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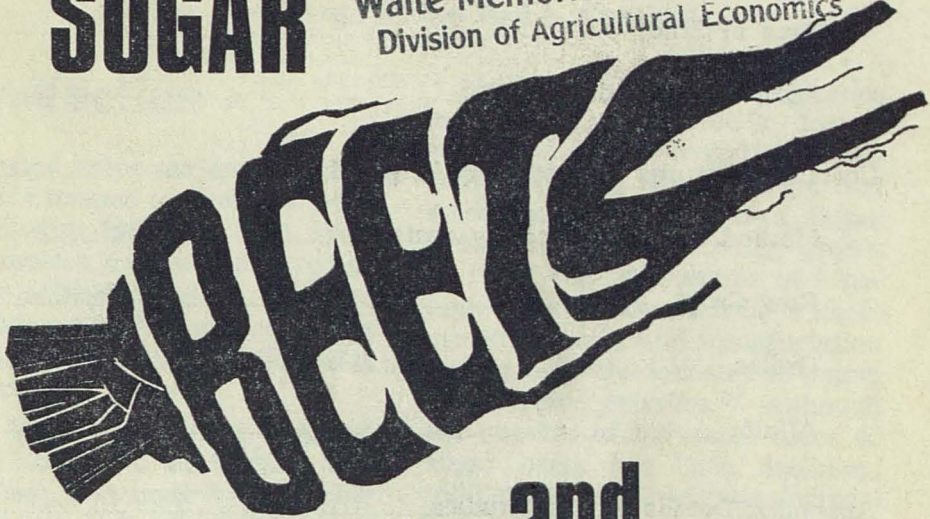
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Costs and Returns of Producing

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and Other Irrigated Crops in Montana

Montana Agricultural Experiment Station
Montana State University, Bozeman

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Costs and Returns of Producing Sugar Beets and Other Irrigated Crops in Montana*

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Introduction

Irrigated crops are an important source of income to Montana farmers. Between 1962 and 1966, Montana growers harvested an average of 1.5 million acres of irrigated crops averaging 77.8 million dollars annually or 27 percent of the value of all crops.

The largest portion of irrigated land is planted to alfalfa hay, barley, wheat, and sugar beets (Table 1). Almost half of the irrigated acreage in Montana is seeded to alfalfa hay and barley.

Montana Sugar Production

Montana ranked fifth in U. S. beet sugar production in 1967, producing 6.4 percent of the U. S. total or 3.8 million cwt. of refined beet sugar or 20.5 percent of the U. S. total.

The production of sugar beets in Montana dates back to 1898, when F. W. Traphagen's feasibility study of sugar beet production in Montana motivated the establishment of the sugar industry in the state.

The sugar beet producing areas in Montana are located in diverse soil types where irrigation water is available and where the growing season is 95 or more days. Sugar beets are currently being grown in 16 of the 56 counties in Montana. Cost pressures from a short growing season and transportation have caused the industry to perish in 13 other counties.^{2/} Although the number of harvested acres of sugar beets has been declining, total production has been increasing due to higher yields. About 77,000 acres of sugar beets were harvested in 1947 compared with 57,000 in 1967 (Table 2). The yield has varied from 10.2 tons per acre in 1943 to 17.8 tons per acre in 1963.

* Part of the supply response study for sugar beets under regional project WM-51. Cooperating in this project was the Governor's Sugar Beet Committee established by Governor Babcock, December 14, 1964. We acknowledge the Governor's Sugar Beet Committee and their chairman, Ishmael Yost, for their assistance and financial support of this project.

1/ Assistant professor of Agricultural Economics and Economics and graduate research assistant, respectively, Montana State University.

2/ These counties are Powder River, Sweet Grass, Gallatin, Lake, Sanders, Pondera Cascade, Jefferson, Madison, Hill, McCone, Valley, and Teton.

Table 1: Number of acres of the major irrigated crops in Montana, 1966.

Crop	Irrigated Acres	Non Irrigated Acres
Alfalfa hay	599,500	445,500
Barley	100,000	1,551,000
Wheat	78,800	3,723,200
Sugar Beets	61,400	—
Corn-Silage	49,000	—
Oats	38,700	155,300
Dry Beans	13,000	—

Source: United States Department of Agriculture—Statistical Reporting Service, Helena, Montana.

Table 2: Montana Sugar Beet Production: Acres planted, acres harvested, yield per acre and total production, alternate years 1929-1967.

Year	Total Acres Planted (000)	Total Acres Harvested (000)	Average Yield Per Acre (Tons)	Total Production (Tons)
1929	41.0	38.0	10.2	386,000
1931	59.0	54.0	11.4	617,000
1933	71.0	68.0	12.3	838,000
1935	53.0	51.0	11.2	570,000
1937	76.0	70.0	12.2	852,000
1939	77.0	74.0	12.1	894,000
1941	66.0	64.0	12.4	793,000
1943	60.0	57.0	10.2	581,000
1945	87.0	81.0	10.7	865,000
1947	82.0	77.0	11.7	899,000
1949	65.0	59.0	11.8	697,000
1951	48.8	44.9	12.0	537,000
1953	45.3	43.6	13.4	586,000
1955	50.8	50.0	14.5	724,000
1957	57.9	56.8	15.7	891,000
1959	57.7	52.6	15.7	827,000
1961	68.2	60.6	14.7	893,000
1963	66.7	65.7	17.8	1,170,000
1965	62.2	60.5	12.4	748,000
1967	59.5	57.2	17.6	1,013,760

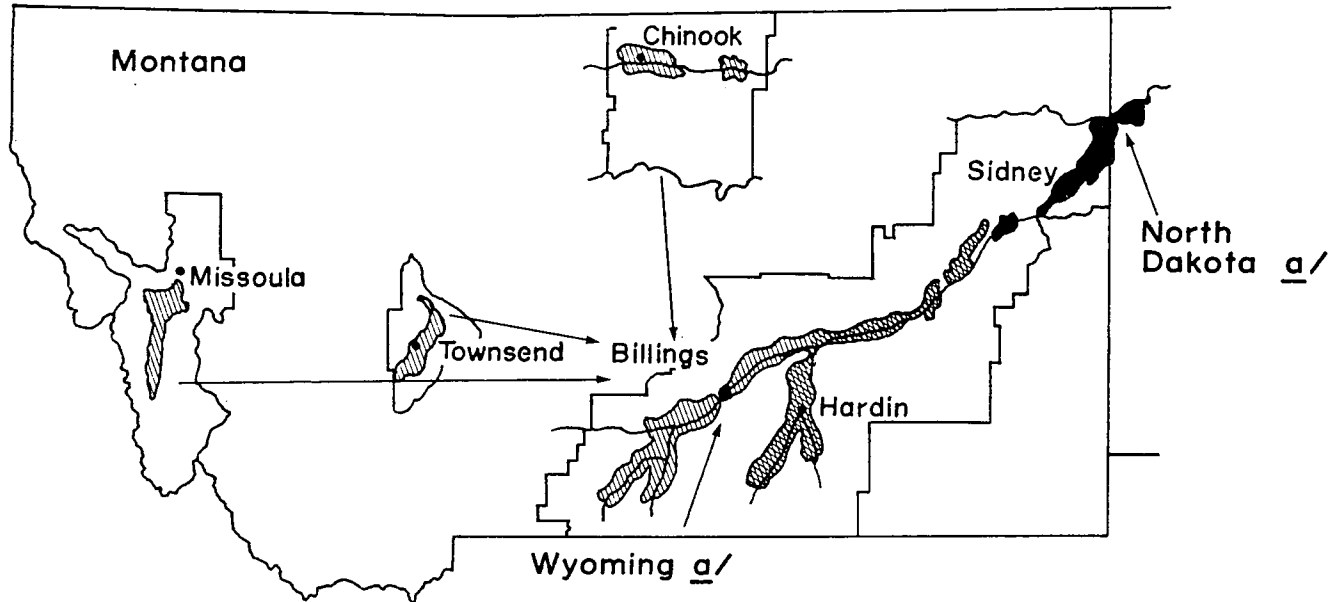
Source: United States Department of Agriculture-Statistical Reporting Service, Montana Agricultural Statistics, Helena, Montana.

