

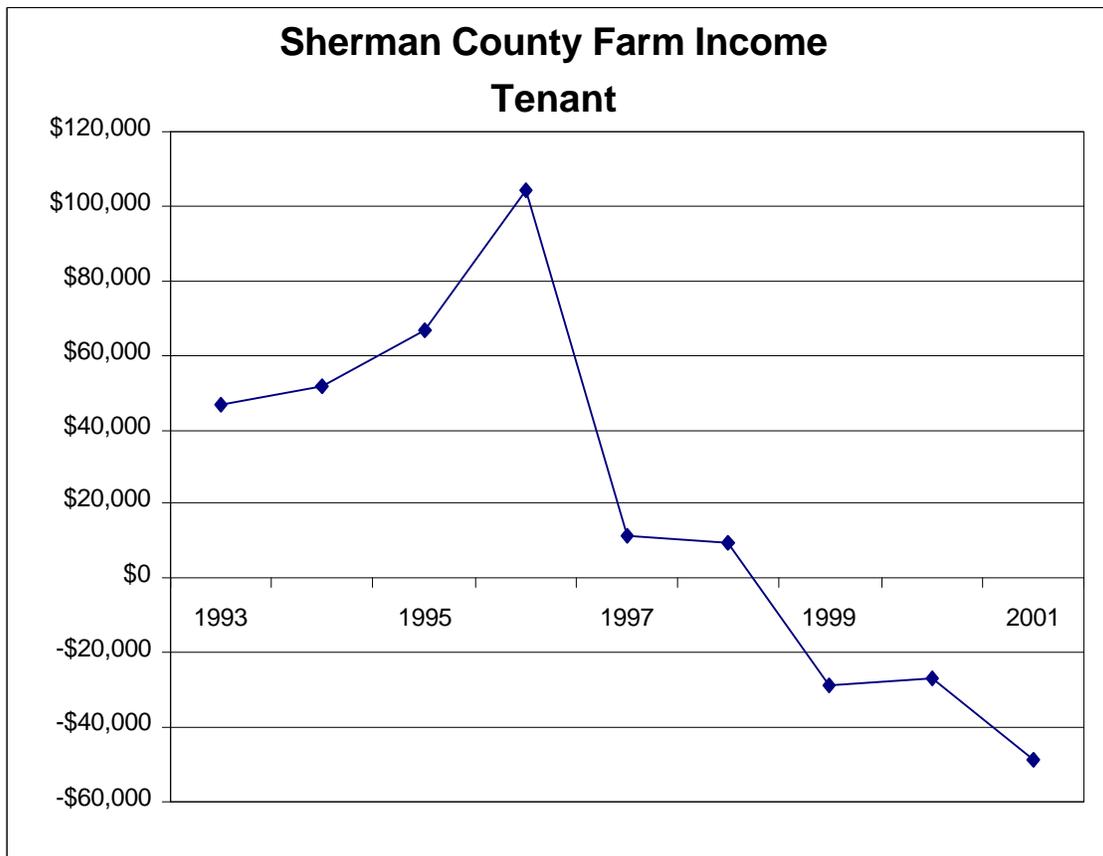
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The Effect of the Farm Crisis on Oregon Wheat Growers A Case Study of a Representative Farm in Sherman County

