Farm Business Management Reports		EB1907
	# ECONOMICS OF WINTER WHEAT-SUMMER FALLOW VS. CONTINUOUS NO-TILL SPRING WHEAT IN THE HORSE HEAVEN HILLS, WASHINGTON	
	Douglas L. Young Herbert R. Hinman William F. Schillinger	
		

Table of Contents

**Economics of Winter Wheat-Summer Fallow vs.
Continuous No-Till Spring Wheat in the
Horse Heaven Hills, Washington**

Douglas L. Young, Herbert R. Hinman, and William F. Schillinger[1]

Introduction

This publication presents comparisons of the production costs and profitability of traditional winter wheat-summer fallow grown under conventional tillage with those of continuous no-till hard red spring wheat. The results are based on a 1997-2000 experiment conducted on the Doug Rowell Farm in the southern section of Horse Heaven Hills (HHH**)** in Benton County, Washington (See Figure 1).

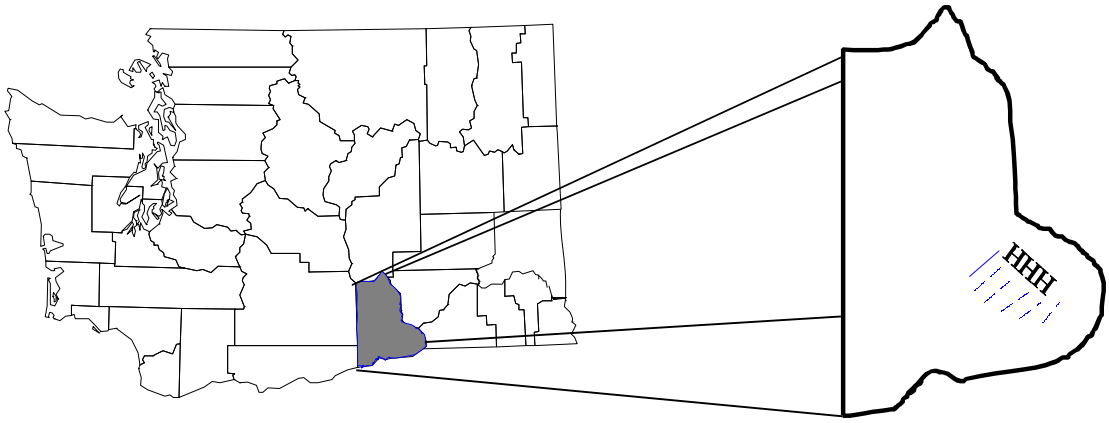

Figure 1. Benton County, Washington.

The HHH encompasses approximately 300,000 cultivated dryland acres. This region receives less precipitation than any other nonirrigated cereal production region in the United States. The long-term average precipitation on the Rowell Farm in the southern portion of the HHH is only 6.5 inches per year, essentially equal to the 6.6-inch per year average over 1997-2000 at the experiment site. Not surprisingly, given such a dry climate, crop yields for soft white winter wheat after fallow are among the lowest and most varied in the state. The long-run average on the entire Rowell Farm is 24 bushels per acre and only 20 bushels per acre on the drier southern half of the farm. Growers in the HHH are considered some of the best practitioners of conservation tillage in the Inland Pacific Northwest. However, low production of crop residue and repeated drought cycles, combined with tillage during the fallow period, often leaves soils vulnerable to wind erosion due to lack of residue cover, clods, and roughness.

[1]Young and Hinman are Professors and Economists in the Department of Agricultural Economics and Schillinger is an Associate Scientist in the Department of Crop and Soil Sciences, Washington State University.

Growers in the HHH practice summer fallow to store a portion of the winter precipitation in the soil for use by the succeeding winter wheat crop. Storage efficiency of precipitation during the fallow cycle is low, generally around 30 percent. Successful establishment of winter wheat on fallow in late August or early September depends on carryover soil water from the previous winter. Seed is often placed as deep as eight inches below the soil surface with deep-furrow drills to reach adequate moisture for germination. Winter wheat stand establishment often fails due to inadequate seed-zone moisture, the need for seedlings to emerge through thick soil cover, or soil crusting caused by rain showers before seedling emergence. Cost of resowing winter wheat can sharply reduce profits in this low-yield-potential region.

Due to inefficient storage of precipitation, frequent difficulty with winter wheat stand establishment, and wind erosion hazards caused by lack of residue and tillage, growers in the Horse Heaven Hills are interested in alternatives to wheat-fallow farming. The purpose of our study was to compare winter wheat-fallow with no-till continuous hard red spring wheat on wheat yields, water use efficiency, control of Russian thistle, and farm economics. Grain yield and economics of the two systems for the first four years of the study are reported in this publication.

Experiment Description

In collaboration with Doug Rowell and the Benton County Wheat Growers Association, a six-year experiment was initiated in February 1997, on the driest region of the Horse Heaven Hills. The experiment compares the traditional winter wheat-summer fallow rotation to continuous no-till hard red spring wheat. Both the crop and fallow phases of the wheat-fallow rotation are present each year. The experimental design is a randomized complete block with six replications (total of 18 plots). The study covers eight acres with each plot 300 feet long and 60 feet wide. Historic winter wheat yields at the site had ranged from 3 to 30 bushels per acre. The Warden silt loam soil (coarse-silty, mixed, mesic Xerollic Camborthids) is more than six feet deep with a slope of less than two percent.

Equipment and field management for the wheat-fallow system are provided by Doug Rowell. Tillage operations entail primary spring tillage in March with a V-shaped sweep implement or tandem disk, followed by 2 or 3 rodweedings as needed during the late spring and summer to control Russian thistle. Fertilizer is not used during dry years. For example, during the three crop years of 1997-98 to 1999-2000, nitrogen fertilizer was applied only in 1997-98 at a rate of only 25 pounds per acre (see Appendix tables). Winter wheat is sown with a deep furrow drill in August, if adequate seed-zone moisture is available, or with ten-inch hoe drills after the onset of rains in October or November. In-crop broadleaf weeds are controlled with 2-4,D herbicide.

In the no-till treatment, hard red spring wheat is sown in February or early March with a low-disturbance Cross-slot drill. The Cross-slot is equipped with notched coulters on eight-inch row spacing that delivers seed and liquid fertilizer in one pass. Soil tests for soil moisture and nutrient availability are taken just prior to sowing each year to determine an optimum fertilizer rate based on 3.5 pounds of nitrogen for each expected bushel of wheat production for 14 percent grain protein. Two or three herbicide applications are required each year for the no-till continuous spring wheat system: a pre-plant glyphosate application if downy brome is present, an in-crop broadleaf herbicide, and a postharvest burn-down herbicide for Russian thistle control.

All plots are harvested in July with a commercial-size combine equipped with a 30 foot header. Grain yield from each plot is determined by auguring grain into a truck mounted on weigh pads.

Budgeting Procedures and Assumptions

For crops grown in the experiment, budgets are reported in this publication on an annual basis for 1997-2000 for hard red spring wheat (HRSW) and for 1998-2000 soft white winter wheat (WW)-Fallow plots. A separate budget is also prepared for the Rowell Farm's long-run average WW-Fallow operation. HRSW had not been grown on the farm. For the annual

experiment budgets, the costs are based on the actual sequence of operations conducted in the research plots. Application rates for fertilizer, herbicide, seed and other inputs are those used during the experiment, or by the host farmer, as appropriate (see Appendix tables). Fixed costs for property taxes and crop insurance were obtained from Rowell Farm.

The sizes and types of machinery utilized for both the experiment and farm budgets are based on machinery owned by Rowell Farm, which farms 11,625 acres in a wheat-fallow rotation. The years' use, salvage values, hours used per year, repair costs per year, and fuel consumption rates are as reported on the Rowell Farm. These data are listed in the Appendix tables.

For consistency, the budgets assume standard rates from other Washington dryland budgets for various miscellaneous items. Interest on capital invested in machinery and operating capital were assumed to be ten percent. Overhead expenses for general items like farm lighting, utility sheds, legal and accounting fees were computed at five percent variable cost.

The Rowell Farm owns and rents land. However, a charge for using land should be assessed in a consistent manner regardless of how it is acquired. In this study, the cost of using land for farming is the net amount, which a farmer foregoes by farming his/her land rather than renting it out. In this publication, this "net rent" is the prevailing crop share rent in the region net of any expenses borne by the landlord. For the Rowell Farm, the net rent for wheat-fallow ground is 1/4 of the WW crop, minus the landlord's expenses of 1/4 of the fertilizer bill, 1/4 of the crop insurance, and the annual property taxes. Because WW is harvested every other year, these returns and expenses are accumulated over two years and divided by two for conversion to an annual basis. For HRSW the same crop share and landlord expenses apply, but a crop is harvested every year.

This publication provides estimates of profitability for each rotation based on subtracting total production costs from the revenue from grain harvests. Grain yields from the experiment are reported for each year from 1997-2000 and for the average over the experiment. Yields from the Rowell Farm and from an earlier Horse Heaven Hills budget are long-term averages. All cost and revenue figures are presented on a per rotational acre basis; for example, for winter wheat-summer fallow, one can conceptualize rotational costs and revenues representing one-half acre of winter wheat and one-half acre of fallow. This correctly portrays the average return per acre per year of a grower who has one-half of the farm in fallow and one-half in winter wheat. It also ensures comparability on a standard per acre basis for differing crop rotations. In this report, prices are the 1995-1999 marketing year averages: $3.44 per bushel for soft white winter wheat (SWWW) and $4.18 per bushel for 14 percent protein HRSW. The analysis assumes the long-run average protein adjustment of $0.04 per bushel premium for every 1/4 percent additional protein from 14 percent to 15.5 percent, and a $0.09 per bushel discount for each 1/4 percent protein shortfall below 14 percent . These premiums and discounts vary over time depending on relative supply and demand conditions for different types of wheat. The price margins for HRSW compared with SWWW have also varied. For example, during 1993-1997, the price advantage of 14 percent protein HRSW over SWWW varied from $0.39 to $1.84 per bushel (USDA-NASS, USDA Ag. Marketing Service).