Area of Study




The irrigated portions of the state that have supported beet production are divided into five production areas corresponding to three sugar factory districts.

The Great Western Sugar Company contracts for sugar beets in the Mid-Yellowstone, Milk River, and Bitterroot Valleys, and in the

Crow Creek Irrigation Project (Figure 1). Each of these areas is geographically separated and characterized by unique soil and climatic features. The Holly Sugar Company has two factory districts in Montana, one in the extreme lower Yellowstone Valley at Sidney and the other in the Big Horn River Basin near Hardin. There are other irrigated areas in Montana where



- Region 1-Sidney
- Region 2-Hardin
- Region 3-Billings & Chinook
- Region 4-Missoula
- Region 5-Townsend

-  Great Western
-  Holly - Hardin
-  Holly - Sidney

a/ Arrows indicate sugar beet flow patterns.

Fig. 1. Sugar Factory Districts and Production Regions, Montana, 1966.

sugar beets would probably be grown if transportation costs were not prohibitive; but this cost study was restricted to those production areas that currently grow sugar beets.

Sampling Procedure

The population considered for this research is sugar beet producers supplying beets to refining factories located in Montana. Thus, the universe includes sugar beet growers in Montana as well as a few producers in Wyoming and North Dakota. However, the sampling frame was limited to Montana and a few North Dakota growers, since a cost study was recently prepared by the University of Wyoming.

During the summer of 1967, 117 growers in four irrigated areas of Montana and North Dakota were personally interviewed. The sample frame was taken from a list of sugar beet producers' names furnished by the Great Western and Holly Sugar companies. Each producer was represented by his sugar beet contract number. Then a random number table was used to select a ten percent sample in each factory district. Because of non-response, a few additional growers were sampled. Of the total

of 1,124 sugar beet growers, 117 questionnaires were completed for a 10.4 percent sample (Table 3).

Costs and Returns of Producing Irrigated Crops

The costs and returns of producing seven irrigated crops in selected areas of Montana are reported in Tables 4-10. This study analyzes the profitability of producing three row crops (sugar beets, dry beans, and corn silage), three grains (wheat, oats, and barley), and alfalfa hay.

Method Used in Allocating Costs of Production

Total costs of production include both variable and fixed costs. Variable costs or out-of-the-pocket costs are those that vary with the rate of production and are specifically used for a specific enterprise. Such costs are contract labor, seed, fertilizer, etc. Fixed costs or indirect costs are those costs not varying with the rate of production and existing regardless of whether a crop is produced or not. Land costs, interest and depreciation on

Table 3: Sampling percent in the three farm districts in Montana, 1966.

Farm District	No. of Growers	No. in Sample	Sampling Percent
Hardin	203.0	28	13.8
Sidney	392.0	51	13.0
Billings	529.0	38	7.2
Total	1124.0	117	10.4

machinery and equipment are examples.

Also, there are joint costs of producing different enterprises on multi-enterprise farms. The allocation of these costs is somewhat arbitrary.^{3/} Therefore in this research joint costs such as building and fencing costs were not allocated. However, multi-use machinery costs were allocated according to the amount of time used on an individual enterprise. Taxes, interest, insurance, and equipment housing were allocated as a fixed percentage of the average value share of the machinery.^{4/}

Row Crops

Of the irrigated crops studied, sugar beets were the most profitable. Growers in all districts reported positive net income per acre (Table 4). The growers in the Sidney region farming 51-100 acres of sugar beets received the highest net return per acre (\$136.70). Producers with less than 50 acres in the Hardin area received the lowest net return of \$76.74 per acre primarily because of high machinery costs.

Beet prices and yields vary considerably by production area, according to data supplied by growers and factory personnel. The average price per ton in 1966 including government payments and sales of by-products was \$16.05 in Billings, \$15.19 in Hardin, and \$16.46 in Sidney. In 1968, premium prices of \$17.00 per ton were paid to producers raising beets with sugar content above the factory average.

Yields per acre were higher in the Billings and Hardin areas than around Sidney. Producers with small acreages of sugar beets in Billings averaged almost 18 tons per acre compared to 16 tons per acre for producers with small acreages in the Sidney area.

Sugar beet production requires a considerable investment in specialized machinery. The survey indicated that most growers use two row machinery. This includes planter-incorporators (6 row combination), cultivators, and two-row harvesters. Occasionally three-row machinery was reported, and some growers located in the northern districts (high-line) use one-row harvesters. Also, automatic beet thinning implements were more commonly used in the Billings area than in other regions of the state.

Because of Montana's capacity to produce beets, it is expected that sugar refining capacity will increase significantly in the next few years. Currently, 8,400 tons of sugar beets are sliced per 24 hour day during the processing season. By 1975, sugar factories will be increasing their slicing capacity to 11,500 tons per day. The Holly Sugar Company factories at Sidney and Hardin will be expanded to 4,400 tons and 2,700 tons per day, respectively. The Great Western

3/ Actually, because sugar beets must be grown in rotation to control diseases, the most appropriate cost study would be to study the rotation and not specific enterprises. In this way fixed costs would not have to be allocated at all. However, because many producers in Montana use such diverse rotations, each crop had to be budgeted as though it was the only crop being produced.

4/ For a definition of the average value share see appendix, p. 17.

Table 4: Cost and returns of producing sugar beets by region, Montana, 1966.

	Number of Producers In The Sample	Weighted Average Yield (Tons)	Average Price Per Ton	Total Revenue Per Acre a/	Total Variable Cost Per Acre	Return Over Variable Costs Per Acre	Total Fixed Cost Per Acre	Net Income Per Acre b/
			\$	\$	\$	\$	\$	\$
BILLINGS AREA c/								
PRODUCERS WITH								
0-50 Acres	18	17.95	16.05	288.10	114.35	173.75	64.86	108.89
51-100 Acres	17	16.56	16.05	265.79	101.30	164.49	55.31	109.18
101 Acres & Over	3	17.83	16.05	286.17	126.05	160.12	52.71	107.41
HARDIN AREA								
PRODUCERS WITH								
0-50 Acres	4	16.49	15.19	250.48	110.69	139.79	63.05	76.74
51-100 Acres	15	17.69	15.19	268.71	95.29	173.42	49.30	124.12
101 Acres & Over	9	17.75	15.19	269.62	100.11	169.51	46.27	123.24
SIDNEY AREA								
PRODUCERS WITH								
0-50 Acres	9	16.39	16.46	269.78	105.89	163.89	53.86	110.03
51-100 Acres	29	17.58	16.46	289.37	98.76	190.61	53.91	136.70
101 Acres & Over	13	16.48	16.46	271.26	101.08	170.18	46.81	123.37

a/ This return includes government payments and by-products.

b/ Net income is the return to management and risk-bearing.

c/ Includes Blaine and Phillips counties in North Central Montana.

Sugar Refinery at Billings should have a slicing capacity near 4,400 tons per day by 1975.

Other row crops examined were corn silage and dry beans. Corn silage is grown in all areas except in the Northern region. Most of this silage is stored in pits and used to feed livestock.

There appears to be no set market for corn silage. Most growers that produce silage also have livestock feeding operations. However, growers that sold their crop to livestock feeders generally received an average of \$6.86 per ton in 1966 (Table 5). At a price of \$6.86 per ton and an average yield of 21.36 tons per acre, farmers with 21-50 acres of corn in the Billings area had the highest net return per acre (\$48.78). Growers in the Sidney area with less than 20 acres had the lowest net return of \$3.11 per acre.