by

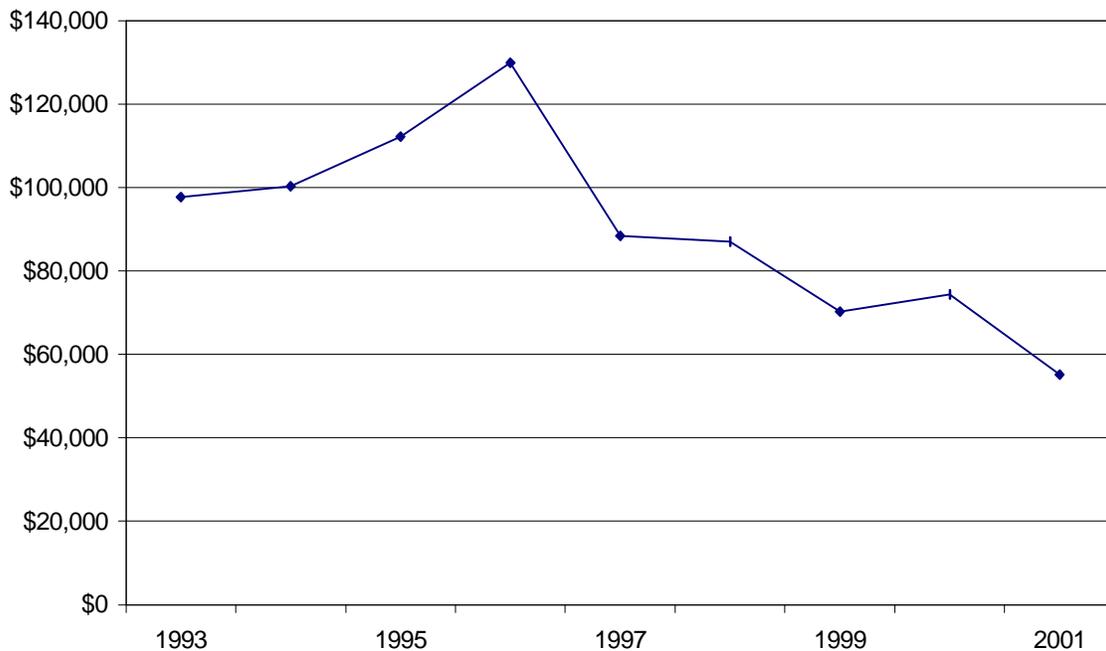
Tom McCoy
541-442-5233
tmccoy@gorge.net

How serious is the current agricultural depression? One way to answer this question is to examine how farm income has changed for a farmer who leases his land, pays all the expenses, and receives 2/3 of the crop. Each year, Oregon State University publishes a study that estimates the cost of production for a typical wheat farm in North Central Oregon. The farm modeled by the OSU cost of production study uses the summerfallow method of farming and has 1,500 acres of cropland each year and 3,000 total acres in the farm. This farm closely matches a representative wheat farm in Sherman County and the cost figures from the study were used along with actual Sherman County wheat yields and actual wheat prices to calculate net farm income.



Net income is also calculated separately for the landlord. The landlords are assumed to receive 1/3 of the crop and to pay the property taxes. Although some farmers own the land they farm, most farmland in Sherman County is leased.

Sherman County Farm Income Landlord



Annual farm income is calculated by first multiplying actual average Sherman County wheat yields per acre by the net Portland price of soft white wheat. The net Portland price is calculated by subtracting marketing costs (handling, transportation to Portland, storage, and the 3¢ per bushel wheat commission assessment) from the yearly average price of soft white wheat delivered to Portland. Government payments (Deficiency, AMTA, and Market Loss Payments and LDP) are then added to wheat sales income to obtain total revenue. Cash and machinery costs from the OSU cost of production study are subtracted from total revenue to estimate farm income for the tenant. Property taxes, fire and hail insurance on the landlord's share of the crop, and conservation expenses are deducted from the landlord's total revenue to calculate net income for the landlord. Net income per acre is multiplied by the 1500 crop acres in the representative farm to calculate total net income.

In calculating farm income, the focus is on cash costs. Fertilizer, chemicals, seed, fuel, and repairs are among the costs included. The operator is assumed to do most of the farm labor, but the cost of the operator's labor is not included since it is not a cash cost. Extra

labor hired at harvest is included in the cash costs. The calculated farm income can be interpreted as the return to the operator's labor and management.

INCOME OF SHERMAN COUNTY TENANT WITH 1/3-2/3 LEASE										
1500 acres of cropland										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	prelim.
	(per acre)									
Wheat Sales Income	120	134	157	175	118	100	71	76	65	
Gov Payments										
Def., AMTA, Mark.Loss	26	16	9	14	16	25	32	31	26	
LDP						7	6	8		
Total Revenue/acre	146	150	166	189	134	132	110	115	91	
Cash Costs/acre	79	69	68	75	76	75	76	79	79	
Cash Income/acre	68	81	98	114	58	58	34	37	12	
Machinery Exp/acre	37	47	54	45	51	51	54	54	44	
Income/acre	31	35	44	70	8	6	-19	-18	-32	
	Farm totals = per acre x 1,500 acres									
Income before equipment expenses	101,421	121,644	147,310	171,409	87,745	86,678	51,505	55,071	17,645	
Equipment expenses	54,855	69,885	80,895	67,005	76,020	77,160	80,340	81,720	66,045	
Net farm income	46,566	51,759	66,415	104,404	11,725	9,518	-28,835	-26,649	-48,400	
Av Portland SWW Price	3.53	4.16	5.27	4.54	3.78	3.02	3.02	2.99	3.60	
- marketing costs	0.53	0.56	0.56	0.56	0.56	0.59	0.59	0.60	0.64	
Net Wheat Price	3.00	3.60	4.71	3.98	3.22	2.43	2.43	2.39	2.96	
Sherman Co. Av. Wheat Yield (bu/acre)	60	56	50	66	55	62	44	48	33	