HRSW prices for the experiment are based on the HRSW protein levels achieved during the experiment each year. HRSW protein for the Rowell Farm average and for a 1993 Extension budget were assumed at 14 percent since exact levels were not known. Government transition, supplemental, and loan deficiency payments, which were substantial for 1998-2000, are not included in the net revenue results in Table 2. Including government payments would not influence the ranking of the experimental systems since these decoupled payments are not related to choice of cropping system.

Description of Appendix Budget Tables

The Appendix contains detailed budget tables for the production systems described in this publication. Each Appendix table number is followed by codes denoting the source of the data (R for Rowell and EXP for Experiment) and land use (SF for summer fallow, WW for winter wheat, HRSW for hard red spring wheat). The last two digits of the year are also affixed for the Experiment budgets. The Appendix budget tables are the following:

Table 1RSF presents Rowell's average Schedule of Operations and Estimated Costs per Acre for Summer Fallow. Table 2RSF presents the same costs as Table 1RSF in an itemized manner.

Table 3RWW presents Rowell's average Schedule of Operations and Estimated Costs per Acre for Winter Wheat after Summer. Appendix Table 4RWW presents the same costs as Table 3RWW in an itemized manner.

Tables 1EXSF97-99 present the Experiment's Schedule of Operations and Estimated Costs per Acre for Summer Fallow in the year listed in the title (1997 - 1999). Tables 2EXSF97-99 present the same costs in an itemized manner.

Tables 3EXWW98-00 present the Experiment's Schedule of Operations and Estimated Costs Per Acre for Winter Wheat after Summer Fallow in the year listed in the title (1998 - 2000). Tables 4EXSF98-00 present the same costs in an itemized manner.

Tables 1EXHRSW97-00 present the Experiment's Schedule of Operations and Estimated Costs per Acre for Continuous No-Till Hard Red Spring Wheat in the year listed in the title (1997 - 2000). Tables 2EXHRSW97-00 present the same costs in an itemized manner.

Table 5 presents the hourly machinery cost for the various machines used for winter and spring wheat production at the HHH in this study.

Appendix Tables 1 and 3. Schedule of Operations and Costs Per Acre for Summer Fallow-Winter Wheat

Appendix Tables 1 and 3 (codes following common budget types are deleted for concision) outline the schedule of field operations by calendar month, the type of machinery used, and the hours used per acre for the land use. The costs are divided into two categories. The first is machinery and land fixed costs. The second category, variable costs, is associated with operating machinery, labor, and purchasing services and materials. Total cost is the sum of fixed and variable costs.

Machinery fixed costs include depreciation, interest on the investment, property taxes, and insurance. These costs do not vary with the crops produced, given the ownership of a specific machinery complement, and are incurred whether or not a crop is grown. The per-hour fixed costs are determined by dividing the total annual fixed cost by the annual hours of machinery use for the Rowell Farm. Machinery fixed costs for a specific field operation are determined by multiplying the machine hours per acre times the per-hour fixed costs (Appendix Table 5).

Land fixed costs include taxes and net rent. As previously mentioned, net rent is based on rental agreements typical for the area minus expenditures typically covered by the landlord. The typical lease agreement is a one-fourth landlord and three-fourths tenant crop share, with the landlord paying land taxes, one-fourth of the fertilizer cost and one-fourth of the crop insurance. The tenant covers all other production expenses.

Thus, average net rent per acre for summer fallow-winter wheat produced by Doug Rowell is calculated as follows:

	$20.47	(one-fourth gross receipts from production)
-	$ 2.18	(land tax; summer fallow and winter wheat)
-	$ 1.03	(one-fourth fertilizer)
-	$ .75	(one-fourth crop insurance costs)
	$16.51	Net Rent per Acre

The net rent per acre for summer fallow-winter wheat produced under the other production systems is calculated in a similar manner. No share rents are charged in the fallow budgets as no crop is harvested.

While the owner-operator does not actually experience a land rental cost, the cost represents the minimum returns the owner-operator must have to justify growing this crop. This net rent return represents the income the owner-operator foregoes by producing this crop rather than renting to a tenant who produces the crop. Thus, the appropriate land charge for the owner-operator growing the crop is equal to the net rent lost. As used in this publication, land cost is termed an opportunity cost to indicate that it is not an out-of-pocket expense, but rather a return that is foregone as a result of choosing to use the land to grow this crop. To determine the profitability of crop production related to other activities, the owner-operator may want to consider these foregone returns, or opportunity costs, along with the usual production expenses. Of course, for the individual producer, any land costs that are actual cash costs, such as interest payments on loans outstanding or land rent payments, must be identified and treated as cash costs and not as opportunity costs. Changes in land value are not considered as part of this enterprise.

In Appendix Table 3, the previous year's summer fallow costs, plus interest, are included as part of the fixed costs of raising winter wheat. These are costs that ultimately must be covered by wheat sales if the enterprise is to remain profitable.

Variable costs vary directly with the crop grown and the number of acres produced. Variable costs include fuel, oil, repairs, fertilizer, chemicals, custom work, overhead, and interest on operating capital. Machine operating labor, including that provided by the owner-operator, is also included as a variable cost.

Appendix Tables 2 and 4. Itemized Costs Per Acre

Appendix Tables 2 and 4 itemize the costs appearing in the "Schedule of Operations and Costs Per Acre" for the respective Appendix Table 1. Most of the items are self-explanatory or have been previously explained. Two entries, "Interest on Tractors" and "Interest on Machinery," warrant additional explanation.

Tractor and machinery interest costs are calculated on the average annual investment in the machine. The average machine investment is (Purchase cost + Salvage value)/2. The ten percent interest charge made against this average investment represents either an opportunity cost (returns foregone by investing in the given machine rather than in an alternative investment) or interest paid on money borrowed to finance machine purchases, or both. Interest cost for one acre of summer fallow or winter wheat is determined by multiplying the respective machine and/or tractor hours per acre times the per-hour interest costs (Appendix Table 5).

Appendix Table 5. Hourly Machinery Costs

The data in Appendix Table 5 are used to estimate the per-hour fixed and variable costs of the machinery complement on the Rowell Farm which was used on both the farm and experiment. Machinery fixed costs include depreciation and interest on investment, property taxes, and insurance; these are costs that do not vary with crop grown or number of acres. Current replacement costs are used for all equipment and buildings. Note that interest on investment is charged as a ten percent opportunity cost to the enterprise. These are assumed to be the earnings foregone by investing money in the equipment and buildings rather than the next best alternative. This may also represent the interest paid on funds borrowed to purchase equipment. Equipment variable costs include repair, fuel, and lubrication–costs that vary with the crop grown and the number of acres cultivated.

Discussion of Cost and Profitability Comparisons

This section matches revenues from the HHH cropping systems with the costs reported in the Appendix Budget Tables. Revenues from the 1997-2000 HHH experiment are reported for both the wheat-fallow and continuous HRSW cropping systems. The experiment results are compared for WW-Fallow to the Rowell Farm average and to estimates from a 1993 HHH budget for WW-Fallow and HRSW. Table 1 shows that continuous no-till HRSW averaged only 10.4 bushels per acre from 1997-2000, with protein well below 14 percent in the first two years and just above 14 percent in last two drier years. WW after fallow, on the other hand, averaged 24 bushels per acre including a record 41.2 bushels per acre in 1998. Average WW after fallow yields on the Rowell Farm (23.8 bushels per acre) and those assumed by the 1993 Extension budget (25 bushels per acre) were similar to the Experiment's 24 bushels per acre average (Table 1).

Table 2 compares gross returns, total costs, and net returns over total costs for the WW-fallow and continuous no-till HRSW systems in the HHH Experiment. Readers should recall that the WW-fallow gross returns and total costs are per rotational acre which means that the costs are one-half of those listed in the Appendix WW tables which aggregate costs for one acre of fallow and one acre of WW. Similarly, the gross returns in Table 2 reflect one-half acre of winter wheat and one-half acre of fallow. The gross returns for HRSW during 1997 and 1998 suffered substantial discounts due to low protein.

Gross returns on an annual per-acre basis averaged about $5.00 per acre less for HRSW compared with WW-fallow (Table 2). Furthermore, production costs for HRSW, which averaged $76.18 per acre, approached double those for WW-fallow at $41.65 per acre. Costs for the WW-fallow system, which were modeled after Doug Rowell's practices, are among the lowest wheat production costs observed anywhere in the U.S. Fallow tillage costs are tightfisted using machinery acquired and maintained at minimal cost. During dry years, no fertilizer is applied (See Appendix tables for year-by-year fertilizer, herbicide, and seeding rates). Chemical weed control is limited to inexpensive herbicides like 2,4-D. Farm-grown grain is kept and treated for seed. While the Experiment's HRSW production costs in Table 2 are low compared

Table 1. Crop Yields and Precipitation, Horse Heaven Hills Experiment and Comparison Sites, 1997-2000.

