	172.23	156.61	163.46	175.60
Cost per Bushel	3.81	4.18	4.03	4.09	4.40	5.29	6.09	5.22	5.39	5.24	5.39	5.07	4.61	4.81	5.16
YIELD Assumed (bu.)	32	32	33	33	33	33	34	34	34	34	34	34	34	34	34
YIELD Actual (bu.)	33	39	38	25	37	33	49	57	43	51	50	40	43	56	54

Figure 1. Fixed Costs per Acre, 1974

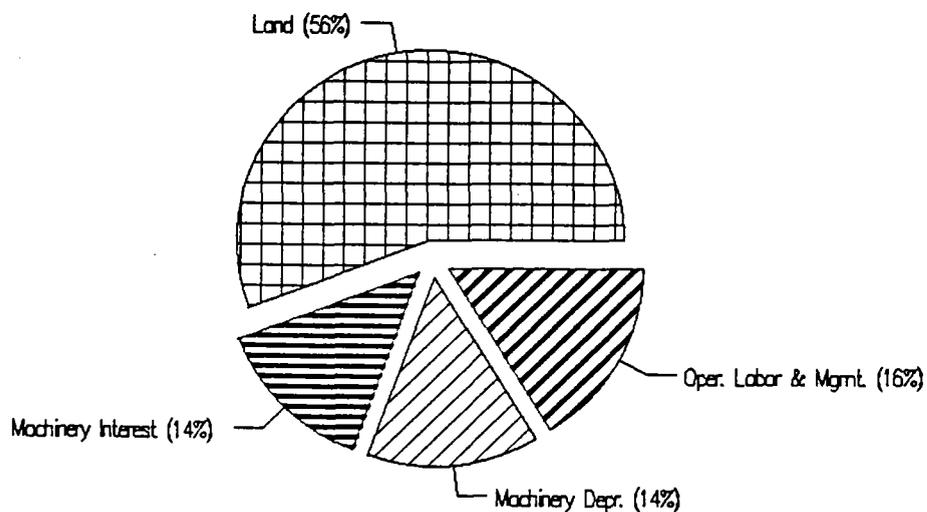


Figure 2. Fixed Costs per Acre, 1988

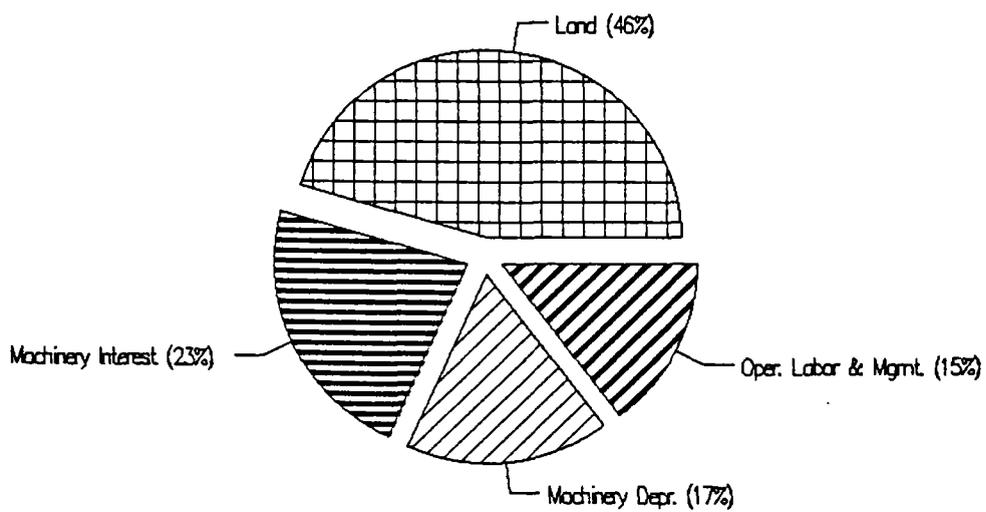


Figure 3. Total Cost per Acre 1974-1988

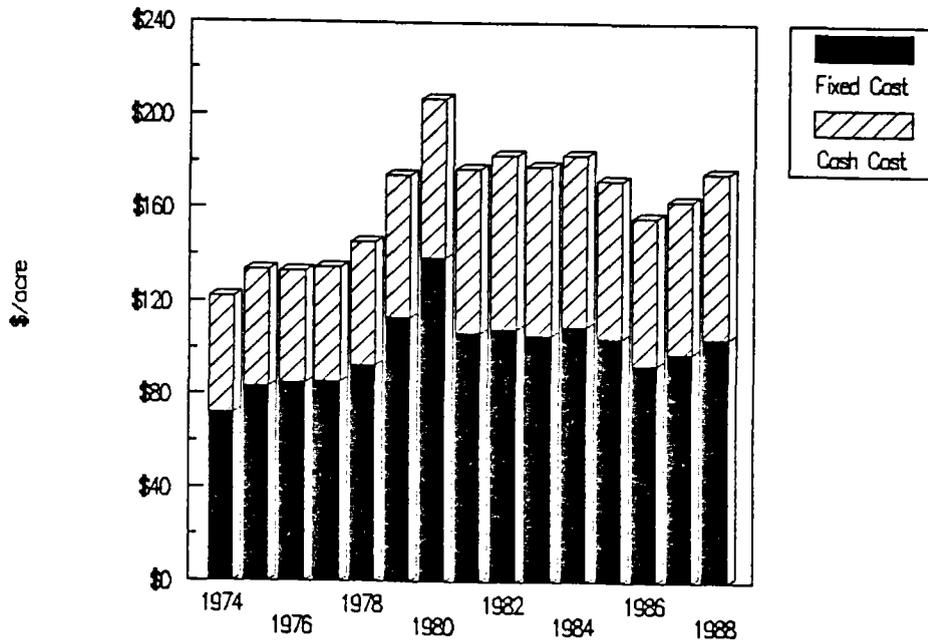


Figure 4. Study vs. Actual Yields

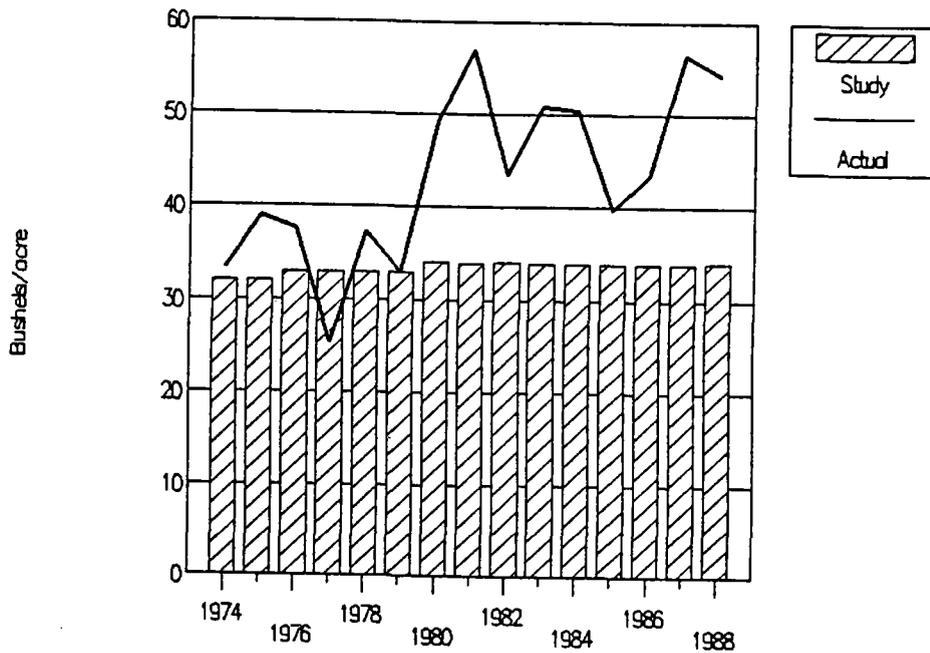


Table A-1. Machinery Assumptions for the 2,500 Acre Dryland Wheat Farm, Oregon Columbia Plateau

Machine	Purchase price (\$)	Current value ^(a) (\$)	Salvage value (\$)	Remaining life ^(b) (yrs)	Annual use	Fuel consumption
Crawler tractor, 90 DBHP	100000	60473	20945	7.5	806 hrs	7 gal/hr
Mold-board plow, 10-16"	18700	11100	3500	7.5	227 hrs	--
Cultivator, 40'	14500	9132	3763	7.5	139 hrs	--
Rod weeder, 48'	15000	9900	4800	5	250 hrs	--
Grain drills, 4-8' ^(c)	21000	13252	5504	7.5	106 hrs	--
Combine, 20' hillside	122000	78500	35000	6	179 hrs	5 gal/hr
Trucks, 2-ton ^(d)	32500	21500	10500	5	6500 mi	5 mi/gal
Pickup, 3/4 ton, 4 X 4	15500	9750	4000	3	10000 mi	10 mi/gal
Other machinery ^(e)	28500	18125	7750	5	1250 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 wagon, disc, rotary hoe and harrow.