Dry bean production in Montana is mostly in the Sidney area. Only a few farmers at Hardin and Billings reported dry bean production. Farmers producing beans at all three acreage sizes in Billings and Sidney areas had net returns ranging from \$22.52 to \$50.74 per acre (Table 6). Hardin area producers with less than 20 acres of beans incurred a loss of \$16.06 per acre. Low yields, 13 cwt. per acre (7 cwt. per acre below the average yield in other areas), suggest an explanation for the low returns to bean production. Highest yields were reported at Sidney (24.91 cwt. per acre), as were the lowest average total costs (\$73.44 per acre).

Grains

Three grain crops — spring wheat, barley, and oats — were also analyzed in three irrigated farming areas of Montana.

Spring wheat growers in the Sidney area with 21-50 acres had an average net return of \$40.47 per acre in 1966 (Table 7). One grower is the Billings area with more than 50 acres made \$44.74 per acre, while five growers with less than 20 acres in the Sidney area had lowest returns per acre (\$15.98).

Barley was not too profitable for farmers reporting barley production. The greatest losses were experienced by producers in the Billings area with 21-50 acres (Table 8). However, Sidney growers with 21-50 acres reported an average return of \$14.87 per acre. Also, losses were reported for farmers producing oats in the Hardin and Sidney area. The return to management and risk-bearing ranged from \$1.17 per acre to —\$20.74 per acre (Table 9).

Alfalfa

Of the 117 farmers interviewed, 78 reported alfalfa production. Average net returns ranged from —\$25.70 per acre to \$57.69 per acre (Table 10). However, average net returns were positive in all regions and in all farm size groups except farmers in the Billings area with less than 20 acres of alfalfa. Billings area producers with more than 50 acres had the highest yields (4.43 tons per acre) and the highest net return per acre.

Table 5. Cost and returns of producing corn silage by region, Montana, 1966.

	Number of Producers In The Sample	Weighted Average Yield (Tons)	Average Price Per Ton	Total Revenue Per Acre	Total Variable Cost Per Acre	Return Over Variable Costs Per Acre	Total Fixed Cost Per Acre	Net Income Per Acre a/
			\$	\$	\$	\$	\$	\$
BILLINGS AREA b/								
PRODUCERS WITH								
0-20 Acres	2	18.36	6.86	125.95	68.52	57.43	46.60	10.83
21-50 Acres	9	21.36	6.86	146.53	48.58	97.95	49.17	48.78
51 Acres & Over	4	19.22	6.86	131.85	52.16	79.69	39.92	39.77
HARDIN AREA								
PRODUCERS WITH								
0-20 Acres	1	16.00	6.86	109.76	58.75	51.01	44.03	15.53
21-50 Acres	5	17.91	6.86	122.86	56.49	66.37	37.74	28.63
51 Acres & Over	7	18.16	6.86	124.58	50.04	74.54	35.92	38.62
SYDNEY AREA								
PRODUCERS WITH								
0-20 Acres	5	12.44	6.86	85.34	44.23	41.11	38.00	3.11
21-50 Acres	10	21.30	6.86	146.12	46.41	99.71	38.48	61.23
51 Acres & Over	3	16.78	6.86	115.11	52.31	62.80	42.17	20.63

a/ Net income is the return to management and risk-bearing.

b/ Includes Blaine and Phillips counties in North Central Montana.

Table 6. Cost and returns of producing dry beans by Region, Montana, 1966.

	Number of Producers In The Sample	Weighted Average Yield (Cwt.)	Average Price Per cwt.	Total Revenue Per Acre	Total Variable Cost Per Acre	Return Over Variable Costs Per Acre	Total Fixed Cost Per Acre	Net Income Per Acre a/
			\$	\$	\$	\$	\$	\$
BILLINGS AREA b/								
PRODUCERS WITH								
0-20 Acres	6	22.67	5.80	131.49	56.69	74.80	52.36	22.54
21-50 Acres	5	20.34	5.80	117.97	51.94	66.03	43.51	22.52
51 Acres & Over	1	22.00	5.80	127.60	56.29	71.31	29.21	42.10
HARDIN AREA								
PRODUCERS WITH								
0-20 Acres	1	13.00	5.80	75.40	47.10	28.30	44.36	(16.06)c/
21-50 Acres	2	23.62	5.80	137.00	42.86	94.14	38.48	55.66
51 Acres & Over	—	—	—	—	—	—	—	—
SIDNEY AREA								
PRODUCERS WITH								
0-20 Acres	2	24.91	5.80	144.48	64.38	80.10	29.35	50.74
21-50 Acres	14	18.24	5.80	105.79	38.11	67.68	35.34	32.35
51 Acres & Over	10	19.87	5.80	115.25	44.61	70.64	34.82	35.82

a/ Net income is the return to management and risk-bearing.

b/ Includes Blaine and Phillips counties in North Central Montana.

c/ Figures in parenthesis indicate a negative net return per acre.

Table 7. Cost and returns of producing spring wheat by region, Montana, 1966.

	Number of Producers In The Sample	Weighted Average Yield (Bu.)	Average Price Per Bushel	Total Revenue Per Acre a/	Total Variable Cost Per. Acre	Return Over Variable Costs Per Acre	Total Fixed Cost Per Acre	Net Income Per Acre b/
			\$	\$	\$	\$	\$	\$
BILLINGS AREA c/								
PRODUCERS WITH								
0-20 Acres	11	47.90	1.95	93.41	30.86	62.55	49.59	12.96
21-50 Acres	4	36.10	1.95	70.40	29.40	41.00	52.09	(11.09)d/
51 Acres & Over	1	48.00	1.95	93.60	21.98	71.62	26.88	44.74
HARDIN AREA								
PRODUCERS WITH								
0-20 Acres	8	43.70	1.95	85.22	30.66	54.56	32.06	22.50
21-50 Acres	3	38.60	1.95	75.27	21.18	54.09	33.43	20.66
51 Acres & Over	5	38.90	1.95	75.86	20.65	55.21	27.73	27.48
SIDNEY AREA								
PRODUCERS WITH								
0-20 Acres	5	34.78	1.95	67.82	24.61	43.21	27.22	15.98
21-50 Acres	12	47.05	1.95	91.75	21.17	70.58	30.15	40.47
51 Acres & Over	11	45.65	1.95	89.02	22.57	66.45	29.18	37.44

a/ This return includes government payments.

b/ Net income is the return to management and risk-bearing.

c/ Includes Blaine and Phillips counties in North Central Montana.

d/ Figures in parenthesis indicate a negative net return per acre.

Table 8. Cost and returns of producing barley by region, Montana, 1966.

	Number of Producers In The Sample	Weighted Average Yield (Bu.)	Average Price Per Bushel	Total Revenue Per Acre	Total Variable Cost Per Acre	Return Over Variable Costs Per Acre	Total Fixed Cost Per Acre	Net Income Per Acre a/
			\$	\$	\$	\$	\$	\$
BILLINGS AREA b/								
PRODUCERS WITH								
0-20 Acres	5	68.70	.90	61.83	24.37	37.46	37.47	(.01)c/
21-50 Acres	5	46.40	.90	41.81	28.08	13.73	36.44	(22.71)
51 Acres & Over	5	62.40	.90	56.16	28.13	23.03	28.05	(.02)
HARDIN AREA								
PRODUCERS WITH								
0-20 Acres	8	52.21	.90	46.99	19.10	27.89	28.08	(.19)
21-50 Acres	3	49.34	.90	44.41	14.63	29.78	23.33	6.45
51 Acres & Over	—	—	—	—	—	—	—	—
SIDNEY AREA								
PRODUCERS WITH								
0-20 Acres	9	53.87	.90	48.48	19.13	29.35	30.06	(.71)
21-50 Acres	5	63.62	.90	57.26	16.74	40.52	25.64	14.87
51 Acres & Over	3	67.07	.90	60.36	20.53	39.83	30.18	9.65

a/ Net income is the return to management and risk-bearing.

b/ Includes Blaine and Phillips counties in North Central Montana.

c/ Figures in parenthesis indicate a negative return per acre.