Year	Precip. (in.) (Aug. - July)	Wheat Yield (Bu/Ac) WW - Fallow	Wheat Yield (Bu/Ac) Cont. HRSW
Experiment			
1997	9.44	26.5[a]	13.7 (10.5)[b]
1998	7.87	41.2	18.0 (12.4)
1999	4.25	8.5	3.8 (14.6)
2000	4.76	19.8	5.9 (14.1)
Exp. Av.	6.60	24.0	10.4 (12.9)
Rowell Farm Av.	6.50	23.8	-
EB 1782[c]	8.00	25.0	12

[a] WW not grown in experiment in 1997, which was the first year of the study. Rowell's 1997 winter wheat (WW) yield at the experiment site of 26.5 bushels per acre was substituted for this year.

[b] Parentheses contain % protein for HRSW in the Experiment.

[c] van Doren, G. and G. Willett, *An Economic Analysis of Crop Rotation Alternatives on Dryland Grain Farms*, Horse Heaven Hills Area, Washington, 1993, EB 1782, Cooperative Extension, WSU.

with higher rainfall regions, the regular use of fertilizer and herbicides, plus every year no-till seeding and harvesting, drives the HRSW total cost to nearly double that of WW-fallow. Yearly costs and input use are detailed in the Appendix budgets. The results in Table 2 reveal that continuous no-till HRSW trailed WW-fallow in profitability by a margin of $32.00 per acre to $40.00 per acre over the four years. In summary, HRSW averaged a loss of about $40.00 pre acre per year while the WW-fallow essentially broke even from 1997-2000. The latter result implies that the WW-fallow paid a normal market return to all resources including the farmer's labor, land, and machinery investment. A cost has been charged for all these resources in the Appendix budgets. Interestingly, wheat production budgets for many higher moisture regions in Washington during the last few years have shown negative net returns before government payments.

Table 3 reveals comparable average gross returns of about $40.00 per acre for WW-fallow for the experiment, the host farm, and a 1993 Extension publication; however, higher costs assumed for the publication reduce its projected net returns. Costs for the 1993 publication are further increased when adjusted for inflation to 1998 levels. The average net returns of -$39.99 per acre for HRSW grown in the experiment suffer due to the low average protein level of 12.9 percent and associated annual price discounts as well as a low 10.4 bushel per-acre average yield. An average protein level of 14 percent was assumed, perhaps generously, for the publication lacking any empirical source for this panel-constructed budget. The bottom line, however, is that both the four-year experiment and the earlier Extension budget show continuous

Table 2. Annual Costs and Market Returns[a] by Rotation and Year, Horse Heaven Hills Experiment, Benton County, Washington, 1997-2000.

Year Rotation	Gross Returns[b] ($/Ac)	Total Costs ($/Ac)	Net Returns ($/Ac)
1997			
WW-Fal[c]	45.58	41.65	3.93
Cont. HRSW	40.00	84.22	-44.22
1998			
WW-Fal	70.86	57.08	13.78
Cont. HRSW	63.90	89.34	-25.44
1999			
WW-Fal	14.62	30.27	-15.65
Cont. HRSW	16.18	71.11	-54.93
2000			
WW-Fal	34.06	37.61	-3.55
Cont. HRSW	24.66	60.04	-35.38
Averages			
WW-Fal	41.28	41.65	-0.37
Cont. HRSW	36.19	76.18	-39.99

[a] Returns exclude government payments and any crop insurance claims. To convert to comparable per acre basis, costs and returns for winter wheat-fallow include one-half acre of wheat and one-half acre of fallow.

[b] The five-year (1996-99 marketing years) average price of $3.44 per bushel was used throughout for soft white winter wheat (WW). Annual hard red spring wheat (HRSW) prices were adjusted for annual protein penalties and premiums beginning from the base five-year average price for 14% protein of $4.18 per bushel. The long-run average protein adjustments of $0.09 per bushel penalty for each 1/4% below 14% and $0.04 per bushel premium for each 1/4% above 14% to 15.5% was used.

[c] Winter wheat was not grown in the experiment in 1997. The 1997 winter wheat yield on the Rowell Farm near the experiment site of 26.5 bushels per acre and 1998-2000 experiment average cost of $41.65 per acre were substituted.

HRSW wheat substantially lagging in profitability compared with the traditional regional system of winter wheat- summer fallow. These results showing continuous no-till HRSW lagging WW-fallow in profitability parallel those from an experiment at Ralston, WA, which at 11.5 inches per year enjoys five inches more annual precipitation than the Horse Heaven Hills. In some respects, these results are not unexpected. Winter wheat after fallow has a 100-year research lead over spring grain systems in arid regions of the Pacific Northwest. Additional research is needed in breeding, pest management, nutrient management, and other best management practices to narrow the profitability gap between WW-fallow and soil saving spring cropping systems in arid areas. Other results have indicated that farmers might be able to trim the cost of production for HRSW (Northwest Columbia Plateau Wind Erosion/Air Quality Project 2000 Annual Report, Washington State University, January 2001).

Tables 2 and 3 include only market returns. Adding current government payments will not alter rankings by cropping system, but would substantially increase farm-wide net returns. USDA estimated government payments accounted for 42 percent of farm net income nationally in fiscal year 2000, and was likely considerably higher for many grain farms.

Table 3. Average Costs and Market Returns[a] by Rotation and Source, Horse Heaven Hills Region, WA.

Rotation Source	Gross Returns ($/Ac)	Total Costs ($/Ac)	Net Returns ($/Ac)
WW-Fallow:			
Exp. 1997-2000	41.28	41.65	-0.37
Rowell Av.	40.59	37.68	2.91
EB1782[b]	43	61.39 [71.17][c]	-18.39 [-28.17][c]
Contin. HRSW			
Exp. 1997-2000	36.19	76.18	-39.99
EB1782	50.16	75.86 [88.00][c]	-25.70 [-37.84][c]

[a] Returns exclude government payments and any crop insurance claims. To convert to comparable per acre basis, costs and returns for wheat-fallow include one-half acre of wheat and one-half acre of fallow. The five-year (1995-99 marketing year) average price of $3.44 per bushel was used throughout for WW. Annual HRSW prices were adjusted for annual protein penalties and premiums beginning from the base five-year average price for 14% protein of $4.18 bushels. Long-run average protein adjustment of $0.09 per bushel penalty for each 1/4% below 14% and $0.04 per bushel premium for each 1/4% above 14% to 15.5% was used. A 14% HRSW protein level was assumed for Rowell and EB 1782.

[b] van Doren, G. and G. Willett, *An Economic Analysis of Crop Rotation Alternatives on Dryland Grain Farms,* Horse Heaven Hills Area, Washington, 1993, EB 1782, Cooperative Extension, WSU.

[c] Adjusting costs for inflation from 1993 to 1997-2000.

While no-till HRSW may not match WW-fallow in profitability under current technology in arid farming regions in east-central Washington, there is strong evidence that this cropping system provides substantial soil and air quality benefits. A recent study at Washington State University showed that continuous spring grain reduced airborne dust particulates by 95 percent compared with conventional WW-fallow (Lee, B., *Regional Air Quality Modelling of PM-10 Due to Windblown Dust on the Columbia Plateau*. M.S. Thesis, Washington State University, 1998). Research has shown significant public valuation for air quality improvements which could be provided by continuous spring cropping systems. Public cost sharing for soil conserving annual spring cropping would help innovative growers adopt these systems profitably. Researchers should also devote effort to reducing the erosiveness of WW-fallow systems. Examples are the reduced tillage fallow systems which have been tested at Lind and Ralston, Washington (*Northwest Columbia Plateau Wind Erosion/Air Quality Project 2000 Annual Report*, Washington State University, January 2001). These conservation tillage WW-fallow systems could provide a cost-effective intermediate step until farmers and researchers perfect continuous spring cropping systems for the region.

APPENDIX

BUDGET TABLES

TABLE 1RSF. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SUMMER FALLOW, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
POSTHARVEST	STANDING STUBBLE	AUG-FEB	AVG[1]	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ROUNDUP(.5X)[2]	CUSTOM APPLICATION	FEB	AVG	.00	.00	.00	.00	.00	1.63	1.29	.19	3.11	3.11
CHISEL PLOW(.5X)	265HP-CHAL, 32'CHISEL PLOW	MAR	AVG	.03	.04	.68	.76	.36	.00	.00	.07	1.19	1.87
RODWEED	265HP-CHAL, 70' RODWEEDER	MAY	AVG	.04	.05	.98	.60	.46	.00	.00	.04	1.11	2.08
RODWEED	265HP-CHAL, 70' RODWEEDER	JUN	AVG	.04	.05	.98	.60	.46	.00	.00	.04	1.10	2.07
MISC USE	1991 PICKUP	ANN	AVG	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
TAXES	LAND TAXES	ANN	AVG	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
OVERHEAD	LEGAL, ACCT., MISC.	SEA	AVG	.00	.00	.00	.00	.00	.34	.00	.00	.34	.34
TOTAL PER ACRE				.12	.14	3.84	2.20	1.39	1.97	1.29	.36	7.20	11.04

[1]LONG-RUN AVERAGE COST OF PRODUCTION.
[2]11 OUNCES OF ROUNDUP PER APPLIED ACRE.

