COSTS OF PRODUCING DRYLAND WINTER WHEAT ON SUMMER FALLOW, SOUTHEASTERN WYOMING 1975–76

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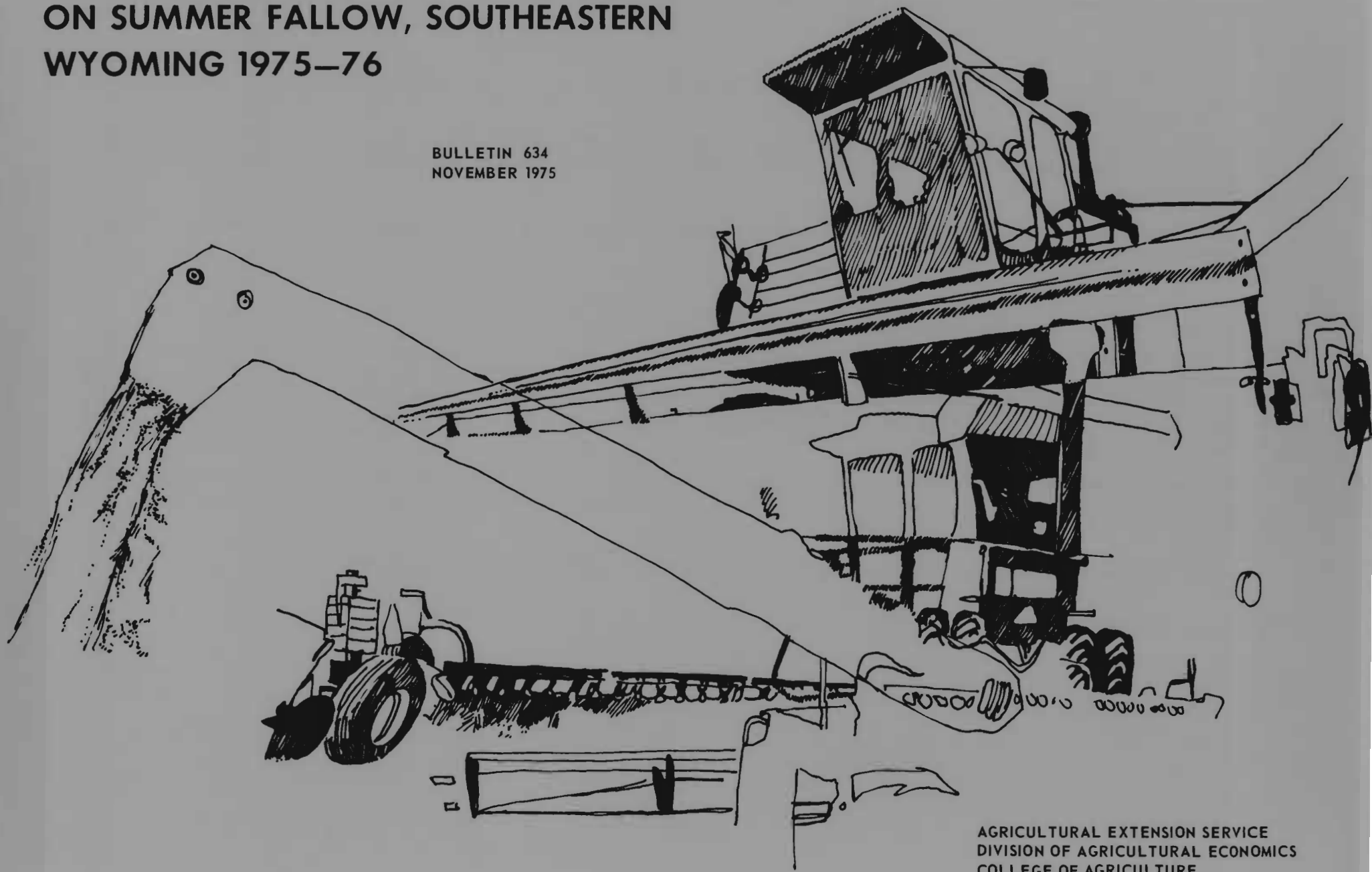

AGRICULTURAL EXTENSION SERVICE
DIVISION OF AGRICULTURAL ECONOMICS
COLLEGE OF AGRICULTURE
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Costs of Producing Dryland Winter Wheat on Summer Fallow, Southeastern Wyoming, 1975-76*

Introduction

Winter wheat grown on non-irrigated land is an important cash crop in Wyoming. In 1973, Wyoming farmers produced about 5.1 million bu on 224,600 acres. This crop sold for about $22 million. 1/ Wheat ranks next to sugarbeets as Wyoming's second most important cash crop. Wheat is third highest in total value of production ranking behind hay and sugarbeets. Hay is Wyoming's most valuable crop, but most hay grown in Wyoming is fed and marketed through livestock rather than being sold for cash.

About 99% of Wyoming's dryland winter wheat is produced in ten eastern Wyoming counties. In the southeast, Laramie, Goshen, Platte, Niobrara and Converse county growers harvested about 203,200 acres in 1974 or about 85% of Wyoming's winter wheat acreage. In the northeast, Campbell, Crook, Sheridan, Weston and Johnson county growers produced about 33,900 acres or 14% of the state's winter wheat. Total production of winter wheat in Wyoming for 1974 was about 6.12 million bushels from 240,000 acres. The estimated value of the 1974 winter wheat crop is about $24 million. 1/

Table 1 shows acreage and yield data for ten Wyoming counties and the state for 1965 through 1974. The acreage of winter wheat grown in Wyoming has been up and down over the past 10 years. A good deal of the fluctuation in acreage can be directly associated with acreage control programs. In recent years, however, controls have been lifted and acreage has increased.

Ten-year average yields for the primary wheat producing counties varies from 21.1 to 29.3 bu/acre. The 10-year average yield for Wyoming is about 25.5 bu/acre. Annual yields for the state varied from a low of 11.8 bu/acre in 1965 up to 34.9 bu/acre in 1972. The past 10-year average yield for the five northeast counties was 27.8 bu/acre while the past 10-year average yield was 25.2 bu/acre for the five southeastern counties.

Most of the wheat in southeastern Wyoming is grown near the communities of Albin, Pine Bluffs, Carpenter, Burns, Hillsdale, Hawk Springs, Chugwater, Wheatland, Torrington,

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1/ Wyoming Crop and Livestock Reporting Service, Cheyenne, Wyoming, 1974 Annual Crop Summary, preliminary data for 1974.

* The author is D.E. Agee, Extension Farm Management Specialist and Assistant Professor, Division of Agricultural Economics, University of Wyoming, Laramie.