Table 9. Cost and returns of producing oats by region, Montana, 1966.

	Number of Producers In The Sample	Weighted Average Yield (Bu.)	Average Price Per Bushel	Total Revenue Per Acre	Total Variable Cost Per Acre	Return Over Variable Costs Per Acre	Total Fixed Cost Per Acre	Net Income Per Acre
			\$	\$	\$	\$	\$	\$
BILLINGS AREA b/								
PRODUCERS WITH								
0-20 Acres	—	—	—	—	—	—	—	—
21-50 Acres	—	—	—	—	—	—	—	—
51 Acres & Over	—	—	—	—	—	—	—	—
HARDIN AREA								
PRODUCERS WITH								
0-20 Acres	7	81.51	.58	47.28	21.71	25.57	30.38	(4.81)c/
21-50 Acres	4	72.63	.58	42.13	26.84	15.29	31.49	(16.20)
51 Acres & Over	2	—	—	—	—	—	—	—
SIDNEY AREA								
PRODUCERS WITH								
0-20 Acres	12	82.46	.58	47.83	19.24	28.59	28.12	1.17
21-50 Acres	4	71.96	.58	41.74	30.28	11.46	32.21	(20.74)
51 Acres & Over	1	41.00	.58	28.78	12.79	15.99	23.61	(12.62)

a/ Net income is the return to management and risk-bearing.

b/ Includes Blaine and Phillips counties in North Central Montana.

c/ Figures in parenthesis indicate a negative return per acre.

Table 10. Cost and returns of producing alfalfa by region, Montana, 1966.

	Number of Producers In The Sample	Weighted Average Yield (Tons)	Average Price Per Ton	Total Revenue Per Acre	Total Variable Cost Per Acre	Return Over Variable Costs Per Acre	Total Fixed Cost Per Acre	Net Income Per Acre a/
			\$	\$	\$	\$	\$	\$
BILLINGS AREA b/								
PRODUCERS WITH								
0-20 Acres	5	3.00	27.50	82.50	55.10	27.40	53.10	(25.70)c/
21-50 Acres	8	4.42	27.50	121.55	39.85	81.70	44.80	36.90
51 Acres & Over	6	4.43	27.50	121.83	31.24	90.59	32.90	57.69
HARDIN AREA								
PRODUCERS WITH								
0-20 Acres	2	3.57	27.50	98.18	52.38	45.80	40.92	4.88
21-50 Acres	9	3.60	27.50	99.00	37.44	61.56	31.69	29.87
51 Acres & Over	7	3.53	27.50	97.08	32.58	64.50	25.59	38.91
SIDNEY AREA								
PRODUCERS WITH								
0-20 Acres	10	3.45	27.50	94.88	37.16	57.72	38.03	19.69
21-50 Acres	20	3.79	27.50	104.23	31.57	72.66	33.10	39.57
51 Acres & Over	11	3.53	27.50	97.08	29.27	67.81	32.07	35.74

a/ Net income is the return to management and risk-bearing.

b/ Includes Blaine and Phillips counties in North Central Montana.

c/ Figures in parenthesis indicate a negative return per acre.

Alfalfa is considered essential in sugar beet rotations. It destroys the life cycle of the nematode and some other diseases as well as building soil fertility.

Costs of Producing Irrigated Crops

A detailed breakdown of the costs of producing irrigated crops by area and farm size are presented in appendix Table I-XX. **Foot-**

notes are at the end of the appendix.

These cost data represent the cost of typical operations on various sizes of farms. In order for an individual farmer to calculate his own costs of production he must total the costs only of those operations he uses.

The total variable and fixed costs summarized at the bottom of appendix tables I-XX are the weighted average costs of only those operations which producers used in 1966.

APPENDIX

Costs of Producing Irrigated Crops

Appendix Table I: Typical Costs of Operations of Producing Sugar Beets Per Acre and Ton, Billings District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-50 acres (dollars)	51-100 acres (dollars)	101 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	3.55	3.15	2.66
Tractors			
Less than 50 draw bar horse power	5.56	5.21	6.04
More than 50 draw bar horse power	3.94	2.60	5.34
Labor	17.87	16.03	15.42
Materials			
Seed	4.31	4.49	6.59
Herbicide	4.81	4.47	4.59
Commercial Fertilizer	21.40	19.95	25.52
Organic Manure	9.35	7.76	12.34
Insect Control	1.51	1.00	3.00
Contract Labor			
Thinning	14.02	12.50	19.85
Hoeing	9.64	11.03	10.86
Other	6.32	4.07	5.70
Housing	1.82	1.35	1.03
Custom Work	14.71		
Harvest:			
Equipment			
Machinery	5.43	3.82	1.48
Tractors			
Less than 50 draw bar horse power	3.25	2.73	2.00
More than 50 draw bar horse power	3.28	2.75	3.20
Trucks	1.66	1.72	11.19
Labor	4.58	4.42	3.73
FIXED COSTS			
Land Taxes	1.39	1.22	1.25
Value Per Acre	442.66	337.62	393.38
Interest Per Acre (5%)	22.13	16.88	19.67
Cost of Irrigation Water	2.99	2.89	2.12
Maintenance of Irrigation			
Equipment .....	.38	.51	.42
Cost of Crop Insurance	4.48	4.67	4.56
Depreciation Share:			
Tractors	6.31	7.95	6.47
Special Machinery ¹ / _*	6.49	5.57	4.19
Multi-Use Machinery ² / _*	10.99	9.24	8.93
Average Value Share: ³ / _*			
Tractors	3.61	3.62	2.17
Special Machinery	3.48	2.62	1.25
Multi-Use Machinery	5.57	4.09	2.10
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	114.35	101.30	126.05
Total Fixed Cost	64.86	55.31	52.71
Total Cost Per Acre	179.21	156.61	178.76
Average Yield (tons)	17.95	16.56	17.83
Average Cost Per Ton	9.99	9.46	10.03

* See footnotes at end of appendix

Appendix Table II: Typical Costs of Operations of Producing Sugar Beets Per Acre and Ton, Hardin District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-50 acres (dollars)	51-100 acres (dollars)	101 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	2.97	2.83	2.31
Tractors			
Less than 50 draw bar			
horse Power	5.31	4.24	2.14
More than 50 draw bar			
horse power	2.63	2.70	4.23
Labor	15.86	15.38	15.15
Materials			
Seed	4.15	3.76	3.02
Herbicide	3.90	5.09	5.56
Commercial Fertilizer	19.30	20.20	26.77
Organic Manure	5.91	.62	10.00
Insect Control	2.50		4.80
Contract Labor			
Thinning	15.42	15.31	16.17
Hoeing	8.99	8.36	8.48
Other	2.87	6.93	4.00
Housing	3.02	1.89	1.42
Custom Work			
Harvest:			
Equipment			
Machinery	5.02	2.66	1.14
Tractors			
Less than 50 draw bar			
horse power	4.77	2.19	1.01
More than 50 draw bar			
horse power	2.09	2.81	1.44
Trucks	2.00	1.83	2.27
Labor	5.76	3.62	2.10
FIXED COSTS			
Land Taxes	1.30	1.41	1.46
Value Per Acre	321.43	335.33	293.90
Interest Per Acre (5%)	16.07	16.77	14.70
Cost of Irrigation Water	4.74	3.79	2.49
Maintenance of Irrigation			
Equipment .....	.41	.47	.33
Cost of Crop Insurance	6.65	6.65	6.49
Depreciation Share:			
Tractors	6.38	3.66	5.35
Special Machinery ¹ / _*	5.77	4.04	4.31
Multi-use Machinery ² / _*	10.36	4.31	4.88
Average Value Share: ³ / _*			
Tractors	3.94	3.47	2.42
Special Machinery	2.68	2.88	2.07
Multi-use Machinery	5.36	2.71	2.09
TYPICAL COST PER ACRE ⁴/_*			
Total Variable Cost	110.69	95.29	100.11
Total Fixed Cost	63.05	49.30	46.27
Total Cost Per Acre	173.74	144.59	146.38
Average Yield (tons)	16.49	17.69	17.75
Average Cost Per Ton	10.54	8.17	8.25