TABLE 2RSF. ITEMIZED COSTS PER ACRE FOR SUMMER FALLOW, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
ROUNDUP	OZ.	.23	5.50	1.29	
CUSTOM APPLICATION	ACRE	3.25	.50	1.63	
TRACTOR REPAIR	ACRE	.70	1.00	.70	
TRACTOR FUEL/LUBE	ACRE	1.03	1.00	1.03	
MACHINERY REPAIRS	ACRE	.44	1.00	.44	
MACHINE FUEL/LUBE	ACRE	.03	1.00	.03	
LABOR(TRAC/MACH)	HOUR	10.00	.14	1.39	
INTEREST ON OP. CAP.	ACRE	.36	1.00	.36	
OVERHEAD	ACRE	.34	1.00	.34	
TOTAL VARIABLE COST				7.20	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	1.14	1.00	1.14	
TRACTOR INTEREST	ACRE	1.10	1.00	1.10	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.20	1.00	.20	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	.10	1.00	.10	
MACHINE INTEREST	ACRE	.16	1.00	.16	
MACHINE INSURANCE	ACRE	.00	1.00	.00	
MACHINE TAXES	ACRE	.03	1.00	.03	
MACHINE HOUSING	ACRE	.00	1.00	.00	
LAND TAX	ACRE	1.09	1.00	1.09	
TOTAL FIXED COST				3.84	
TOTAL COST				11.04	

TABLE 3RWW. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW, HORSE HEAVEN HILLS, ROWELL FARM.

						VARIABLE COST						
OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.	TOTAL VARIABLE COST	TOTAL COST
						$	$	$	$	$	$	$	$
HAUL SEED	DODGE SEED TRUCK	OCT	AVG[1]	.02	.02	.29	.91	.20	.00	.00	.00	1.11	1.40
SEED[2]	265HP-CHAL, 50' DF DRILL	OCT	AVG	.05	.06	1.46	.94	.60	.00	3.75	.00	5.29	6.75
FERTILIZE(.5X)[3]	CUSTOM APPLICATION	JAN	AVG	.00	.00	.00	.00	.00	1.75	4.10	.44	6.29	6.29
SPRAY[4]	CUSTOM APPLICATION	MAR	AVG	.00	.00	.00	.00	.00	3.25	2.57	.34	6.16	6.16
HARVEST[5]	30' JD 6620 COMBINE	JUL	AVG	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL	AVG	.00	.00	.00	.00	.00	3.21	.00	.08	3.29	3.29
MISC. USE	1991 PICKUP	ANN	AVG	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC TRUCK USE	1989 FORD 4X4	ANN	AVG	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
SUMMER FALLOW	SUMMER FALLOW COST + INTEREST	ANN	AVG	.00	.00	12.14	.00	.00	.00	.00	.00	.00	12.14
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN	AVG	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
TAXES	LAND TAXES	ANN	AVG	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
LAND RENT	NET LAND RENT	ANN	AVG	.00	.00	16.51	.00	.00	.00	.00	.00	.00	16.51
OVERHEAD	LEGAL, ACCT., MISC.	ANN	AVG	.00	.00	.00	.00	.00	1.82	.00	.00	1.82	1.82
TOTAL PER ACRE				.30	.34	37.22	8.82	4.56	13.03	10.42	1.30	38.13	75.35

[1]LONG-RUN AVERAGE COST OF PRODUCTION.
[2]60 LBS. OF SEED.
[3]25 LBS. OF NITROGEN AQUA AND 8 LBS. OF SULFUR THISOL PER APPLIED ACRE.
[4]1 PINT OF 2,4-D AMINE, 0.5 PINTS OF LV 2,4-D AND 1.125 OUNCES ADWET SURFACTANT.
[5]35 BUSHELS.

TABLE 4RWW. ITEMIZED COST PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
SWWW SEED	LB.	.06	60.00	3.75	
NITROGEN AQUA	LB.	.25	12.50	3.14	
SULFUR THISOL	LB.	.24	4.00	.96	
CUSTOM APPLICATION	ACRE	3.50	.50	1.75	
2,4-D AMINE	PT.	1.25	1.00	1.25	
LV 2,4-D	PT.	2.44	.50	1.22	
ADWET SURFACT	OZ.	.09	1.12	.10	
CUSTOM APPLICATION	ACRE	3.25	1.00	3.25	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
LABOR(TRAC/MACH)	HOUR	10.00	.11	1.11	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
HAUL GRAIN	BU.	.14	23.80	3.21	
TRACTOR REPAIR	ACRE	.31	1.00	.31	
TRACTOR FUEL/LUBE	ACRE	.42	1.00	.42	
MACHINERY REPAIRS	ACRE	6.65	1.00	6.65	
MACHINE FUEL/LUBE	ACRE	1.44	1.00	1.44	
INTEREST ON OP. CAP.	ACRE	1.30	1.00	1.30	
OVERHEAD	ACRE	1.82	1.00	1.82	

TOTAL VARIABLE COST				38.13	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	.50	1.00	.50	
TRACTOR INTEREST	ACRE	.58	1.00	.58	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.10	1.00	.10	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.20	1.00	2.20	
MACHINE INTEREST	ACRE	3.41	1.00	3.41	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.61	1.00	.61	
MACHINE HOUSING	ACRE	.03	1.00	.03	
NET LAND TAX[1]	ACRE	1.09	1.00	1.09	
LAND RENT	ACRE	16.51	1.00	16.51	
SUMMER FALLOW	ACRE	11.04	1.10	12.14	

TOTAL FIXED COST				37.22	
TOTAL COST				75.35	

[1]1/4 (PRICE x YIELD) - (1/4 FERTILIZER COST + CROP INSURANCE + LAND TAX)

TABLE 1EXSF97. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SUMMER FALLOW EXPERIMENT, 1997, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
POSTHARVEST	STANDING STUBBLE	AUG-FEB	1997	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ROUNDUP[1]	CUSTOM APPLICATION	FEB	1997	.00	.00	.00	.00	.00	3.25	2.34	.37	5.96	5.96
DISK	256HP-CHAL, 27' DOUBLE DISK	MAR	1997	.07	.07	2.18	1.21	.72	.00	.00	.11	2.04	4.23
RODWEED	265HP-CHAL, 70' RODWEEDER	MAY	1997	.04	.05	.98	.60	.46	.00	.00	.04	1.11	2.08
FERTILIZE[2]	CUSTOM APPLICATION	JUN	1997	.00	.00	.00	.00	.00	3.50	8.20	.39	12.08	12.08
RODWEED	265HP-CHAL, 70' RODWEEDER	JUN	1997	.04	.05	.98	.60	.46	.00	.00	.04	1.10	2.07
RODWEED	265HP-CHAL, 70' RODWEEDER	AUG	1997	.04	.05	.98	.60	.46	.00	.00	.02	1.08	2.05
MISC USE	1991 PICKUP	ANN	1997	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
TAXES	LAND TAXES	ANN	1997	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
OVERHEAD	LEGAL, ACCT., MISC.	ANN	1997	.00	.00	.00	.00	.00	1.19	.00	.00	1.19	1.19
TOTAL PER ACRE				.20	.22	6.31	3.25	2.21	7.94	10.54	.99	24.92	31.23

[1]10 OZS. ROUNDUP
[2]25 LBS. NITROGEN AQUA AND 8 LBS. SULFUR THISOL

TABLE 2EXSF97. ITEMIZED COSTS PER ACRE FOR SUMMER FALLOW EXPERIMENT, 1997, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
ROUNDUP	OZ	.23	10.00	2.34	
NITROGEN AQUA	LB.	.25	25.00	6.28	
SULFUR THISOL	LB.	.24	8.00	1.92	
CUSTOM HERB. APPLIC.	ACRE	3.25	1.00	3.25	
CUSTOM FERT. APPLIC.	ACRE	3.50	1.00	3.50	
TRACTOR REPAIR	ACRE	1.16	1.00	1.16	
TRACTOR FUEL/LUBE	ACRE	1.55	1.00	1.55	
MACHINERY REPAIRS	ACRE	.51	1.00	.51	
MACHINE FUEL/LUBE	ACRE	.03	1.00	.03	
LABOR(TRAC/MACH)	HOUR	10.00	.22	2.21	
INTEREST ON OP. CAP.	ACRE	.99	1.00	.99	
OVERHEAD	ACRE	1.19	1.00	1.19	

TOTAL VARIABLE COST				24.92	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	1.87	1.00	1.87	
TRACTOR INTEREST	ACRE	2.13	1.00	2.13	
TRACTOR INSURANCE	ACRE	.02	1.00	.02	
TRACTOR TAXES	ACRE	.38	1.00	.38	
TRACTOR HOUSING	ACRE	.02	1.00	.02	
MACHINE DEPRECIATION	ACRE	.45	1.00	.45	
MACHINE INTEREST	ACRE	.29	1.00	.29	
MACHINE INSURANCE	ACRE	.00	1.00	.00	
MACHINE TAXES	ACRE	.05	1.00	.05	
MACHINE HOUSING	ACRE	.00	1.00	.00	
LAND TAX	ACRE	1.09	1.00	1.09	