INCOME OF SHERMAN COUNTY LANDLORD WITH 1/3-2/3 LEASE										
		1500 acres of cropland								
		1993	1994	1995	1996	1997	1998	1999	2000	2001
						(per acre)				prelim.
Wheat Sales Income		60	67	78	88	59	50	36	38	33
Gov Payments										
Def., AMTA, Market Loss		13	8	4	7	8	13	16	16	13
LDP							3	3	4	
Total Revenue/acre		73	75	83	95	67	66	55	58	45
Property Tax		7	7	7	7	7	7	7	7	7
Fire and Hail Insurance		1	1	1	1	1	1	1	1	1
Conservation		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Cash Costs/acre		8	8	8	8	8	8	8	8	9
Income/acre		65	67	75	87	59	58	47	50	37
		Farm totals = per acre x 1,500 acres								
Net Income		97,640	100,257	112,232	129,838	88,409	87,073	70,242	74,344	55,075
Av Portland SWW Price		3.53	4.16	5.27	4.54	3.78	3.02	3.02	2.99	3.60
- marketing costs		0.53	0.56	0.56	0.56	0.56	0.59	0.59	0.60	0.64
Net Wheat Price		3.01	3.60	4.71	3.98	3.22	2.43	2.43	2.39	2.96
Sherman Co. Av. Wheat Yield (bu/acre)		60	56	50	66	55	62	44	48	33

Notes:

1. Wheat Sales Income = share of crop x average net Portland Price x average Sherman Co. yield. The average net Portland Price is the average SWW Portland Price minus the marketing costs from the OSU Cost of Production Studies (see below). The tenant is assumed to receive 2/3 of the crop and the landlord is assumed to receive 1/3.
2. Average SWW Portland Prices come from William I. Tierney, Jr., *Quarterly Wheat Outlook*, December 31, 2001. The 2001 SWW price is a ten-month average, since there are still two months remaining in the marketing year.
3. Sherman County historical wheat yields come from Sandy Macnab, Sherman Co. Extension Agent. Sandy's estimate of the average Sherman County wheat yield in 2001 was 27 bushels per acre. The 2001 crop was affected by a severe drought. The acreage of annual cropped wheat in Sherman County in 2001 increased enough that the county-wide average wheat yield differs from the average summerfallow yield. Sandy estimated that the summerfallow wheat yield in 2001 was 33 bushels per acre.
4. The deficiency payment (1993 and 1994) and the AMTA plus market loss payments (1995 to 2001) were based on a 45 bushel per acre payment yield. This is the yield used by the OSU Cost of Production study for the North Central Region of Oregon. The per bushel payment rate as follows:

1993	\$1.03	1998	\$.9927
1994	.35	1999	1.274
1995	.56	2000	1.225
1996	.631	2001	1.014

The per acre payment is the per bushel payment times 45 times .85 times share of crop.

5. The LDP payment = estimated LDP rate x actual average production x share of crop.

Estimated LDP rate = County Loan Rate – (Average Portland Price – County Differential)

For 1998, estimated LDP rate = 2.88 - (3.02 - .30) = .16

For 1999, estimated LDP rate = 2.88 - (3.02 - .35) = .21

For 2000, estimated LDP rate = 2.88 - (2.99 - .35) = .24

The LDP program was not used in other years since the county posted price (Average Portland Price – County Differential) was above the wheat loan rate.

6. The cash costs and machinery expense for the tenant and marketing costs for the years 1993 to 1999 were taken from Sandy Macnab, Gordon Cook, and Mary K. Corp, *A Quarter Century of Dryland Wheat Production and Marketing – Changes and Trends in Oregon's Columbia Plateau*, Special Report 1010, Oregon State University Extension Service, February 2000. These costs appear on page 5 of the report.