* See footnotes at end of appendix

Appendix Table III: Typical Costs of Operations of Producing Sugar Beets Per Acre and Ton, Sidney District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-50 acres (dollars)	51-100 acres (dollars)	101 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	2.56	2.61	2.30
Tractors			
Less than 50 draw bar			
horse power	3.47	3.43	3.17
More than 50 draw bar			
horse power	3.40	4.16	2.91
Labor	14.75	14.31	14.82
Materials			
Seed	3.92	4.13	4.34
Herbicide	4.10	4.42	4.97
Commercial Fertilizer	24.14	22.83	25.40
Organic Manure	5.93	4.27	3.86
Insect Control		3.90	3.90
Contract Labor			
Thinning	24.16	25.75	26.12
Hoeing			
Other	4.54	4.60	2.35
Housing	2.70	1.38	1.57
Custom Work	67.85	25.97	46.00
Harvest:			
Equipment			
Machinery	4.81	2.42	1.15
Tractors			
Less than 50 draw bar			
horse power	3.66	2.33	1.20
More than 50 draw bar			
horse power	2.98	2.04	1.90
Trucks	2.06	1.70	1.42
Labor	4.27	2.76	2.15
FIXED COSTS			
Land Taxes	1.20	1.27	1.23
Value Per Acre	318.89	324.80	312.78
Interest Per Acre (5%)	15.94	16.24	15.64
Cost of Irrigation Water	4.74	4.44	4.38
Maintenance of Irrigation			
Equipment .....	.50	.54	.63
Cost of Crop Insurance	5.31	5.35	5.34
Depreciation Share:			
Tractors	7.67	5.72	4.32
Special Machinery ¹ / _*	3.46	5.61	3.81
Multi-use Machinery ² / _*	7.18	6.18	3.78
Average Value Share: ³ / _*			
Tractors	3.69	3.50	3.00
Special Machinery	1.77	3.14	2.36
Multi-use Machinery	3.78	3.58	2.96
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	105.89	98.76	101.08
Total Fixed Cost	53.86	53.91	46.81
Total Cost Per Acre	159.75	152.67	147.89
Average Yield (tons)	16.39	17.58	16.48
Average Cost Per Ton	9.75	8.68	8.97

* See footnotes at end of appendix

Appendix Table IV: Typical Costs of Operations of producing Corn Silage Per Acre and Ton, Billings District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	2.47	2.05	2.35
Tractors			
Less than 50 draw bar			
horse power	4.93	2.33	2.42
More than 50 draw bar			
horse power		3.05	2.35
Labor	11.11	9.98	9.15
Materials			
Seed	8.17	4.42	4.58
Herbicide	1.70	2.23	1.00
Commercial Fertilizer	14.00	11.96	17.22
Organic Manure			4.62
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other	17.73	3.95	3.92
Housing .....	.80	.78	.16
Custom Work	12.00		10.00
Harvest:			
Equipment			
Machinery	8.00	3.75	1.24
Tractors			
Less than 50 draw bar			
horse power	2.14	2.50	
More than 50 draw bar			
horse power		1.32	1.25
Trucks .....	.92	1.23	1.89
Labor	3.21	1.87	1.50
FIXED COSTS			
Land Taxes	1.24	1.49	1.50
Value Per Acre	440.00	496.86	395.49
Interest Per Acre (5%)	22.00	24.84	19.77
Cost of Irrigation Water	2.22	3.17	2.64
Maintenance of Irrigation			
Equipment .....	.33	.32	.34
Cost of Crop Insurance			
Depreciation Share:			
Tractors	5.92	3.88	5.00
Special Machinery 1/*		7.62	2.19
Multi-use Machinery 2/*	8.58	3.83	3.77
Average Value Share: 3/*			
Tractors	2.72	2.56	2.67
Special Machinery		4.18	1.06
Multi-use Machinery	3.90	2.35	1.29
TYPICAL COST PER ACRE 4/*			
Total Variable Cost	68.52	48.58	52.16
Total Fixed Cost	46.60	49.17	39.92
Total Cost Per Acre	115.12	97.75	92.08
Average Yield (tons)	18.36	21.36	19.22
Average Cost Per Ton	6.27	4.58	4.79

* See footnotes at end of appendix

Appendix Table V: Typical Costs of Operations of Producing Corn Silage Per Acre and Ton, Hardin District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	1.92	1.86	1.77
Tractors			
Less than 50 draw bar horse power		3.23	1.09
More than 50 draw bar horse power	4.82	1.30	4.26
Labor	10.17	10.86	9.81
Materials			
Seed	4.50	4.10	3.92
Herbicide .....	.75	1.86	2.54
Commercial Fertilizer	15.40	24.03	21.35
Organic Manure			1.01
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other			1.34
Housing .....			.51
Custom Work		10.00	
Harvest:			
Equipment			
Machinery	16.00	6.27	1.02
Less than 50 draw bar horse power		1.65	1.06
More than 50 draw horse power .....	.71	1.59	1.27
Trucks .....	.66	.24	1.07
Labor .....	.86	2.16	1.95
FIXED COSTS			
Land Taxes	1.53	1.41	1.52
Value Per Acre	250.00	352.24	301.43
Interest Per Acre (5%)	12.50	17.61	15.07
Cost of Irrigation Water	3.10	5.17	2.49
Maintenance of Irrigation Equipment .....	.40	.32	.30
Cost of Crop Insurance			
Depreciation Share:			
Tractors	7.65	4.35	6.98
Special Machinery ¹ / _*		2.01	1.44
Multi-use Machinery ² / _*	5.52	2.49	3.03
Average Value Share: ³ / _*			
Tractors	3.41	2.49	2.29
Special Machinery		1.27	1.26
Multi-use Machinery	3.72	1.58	1.81
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	58.75	56.49	50.04
Total Fixed Cost	44.03	37.74	35.92
Total Cost Per Acre	102.78	94.23	85.96
Average Yield (tons)	16.00	17.91	18.16
Average Cost Per Ton	5.89	5.26	4.73

* See footnotes at end of appendix.

Appendix Table VI: Typical Costs of Operations of Producing Corn Silage Per Acre and Ton, Sidney District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	2.14	1.54	1.49
Tractors			
Less than 50 draw bar horse power	5.28	1.88	1.84
More than 50 draw bar horse power	2.66	2.20	1.43
Labor	9.57	9.84	7.94
Materials			
Seed	3.94	4.52	4.06
Herbicide	1.04	3.71	1.25
Commercial Fertilizer	15.18	13.83	36.57
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other		2.28	2.19
Housing		.45	.36
Custom Work	8.75	17.26	
Harvest:			
Equipment			
Machinery	14.37	3.57	1.42
Tractors			
Less than 50 draw bar horse power	4.75		
More than 50 draw bar horse power		1.62	1.02
Trucks	.53	.42	2.29
Labor	7.12	1.88	1.22
FIXED COSTS			
Land Taxes	1.15	1.08	1.15
Value Per Acre	327.02	318.33	327.57
Interest Per Acre (5%)	16.35	15.92	16.38
Cost of Irrigation Water	4.77	5.19	4.74
Maintenance of Irrigation Equipment	.59	.42	.39
Cost of Crop Insurance			
Depreciation Share:			
Tractors	4.30	4.11	3.47
Special Machinery ¹ / _*	6.06	3.99	.94
Multi-use Machinery ² / _*	2.40	3.00	2.93
Average Value Share: ³ / _*			
Tractors	3.12	2.56	2.30
Special Machinery	3.03	3.87	1.43
Multi-use Machinery	2.42	1.79	2.11
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Costs	44.23	46.41	52.31
Total Fixed Costs	38.00	38.48	42.17
Total Cost Per Acre	82.23	84.89	94.48
Average Yield (tons)	12.44	21.30	16.78
Average Cost Per Ton	6.61	3.99	5.63