TOTAL FIXED COST				6.31	
TOTAL COST				31.23	

TABLE 3EXWW98. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW EXPERIMENT, 1998, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
HAUL SEED	DODGE SEED TRUCK	SEP	1997	.02	.02	.29	.91	.20	.00	.00	.01	1.12	1.41
SEED[1]	265HP-CHAL, 35' FLEX AIR SEED	SEP	1997	.05	.06	1.79	1.18	.60	.00	1.69	.03	3.49	5.28
HAUL SEED	DODGE SEED TRUCK	NOV	1997	.02	.02	.29	.91	.20	.00	.00	.10	1.21	1.50
SEED[2]	265HP-CHAL, 50' DF DRILL	NOV	1997	.05	.06	1.46	.94	.60	.00	3.13	.43	5.09	6.55
SPRAY[3]	CUSTOM APPLICATION	APR	1998	.00	.00	.00	.00	.00	3.25	2.54	.29	6.08	6.08
HARVEST[4]	30' JD 6620 COMBINE	JUL	1998	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL	1998	.00	.00	.00	.00	.00	5.56	.00	.14	5.70	5.70
MISC. USE	1991 PICKUP	ANN	1998	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC. TRUCK USE	1989 FORD 4X4	ANN	1998	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN	1998	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
OVERHEAD	LEGAL, ACCT., MISC.	ANN	1998	.00	.00	.00	.00	.00	1.84	.00	.00	1.84	1.84
LAND RENT	NET LAND RENT	ANN	1998	.00	.00	30.45	.00	.00	.00	.00	.00	.00	30.45
TAXES	LAND TAXES	ANN	1998	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
SUMMER FALLOW	SUMMER FALLOW COST + INTEREST	ANN	1998	.00	.00	34.35	.00	.00	.00	.00	.00	.00	34.35
TOTAL PER ACRE				.36	.31	75.45	10.90	5.36	13.66	7.35	1.44	38.71	114.16

[1]27 LBS. SEED
[2]50 LBS. SEED
[3]1 PINT LV 2,4-D AND 1.125 OZS. ADWET SURFACTANT
[4]41.2 BU.

TABLE 4EXWW98. ITEMIZED COSTS PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW EXPERIMENT, 1998, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
SWWW SEED	LB.	.06	77.00	4.82	
LV 2,4-D	PINT	2.44	1.00	2.44	
ADWET SURFACTANT	OZ.	.09	1.12	.10	
CUSTOM APPLICATION	ACRE	3.25	1.00	3.25	
HAUL GRAIN	BU.	.14	41.20	5.56	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
TRACTOR REPAIR	ACRE	.63	1.00	.63	
TRACTOR FUEL/LUBE	ACRE	.84	1.00	.84	
MACHINERY REPAIRS	ACRE	7.98	1.00	7.98	
MACHINE FUEL/LUBE	ACRE	1.46	1.00	1.46	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
LABOR(TRAC/MACH)	ACRE	10.00	.19	1.91	
INTEREST ON OP. CAP.	ACRE	1.44	1.00	1.44	
OVERHEAD	ACRE	1.84	1.00	1.84	

TOTAL VARIABLE COST				38.71	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	1.01	1.00	1.01	
TRACTOR INTEREST	ACRE	1.15	1.00	1.15	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.21	1.00	.21	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.51	1.00	2.51	
MACHINE INTEREST	ACRE	3.89	1.00	3.89	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.70	1.00	.70	
MACHINE HOUSING	ACRE	.04	1.00	.04	
LAND TAX	ACRE	1.09	1.00	1.09	
NET LAND RENT[1]	ACRE	30.45	1.00	30.45	
SUMMER FALLOW	ACRE	31.23	1.10	34.35	

TOTAL FIXED COST				75.45	
TOTAL COST				114.16	

[1]1/4 (PRICE X YIELD) - (1/4 FERTILIZER COST + 1/4 CROP INSURANCE + LAND TAX)

TABLE 1EXSF98. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SUMMER FALLOW EXPERIMENT, 1998, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST: FUEL, LUBE, & REPAIRS	VARIABLE COST: MACH LABOR	VARIABLE COST: SERVICE	VARIABLE COST: MATER.	VARIABLE COST: INTER.	TOTAL VARIABLE COST	TOTAL COST
						$	$	$	$	$	$	$	$
POSTHARVEST	STANDING STUBBLE	AUG-FEB	1998	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
DISK	256HP-CHAL, 27' DOUBLE DISK	MAR	1998	.07	.07	2.18	1.21	.72	.00	.00	.11	2.04	4.23
CHISEL PLOW	265HP-CHAL, 32'CHISEL PLOW	MAR	1998	.06	.07	1.37	1.53	.72	.00	.00	.13	2.38	3.75
RODWEED	265HP-CHAL, 70' RODWEEDER	MAY	1998	.04	.05	.98	.60	.46	.00	.00	.04	1.11	2.08
RODWEED	265HP-CHAL, 70' RODWEEDER	JUN	1998	.04	.05	.98	.60	.46	.00	.00	.04	1.10	2.07
RODWEED	265HP-CHAL, 70' RODWEEDER	AUG	1998	.04	.05	.98	.60	.46	.00	.00	.02	1.08	2.05
MISC USE	1991 PICKUP	ANN	1998	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
TAXES	LAND TAXES	ANN	1998	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
OVERHEAD	LEGAL, ACCT., MISC.	ANN	1998	.00	.00	.00	.00	.00	.40	.00	.00	.40	.40
TOTAL PER ACRE				.26	.29	7.68	4.77	2.93	.40	.00	.36	8.46	16.14

TABLE 2EXSF98. ITEMIZED COSTS PER ACRE FOR SUMMER FALLOW EXPERIMENT, 1998, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
TRACTOR REPAIR	ACRE	1.55	1.00	1.55	
TRACTOR FUEL/LUBE	ACRE	2.27	1.00	2.27	
MACHINERY REPAIRS	ACRE	.93	1.00	.93	
MACHINE FUEL/LUBE	ACRE	.03	1.00	.03	
LABOR(TRAC/MACH)	HOUR	10.00	.29	2.93	
INTEREST ON OP. CAP.	ACRE	.36	1.00	.36	
OVERHEAD	ACRE	.40	1.00	.40	
TOTAL VARIABLE COST				8.46	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	2.52	1.00	2.52	
TRACTOR INTEREST	ACRE	2.49	1.00	2.49	
TRACTOR INSURANCE	ACRE	.02	1.00	.02	
TRACTOR TAXES	ACRE	.45	1.00	.45	
TRACTOR HOUSING	ACRE	.02	1.00	.02	
MACHINE DEPRECIATION	ACRE	.52	1.00	.52	
MACHINE INTEREST	ACRE	.47	1.00	.47	
MACHINE INSURANCE	ACRE	.00	1.00	.00	
MACHINE TAXES	ACRE	.08	1.00	.08	
MACHINE HOUSING	ACRE	.00	1.00	.00	
LAND TAX	ACRE	1.09	1.00	1.09	
TOTAL FIXED COST				7.68	
TOTAL COST				16.14	

TABLE 3EXWW99. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW EXPERIMENT, 1999, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
HAUL SEED	DODGE SEED TRUCK	NOV	1998	.02	.02	.29	.91	.20	.00	.00	.10	1.21	1.50
SEED[1]	265HP-CHAL, 50' DF DRILL	NOV	1998	.05	.06	1.46	.94	.60	.00	3.75	.48	5.77	7.24
SPRAY[2]	CUSTOM APPLICATION	APR	1999	.00	.00	.00	.00	.00	3.25	2.54	.29	6.08	6.08
HARVEST[3]	30' JD 6620 COMBINE	JUL	1999	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL	1999	.00	.00	.00	.00	.00	1.15	.00	.03	1.18	1.18
MISC. USE	1991 PICKUP	ANN	1999	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC. TRUCK USE	1989 FORD 4X4	ANN	1999	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN	1999	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
OVERHEAD	LEGAL, ACCT., MISC.	ANN	1999	.00	.00	.00	.00	.00	1.42	.00	.00	1.42	1.42
LAND RENT	NET LAND RENT	ANN	1999	.00	.00	4.38	.00	.00	.00	.00	.00	.00	4.38
SUMMER FALLOW	SUMMER FALLOW COST + INTEREST	ANN	1999	.00	.00	17.75	.00	.00	.00	.00	.00	.00	17.75
TAXES	LAND TAXES	ANN	1999	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
TOTAL PER ACRE				.30	.34	30.70	8.82	4.56	8.82	6.29	1.35	29.83	60.53

[1]60 LBS. SEED
[2]1 PINT LV 2,4-D AND 1.125 OZS. ADWET SURFACTANT
[3]8.5 BU.