Table 1. Dryland winter wheat: Acreage harvested and yield per acre, northeastern and southeastern Wyoming counties, 1965-74. 1/

Year	Northeast area					Southeast area					State of Wyoming
	Campbell	Crook	Johnson	Sheridan	Weston	Converse	Goshen	Laramie	Niobrara	Platte	
	Acres of dryland winter wheat										
1965	17,900	16,300	600	4,800	4,800	2,400	40,000	53,620	5,500	26,350	177,370
1966	16,800	14,400	350	5,300	4,000	2,600	60,500	72,300	7,300	29,600	218,870
1967	23,200	20,600	700	6,100	5,300	3,200	69,800	96,900	9,000	37,000	279,100
1968	23,000	17,700	700	5,600	4,000	3,100	66,100	81,500	8,900	36,200	252,650
1969	22,000	12,300	450	3,800	3,000	1,950	57,600	75,800	7,900	30,800	219,850
1970	19,000	10,500	450	4,400	2,600	1,700	48,700	67,400	6,300	27,200	191,950
1971	19,700	12,200	300	3,850	2,700	2,000	49,500	72,250	7,000	26,900	199,500
1972	17,200	9,900	300	3,650	2,400	1,700	56,600	79,600	8,400	32,700	215,900
1973 2/	16,800	11,350	350	3,400	2,400	1,600	53,200	86,550	7,100	38,150	224,600
1974 2/	17,700	11,300	400	2,300	2,200	1,600	53,900	101,500	5,700	40,500	240,000
Average 1965-74	19,330	13,655	460	4,320	3,340	2,185	55,590	78,742	7,310	32,540	221,979
	Yield in bushels per acre, dryland winter wheat										
1965	14.9	18.5	14.0	14.4	12.0	8.0	8.8	8.5	8.0	16.0	11.8
1966	24.0	20.9	19.4	19.4	15.0	15.0	19.9	21.7	17.5	22.4	20.9
1967	34.8	35.6	19.4	30.9	33.8	22.0	22.0	27.5	28.3	31.9	27.9
1968	32.7	34.5	19.0	33.0	27.9	22.9	28.8	31.9	32.0	32.3	30.9
1969	18.0	25.4	21.8	26.5	20.7	20.2	16.4	23.7	16.3	15.2	19.7
1970	25.0	25.7	22.7	23.0	23.0	22.9	28.2	31.9	26.4	29.5	28.8
1971	32.8	31.2	25.0	28.2	27.3	25.0	33.7	33.9	34.9	32.5	32.9
1972	32.7	37.0	34.0	37.0	38.0	32.4	35.8	35.4	34.8	33.8	34.9
1973 2/	27.2	33.0	34.0	30.0	36.0	17.0	24.9	17.9	23.0	25.0	22.7
1974 2/	31.2	31.2	25.3	27.9	25.5	26.0	22.9	25.2	20.9	22.0	24.8
Average 1965-74	27.3	29.3	23.5	27.0	25.9	21.1	24.1	25.8	24.2	26.1	25.5

1/ Source: Wyoming Agricultural Statistics 1965-74, compiled by the Wyoming Crop and Livestock Reporting Service, Cheyenne, Wyoming. About 1 to 2 percent of the winter wheat grown in Wyoming is on irrigated land. The above data excludes winter wheat grown on irrigated land.

2/ Preliminary.

Lingle and Lusk. The elevation of the area varies from a low of about 4,100 ft above sea level at Torrington to a high of 5,638 ft at Hillsdale. The frost-free growing season ranges from about 102 days at Chugwater to 133 days at Wheatland. 1/

Precipitation information is not available for all of the above communities. Available records show average precipitation is about 15.5 inches at Chugwater, 14.2 inches at Fort Laramie (near Lingle), 15.0 inches at Lusk, 14.2 inches at Pine Bluffs, 13.5 inches at Torrington and 12.5 inches at Wheatland. 2/ In this dryland wheat area, about 80% of the annual precipitation is received from April through September. The limited amount of precipitation is the major factor affecting wheat yields in southeastern Wyoming.

The Situation

Wheat farmers, like other Wyoming farmers and ranchers, are faced with continually rising prices for all production inputs. At the same time, product prices fluctuate widely and farmers never really know what they will receive for their crops.

Because of uncertain cost-price relationships, farmers must continually analyze and re-evaluate their operations. It is helpful in making this analysis, if operators can compare production, costs and performance rates for specific operations with "standards of performance." This comparison can give operator-managers some insight as to the strong and weak points of their own operations.

Objective

The objective of this study is to gather, organize and report cost-of-production data for dryland winter wheat grown in southeastern Wyoming. The goal is to present well-organized input data for a "better than average dryland wheat farm." This information should be useful to farmers, bankers, and others to use as a guide, as a base for comparison or standard of performance in evaluating specific operations.

Procedure

The group interview technique was used to obtain detailed production information from farmers. Some individual interviews were also conducted to obtain specific data.

Cooperating farmers specified current cultural practices, machinery requirements, land resources, and storage facilities for a "model farm." They also provided guidelines

1/ Becker, Alyea and Eppson, Probabilities of Freeze in Wyoming, Univ. of Wyo., Agri. Exp. Sta. Bull. 381, July 1961, page 10.

2/ Becker and Alyea, Precipitation Probabilities in Wyoming, Univ. of Wyo., Agri. Exp. Sta. Bull. 416, June 1964, page 9.

on machinery performance rates, labor requirements, part of the machinery cost data and prices for some inputs.

Farm suppliers were contacted to obtain current prices for fuel, other inputs and custom rates. Dealers provided current investment costs for vehicles, tractors, machinery and improvements. They also provided some guides for developing annual costs of owning and operating the machinery complement. The above data were then organized and extended to arrive at hourly or per acre costs for each machine and improvement.

The enterprise cost budget for dryland winter wheat was developed in a step-by-step manner. Costs for performing each cultural operation were determined in sequence as performed throughout the production cycle. General overhead, real estate and management costs were then added to arrive at total production and opportunity costs.

Limitations of Study

The information reported here was provided by a small group of "better than average" farmers. Their production skills and suggested technology is probably better than average for the area. Also, the model farm is probably larger and more efficient than the average for southeastern Wyoming.

Machinery investments and costs of owning and operating the machinery complement are developed for new equipment at 1975 prices. Even though investment and operating costs for machinery and improvements are at current high levels, the size of the model farm (1,410 acres fallow and 1,410 acres wheat) allows for efficient use of machinery and improvements.

Therefore, information reported here should not necessarily be interpreted as "average costs of producing wheat in southeastern Wyoming." Rather, this information should be used as a guide, a base for comparison, a standard of performance and as a goal in evaluating individual farming operations.