* See footnotes at end of appendix

Appendix Table VII: Typical costs of Operations of Producing Dry Beans Per Acre and cwt, Billings District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	2.58	2.49	3.28
Tractors			
Less than 50 draw bar horse power	3.24	3.89	6.93
More than 50 draw bar horse power	3.40	2.18	15.33
Labor	12.29	14.33	15.33
Materials			
Seed	7.92	7.40	8.15
Herbicide	3.18	5.11	3.00
Commercial Fertilizer	9.48	7.63	6.22
Organic Manure		4.00	
Insect Control			
Contract Labor			
Thinning	7.00		
Hoeing			
Other			
Housing			
Custom Work	12.00	14.00	
Harvest:			
Equipment			
Machinery	10.09	5.12	5.06
Tractors			
Less than 50 draw bar horse power	1.76	.96	2.00
More than 50 draw bar horse power	.63	.60	
Trucks	.52	.22	.08
Labor	2.71	2.26	4.00
FIXED COSTS			
Land Taxes	1.45	1.31	1.20
Value Per Acre	439.63	433.34	400.00
Interest Per Acre (5%)	21.98	21.67	20.00
Cost of Irrigation Water	4.67	1.56	1.00
Maintenance of Irrigation Equipment	.57	.33	.49
Cost of Crop Insurance			
Depreciation Share:			
Tractors	6.73	5.46	2.00
Special Machinery 1/*	2.21	.81	.21
Multi-use Machinery 2/*	6.25	6.00	2.34
Average Value Share: 3/*			
Tractors	3.71	2.39	.93
Special Machinery	1.62	.61	.15
Multi-use Machinery	4.33	3.91	1.38
TYPICAL COSTS PER ACRE 4/*			
Total Variable Cost	56.69	51.94	56.29
Total Fixed Cost	52.36	43.51	29.21
Total Cost Per Acre	108.95	95.45	85.50
Average Yield (cwt.)	22.67	20.34	22.00
Average Cost Per Cwt.	4.81	4.69	3.89

* See footnotes at end of appendix

Appendix Table VIII: Typical Costs of Operations of Producing Dry Beans Per Acre and cwt., Hardin District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	2.60	2.01	3.72
Tractors			
Less than 50 draw bar horse power	2.30	3.19	5.76
More than 50 draw bar horse power	3.62	2.30	2.09
Labor (1.25 per hour)	11.75	10.00	15.93
Materials			
Seed	3.60	10.25	8.00
Herbicide		2.00	
Commercial Fertilizer			7.00
Organic Manure			
Insect Control			
Contract Labor			
Thinning		8.00	2.30
Hoeing			
Other			
Housing			.67
Custom Work			
Harvest:			
Equipment			
Machinery	16.90	4.51	3.74
Tractors			
Less than 50 draw bar horse power	.50	.95	2.69
More than 50 draw bar horse power			1.44
Trucks	1.62	.90	3.00
Labor	1.80	2.25	5.76
FIXED COSTS			
Land Taxes	1.53	1.53	1.53
Value Per Acre	300.00	300.00	300.00
Interest Per Acre (5%)	15.00	15.00	15.00
Cost of Irrigation Water	1.50	1.17	1.50
Maintenance of Irrigation Equipment	.38	.18	.48
Cost of Crop Insurance			
Depreciation Share:			
Tractors	1.72	3.19	6.36
Special Machinery ¹ / _*			.48
Multi-use Machinery ² / _*	16.98	3.89	2.42
Average Value Share: ³ / _*			
Tractors	3.09	2.89	3.09
Special Machinery			.43
Multi-use Machinery	4.54	4.73	1.72
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	47.10	42.86	68.67
Total Fixed Cost	44.36	38.48	32.53
Total Cost Per Acre	91.46	81.34	101.20
Average Yield (cwt.)	13.00	23.62	
Average Cost Per Cwt.	7.04	3.44	

* See footnotes at end of appendix

Appendix Table IX: Typical Costs of Operations of Producing Dry Beans Per Acre and cwt., Sidney District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	2.88	1.87	2.26
Tractors			
Less than 50 draw bar horse power	6.60	2.96	3.20
More than 50 draw bar horse power		1.90	2.74
Labor	12.33	9.34	11.55
Materials			
Seed	9.02	6.66	8.08
Herbicide	4.04	3.27	3.46
Commercial Fertilizer	6.00	5.00	3.86
Organic Manure			
Insect Control			
Contract Labor			
Thinning	7.20	7.52	5.08
Hoeing			10.00
Other			2.34
Housing		6.00	
Custom Work	10.91	8.08	8.40
Harvest:			
Equipment			
Machinery	8.04	3.86	2.63
Tractors			
Less than 50 draw bar horse power		.48	.72
More than 50 draw bar horse power			.82
Trucks	.52	.38	.37
Labor	.75	1.02	1.54
FIXED COSTS			
Land Taxes	1.14	1.26	1.18
Value Per Acre	335.00	327.93	328.66
Interest Per Acre (5%)	16.75	16.40	16.43
Cost of Irrigation Water	4.38	4.30	4.69
Maintenance of Irrigation Equipment	1.11	.40	.44
Cost of Crop Insurance			
Depreciation Share:			
Tractors	2.29	3.06	3.25
Special Machinery ¹ / _*		2.12	2.43
Multi-use Machinery ² / _*	1.05	3.40	3.04
Average Value Share: ³ / _*			
Tractors	2.43	2.27	2.20
Special Machinery		1.27	.81
Multi-use Machinery	1.31	2.91	1.90
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	64.38	38.11	44.61
Total Fixed Cost	29.35	35.34	34.82
Total Cost Per Acre	93.74	73.44	79.43
Average Yield (cwt.)	24.91	18.24	19.87
Average Cost Per Cwt.	3.76	4.02	4.00

* See footnotes at end of appendix

Appendix Table X: Typical Costs of Operations of Producing Spring Wheat Per Acre and Bushel, Billings District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	1.64	1.07	.98
Tractors			
Less than 50 draw bar			
horse power	2.39	.92	1.97
More than 50 draw bar			
horse power	3.03	1.49	
Labor	6.63	5.16	3.71
Materials			
Seed	3.18	3.70	4.00
Herbicide .....	.49	.40	1.00
Commercial Fertilizer	4.63	6.69	2.50
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other			
Housing			
Custom Work	5.18	8.00	5.00
Harvest:			
Equipment			
Machinery	10.72	7.55	
Tractors			
Less than 50 draw bar			
horse power	1.00		
More than 50 draw bar			
horse power .....	.62		
Trucks .....	.21	.32	.44
Labor	1.57	1.18	
FIXED COSTS			
Land Taxes	1.45	1.57	.92
Value Per Acre	491.74	700.00	375.00
Interest Per Acre (5%)	24.59	35.00	18.75
Cost of Irrigation Water	3.01	2.32	4.00
Maintenance of Irrigation			
Equipment .....	.66	.24	1.43
Cost of Crop Insurance			
Depreciation Share:			
Tractors	3.11	2.53	.36
Special Machinery ¹ / _*			
Multi-use Machinery ² / _*	10.58	6.91	1.14
Average Value Share: ³ / _*			
Tractors	1.69	1.00	.44
Special Machinery			
Multi-use Machinery	5.19	2.75	1.27
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	30.86	29.40	21.98
Total Fixed Cost	49.59	52.09	26.88
Total Cost Per Acre	80.45	81.49	48.86
Average Yield (bushels)	47.90	36.10	48.00
Average Cost Per Bushel	1.68	2.25	1.02