TABLE 4EXWW99. ITEMIZED COSTS PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW EXPERIMENT, 1999, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
SWWW SEED	LB.	.06	60.00	3.75	
LV 2,4-D	PINT	2.44	1.00	2.44	
ADWET SURFACTANT	OZ.	.09	1.12	.10	
CUSTOM APPLICATION	ACRE	3.25	1.00	3.25	
HAUL GRAIN	BU.	.14	8.50	1.15	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
TRACTOR REPAIR	ACRE	.31	1.00	.31	
TRACTOR FUEL/LUBE	ACRE	.42	1.00	.42	
MACHINERY REPAIRS	ACRE	6.65	1.00	6.65	
MACHINE FUEL/LUBE	ACRE	1.44	1.00	1.44	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
LABOR(TRAC/MACH)	HOUR	10.00	.11	1.11	
INTEREST ON OP. CAP.	ACRE	1.35	1.00	1.35	
OVERHEAD	ACRE	1.42	1.00	1.42	

TOTAL VARIABLE COST				29.83	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	.50	1.00	.50	
TRACTOR INTEREST	ACRE	.58	1.00	.58	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.10	1.00	.10	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.20	1.00	2.20	
MACHINE INTEREST	ACRE	3.41	1.00	3.41	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.61	1.00	.61	
MACHINE HOUSING	ACRE	.03	1.00	.03	
LAND TAX	ACRE	1.09	1.00	1.09	
NET LAND RENT[1]	ACRE	4.38	1.00	4.38	
SUMMER FALLOW	ACRE	16.14	1.10	17.75	

TOTAL FIXED COST				30.70	
TOTAL COST				60.53	

[1]1/4 (PRICE X YIELD) - (1/4 FERTILIZER COST + 1/4 CROP INSURANCE + LAND TAX)

TABLE 1EXSF99. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SUMMER FALLOW EXPERIMENT, 1999, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
POSTHARVEST	STANDING STUBBLE	AUG-FEB	1999	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
DISK	256HP-CHAL, 27' DOUBLE DISK	MAR	1999	.07	.07	2.18	1.21	.72	.00	.00	.11	2.04	4.23
CHISEL PLOW	265HP-CHAL, 32'CHISEL PLOW	MAR	1999	.06	.07	1.37	1.53	.72	.00	.00	.13	2.38	3.75
RODWEED	265HP-CHAL, 70' RODWEEDER	JUN	1999	.04	.05	.98	.60	.46	.00	.00	.04	1.10	2.07
RODWEED	265HP-CHAL, 70' RODWEEDER	AUG	1999	.04	.05	.98	.60	.46	.00	.00	.02	1.08	2.05
MISC USE	1991 PICKUP	ANN	1999	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
TAXES	LAND TAXES	ANN	1999	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
OVERHEAD	LEGAL, ACCT., MISC.	ANN	1999	.00	.00	.00	.00	.00	.35	.00	.00	.35	.35
TOTAL PER ACRE				.22	.25	6.71	4.17	2.47	.35	.00	.31	7.30	14.01

TABLE 2EXSF99. ITEMIZED COSTS PER ACRE FOR SUMMER FALLOW EXPERIMENT, 1999, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
TRACTOR REPAIR	ACRE	1.30	1.00	1.30	
TRACTOR FUEL/LUBE	ACRE	1.93	1.00	1.93	
MACHINERY REPAIRS	ACRE	.91	1.00	.91	
MACHINE FUEL/LUBE	ACRE	.03	1.00	.03	
LABOR(TRAC/MACH)	HOUR	10.00	.25	2.47	
INTEREST ON OP. CAP.	ACRE	.31	1.00	.31	
OVERHEAD	ACRE	.35	1.00	.35	
TOTAL VARIABLE COST				7.30	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	2.12	1.00	2.12	
TRACTOR INTEREST	ACRE	2.03	1.00	2.03	
TRACTOR INSURANCE	ACRE	.02	1.00	.02	
TRACTOR TAXES	ACRE	.37	1.00	.37	
TRACTOR HOUSING	ACRE	.02	1.00	.02	
MACHINE DEPRECIATION	ACRE	.51	1.00	.51	
MACHINE INTEREST	ACRE	.46	1.00	.46	
MACHINE INSURANCE	ACRE	.00	1.00	.00	
MACHINE TAXES	ACRE	.08	1.00	.08	
MACHINE HOUSING	ACRE	.00	1.00	.00	
LAND TAX	ACRE	1.09	1.00	1.09	
TOTAL FIXED COST				6.71	
TOTAL COST				14.01	

TABLE 3EXWW00. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW EXPERIMENT, 2000, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
HAUL SEED	DODGE SEED TRUCK	NOV	1999	.02	.02	.29	.91	.20	.00	.00	.10	1.21	1.50
SEED[1]	265HP-CHAL, 50' DF DRILL	NOV	1999	.05	.06	1.46	.94	.60	.00	4.06	.51	6.12	7.58
SPRAY[2]	CUSTOM APPLICATION	APR	2000	.00	.00	.00	.00	.00	3.25	2.60	.29	6.15	6.15
HARVEST[3]	30' JD 6620 COMBINE	JUL	2000	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL	2000	.00	.00	.00	.00	.00	3.38	.00	.08	3.46	3.46
MISC. USE	1991 PICKUP	ANN	2000	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC. TRUCK USE	1989 FORD 4X4	ANN	2000	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN	2000	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
OVERHEAD	LEGAL, ACCT., MISC.	ANN	2000	.00	.00	.00	.00	.00	1.56	.00	.00	1.56	1.56
LAND RENT	NET LAND RENT	ANN	2000	.00	.00	18.57	.00	.00	.00	.00	.00	.00	18.57
TAXES	LAND TAXES	ANN	2000	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
SUMMER FALLOW	SUMMER FALLOW COST + INTEREST	ANN	2000	.00	.00	15.41	.00	.00	.00	.00	.00	.00	15.41
TOTAL PER ACRE				.30	.24	42.55	8.82	4.56	11.19	6.67	1.44	32.66	75.21

[1]65 LBS. SEED
[2]2 PINTS 2,4-D AMINE AND 1.125 OZS. ADWET SURFACTANT
[3]25 BU.

TABLE 4EXWW00. ITEMIZED COSTS PER ACRE FOR WINTER WHEAT FOLLOWING SUMMER FALLOW EXPERIMENT, 2000, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
SWWW SEED	LB.	.06	65.00	4.06	
2,4-D AMINE	PINT	1.25	2.00	2.50	
ADWET SURFACTANT	OZ.	.09	1.12	.10	
CUSTOM APPLICATION	ACRE	3.25	1.00	3.25	
HAUL GRAIN	BU.	.14	25.00	3.38	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
TRACTOR REPAIR	ACRE	.31	1.00	.31	
TRACTOR FUEL/LUBE	ACRE	.42	1.00	.42	
MACHINERY REPAIRS	ACRE	6.65	1.00	6.65	
MACHINE FUEL/LUBE	ACRE	1.44	1.00	1.44	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
LABOR(TRAC/MACH)	HOUR	10.00	.11	1.11	
INTEREST ON OP. CAP.	ACRE	1.44	1.00	1.44	
OVERHEAD	ACRE	1.56	1.00	1.56	

TOTAL VARIABLE COST				32.66	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	.50	1.00	.50	
TRACTOR INTEREST	ACRE	.58	1.00	.58	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.10	1.00	.10	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.20	1.00	2.20	
MACHINE INTEREST	ACRE	3.41	1.00	3.41	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.61	1.00	.61	
MACHINE HOUSING	ACRE	.03	1.00	.03	
LAND TAX	ACRE	1.09	1.00	1.09	
NET LAND RENT[1]	ACRE	18.57	1.00	18.57	
SUMMER FALLOW	ACRE	14.01	1.10	15.41	

TOTAL FIXED COST				42.44	
TOTAL COST				75.21	

[1]1/4 (PRICE X YIELD) - (1/4 FERTILIZER COST + 1/4 CROP INSURANCE + LAND TAX)

TABLE 1EXHRSW97. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT EXPERIMENT, 1997, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
						$	$	$	$	$	$	$	$
SPRAY[1]	CUSTOM APPLICATION	FEB	1997	.00	.00	.00	.00	.00	3.25	2.81	.40	6.46	6.46
HAUL SEED & FERT	DODGE SEED TRUCK	MAR	1997	.02	.02	.29	.91	.20	.00	.00	.06	1.18	1.47
SEED & FERTILIZE[2]	265HP-CHAL, 35' FLEX AIR SEED	MAR	1997	.05	.06	1.79	1.18	.60	.00	20.55	1.30	23.62	25.41
SPRAY[3]	CUSTOM APPLICATION	APR	1997	.00	.00	.00	.00	.00	3.25	10.96	.71	14.92	14.92
HARVEST[4]	30' JD 6620 COMBINE	JUL	1997	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL	1997	.00	.00	.00	.00	.00	1.85	.00	.05	1.90	1.90
MISC USE	1991 PICKUP	ANN	1997	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC TRUCK USE	1989 FORD 4X4	ANN	1997	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN	1997	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
OVERHEAD	LEGAL, ACCT., MISC.	ANN	1997	.00	.00	.00	.00	.00	3.11	.00	.00	3.11	3.11
LAND RENT	NET LAND RENT	ANN	1997	.00	.00	9.96	.00	.00	.00	.00	.00	.00	9.96
TAXES	LAND TAXES	ANN	1997	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
TOTAL PER ACRE				.30	.34	18.86	9.05	4.56	14.46	34.32	2.97	65.36	84.22

[1]12 OZS. ROUNDUP
[2]70 LBS. SEED, 26 LBS. NITROGEN AQUA, 8 LBS. PHOSPHATE, AND 6 LBS. SULFUR THISOL.
[3]12 OZS. BUCTRIL AND 0.33 OZ. HARMONY EXTRA
[4]13.7 BU.