Cash Costs/acre = "TOTAL Variable Costs" – "Marketing" + "Insurance"

– landlords's share of fire & hail insurance on the crop (\$.83/acre) – conservation costs (\$.30/acre)

Machinery Expense/acre = "Mach. interest" + "Mach. depreciation"

Marketing costs/bushel = "Marketing"/ 45 bushels

For 2000 and 2001, Cash Costs and Machinery Costs were taken from Sandy Macnab, *Enterprise Budget – Wheat, Winter (Conventional) Mid-Columbia Area 2000 and 2001*, Oregon State University Extension Service, EM 8508, Costs are calculated as outlined above except that the cost of operator labor is included in TOTAL Variable Cost in the enterprise budgets and is subtracted out. Operator labor is estimated at \$11.41/acre. CRC federal crop insurance at the 75% level is added in the enterprise budget for 2001. Hence, the landlord's share of insurance on the crop that is subtracted out increased to \$1.47/acre.

There are two “costs” that may or may not be “cash costs” and this should be kept in mind when interpreting the results. They are machinery costs and land costs.

Machinery costs – Interest and depreciation on farm machinery are included and are listed as a separate expense category. If a farmer has his machinery paid for and can put off purchasing or replacing equipment, this expense can be delayed for several years as a cash expense. There is an old saying that in bad times a farmer “lives off his depreciation.” However, reliable equipment is a critical input in modern farming and newer equipment has features that improve efficiency. Purchases can be delayed but not for more than several years. Hence, it is reasonable to assume that over the period covered by this study, cash expenses on equipment should average close to the machinery expenses listed in the enterprise budgets. The enterprise budgets that are used to estimate machinery costs assume that the machinery is half depreciated.

Land costs – The opportunity cost of land is not included in calculating the landlord’s income. For the minority of farmers and landlords who are purchasing land, interest and principle payments can be a very big cash cost. However, this study attempts to estimate only net income before land costs. Ultimately, the value of land depends on the landlord’s income from the land. When wheat prices rose dramatically in the mid-1970’s, the landlord’s return rose and land prices increased. If the current depression persists, land prices should decline. Since land costs ultimately depend on landlord’s income, including land cost in estimating landlord’s income creates a circularity problem. For the reader who would like to account for the current opportunity cost of land, cropland with the 45 bushel per acre average yield used in this study sold recently for approximately \$450 per acre. Using a 6% interest rate, the opportunity cost of owning land would currently be approximately \$27 per acre. Since a crop is produced on an acre every other year, the opportunity cost would be \$54 per crop acre.

A Note on Lease Terms – In developing the net income figures presented here, I assume a lease with the landlord paying the property taxes and receiving one-third of the crop. Historically, this has been viewed as the “typical” lease in Sherman County for summerfallow land. However, most actual leases vary from the “typical” lease in some ways. The landlord’s actual share ranges from 25% to 50%. Often, a higher share is associated with the landlord paying part of the production expenses and/or providing some of the machinery. Amos Bechtel and Mary Corp have recently published a helpful framework for developing equitable leases (see *Flexible Crop-Share Leasing Agreements*, EM 8775, Oregon State University Extension Service, March 2001. A copy can be downloaded from Mary Corp’s excellent website, www.cerealcentral.com). Their paper has a section on issues relating to land costs. In the Mid-Columbia area, Clark Seavert did pioneering work in helping farmers develop new leases. Clark’s framework has been particularly helpful in deciding how a major change in farming practices should affect lease terms – e.g., how summerfallow leases should be modified when annual cropping is used on more of the leased land.

Viewed from a longer perspective, lease terms should change as farm income changes. This creates the same kind of circularity problem that complicates the use of land costs in

determining farm income. When wheat prices rise and farm income increases, tenants will compete to lease additional land and lease terms will become more favorable to the landlord. When wheat prices rose dramatically in the early 1970's, the "typical" new lease in Sherman County went from 1/3-2/3 to 40%-60%. When wheat prices returned to more normal levels in the 1980's, at least some leases switched back. If the current agricultural depression continues, lease terms may adjust further. Economic theory suggests that competition among tenants will cause lease terms to adjust so that the tenant is profitable, but earns just enough to keep him farming the land. Hence, lease terms depend on the tenant's expected profitability in the medium-term future. A look at the historic fluctuations in revenue per acre (see page 10) shows how difficult it is to predict profitability in the future. Given the uncertainty about future returns and the desirability of maintaining a long-term relationship between landlord and tenant, lease terms have been slow to adjust to the changes in economic conditions affecting agriculture.