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

Machine	Depreciation ^(a) (\$/yr)	Interest ^(b) 12.75% (\$/yr)	Insurance (\$/yr)	Total annual ownership costs (\$/yr)
Crawler tractor, 90 DBHP	5270	7710	480	13461
Mold-board plow, 10-16"	1013	1415	—	2429
Cultivator, 40'	716	1164	—	1880
Rod weeder, 48'	1020	1262	—	2282
Grain drills, 4-8'	1033	1690	—	2723
Combine, 20' hillside	7250	10009	671	17930
Trucks, 2-ton	2200	2741	520 ^(c)	5461
Pickup, 3/4 ton, 4 X 4	1917	1243	360 ^(c)	3520
Other machinery	2075	2311	—	4386
TOTAL	22494	29546	2031	54071

(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

Machine	Repairs ^(a) (\$/yr)	Fuel ^(b) (\$/yr)	Lube (\$/yr)	Total annual operating costs (\$/yr)	Total annual costs ^(c) (\$/yr)
Crawler tractor, 90 DBHP	1971	4229	781	6982	20442
Mold-board plow, 10-16"	545	—	—	545	2974
Cultivator, 40'	436	—	—	436	2316
Rod weeder, 48'	1223	—	—	1223	3506
Grain drills, 4-8'	474	—	—	474	3197
Combine, 20' hillside	3714	670	173	4557	22487
Trucks, 2-ton	819	1235	195	2249	7710
Pickup, 3/4 ton, 4 X 4	735	950	200	1885	5405
Other machinery	1247	—	—	1247	5633
TOTAL	11165	7084	1350	19599	73670

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

(b) Based on: 0.75 per gallon for diesel fuel and
0.95 per gallon for gas.

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

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