TABLE 2EXHRSW97. ITEMIZED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT EXPERIMENT, 1997, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
ROUNDUP	OZ	.23	12.00	2.81	
HRSW SEED	LB.	.15	70.00	10.50	
NITROGEN AQUA	LB.	.25	26.00	6.53	
PHOSPHATE	LB.	.26	8.00	2.08	
SULFUR THISOL	LB.	.24	6.00	1.44	
BUCTRIL	OZ.	.48	12.00	5.76	
HARMONY EXTRA	OZ	15.61	.33	5.20	
CUSTOM APPLICATIONS	ACRE	3.25	2.00	6.50	
HAUL GRAIN	BU.	.14	13.70	1.85	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
TRACTOR REPAIR	ACRE	.31	1.00	.31	
TRACTOR FUEL/LUBE	ACRE	.42	1.00	.42	
MACHINERY REPAIRS	ACRE	6.88	1.00	6.88	
MACHINE FUEL/LUBE	ACRE	1.44	1.00	1.44	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
LABOR(TRAC/MACH)	HOUR	10.00	.11	1.11	
INTEREST ON OP. CAP.	ACRE	2.97	1.00	2.97	
OVERHEAD	ACRE	3.11	1.00	3.11	

TOTAL VARIABLE COST				65.36	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	.50	1.00	.50	
TRACTOR INTEREST	ACRE	.58	1.00	.58	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.10	1.00	.10	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.31	1.00	2.31	
MACHINE INTEREST	ACRE	3.59	1.00	3.59	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.65	1.00	.65	
MACHINE HOUSING	ACRE	.04	1.00	.04	
LAND TAX	ACRE	1.09	1.00	1.09	
NET LAND RENT[1]	ACRE	9.96	1.00	9.96	

TOTAL FIXED COST				18.86	
TOTAL COST				84.22	

[1]1/4 (PRICE X YIELD) - (1/4 FERTILIZER COST + 1/4 CROP INSURANCE + LAND TAX)

TABLE 1EXHRSW98. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT EXPERIMENT, 1998, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
						FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
					$	$	$	$	$	$	$	$
SPRAY[1]	CUSTOM APPLICATION	AUG 1997	.00	.00	.00	.00	.00	3.25	6.88	.17	10.29	10.29
SPRAY[2]	CUSTOM APPLICATION	FEB 1998	.00	.00	.00	.00	.00	3.25	2.34	.37	5.96	5.96
HAUL SEED & FERT	DODGE SEED TRUCK	MAR 1998	.02	.02	.29	.91	.20	.00	.00	.06	1.18	1.47
SEED & FERTILIZE[3]	265HP-CHAL, 35' FLEX AIR SEED	MAR 1998	.05	.06	1.79	1.18	.60	.00	18.54	1.19	21.50	23.29
SPRAY[4]	CUSTOM APPLICATION	APR 1998	.00	.00	.00	.00	.00	3.25	3.20	.32	6.77	6.77
HARVEST[5]	30' JD 6620 COMBINE	JUL 1998	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL 1998	.00	.00	.00	.00	.00	2.43	.00	.06	2.49	2.49
MISC USE	1991 PICKUP	ANN 1998	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC TRUCK USE	1989 FORD 4X4	ANN 1998	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN 1998	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
OVERHEAD	LEGAL, ACCT., MISC.	ANN 1998	.00	.00	.00	.00	.00	3.12	.00	.00	3.12	3.12
LAND RENT	NET LAND RENT	ANN 1998	.00	.00	14.96	.00	.00	.00	.00	.00	.00	14.96
TAXES	LAND TAXES	ANN 1998	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
TOTAL PER ACRE			.30	.34	23.86	9.05	4.56	18.30	30.95	2.62	65.48	89.34

[1]22 OZS. PARAQUAT SUREFIRE
[2]10 OZS. ROUNDUP
[3]70 LBS SEED, 20 LBS. NITROGEN AQUA, 7 LBS. PHOSPHATE, AND 5 LBS. SULFUR THISOL
[4]4 OZS. BANVIL
[5]18 BU.

TABLE 2EXHRS98. ITEMIZED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT EXPERIMENT, 1998, HORSE HEAVENS HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
PARAQUAT SUREFIRE	OZ.	.31	22.00	6.88	
ROUNDUP	OZ.	.23	10.00	2.34	
HRSW SEED	LB.	.15	70.00	10.50	
NITROGEN AQUA	LB.	.25	20.00	5.02	
PHOSPHATE	LB.	.26	7.00	1.82	
SULFUR THISOL	LB.	.24	5.00	1.20	
BANVIL	OZ	.80	4.00	3.20	
CUSTOM APPLICATION	ACRE	3.25	3.00	9.75	
HAUL GRAIN	BU.	.14	18.00	2.43	
TRACTOR REPAIR	ACRE	.31	1.00	.31	
TRACTOR FUEL/LUBE	ACRE	.42	1.00	.42	
MACHINERY REPAIRS	ACRE	6.88	1.00	6.88	
MACHINE FUEL/LUBE	ACRE	1.44	1.00	1.44	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
LABOR(TRAC/MACH)	HOUR	10.00	.11	1.11	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
INTEREST ON OP. CAP.	ACRE	2.89	1.00	2.89	
OVERHEAD	ACRE	3.40	1.00	3.40	

TOTAL VARIABLE COST				65.48	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	.50	1.00	.50	
TRACTOR INTEREST	ACRE	.58	1.00	.58	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.10	1.00	.10	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.31	1.00	2.31	
MACHINE INTEREST	ACRE	3.59	1.00	3.59	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.65	1.00	.65	
MACHINE HOUSING	ACRE	.04	1.00	.04	
LAND TAX	ACRE	1.09	1.00	1.09	
NET LAND RENT[1]	ACRE	14.96	1.00	14.96	

TOTAL FIXED COST				23.86	
TOTAL COST				89.34	

[1]1/4 (PRICE X YIELD) - (1/4 FERTILIZER COST + 1/4 CROP INSURANCE + LAND TAX)

TABLE 1EXHRS99. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT EXPERIMENT, 1999, HORSE HEAVEN HILLS, ROSWELL FARM.

OPERATION	TOOLING	MTH YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST						
						FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.	TOTAL VARIABLE COST	TOTAL COST
					$	$	$	$	$	$	$	$
SPRAY[1]	CUSTOM APPLICATION	AUG 1998	.00	.00	.00	.00	.00	3.25	6.88	.17	10.29	10.29
HAUL SEED & FERT	DODGE SEED TRUCK	MAR 1999	.02	.02	.29	.91	.20	.00	.00	.06	1.18	1.47
SEED & FERTILIZE[2]	265HP-CHAL, 35' FLEX AIR SEED	MAR 1999	.05	.06	1.79	1.18	.60	.00	22.55	1.42	25.74	27.54
SPRAY[3]	CUSTOM APPLICATION	APR 1999	.00	.00	.00	.00	.00	3.25	6.40	.48	10.13	10.13
HARVEST[4]	30' JD 6620 COMBINE	JUL 1999	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL 1999	.00	.00	.00	.00	.00	.51	.00	.01	.53	.53
MISC PICKUP USE	1991 PICKUP	ANN 1999	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC TRUCK USE	1989 FORD 4X4	ANN 1999	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN 1999	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
OVERHEAD	LEGAL, ACCT., MISC.	ANN 1999	.00	.00	.00	.00	.00	3.10	.00	.00	3.10	3.10
LAND RENT	NET LAND RENT	ANN 1999	.00	.00	-.88	.00	.00	.00	.00	.00	.00	-.88
TAXES	LAND TAXES	ANN 1999	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
TOTAL PER ACRE			.30	.34	5.97	9.05	4.56	13.12	35.83	2.59	65.14	71.11

[1]22 OZS. PARAQUAT SUREFIRE
[2]70 LBS. SEED, 30 LBS. NITROGEN AQUA, 10 LBS. PHOSPHATE AND 8 LBS. SULFUR THISOL
[3]8 OZS. BANVIL
[4]3.8 BUS.

TABLE 2EXHRS99. ITEMIZED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT EXPERIMENT, 1999, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
PARAQUAT SUREFIRE	OZ.	.31	22.00	6.88	
HRSW SEED	LB.	.15	70.00	10.50	
NITROGEN AQUA	LB.	.25	30.00	7.53	
PHOSPHATE	LB.	.26	10.00	2.60	
SULFUR THISOL	LB.	.24	8.00	1.92	
BANVIL	OZ	.80	8.00	6.40	
CUSTOM APPLICATION	ACRE	3.25	2.00	6.50	
HAUL GRAIN	BU.	.14	3.80	.51	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
TRACTOR REPAIR	ACRE	.31	1.00	.31	
TRACTOR FUEL/LUBE	ACRE	.42	1.00	.42	
MACHINERY REPAIRS	ACRE	6.88	1.00	6.88	
MACHINE FUEL/LUBE	ACRE	1.44	1.00	1.44	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
LABOR(TRAC/MACH)	HOUR	10.00	.11	1.11	
INTEREST ON OP. CAP.	ACRE	2.59	1.00	2.59	
OVERHEAD	ACRE	3.10	1.00	3.10	

TOTAL VARIABLE COST				65.14	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	.50	1.00	.50	
TRACTOR INTEREST	ACRE	.58	1.00	.58	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.10	1.00	.10	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.31	1.00	2.31	
MACHINE INTEREST	ACRE	3.59	1.00	3.59	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.65	1.00	.65	
MACHINE HOUSING	ACRE	.04	1.00	.04	
LAND TAX	ACRE	1.09	1.00	1.09	
NET LAND RENT[1]	ACRE	-.88	1.00	-.88	

TOTAL FIXED COST				5.97	
TOTAL COST				71.11	

[1]1/4 (PRICE X YIELD) - (1/4 FERTILIZER COST + 1/4 CROP INSURANCE + LAND TAX)

TABLE 1EXHRS00. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT EXPERIMENT, 2000, HORSE HEAVEN HILLS, ROWELL FARM.