Crop Insurance

Except for property taxes, the costs used in this study come from the OSU Enterprise Budgets (see note 6 on page 5) and I have tried to stay as close as possible to the assumptions used in developing the Enterprise Budgets. Until 2001, the yearly OSU Enterprise Budgets included fire and hail insurance on the crop but did not include the cost of federal crop insurance. In 2001, CRC crop insurance at the 75% level was added. If the crop insurance guarantee is calculated based on the 45 bushel per acre average yield assumed in the Enterprise Budgets, a federal crop insurance payment might have been made in 2001, but it would have been very small. Seventy-five percent of 45 bushels is slightly above the 33 bushel actual average yield in 2001. In 2001 the CRC harvest price of \$3.52 per bushel exceeded the base price of \$3.41 per bushel, so the revenue insurance component of CRC did not cause a payment. Hence, it seemed reasonable to ignore crop insurance payments in calculating net income on pages 3 and 4.

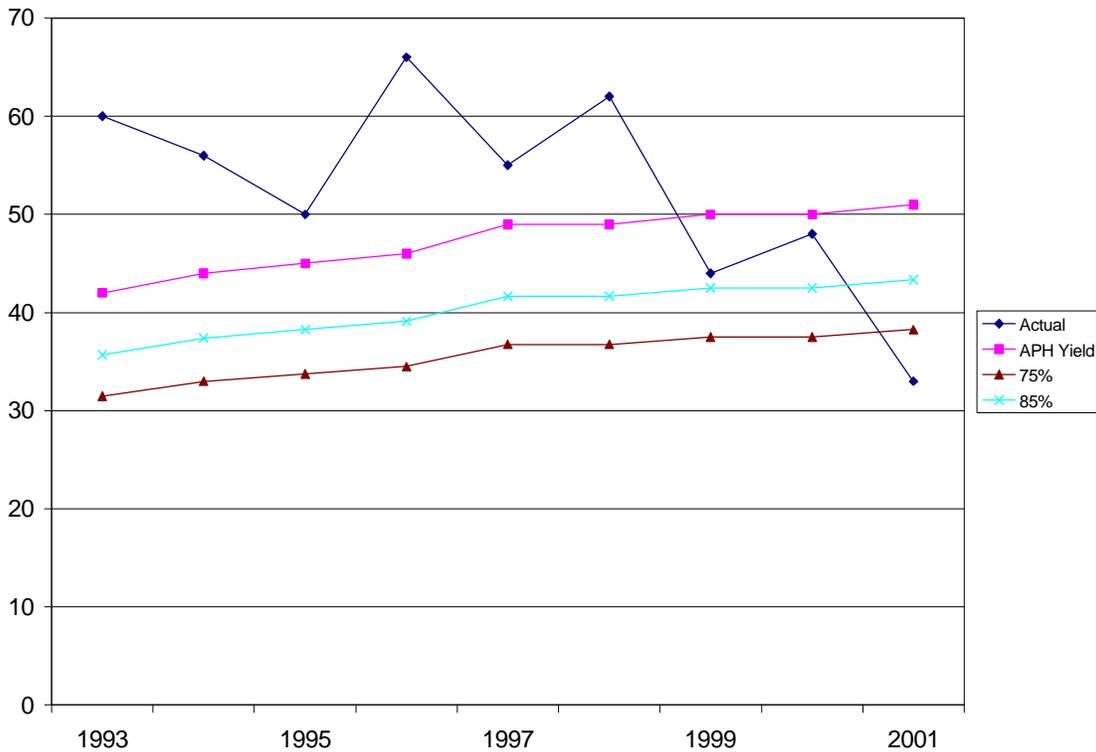
There is an alternative approach that could be used to account for the effect of crop insurance on farm income. The crop insurance guarantee for 2001 can be calculated from the actual yield history (see page 11). For farmers, the crop insurance guarantee is based on a percentage of the "Actual Production History (APH) yield." The "APH yield" is the average yield for the previous 10 years. If a farm's past yields equal the historic Sherman County average yields, the APH yield for 2001 would be 51 bushels per acre. By using this APH yield for 2001 and the CRC harvest price of \$3.52 per bushel, we can calculate the payment that crop insurance would have made to the tenant insured at the 75% level:

$$[(51 \times .75) - 33] \times \$3.52 \times .6667 = \$12.32 \text{ per acre}$$

By a similar calculation, the landlord would have received a payment of \$6.16 per acre in 2001. These payments could be added to the income figures for 2001 (although strictly speaking the cost of federal crop insurance would also need to be increased slightly above what it is in the Enterprise Budget because of the higher guarantee). If these crop insurance payments are added, the tenant's net income would increase by \$18,480 (to -\$29,920) and the landlord's net income would increase by \$9,240 (to \$64,315).

Using the same procedure, crop insurance yield guarantees can also be calculated for the other years in the study (see the graph below). The average Sherman County APH yield over the nine years used in this study is 47 bushels per acre and APH yields are slowly increasing. The actual yield does not fall below the crop insurance guarantee (even at the 85% level) in any year except 2001. This provides some justification for the decision to leave federal crop insurance out of the Enterprise Budgets until 2001.

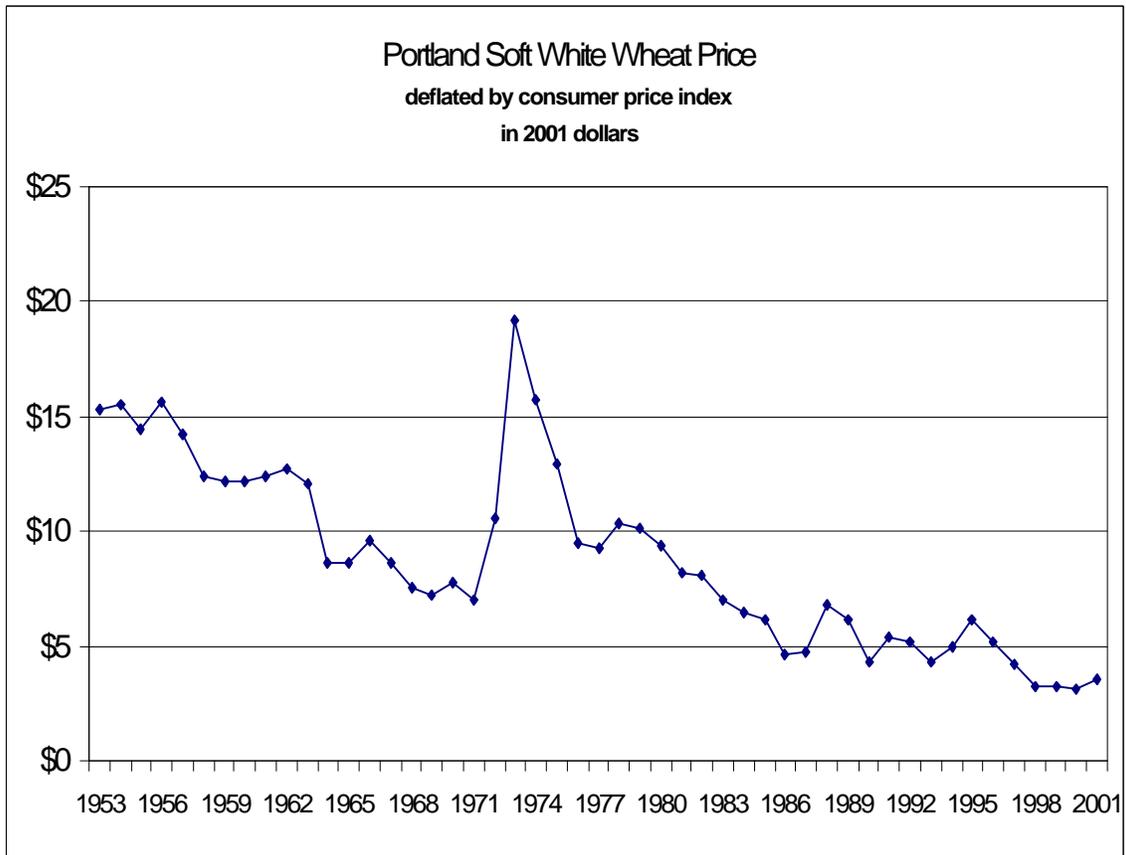
Sherman County Yields and Crop Insurance Guarantees Calculated from Sherman County Average Yields