The Model Farm

Cooperating wheat growers outlined what they thought would be a "better than average" dryland wheat farm for southeastern Wyoming. They suggested the size of farm, the improvements needed, excluding a farm home and the machinery complement necessary to perform the work on the farm.

Farm Assets

The basic resources for the model farm are outlined in Table 2. The model farm is assumed to be 2,880 acres, or 4½ sections of land. The total acreage includes 2,820 acres of tillable land with about 60 acres non-tillable in farmstead, roads, fence rows, and other waste areas. An average value of $245/acre is assumed for the total acreage. Since tillable land must support the cost of the entire unit, a value of $250/acre is assumed

Table 2. Estimated asset values, 2,880 acre dryland wheat farm, southeastern Wyoming 1975-76.

Item	Description	Average value
Land:		
	Tillable wheat land, 2,820 acres @ $250	$705,000
	Nontillable, farmstead, roads, etc. 60 acres	---
	Subtotal value of land 2,880 acres @ $245	$705,000
Depreciable assets:[1/]		
Improvements:		
	Grain bins, 3 - 6,000 bu each or 18,000 bu capacity	12,265
	Grain bin, rectangular, metal, 40 x 60 ft -16,400 bu capacity	6,054
	Shop, rectangular, 60 x 40 ft, metal, cement floor, heat and lights	6,875
Vehicles:		
	Pickup, ½ ton	3,260
	Truck, 2 ton with grain box and hoist	7,400
Tractors:		
	150 hp, 2-wheel drive, diesel, with duals	16,575
	125 hp, 2-wheel drive, diesel, with duals	13,500
Machinery:		
	Plow, 8 bottom moldboard; Springtooth 31 ft; Rodweeder 36 ft	7,238
	Grain drills, 3 - 8 ft drills and hitch	3,778
Miscellaneous:		
	Grain augers, fuel tanks, shop tools, sprayer	6,399
	Subtotal, average value, depreciable assets	83,344
Total value, land plus average value of depreciable assets		$788,344

[1/] Average value equals $\frac{\text{Cost + salvage value}}{2}$

See Appendix Worksheet I, page 20 for details on depreciable assets.

for each tillable acre. Some farm land in the area would probably sell for more than $250/acre while other land may sell for less. The investment value of $250/acre is, therefore, hopefully "a happy medium."

The improvements assumed necessary include three steel granaries with a total capacity of 18,000 bu and one rectangular grain storage unit with a capacity of 16,400 bu. The total grain storage capacity is 34,400 bu or about adequate for an average wheat crop.

Vehicles needed include a pickup and a 2-ton truck with grain box and hoist. The machinery complement includes one 150 hp, 2-wheel drive diesel tractor with duals, one 125 hp, 2-wheel drive diesel tractor with duals, a moldboard plow, springtooth, rod weeder and grain drills. Some miscellaneous equipment is also necessary.

The dollar values of depreciable assets shown in Table 2 are "average values" as determined and shown for the entire machinery complement in Appendix Worksheet I, page 20.

Based on the above assumptions, the total investment necessary for the model farm is $788,344. This includes $705,000 for land, $25,194 for grain storage and shop and $58,150 for machinery and equipment. New cost of depreciable assets would be approximately $142,384 as contrasted to average value of $83,344 (Appendix Worksheet I, page 20).

Operations calendar

Cooperating wheat growers outlined the specific jobs or operations to be performed and the approximate dates the jobs are to begin and be completed. The operations calendar for the model farm is shown in Table 3. The calendar shows fallow operations normally begin in early April and are completed in late August just before planting. Other operations include machinery-improvement maintenance, spraying, hauling seed, harvest and hauling wheat to market.

Labor-Machine Performance Rates

Cooperators provided estimated performance rates, fuel use and labor-machine requirements for various jobs. This information is summarized and shown in Table 4.

Also shown in Table 4 are labor and machine requirements for the total farm operation. Note that total annual use for the two tractors is moderate. It might be possible, with little or no down time, to complete all tillage and planting operations with one tractor. It is normal, however, to expect and have some down time and inclement weather. These factors make it mandatory to have excess tractor capacity to assure that all operations can be completed on a timely basis.

The estimated total "minimum productive labor requirement" for the model farm is about 1,800 hr. Cooperating farmers estimated that overhead labor would amount to about 30% of "productive labor" or an additional 540 hr/year. Overhead labor includes time for travel to and from fields, adjusting equipment, travel for obtaining repairs, other business

Table 3. Operations calendar for dryland winter wheat, southeastern Wyoming, 1975-76

Time period	Operations	
	Fallow	Other
April:		
First half	Start plowing	Machinery maintenance
Second half	Continue plowing	Machinery maintenance
May:		
First half	Finish plowing	Spray insects
Second half	Start 1st springtooth	Machinery maintenance
June:		
First half	Finish 1st springtooth	Spray weeds
Second half	Second springtooth	Machinery maintenance
July:		
First half	First rodweed	Start harvest; haul wheat to storage
Second half		
August:		
First half	Third springtooth	Finish harvest; haul & clean seed; start planting
Second half	Second rodweed	
September:		
First half		Finish planting
Second half		Start hauling wheat to elevator
October, November, December, January, February, March		Finish hauling wheat to elevator; Repair and overhaul machinery & improvements; Clean granaries

Table 4. Performance rates and labor-machine requirements for 2,880 acre dryland wheat farm, southeastern Wyoming 1975-76. (1,410 acres fallow, 1,410 acres wheat, average yield 25 bu/acre, total production 35,250 bu)

Operation(s)	Tractor size	Implement size	Fuel use 1/	Acres/ 10 hours	Hours/ acre	Total farm: Acres covered	Total farm: Hours	Total farm: 10 hour days
Plow stubble, 1 time	150 hp	8-18's	High	60	.167	1,410	235	23.5
Springtooth, 3 times	150 hp	31 ft	High	100	.100	4,230	423	42.3
Rodweed, 2 times	125 hp	36 ft	Med	140	.071	2,820	200	20.0
Plant, 1 time	125 hp	24 ft	Low	80	.125	1,410	176	17.6
Haul seed	--	2 ton	5 mi/gal	352	.028	1,410	39	3.9
Spray weeds, 1/2 of wheat	custom	air	.5 gal/acre	3,525	.003	705	2	.2
Spray army worms 1/5 of wheat	custom	air	.5 gal/acre	3,525	.003	282	1	.1
Combine (diesel)	custom	--	6 gal/hr	80	.125	1,410	--	--
Haul wheat to bins (5 mi)	custom	--	5 mi/gal	200	--	1,410	--	--
Elevate wheat into bins	--	augers	1 gal/hr	200	.05	1,410	70	7.0
Load & haul wheat to elevator	--	2 ton	5 mi/gal	34	.293	1,410	413	41.3
Service, repair, overhaul equipment	--	--	--	--	--	--	243	24.3
Pickup, annual use	--	½ ton	10 mi/gal	--	--	--	--	--
Subtotal, labor required							1,802	180
Overhead labor @ 30% of subtotal							540	54
Total labor required for case farm							2,342	234