OPERATION	TOOLING	MTH YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
						FUEL, LUBE, & REPAIRS	MACH LABOR	SERVICE	MATER.	INTER.		
					$	$	$	$	$	$	$	$
SPRAY[1]	CUSTOM APPLICATION	FEB 2000	.00	.00	.00	.00	.00	3.25	2.81	.40	6.46	6.46
HAUL SEED & FERT	DODGE SEED TRUCK	MAR 2000	.02	.02	.29	.91	.20	.00	.00	.06	1.18	1.47
SEED & FERTILIZE[2]	265HP-CHAL, 35' FLEX AIR SEED	MAR 2000	.05	.06	1.79	1.18	.60	.00	15.03	.98	17.79	19.58
SPRAY[3]	CUSTOM APPLICATION	APR 2000	.00	.00	.00	.00	.00	3.25	1.76	.25	5.26	5.26
HARVEST[4]	30' JD 6620 COMBINE	JUL 2000	.20	.23	5.36	6.26	3.45	.00	.00	.24	9.95	15.31
HAUL GRAIN	HAUL GRAIN TO ELEVATOR	JUL 2000	.00	.00	.00	.00	.00	.80	.00	.02	.82	.82
MISC PICKUP USE	1991 PICKUP	ANN 2000	.01	.01	.11	.23	.11	.00	.00	.02	.36	.47
MISC TRUCK USE	1989 FORD 4X4	ANN 2000	.02	.02	.25	.48	.20	.00	.00	.03	.71	.96
CROP INSURANCE	MULTI-PERIL FEDERAL CROP INS.	ANN 2000	.00	.00	.00	.00	.00	3.00	.00	.15	3.15	3.15
OVERHEAD	LEGAL, ACCT., MISC.	ANN 2000	.00	.00	.00	.00	.00	2.28	.00	.00	2.28	2.28
LAND RENT	NET LAND RENT	ANN 2000	.00	.00	3.19	.00	.00	.00	.00	.00	.00	3.19
TAXES	LAND TAXES	ANN 2000	.00	.00	1.09	.00	.00	.00	.00	.00	.00	1.09
TOTAL PER ACRE			.30	.34	12.09	9.05	4.56	12.58	19.60	2.16	47.95	60.04

[1]12 OZS. ROUNDUP
[2]70 LBS. SEED, 10 LBS. NITROGEN AQUA, 5 LBS. PHOSPHATE AND 3 LBS. SULFUR THISOL
[3]22 OZS. 2,4-D AMINE
[4]5.9 BU.

TABLE 2EXHRS00. ITEMIZED COSTS PER ACRE FOR CONTINUOUS NO-TILL HARD RED SPRING WHEAT, SCHILLINGER, 2000, HORSE HEAVEN HILLS, ROWELL FARM.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR FARM
VARIABLE COSTS		$		$	
ROUNDUP	OZ	.23	12.00	2.81	
HRSW SEED	LB.	.15	70.00	10.50	
NITROGEN AQUA	LB.	.25	10.00	2.51	
PHOSPHATE	LB.	.26	5.00	1.30	
SULFUR THISOL	LB.	.24	3.00	.72	
2,4-D AMINE	OZ	.08	22.00	1.76	
CUSTOM APPLICATION	ACRE	3.25	2.00	6.50	
HAUL GRAIN	BU.	.14	5.90	.80	
CROP INSURANCE	ACRE	3.00	1.00	3.00	
TRACTOR REPAIR	ACRE	.31	1.00	.31	
TRACTOR FUEL/LUBE	ACRE	.42	1.00	.42	
MACHINERY REPAIRS	ACRE	6.88	1.00	6.88	
MACHINE FUEL/LUBE	ACRE	1.44	1.00	1.44	
COMBINE DRIVER	HOUR	15.00	.23	3.45	
LABOR(TRAC/MACH)	HOUR	10.00	.11	1.11	
INTEREST ON OP. CAP.	ACRE	2.16	1.00	2.16	
OVERHEAD	ACRE	2.28	1.00	2.28	

TOTAL VARIABLE COST				47.95	
FIXED COSTS		$		$	
TRACTOR DEPRECIATION	ACRE	.50	1.00	.50	
TRACTOR INTEREST	ACRE	.58	1.00	.58	
TRACTOR INSURANCE	ACRE	.01	1.00	.01	
TRACTOR TAXES	ACRE	.10	1.00	.10	
TRACTOR HOUSING	ACRE	.01	1.00	.01	
MACHINE DEPRECIATION	ACRE	2.31	1.00	2.31	
MACHINE INTEREST	ACRE	3.59	1.00	3.59	
MACHINE INSURANCE	ACRE	.03	1.00	.03	
MACHINE TAXES	ACRE	.65	1.00	.65	
MACHINE HOUSING	ACRE	.04	1.00	.04	
NET LAND RENT[1]	ACRE	3.19	1.00	3.19	
NET LAND TAX	ACRE	1.09	1.00	1.09	

TOTAL FIXED COST				12.09	
TOTAL COST				60.04	

[1]1/4 (PRICE X YIELD) - (1/4 FERTILIZER COST + 1/4 CROP INSURANCE + LAND TAX)

TABLE 5. HOURLY MACHINERY COSTS.

MACHINERY	PURCHASE PRICE	YEARS TO TRADE	ANNUAL HOURS	DEPREC-IATION	INTER-EST	INSUR-ANCE	TAXES	HOUSING	TOTAL FIXED COST	REPAIR	FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST
	$			COST PER HOUR									
HARROW #1	2,063.00	24	450	.18	.24	.00	.04	.00	.47	.44	.00	.44	.91
RODWEEDER #1	875.00	14	240	.23	.20	.00	.04	.00	.47	.42	.00	.42	.89
AIR REEL	4,088.00	13	200	1.19	1.27	.01	.23	.01	2.71	1.00	.00	1.00	3.71
IH GRAIN DRILL	8,200.00	23	60	2.32	11.00	.10	1.98	.11	15.51	8.33	.00	8.33	23.84
74 D5 CAT	30,000.00	18	300	4.81	5.67	.05	1.02	.06	11.61	3.33	6.28	9.61	21.22
RODWEEDER #2	4,000.00	23	240	.71	.85	.01	.15	.01	1.73	4.17	.00	4.17	5.90
JD 9300 DRILL	11,570.00	21	240	1.80	2.93	.03	.53	.03	5.31	4.17	.00	4.17	9.48
RODWEEDER #3	19,971.00	31	240	2.01	5.20	.05	.94	.05	8.25	4.17	.00	4.17	12.42
89 FORD 4X4	23,205.00	16	200	6.63	6.30	.06	1.13	.06	14.18	20.00	6.90	26.90	41.08
91 FORD 4X4	18,466.00	16	200	5.15	5.12	.05	.92	.05	11.28	20.00	3.14	23.14	34.42
TOWNER DISK	3,228.00	18	160	.95	1.17	.01	.21	.01	2.34	3.13	.00	3.13	5.47
CHAFF SPREADER	1,598.00	13	200	.61	.40	.00	.07	.00	1.09	1.00	.00	1.00	2.09
JD 9610 COMBINE	160,000.00	11	400	21.82	28.00	.25	5.04	.28	55.39	12.50	7.53	20.03	75.42
JD 6620 COMBINE	56,000.00	29	200	9.14	14.75	.13	2.66	.15	26.82	25.00	6.28	31.28	58.10
98 CHEVY 4X4	19,200.00	4	440	5.51	3.26	.03	.59	.03	9.42	2.27	3.14	5.41	14.83
70 DODGE SEED TRUCK	5,750.00	19	40	6.25	8.44	.08	1.52	.08	16.37	50.00	1.57	51.57	67.94
GRAIN TRAILER, 20T	19,290.00	18	300	2.83	3.88	.03	.70	.04	7.49	2.67	.00	2.67	10.15
CHALLENGER 65 #1	124,522.00	8	800	10.08	11.53	.10	2.08	.12	23.91	6.25	8.37	14.62	38.53
FLEXI CHISEL #1	11,065.00	16	300	1.06	2.84	.03	.51	.03	4.47	6.67	.00	6.67	11.13
650BU GRAIN CART	13,688.00	16	400	1.36	2.34	.02	.42	.02	4.16	.50	.00	.50	4.66
CHALLENGER 75	149,241.00	8	800	10.82	14.33	.13	2.58	.14	28.00	6.25	8.37	14.62	42.62
FLEXI AIR SEEDER	21,592.00	15	225	4.03	6.58	.06	1.18	.07	11.91	8.89	.00	8.89	20.80
CHALLENGER 65 #2	67,122.00	5	800	10.53	5.76	.05	1.04	.06	17.43	6.25	11.51	17.76	35.20
FLEXI CHISEL #2	26,052.00	9	600	2.97	3.00	.03	.54	.03	6.57	6.67	.00	6.67	13.24
DISC	25,116.00	6	500	5.71	3.31	.03	.60	.03	9.68	4.00	.00	4.00	13.68

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is violation of law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

Alternate formats of our educational materials are available upon request for persons with disabilities. Please contact the Information Department, College of Agriculture and Home Economics.

Issued by Washington State University Cooperative Extension and the U.S. Department of Agriculture in furtherance of the Acts of May 8 and June 30, 1914. Cooperative Extension programs and policies are consistent with federal and state laws and regulations on nondiscrimination regarding race, sex, religion, age, color, creed, national or ethnic origin; physical, mental or sensory disability; marital status, sexual orientation, and status as a Vietnam-era or disabled veteran. Evidence of noncompliance may be reported through you local Cooperative Extension office.

Published 2000. Subject codes 274, 340.A.

EB1907