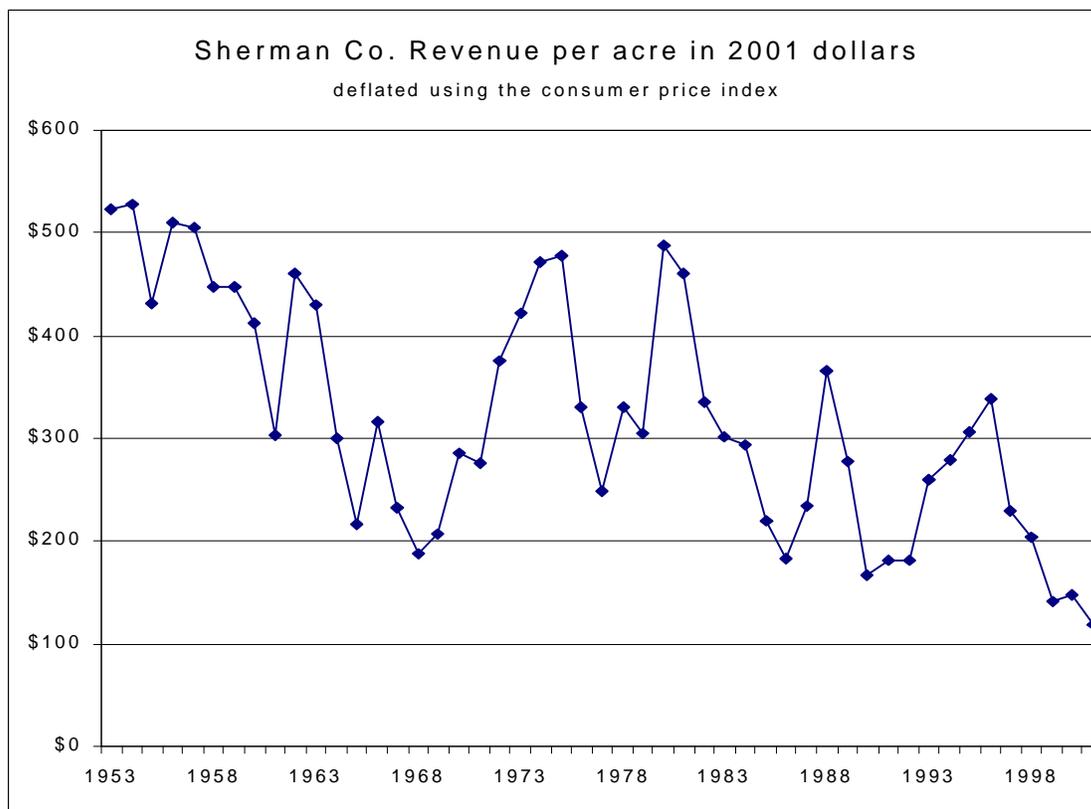
Many changes have been made in federal crop insurance during the last four years. The cost of federal crop insurance has been reduced by the increase in the federal subsidy, the maximum guarantee has been increased from 75% of the APH yield to 85%, and Crop Revenue Coverage (CRC) insurance has been added as an option. CRC insurance provides both traditional yield insurance and revenue insurance that protects against a fall in wheat prices. In some ways, CRC insurance is similar to traditional crop insurance plus a federally subsidized put option. Until the recent reforms, many summerfallow farmers in Sherman County could reasonably ignore federal crop insurance except in years following a drought. Recent changes have made crop insurance a more important management tool and have provided many more options. With so many options, deciding which options a “representative” farm will use is increasingly difficult.

Trends in Prices and Revenue Per Acre

Another way to view the extent of the current crisis is to examine the historical trends in wheat prices and total revenue per acre for a Sherman County farm with a yield equal to the county average.



To account for the effects of inflation, the *consumer price index* was used to adjust all prices to 2001 dollars -- i.e., to adjust the prices and revenue per acre in past years so that they have the same buying power as they would have had in 2001. The inflation-adjusted price of soft white wheat reached record low levels in 2000.



The revenue per acre is calculated by multiplying the inflation-adjusted Portland price by the Sherman County average yield. Marketing costs have not been deducted. Inflation-adjusted revenue per acre in 2001 is the lowest during the period from 1953 to the present. This is due to both low wheat prices and the severe drought that affected Sherman County in 2001.