1/ Fuel use for the 150 hp tractor:
Heavy draft 9.0 gal/hr
Medium draft 6.7 gal/hr
Light draft 5.4 gal/hr

Fuel use for 125 hp tractor:
Heavy draft 8.1 gal/hr
Medium draft 6.5 gal/hr
Light draft 5.0 gal/hr

travel and general farm upkeep-overhead labor. Cooperators indicated that, for the model farm, the owner-operator would perform almost all labor and management himself. In practice, the operator may hire some labor in addition to normally hired custom operations. The amount of labor hired would depend on the age and financial situation of the operator and on other factors such as weather and if the operator is able to keep up with the farm work by himself. The wheat growers indicated it is not easy to find part-time labor with skills necessary for operating the large tractors and wheat machinery.

Input prices

Prices for specific inputs were obtained from farmers, farm suppliers and dealers, Table 5. Fuel prices reflect farm deliveries for April-September 1975. The farm price for gasoline is adjusted downward for refunds received on 70% of total gasoline used.

The rate charged for all labor used on the farm is $8/hr. Cooperators argued that operators of large farm equipment should be compensated comparably to operators of heavy road equipment. Since the owner-operator and his family perform most of the direct labor on the model farm, a rate of $8/hr for 2,342 hr would amount to a total annual labor return or charge of $18,736. This is assumed to be a "reasonable" annual payment for labor on a farm of this size.

The charge for management is set at 5% of expected gross receipts. This rate is commonly charged by professional farm managers. The total charge for management would vary with yield and the price for wheat. Superior management would thus be rewarded for obtaining higher than average yields and also for higher than average prices. For the case farm, the management charge (return) is calculated at 5% of $87.50/acre gross returns or $4.37/acre. This is based on a yield of 25 bu and a price of $3.50/bu. The total return (charge) for management would be $6,162/year. Based on the above resource price assumptions, the operator-manager would receive $24,898 annually for performing all the labor and management for the $788,344 farm. These resource costs are subsequently built into the enterprise cost budget for wheat.

Machinery-Improvement Costs

Information developed and explained up to this point plus investment cost data was then used in developing costs for owning and operating each vehicle, tractor, machine and improvement.

Machinery-Improvement Inventory

Appendix Worksheet I is a list of vehicles, tractors, machinery, and improvements assumed necessary for the model farm. The information includes: size, new cost, salvage value, average investment, depreciable investment, annual use and useful life.

Estimated new costs as obtained from dealers represent retail prices for spring 1975. Improvement costs are current estimates

Table 5. Input prices for dryland winter wheat, southeastern Wyoming 1975-76

Item	Price or cost per unit
Diesel fuel	40.0 cents/gal
Gasoline	50.0 cents/gal net after refunds
Hydraulic oil	$2.21 per gallon
Motor oil	$2.01 per gallon
Grease	71 cents/lb
Wheat seed	$6.00 per bushel or $10/cwt
Clean wheat seed	13.8¢/bu or 23¢/cwt
Custom combine	$8.00 per acre plus 10¢/bu over 20 bu/acre
Haul to bin (max. 5 mi)	10 cents/bu
Land assessment for taxes	$9.10 per acre
Mill levy	69 mills, assumed for 1975
Taxes on machinery	69 mills on .25 of average investment
Custom spray for weeds	$3.40 per acre, includes application and 3/4 lb active 2,4-D/acre
Custom spray for army worms	$3.25 per acre, application and insecticide
Labor	$8.00 per hour, for all labor required except for custom operations
Value of wheat land	$250 per acre
Management	5 percent of expected gross returns
Interest rates:	
Wheat land	6 percent on two acres
Machinery & improvements	9 percent on average investment
Operating capital	9 percent on one-half of cash costs

from a local contractor and include set-up charges. Salvage values are estimated after considering total use for the number of years indicated and estimated total wear-out life. Annual use is based on information developed for the model farm in Table 4. Calculations are:

New cost minus salvage = depreciable investment.

$$\frac{\text{New cost plus salvage}}{2} = \text{average investment.}$$

Note that total salvage value, $24,304, shown at the bottom of Appendix Worksheet I, is about 17% of new cost while depreciable investment, $118,080 makes up the balance or about 83% of new cost.

Machinery-Improvement Fixed Costs

Appendix Worksheet II shows fixed costs for each item in the machinery-improvement complement. Specific calculations are:

$$\text{Depreciation} = \frac{\text{Cost minus salvage}}{\text{Useful life}}$$

Interest charge = Average investment X 9%

Taxes = ½ X average investment X .069 (the mill levy)

Insurance is estimated.

Total annual fixed cost divided by annual use, as determined in Table 4, gives the fixed cost per unit of use, i.e., /hour, /mile, or /acre. Total annual fixed costs, $20,341, are about 14% of new investment cost.

Machinery-Improvement Operating Costs

Appendix Worksheet III shows estimated operating costs for each item in the machinery-improvement complement. Annual costs include fuel, oil-lube-filters, repairs, and service labor for each item. Specific calculations are:

Fuel cost equals gal/hr X hrs operated X price/gal

Oil, lube and filter costs are estimated based on annual use and prices for oil, lube and filters

Repairs are estimated based on information from farmers and cost of repairs from dealers

Service labor equals service time/day plus time for overhauling and installing repairs X $8/hr.

Annual operating cost divided by annual use, as developed in Table 4, equals cost per unit of use, i.e., /mile, /hour, or /acre. Note that the annual cost for fuel is estimated at $4,365 and repairs at $4,460. Total annual machine-improvement operating costs, $11,308, are about 7.9% of the new investment in the machinery complement.

The data developed and explained up to this point are subsequently used in constructing the enterprise cost budget for wheat.

Enterprise Costs for Winter Wheat

Detailed costs for each operation performed on winter wheat are shown in Table 6. It is assumed that enterprise costs begin with the first summer fallow operation performed in early April. Other operations follow in sequence through the production cycle.

Fallow Operations

Fallow operations include moldboard plowing, springtoothing three times, and rodweeding twice. The following example shows how per acre costs in Table 6 are derived:

Per acre costs as determined in the example below and shown in Table 6 may require further explanation. Cash costs for materials and custom services are self-explanatory and are listed under that heading. Cash operating costs for machinery are shown under the column headed "fuel-lube-repair." It should be noted that repairs include a charge for machinery service

Example showing calculation of costs for moldboard plowing, 150 hp tractor, 8 bottom plow, high fuel use.