* See footnotes at end of appendix

Appendix Table XI: Typical Costs of Operations of Producing Spring Wheat Per Acre and Bushel, Hardin District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery .....	.94	.71	1.06
Tractors			
Less than 50 draw bar			
horse power .....	.86	1.02	.54
More than 50 draw bar			
More than 50 draw bar			
horse power	1.91	1.31	2.20
Labor	4.32	3.80	4.42
Materials			
Seed	3.11	4.84	2.46
Herbicide .....	.84	1.00	1.72
Commercial Fertilizer	7.79	8.00	4.87
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other	4.50		
Housing	1.80		
Custom Work	5.50		
Harvest:			
Equipment			
Machinery	10.24	6.26	2.62
Tractors			
Less than 50 draw bar			
horse power .....	.75		
More than 50 draw bar			
horse power .....	.94		
Trucks .....	.63	.39	.84
Labor	1.94	.81	.77
FIXED COSTS			
Land Taxes	1.42	1.40	1.53
Value Per Acre	356.14	370.30	271.99
Interest Per Acre (5%)	17.81	18.51	13.60
Cost of Irrigation Water	2.49	5.01	3.36
Maintenance of Irrigation			
Equipment .....	.47	.78	.15
Cost of Crop Insurance			
Depreciation Share:			
Tractors .....	.95	.44	2.53
Special Machinery ¹ / _*			
Multi-use Machinery ² / _*	4.37	3.59	3.93
Average Value Share: ³ / _*			
Tractors	1.81	.83	.99
Special Machinery			
Multi-use Machinery	3.21	3.65	1.79
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	30.66	21.18	20.65
Total Fixed Cost	32.06	33.43	27.73
Total Cost Per Acre	62.72	54.61	48.38
Average Yield (bushels)	43.70	38.60	38.90
Average Cost Per Bushel	1.43	1.41	1.24

* See footnotes at end of appendix

Appendix Table XII: Typical Costs of Operations of Producing Spring Wheat Per Acre and Bushel, Sidney District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	.88	.82	.81
Tractors			
Less than 50 draw bar horse power	1.53	.75	.44
More than 50 draw bar horse power	1.44	1.66	1.74
Labor	3.64	3.91	3.84
Materials			
Seed	2.64	3.65	3.23
Herbicide	2.56	1.44	1.46
Commercial Fertilizer		4.72	6.42
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other	13.91	2.04	
Housing		.66	
Custom Work	6.02	4.66	4.92
Harvest:			
Equipment			
Machinery	8.51	3.78	3.73
Tractors			
Less than 50 draw bar horse power	1.14		
More than 50 draw bar horse power			.64
Trucks	.34	.18	.37
Labor	1.60	.66	1.10
FIXED COSTS			
Land Taxes	1.14	1.23	1.46
Value Per Acre	331.72	331.35	304.08
Interest Per Acre (5%)	16.59	16.57	15.20
Cost of Irrigation Water	4.54	4.30	4.06
Maintenance of Irrigation Equipment	.43	.68	.35
Cost of Crop Insurance			
Depreciation Share:			
Tractors	1.17	1.52	2.68
Special Machinery ¹ / _*			
Multi-use Machinery ² / _*	1.36	3.59	3.23
Average Value Share: ³ / _*			
Tractors	.88	1.08	1.15
Special Machinery			
Multi-use Machinery	1.54	2.46	1.76
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	24.61	21.17	22.57
Total Fixed Cost	27.22	30.15	29.18
Total Cost Per Acre	51.84	51.28	51.58
Average Yield (bushels)	34.78	47.05	45.65
Average Cost Per Bushel	1.49	1.09	1.13

* See footnotes at end of appendix

Appendix Table XIII: Typical Costs of Operations of Producing Barley Per Acre and Bushel, Billings District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	1.00	1.65	1.18
Tractors			
Less than 50 draw bar			
horse power	1.63	2.72	2.02
More than 50 draw bar			
horse power	1.08	1.96	1.28
Labor	4.77	5.65	5.23
Materials			
Seed	2.65	3.46	3.20
Herbicide	.60	.45	.56
Commercial Fertilizer	4.87	6.09	6.80
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other			.61
Housing			.90
Custom Work	6.52	5.79	6.95
Harvest:			
Equipment			
Machinery	9.46	4.48	6.06
Tractors			
Less than 50 draw bar			
horse power			2.00
More than 50 draw bar			
horse power	.62		
Trucks	.26	.24	.37
Labor	1.43	1.19	2.15
FIXED COSTS			
Land Taxes	1.34	1.36	1.16
Value Per Acre	393.89	529.72	305.17
Interest Per Acre (5%)	19.69	26.49	15.26
Cost of Irrigation Water	4.48	2.02	2.92
Maintenance of Irrigation			
Equipment	.54	.25	.58
Cost of Crop Insurance			
Depreciation Share:			
Tractors	2.48	2.04	1.24
Special Machinery 1/*			
Multi-use Machinery 2/*	5.71	4.85	3.44
Average Value Share: 3/*			
Tractors	1.23	1.05	.69
Special Machinery			
Multi-use Machinery	2.54	2.67	3.32
TYPICAL COSTS PER ACRE 4/*			
Total Variable Costs	24.37	28.08	28.13
Total Fixed Cost	37.47	36.44	28.05
Total Cost Per Acre	61.84	64.52	56.18
Average Yield (bushels)	68.70	46.40	62.40
Average Cost Per Bushel	.90	1.09	.90

* See footnotes at end of appendix

Appendix Table XIV: Typical Costs of Operations of Producing Barley Per Acre and Bushel, Hardin District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery .....	.77	.92	
Tractors			
Less than 50 draw bar horse power .....	.70	.59	
More than 50 draw bar horse power	1.62	1.57	
Labor	3.85	4.22	
Materials			
Seed	2.17	2.56	
Herbicide .....	.83	2.25	
Commercial Fertilizer	7.33		
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other			
Housing			
Custom Work	4.95		
Harvest:			
Equipment			
Machinery	6.08	2.53	
Tractors			
Less than 50 draw bar horse power .....	.80		
More than 50 draw bar horse power	1.00	.24	
Trucks .....	.55		
Labor .....	.95	.64	
FIXED COSTS			
Land Taxes	1.54	1.53	
Value Per Acre	296.57	263.95	
Interest Per Acre (5%)	14.83	13.20	
Cost of Irrigation Water	2.49	4.00	
Maintenance of Irrigation Equipment .....	.24	.22	
Cost of Crop Insurance			
Depreciation Share:			
Tractors	1.68	1.52	
Special Machinery ¹ / _*			
Multi-use Machinery ² / _*	4.11	1.82	
Average Value Share: ³ / _*			
Tractors .....	.93	.60	
Special Machinery			
Multi-use Machinery	2.48	.66	
TYPICAL COSTS PER ACRE ⁴ / _*			
Total Variable Cost	19.10	14.63	
Total Fixed Cost	28.08	23.33	
Total Cost Per Acre	47.18	37.96	
Average Yield (bushels)	52.21	49.34	
Average Cost Per Bushel .....	.91	.77	