Acknowledgements

I owe a big debt to Sandy Macnab, Sherman County Extension Agent, for providing most of the data that are presented here. Sandy develops annual Sherman County yield estimates and I used his wheat yield history and white wheat price data. For many years, he has been one of the main collaborators in publishing enterprise budgets for winter wheat in the Mid-Columbia (EM 8508). The cost estimates in these annual budgets have been very useful to local farmers and are the basis of the estimates developed here. Although I added a few items such as farm program payments and property taxes, this study could be accurately described as a rearrangement of Sandy's data. Dick Stradley, Sherman County Assessor, was also helpful in consulting on property taxes and landlord costs. Neither Sandy nor Dick is responsible for any errors.

	Sherman County Yield (Bu/A)	Portland SWW Price	Consumer Price Index 2001=100	Consumer Price Index 82-84=100	Portland SWW Price in 2001 \$	Revenue per acre in 2001 \$
1953	34.1	2.32	15.1	26.7	15.36	523.62
1954	34.0	2.36	15.2	26.9	15.53	528.05
1955	29.9	2.19	15.1	26.8	14.45	432.12
1956	32.6	2.41	15.4	27.2	15.67	510.70
1957	35.5	2.26	15.9	28.1	14.22	504.75
1958	36.3	2.02	16.3	28.9	12.35	448.23
1959	36.7	2.00	16.4	29.1	12.18	446.93
1960	33.9	2.04	16.7	29.6	12.18	412.96
1961	24.4	2.10	16.9	29.9	12.42	303.06
1962	36.1	2.17	17.1	30.2	12.74	459.81
1963	35.7	2.08	17.3	30.6	12.04	429.76
1964	34.9	1.51	17.5	31.0	8.62	300.67
1965	25.1	1.53	17.8	31.5	8.62	216.47
1966	32.8	1.76	18.3	32.4	9.64	316.26
1967	27.0	1.62	18.9	33.4	8.59	231.93
1968	25.0	1.47	19.6	34.8	7.50	187.41
1969	28.7	1.49	20.7	36.7	7.19	206.36
1970	36.6	1.71	21.9	38.8	7.78	284.83
1971	39.5	1.60	22.9	40.5	7.00	276.54
1972	35.7	2.48	23.6	41.8	10.52	375.42
1973	22.0	4.80	25.1	44.4	19.15	421.21
1974	30.0	4.38	27.8	49.3	15.73	471.81
1975	37.0	3.93	30.4	53.8	12.94	478.66
1976	35.0	3.04	32.1	56.9	9.46	331.17
1977	27.0	3.16	34.2	60.6	9.23	249.34
1978	32.0	3.80	36.8	65.2	10.32	330.30
1979	30.0	4.17	41.0	72.6	10.17	305.17
1980	52.0	4.36	46.5	82.4	9.37	487.28
1981	56.3	4.20	51.3	90.9	8.18	460.69
1982	41.6	4.39	54.5	96.5	8.06	335.16
1983	43.0	3.95	56.2	99.6	7.02	302.01
1984	45.0	3.82	58.7	103.9	6.51	293.01
1985	36.0	3.72	60.8	107.6	6.12	220.42
1986	39.0	2.90	61.9	109.6	4.69	182.76
1987	49.0	3.06	64.1	113.6	4.77	233.75
1988	54.0	4.53	66.8	118.3	6.78	366.21
1989	45.0	4.31	70.0	124.0	6.16	277.00
1990	39.0	3.16	73.8	130.7	4.28	166.99
1991	34.0	4.11	76.9	136.2	5.34	181.70
1992	35.0	4.11	79.2	140.3	5.19	181.58
1993	60.0	3.53	81.6	144.5	4.33	259.58
1994	56.0	4.16	83.7	148.2	4.97	278.39
1995	50.0	5.27	86.1	152.4	6.12	306.21
1996	66.0	4.54	88.6	156.9	5.12	338.22
1997	55.0	3.78	90.6	160.5	4.17	229.40
1998	62.0	3.02	92.0	163.0	3.28	203.44
1999	44.0	3.02	94.1	166.6	3.21	141.25
2000	48.0	2.99	97.2	172.2	3.08	147.60
2001	33.0	3.60	100.0	177.1	3.60	118.80