	Operating cost/hr (From App. Worksheet III)		Hours/acre (From Table 4)	Cost/acre (Table 6)
Tractor, 150 hp, high fuel use	$5.81	X	.167	$ .97
Plow, 8-18's	2.51	X	.167	.42
Labor (operator)	8.00	X	.167	1.34
Total operating costs	$16.32	X	.167	$2.73
	Fixed cost/hr (From App. Worksheet II)			
Tractor	$5.96	X	.167	.99
Plow	4.43	X	.167	.74
Total fixed costs	$10.39	X	.167	$1.73
Cost to plow one acre (operating & fixed)				$4.46

Table 6. Costs of producing winter wheat, one acre fallow and one acre wheat, southeastern Wyoming 1975-76. (1,410 acres wheat, 1,410 acres fallow, average production 35,250 bu or 25 bu/harvested acre)

Operation(s)	Tractor (hp)	Implement	Materials description	Per acre physical data: Truck miles	Tractor hours	Man hours	Per acre cash costs: Materials & custom	Fuel, lube, repair	All labor	All per acre costs: Cash	Fixed	Total
							$	$	$	$	$	$
Fallow:												
Plow, moldboard	150	8-18's	--	--	.167	.167	--	1.39	1.34	2.73	1.73	4.46
Springtooth, 3 times	150	31 ft	--	--	.300	.300	--	1.94	2.40	4.34	2.22	6.56
Rodweed, 2 times	125	36 ft	--	--	.142	.142	--	.95	1.14	2.09	1.62	3.71
Subtotal, fallow					.609	.609	--	4.28	4.88	9.16	5.57	14.73
Plant:												
Haul seed	--	2 ton	40 mi/235 bu	.114	--	.029	--	.02	.23	.25	.04	.29
Grain auger (.003 hr/A)	--	6"x41'	--	--	--	--	--	.01	--	.01	.01	.02
Clean & treat seed	--	--	23¢/cwt x .4 cwt	--	--	--	.09	--	--	.09	--	.09
Plant seed	125	24 ft	40 lb seed	--	.125	.125	4.00	1.21	1.00	6.21	1.79	8.00
Subtotal, plant				.114	.125	.154	4.09	1.24	1.23	6.56	1.84	8.40
Grow:												
Spray weeds, ½ of wheat	custom	air	3/4 lb 2,4-D	--	--	.003	1.70	--	.02	1.72	--	1.72
Spray, armyworms, 1 of 5 yrs	custom	air	$3.25/acre	--	--	.003	.65	--	.02	.67	--	.67
Crop insurance	--	--	--	--	--	--	5.00	--	--	5.00	--	5.00
Subtotal, grow				--	--	.006	7.35	--	.04	7.39	--	7.39
Harvest:												
Combine, $8 for 20 bu	custom	--	10¢/bu for 5 bu	--	--	--	8.50	--	--	8.50	--	8.50
Haul wheat to bins	custom	--	10¢/bu	--	--	--	2.50	--	--	2.50	--	2.50
Put in bins, 2 augers, 35 hrs ea	--	8"x41'	--	--	--	.025	--	.04	.20	.24	.09	.33
	--	6"x41'	--	--	--	.025	--	.04	.20	.24	.08	.32
Subtotal, harvest				--	--	.050	11.00	.08	.40	11.48	.17	11.65
Subtotal, fallow through harvest				.114	.734	.819	22.44	5.60	6.55	34.59	7.58	42.17
Haul to elevator:												
Load wheat, 2 augers, 30 hrs ea	--	8"x41'	and 6"x41'	--	--	.043	--	.07	.34	.41	.15	.56
Haul, 3 hrs/load	--	2 ton	118 loads, 40 mi ea	3.347	--	.251	--	.70	2.01	2.71	1.26	3.97
Subtotal, haul wheat				3.347	--	.294	--	.77	2.35	3.12	1.41	4.53
Subtotal, fallow through haul to elevator				Tk3.461	.734	1.113	22.44	6.37	8.90	37.71	8.99	46.70
General overhead:												
Pickup	--	½ ton	9,000 mi/yr	6.08	--	--	--	.69	--	.69	.97	1.66
Misc: labor @ 30% other @ 5% of above items			Tk .17, Pu .30	.037	.334		1.12	.35	2.67	4.14	.50	4.64
Interest on cash costs @ 9% for 6 months				--	--		1.06	.33	.52	1.91	--	1.91
Subtotal, general overhead				Tk .17	Pu6.38	.037	.334	2.18	1.37	3.19	6.74	1.47	8.21
Subtotal, fallow through general overhead				Tk3.63	Pu6.38	.771	1.447	24.62	7.74	12.09	44.45	10.46	54.91

Real estate overhead: (for 2 acres) Item	Investment	Depreciation	Interest	Taxes	Insurance	Other cash			
Land, 2 acres @ $250 @ 6%	$500	$--	$30.00	$1.26	$--	$--	1.26	30.00	31.26
Shop	5	.32	.44	.08	.15	.26	.49	.76	1.25
Grain storage	13	.85	1.17	.22	--	.25	.47	2.02	2.49
Subtotal, real estate overhead	$518	$1.17	$31.61	$1.56	$.15	$.51	2.22	32.78	35.00
Management: at 5% of expected gross (25 bu/A at $3.50 = $87.50 x .05)							4.37	--	4.37
TOTAL PRODUCTION AND OPPORTUNITY COSTS							51.04	43.24	94.28
Cost/bu or breakeven selling price at: 25 bu/acre							2.04	1.73	3.77
20 bu/acre (total cost $90.64/acre)							2.37	2.16	4.53
30 bu/acre (total cost $98.94/acre)							1.85	1.44	3.29

labor as determined in Appendix Worksheet III (page 22). Therefore, a total of about .18 hr of labor/acre at $8/hr is included in fuel-lube-repair costs.

Per acre labor costs, excluding custom services and machinery service labor, are shown under the column headed "all labor." Man hr/acre X $8/hr gives the labor cost. In this budget, all labor, whether provided by the operator, his family, or hired, is charged to the enterprise as a cash cost. It is assumed that the farmer would have cash living costs and/or hired labor costs throughout the enterprise cycle.

The three right hand columns of Table 6 show all per acre costs classified as cash, fixed and total. The "cash" column is the sum of materials-custom, fuel-lube-repairs, and labor as explained above. Fixed costs include depreciation, interest on average investment, taxes and insurance for machinery and improvements. Therefore, fixed costs as shown here include taxes and insurance on machinery which are cash items. Taxes and insurance on machinery are about $1,590 for the total farm or $1.13/harvested acre.

In Table 6, costs for fallow operations, plowing, springtoothing three times and rod-weeding two times, total $14.73/acre. Also note that the cost to plant seed, excluding 40 lb of seed and cleaning, is $4.00/acre. Custom operators in the area will perform all summer fallow operations and plant the wheat seed for $16 to $20/acre. 1/ How does this compare with the budgeted costs for the model farm using owned equipment?

Data for model farm from Table 6

Operation(s)	Cost/acre
Plow, springtooth 3X, rodweed 2X	$14.73
Plant seed ($8 minus $4 for seed)	4.00
Total, fallow and plant seed	$18.73

Therefore, costs as budgeted for the model farm using owned equipment and labor at $8/hr are competitive with most current custom rates. This relationship is normal as it is generally less costly for farmers to own their own equipment than to hire custom services. This is especially true when owned equipment is used on relatively large acreages as assumed for the model farm.

Some farmers in southeastern Wyoming use fertilizer on winter wheat. Dealers in the Pine Bluffs area reported about 6,000 acres of winter wheat were fertilized for the 1975 crop and about 6,000 to 10,000 acres were fertilized for the 1976 crop. Some increase

1/ Stevens, D.M., Wyoming's Farm Machinery Custom Rates Guide for 1975, Univ. of Wyo., Agri. Exp. Sta., Bull. 630, July 1975, page 3.

in yield and percent protein has been reported for adding 40 units of available nitrogen before planting. Total costs for applying 40 available units of nitrogen in the fall of 1975 are about $8/acre. This would include costs for nitrogen, rig rent and the farm tractor and labor. If wheat would sell for $2.50/bu, it would require an increase in yield of 3.1 bu/acre to pay the added costs of fertilizer. If wheat sells for $3.50/bu an added yield of 2.2 bu/acre would pay added costs. Expected yield increases for adding nitrogen are not firmly known at this writing. This is perhaps one production practice worthy of more experimental work. Future studies may indicate the use of fertilizer as a more common practice in this area.

Planting Costs

Costs for planting include charges for all operations related to procurring, hauling, treating, cleaning and drilling the seed. Seed is charged to the enterprise at $6/bu or $4 for 40 lb/acre. Cooperators indicated the most popular varieties are Lancer, Cheyenne, Scout-66 and Centurk.

Growing Costs

Costs incurred after planting and before harvest are classified as growing costs. Included are costs for spraying weeds, insect control and crop insurance. Cooperators indicated that crop insurance premiums vary widely according to the insured coverage and location. The concensus was that an annual premium of $5 per acre was about the average paid.

Harvest Costs

Harvest costs include custom combining and hauling the wheat to farm storage. The custom combining rate is $8/acre plus 10¢/bu for yields over 20 bu/acre. The custom hauling charge is 10¢/bu for hauling up to 5 miles. These charges total $11/acre for 25 bu/acre or 44¢/bu to combine and haul to farm storage. The farmer uses his own labor and augers to put the wheat into storage. He also supervises the work of the custom harvestors.

Hauling Costs

Cooperators indicated they use their own trucks, augers, and labor for loading and hauling the wheat to the elevator where it is sold. The detailed costs indicate wheat can be loaded and hauled 20 miles (40 miles round trip) to the elevator for about 18¢/bu. Here again farmers are using their own equipment and labor. Wheat can be custom hauled for 10¢/bu for the first 5 miles plus one cent/bu for each additional mile. At this rate the cost would be 25¢/bu to haul wheat 20 miles.

General Overhead Costs

General overhead includes charges for using the farm pickup, miscellaneous costs and interest on cash operating costs at 9% for 6 months. Miscellaneous costs include overhead labor at 30% of previously allocated productive labor. Other miscellaneous costs are calculated at 5% of previously budgeted items. General overhead is thereby estimated at $8.21/acre or about 33¢/bushel.

Real Estate Overhead Costs

Real estate overhead costs are important costs of producing wheat. The farmer has an actual or "opportunity" investment in land. Here it is assumed that the investment is $250/tillable acre. It takes 2 acres of land, one in fallow and one in wheat, to produce 25 bu of wheat each year. So, an investment of $500 in land is required to produce 25 bu of wheat each year. Using an interest rate of 6%, the annual charge for interest on land is $30. Calculations are: $250/acre X 2 acres X 6% equals $30. Taxes on land are calculated as follows: The assessed value of $9.10/acre X the mill levy of 69 mills X 2 acres equals $1.26 annual taxes on 2 acres.

Other real estate overhead costs include depreciation, interest on average investment, taxes, insurance, repairs and utilities for the shop and grain storage. These costs are incurred annually even if no crop is produced. Shop and storage overhead costs are estimated at $3.74/acre/year or about 15¢/bu for an average crop.

Management Cost

Farm operators perform many tasks other than direct labor such as driving a tractor or hauling wheat. Making decisions can be classified as "management." Examples are: obtaining financing to carry on the wheat operation, buying land, selecting the variety to plant, deciding when to perform operations, buying equipment or seed, hiring custom services, checking wheat for weeds, insects, or diseases, keeping up on wheat market reports, attending Extension and/or association meetings and numerous other tasks. A charge for management is therefore justifiable and included as one of the costs of producing wheat.

Professional farm managers have, in the past, set management fees at 5% of gross receipts. This procedure requires estimating yield and product price. In Table 6, a yield of 25 bu/acre and a price of $3.50/bu is assumed to get gross returns of $87.50/acre. The management charge is then 5% of $87.50 or $4.37/acre of wheat. The total management allowance to the operator would be $4.37 X 1,410 acres or $6,162. It might be argued that the management allowance should be higher than $6,162 for managing a 3/4 million dollar business.

Total Production and Opportunity Costs

Total production and opportunity costs of $94.28/acre include charges for all resources used in producing wheat. Certainly some questions can be raised about the rates or prices used for some resources. For example, is $8/hour a fair rate for the operator's direct labor? Is $250/acre a fair investment value for an acre of dry wheat land? Is 6% a fair return or charge for the use of the investment in land? Is $6,162 or about 17.5¢/bu an adequate charge or return for managing a 3/4 million dollar business?

Based on the assumed resource prices, production, etc. used in this analysis the cost of producing wheat is about $94/acre or

$3.77/bu for an average yield of 25 bu/acre. Or a price of $3.77/bu would pay costs of all resources at the rates charged in the enterprise budget.

Dryland wheat farmers generally commit production inputs and expect to receive "average" yields. However, because of unpredictable, uncontrollable weather conditions, yields may be higher or lower than average. Therefore, cost/bu or breakeven selling prices are calculated and shown for a range of yields at the bottom of Table 6. This enterprise budget shows a cost of about $4.53/bu for a 20 bu yield and about $3.29/bu for a 30 bu yield. Harvest, hauling and general overhead costs would vary with lower or higher yields. Adjustments have been made in total costs as shown for the 20 and 30 bu yields.

Fuel Requirements

If fuel prices should change, or if fuel should ever be rationed, it might be useful for wheat farmers to know the amount of fuel required to produce an acre or bushel of wheat. Data from the enterprise statement (Table 6) were summarized to arrive at the fuel requirements/acre and /bu of wheat shown in Table 7. The summary shows that 6.70 gals of diesel and 1.96 gals of gasoline are required to produce one acre or 25 bu of wheat.

Returns to Land

The enterprise budget for wheat (Table 6) is organized so that returns to land can be easily calculated. For example, data from Table 6 show:

Item	Amount
Total production & opportunity costs/acre	$94.28
Minus charge for interest on land (2 acres)	30.00
Equals all costs except interest on land	$64.28

Then:

Gross receipts for wheat, 25 bu @ $3.50	$87.50
Minus all costs except interest on land	64.28
Equals return to 2 acres of land	$23.22

This example shows that if all costs except interest on land are as budgeted and the price of wheat is $3.50/bu, return to investment in land would be $23.22. If the land is worth $250/acre the percentage return to 2 acres of land would be 4.64% ($23.22 ÷ $500 = .0464).

Suppose the price of wheat is $3.00 per bu,

Then:

Gross receipts for wheat, 25 bu @ $3 equals	$75.00
Minus all cost except interest on land	64.28
Equals return to 2 acres of land	$10.72

If wheat sells for $3/bu the return to 2 acres of land would be $10.72. Again if land is worth $250/acre, the percentage return to 2 acres of land would be 2.14% ($10.72 ÷ $500 = .0214).

If wheat sells for $3.771/bu (the breakeven price),

Table 7. Fuel requirements, 2,880 acre dryland wheat farm, 1975-76.
(1,410 acres fallow, 1,410 acres wheat, 35,250 bu production)

Operation	Power unit	Fuel use	Annual use	Gallons used
Diesel				
Plow	150 hp tractor	9.0 gal/hr	235 hrs	2,115
Springtooth	150 hp tractor	9.0 gal/hr	423 hrs	3,807
Rodweed	125 hp tractor	6.5 gal/hr	200 hrs	1,300
Plant	125 hp tractor	5.0 gal/hr	176 hrs	880
Miscellaneous:	150 hp tractor	5.4 gal/hr	32 hrs	173
	125 hp tractor	5.0 gal/hr	24 hrs	120
Combine (custom)	SP, 22 ft	6.0 gal/hr	176 hrs	1,056
Diesel required, gallons:	Total			9,451
	Per acre			6.70
	Per bushel			.268
Gasoline				
Haul wheat	2-ton truck	5 mi/gal	5,000 mi	1,000
Haul wheat	custom	5 mi/gal	1,175 mi	235
General	½ ton pickup	10 mi/gal	9,000 mi	900
Spray weeds	airplane	.5 gal/acre	705 acres	352
Spray armyworms	airplane	.5 gal/acre	282 acres	141
Grain augers	6"&8" X 41 ft	1 gal/hr	130 hrs	130
Gasoline required, gallons:	Total			2,758
	Per acre			1.96
	Per bushel			.078

Then:

Gross receipts for wheat, 25 bu @ $3.771 =	$94.28
Minus all costs except interest on land	64.28
Equals return to 2 acres of land	$30.00

A return of $30 to 2 acres of land is equal to a 6% return to an investment of $500 ($30 ÷ 500 = .06).

As shown above, farmers or others using the enterprise wheat budget can calculate return to land using various appropriate yields and prices. Also, returns to land can be calculated using various rates for labor and management. For example, assume labor is charged to the enterprise at $4/hr and management at 2.5% of expected gross or one-half the rates used in Table 6. Under these assumptions, with wheat at $3.50/bu, return to land would be higher, $15.73/acre or 6.29% return to an investment of $250.

At the above reduced labor and management rates, total return to labor for the model farm would be only $9,368 and return to management only $3,080. This would be extremely low compensation for performing all labor and management on a unit such as the model farm.

Return to land may also be realized through "appreciation" in land values. It is a fact that land values have gone up over past years and markedly so in recent years. However, how can the wheat farmer realize this so-called appreciation return? He may borrow on the increased equity realized through appreciation, or he can liquidate the business. If he borrows, interest and principal payments increase the squeeze for cash needed to meet other obligations. If he liquidates, he must pay capital gains taxes first which may markedly reduce the anticipated appreciation return.

A farm unit efficiently operated and managed, such as the model farm, should normally be expected to return a "reasonable rate" to all resources. If the unit does not return a fair rate to resources, what may happen? It is reasonable to expect the land, in time, to revert to the use that will pay the next highest rate of return.

Appendix Worksheet I. Machinery, equipment and improvements for 2,880 acre dryland farm, southeastern Wyoming 1975-76. (1,410 acres wheat, 1,410 fallow)

Item	Size	New cost	Salvage value	Average investment	Depreciable investment	Annual use	Useful life
Vehicles:		$	$	$	$	(miles)	(yrs)
Pickup	½ ton	5,600	920	3,260	4,680	9,000	5
Truck, grain box & hoist	2 ton	12,500	2,300	7,400	10,200	5,000	12
Tractors:						(hours)	
2-wheel drive, diesel, duals	150 hp	25,500	7,650	16,575	17,850	690	8
2-wheel drive, diesel, duals	125 hp	22,500	4,500	13,500	18,000	400	12
Tillage equipment:							
Plow, moldboard, one way	8-18's	5,000	406	3,203	5,594	235	8
Springtooth (with wheels)	31 ft	2,936	294	1,615	2,642	423	6
Rod weeder	36 ft	4,400	440	2,420	3,960	200	8
Planting equipment:							
Grain drill (with hitch)	24 ft	6,870	687	3,778	6,183	176	8
Miscellaneous equipment:							
Grain auger, with motor	8 in x 41 ft	1,360	136	748	1,224	65	8
Grain auger, with motor	6 in x 41 ft	1,260	126	693	1,134	65	8
						(acres)	
Fuel tank, gas	500 gal	250	25	138	225	1,410	12
Fuel tank, diesel	1,000 gal	400	40	220	360	1,410	12
Fuel tank, diesel, portable	150 gal	200	20	110	180	1,410	8
Shop tools & equipment	Misc.	5,000	2,000	3,500	3,000	1,410	10
Sprayer	200 gal	1,800	180	990	1,620	1,410	8
Improvements:							
Steel bin, forced air	6,000 bu	8,300	830	4,565	7,470	1,410	25
Steel bin, regular	6,000 bu	7,000	700	3,850	6,300	1,410	25
Steel bin, regular	6,000 bu	7,000	700	3,850	6,300	1,410	25
Granary, steel, cement floor[1/]	40'x60'	11,008	1,100	6,054	9,908	1,410	25
Shop, cement floor, heated	40'x60'	12,500	1,250	6,875	11,250	1,410	25
Totals		142,384	24,304	83,344	118,080		

[1/] Capacity is about 16,400 bu.

Appendix Worksheet II. Fixed costs for machinery, equipment and improvements, 2,880 acre dryland farm, southeastern Wyoming 1975-76. (1,410 acres wheat, 1,410 acres fallow)

Item	Size	Annual use	Depreciation	Interest	Taxes	Insurance	Fixed costs Total	Fixed costs Per unit
Vehicles:		(miles)	$	$	$	$	$	($/mile)
Pickup	½ ton	9,000	936	293	64	150	1,443	.160
Truck, grain box & hoist	2 ton	5,000	850	666	135	222	1,873	.375
Tractors:		(hours)						($/hour)
2-wheel drive, diesel, duals	150 hp	690	2,231	1,492	286	100	4,109	5.96
2-wheel drive, diesel, duals	125 hp	400	1,500	1,215	233	100	3,048	7.62
Tillage equipment:								
Plow, moldboard, one way	8-18's	235	699	288	55	---	1,042	4.43
Springtooth (with wheels)	31 ft	423	440	145	28	---	613	1.45
Rod weeder	36 ft	200	495	218	42	---	755	3.78
Planting equipment:								
Grain drill (with hitch)	24 ft	176	773	340	65	---	1,178	6.69
Miscellaneous equipment:								
Grain auger, with motor	8 in x 41 ft	65	153	67	13	---	233	3.58
Grain auger, with motor	6 in x 41 ft	65	142	62	12	---	216	3.32
		(acres)						($/acre)
Fuel tank, gas	500 gal	1,410	19	12	2	---	33	.023
Fuel tank, diesel	1,000 gal	1,410	30	20	4	---	54	.038
Fuel tank, diesel, portable	150 gal	1,410	23	10	2	---	35	.025
Shop tools & equipment	Misc.	1,410	300	315	60	---	675	.48
Sprayer	200 gal	1,410	202	89	17	---	308	.22
Improvements:								
Steel bin, forced air	6,000 bu	1,410	299	411	79	---	789	.56
Steel bin, regular	6,000 bu	1,410	252	346	66	---	664	.47
Steel bin, regular	6,000 bu	1,410	252	346	66	---	664	.47
Granary, steel, cement floor [1/]	40 x 60 ft	1,410	396	545	104	---	1,045	.74
Shop, cement floor, heated	40 x 60 ft	1,410	450	619	119	206	1,394	.99
Totals			10,612	7,499	1,452	778	20,341	41.38

[1/] Capacity is about 16,400 bu.

Appendix Worksheet III. Operating costs for machinery, equipment and improvements, 2,880 acre dryland farm, southeastern Wyoming 1975-76. (1,410 acres wheat, 1,410 acres fallow)

Item	Size	Annual use	Fuel	Oil, lube, filters	Repairs	Service labor	Operating costs Total	Operating costs Per unit
Vehicles:		(miles)	$	$	$	$	$	($/mile)
Pickup	½ ton	9,000	450	46	448	80	1,024	.114
Truck, grain box & hoist	2 ton	5,000	500	49	375	128	1,052	.210
Tractors:		(hours)						($/hour)
2-wheel drive, diesel, duals[1/]	150 hp	690	2,438	160	765	600	3,963	5.74
2-wheel drive, diesel, duals[2/]	125 hp	400	920	102	675	280	1,977	4.94
Tillage equipment:								
Plow, moldboard, one way	8-18's	235	---	5	393	192	590	2.51
Springtooth (with wheels)	31 ft	423	---	2	142	128	272	.64
Rod weeder	36 ft	200	---	3	176	120	299	1.49
Planting equipment:								
Grain drill (with hitch)	24 ft	176	---	12	550	320	882	5.01
Miscellaneous equipment:								
Grain auger, with motor	8 in x 41 ft	65	33	8	41	32	114	1.75
Grain auger, with motor	6 in x 41 ft	65	24	8	38	32	102	1.57
		(acres)						($/acre)
Fuel tank, gas	500 gal	1,410	---	---	---	---	---	---
Fuel tank, diesel	1,000 gal	1,410	---	---	---	---	---	---
Fuel tank, diesel, portable	150 gal	1,410	---	---	---	---	---	---
Shop tools & equipment	Misc.	1,410	---	---	250	---	250	.177
Sprayer	200 gal	1,410	---	---	36	24	60	.043
Improvements:								
Steel bin, forced air	6,000 bu	1,410	---	---	83	24	107	.076
Steel bin, regular	6,000 bu	1,410	---	---	35	16	51	.036
Steel bin, regular	6,000 bu	1,410	---	---	35	16	51	.036
Granary, steel, cement floor[2/]	40 x 60 ft	1,410	---	---	110	32	142	.101
Shop, cement floor, heated	40 x 60 ft	1,410	---	---	308	64	372	.264
Totals			4,365	395	4,460	2,088	11,308	8.02

[1/] Shown are total annual operating costs. Cost/hr for various fuel use: High, 9.0 gal/hr @ $5.81; Medium, 6.7 gal/hr @ $4.89; Low, 5.4 gal/hr @ $4.37.

[2/] Cost/hr for various fuel use: High, 8.1 gal/hr @ $5.88; Medium, 6.5 gal/hr @ $5.24; Low, 5.0 gal/hr @ $4.64.

[3/] Capacity is about 16,400 bu. Repairs include utilities.

The following publications may be obtained from University Extension Agents or by contacting the Bulletin Room, College of Agriculture, University of Wyoming, Box 3354, Laramie, Wyoming, 82071.

Bulletin 502R	Costs to Produce Potatoes, Circular Sprinkler Irrigation, Southeastern Wyoming, 1974.
Bulletin 619	Costs of Producing Crops, Riverton Area, Fremont County, Wyoming, 1974.
AE 75-01	Costs of Producing Crops, Big Horn Basin Area, Wyoming, 1974.
AE 75-02	Costs of Producing Crops, Circular Sprinkler Irrigation, Southeastern Wyoming, 1974.
Bulletin 630	Wyoming's Farm Machinery Custom Rates Guide for 1975.

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