* See footnotes at end of appendix

Appendix Table XV: Typical costs of operations of Producing Barley Per Acre and Bushel, Sidney District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery .....	.65	.60	.64
Tractors			
Less than 50 draw bar			
horse power	1.20	.81	.95
More than 50 draw bar			
horse power	1.28	.85	.81
Labor	3.79	3.41	3.72
Materials			
Seed	2.22	1.73	2.17
Herbicide .....		.89	1.38
Commercial Fertilizer		6.00	3.05
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other		3.50	
Housing .....		.66	
Custom Work	9.79	5.31	9.93
Harvest:			
Equipment			
Machinery	7.58	1.44	2.71
Tractors			
Less than 50 draw bar			
horse power	2.07		
More than 50 draw bar			
horse power			
Trucks .....	.20	.11	.04
Labor	1.72	.81	1.12
FIXED COSTS			
Land Taxes			
Value Per Acre	322.88	335.00	335.00
Interest Per Acre (5%)	16.14	16.75	16.75
Cost of Irrigation Water	4.70	4.26	4.38
Maintenance of Irrigation			
Equipment .....	.58	.86	.98
Cost of Crop Insurance			
Depreciation Share:			
Tractors	1.74	1.09	1.30
Special Machinery 1/*			
Multi-use Machinery 2/*	3.00	.60	1.84
Average Value Share: 3/*			
Tractors	1.77	1.02	1.20
Special Machinery			
Multi-use Machinery	1.86	.72	3.48
TYPICAL COSTS PER ACRE 4/*			
Total Variable Cost	19.13	16.74	20.53
Total Fixed Cost	30.06	25.64	30.18
Total Cost Per Acre	49.19	42.39	50.71
Average Yield (bushels)	53.87	63.62	67.07
Average Cost Per Bushel .....	.91	.66	.75

* See footnotes at end of appendix

Appendix Table XVI: Typical Costs of Operations of Producing Oats Per Acre and Bushel, Hardin District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery	.79	.78	1.17
Tractors			
Less than 50 draw bar horse power	.98	1.20	
More than 50 draw bar horse power	1.70	2.40	2.91
Labor	4.04	4.44	4.16
Materials			
Seed	3.91	2.74	3.93
Herbicide	1.70	.71	2.11
Commercial Fertilizer	7.35	7.60	5.89
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other		4.45	
Housing		1.78	
Custom Work	5.00	6.00	
Harvest:			
Equipment			
Machinery	5.91	7.76	1.97
Tractors			
Less than 50 draw bar horse power	1.00		
More than 50 draw bar horse power			
Trucks	.69	.05	.13
Labor	1.02	.69	1.28
FIXED COSTS			
Land Taxes	1.38	1.34	1.53
Value Per Acre	332.59	400.00	277.78
Interest Per Acre (5%)	16.63	20.00	13.89
Cost of Irrigation Water	4.31	3.46	2.21
Maintenance of Irrigation Equipment	.57	.72	.12
Cost of Crop Insurance			
Depreciation Share:			
Tractors	1.37	.71	.96
Special Machinery ¹ / _*			
Multi-use Machinery ² / _*	3.49	3.03	2.94
Average Value Share: ³ / _*			
Tractors	.77	.71	.48
Special Machinery			
Multi-use Machinery	2.04	2.25	1.61
TYPICAL COSTS PER ACRE			
Total Variable Costs	21.71	26.84	24.75
Total Fixed Cost	30.38	31.49	23.61
Total Cost Per Acre	52.09	58.33	48.36
Average Yield (bushels)	81.51	72.63	
Average Cost Per Bushel	.64	.81	

* See footnotes at end of appendix

Appendix Table XVII: Typical Costs of Operations of Producing Oats Per Acre and Bushel, Sidney District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery .....	.69	1.22	.54
Tractors			
Less than 50 draw bar			
horse power .....	.97	1.02	.11
More than 50 draw bar			
horse power	1.04	2.27	1.21
Labor	3.69	6.48	2.59
Materials			
Seed	1.97	1.95	1.80
Herbicide	1.12	.71	.82
Commercial Fertilizer	3.45	3.50	
Organic Manure			
Insect Control			
Contract Labor			
Thinning			
Hoeing			
Other			
Housing		7.25	
Custom Work	5.16	1.50	6.50
Harvest:			
Equipment			
Machinery	6.46	11.50	
Tractors			
Less than 50 draw bar			
horse power			
More than 50 draw bar			
horse power	1.25	.46	
Trucks .....	.06	.08	.12
Labor	1.09	1.33	
FIXED COSTS			
Land Taxes			
Value Per Acre	333.33	317.62	335.00
Interest Per Acre (5%)	16.55	15.87	16.75
Cost of Irrigation Water	4.57	4.44	4.38
Maintenance of Irrigation			
Equipment .....	.75	1.38	.35
Cost of Crop Insurance			
Depreciation Share:			
Tractors	1.22	1.80	.48
Special Machinery ¹ / _*	1.66	2.80	.05
Multi-use Machinery ² / _*			
Average Value Share: ³ / _*			
Tractors .....	.92	1.04	.63
Special Machinery			
Multi-use Machinery	1.66	2.28	.17
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Costs	19.24	30.28	12.79
Total Fixed Cost	28.12	32.21	23.61
Total Cost Per Acre	46.66	62.49	36.40
Average Yield (bushels)	82.46	71.96	41.00
Average Cost Per Bushel .....	.57	.87	.89

* See footnotes at end of appendix

Appendix Table XVIII: Typical Costs of Operations of Producing Alfalfa Hay Per Acre and Ton, Billings District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery .....	.13	.19	.02
Tractors			
Less than 50 draw bar horse power .....	.23	.34	.04
More than 50 draw bar horse power .....		.16	
Labor	3.92	4.17	6.56
Materials			
Seed	2.69	2.14	2.67
Herbicide			1.00
Commercial Fertilizer	7.21	10.28	3.50
Organic Manure			
Insect Control	1.48	2.99	
Contract Labor			
Thinning			
Hoing			
Other	4.46	1.47	3.49
Housing .....		.13	.88
Custom Work			8.80
Harvest:			
Equipment			
Machinery	26.17	13.83	5.31
Tractors			
Less than 50 draw bar horse power	4.05	4.16	3.34
More than 50 draw bar horse power	3.75	.75	2.08
Trucks .....	.93	.19	1.80
Labor	7.09	7.11	5.47
FIXED COSTS			
Land Taxes			
Value Per Acre	533.33	586.42	381.08
Interest Per Acre (5%)	26.67	29.32	19.05
Cost of Irrigation Water	3.09	2.38	2.61
Maintenance of Irrigation Equipment .....	.40	.31	.49
Cost of Crop Insurance			
Depreciation Share			
Tractors	4.41	2.42	1.24
Special Machinery ¹ / _*	8.14	4.88	2.92
Multi-use Machinery ² / _*	3.80	.58	4.70
Average Value Share: ³ / _*			
Tractors	2.29	1.00	.61
Special Machinery	5.71	3.01	1.87
Multi-use Machinery	1.90	.30	1.92
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	55.10	39.85	31.24
Total Fixed Cost	53.10	44.80	32.90
Total Cost Per Acre	108.20	84.65	64.14
Average Yield (tons)	3.00	4.42	4.43
Average Cost Per Ton	36.06	19.15	14.47

* See footnotes at end of appendix

Appendix Table XIX: Typical Costs of Operations of Producing Alfalfa Hay Per Acre and Ton, Hardin District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery .....	.15	.07	.12
Tractors			
Less than 50 draw bar			
horse power .....	.29	.10	.24
More than 50 draw bar			
horse power .....		.03	.41
Labor	5.81	3.75	4.01
Materials			
Seed	4.74	1.93	2.08
Herbicide			
Commercial Fertilizer		5.97	7.33
Organic Manure			
Insect Control		2.77	2.68
Contract Labor			
Thinning			
Hoeing			
Other		5.49	5.46
Housing		2.04	.24
Custom Work		10.28	10.71
Harvest:			
Equipment			
Machinery	19.90	6.54	3.86
Tractors			
Less than 50 draw bar			
horse power	4.45	4.20	2.86
More than 50 draw bar			
horse power	3.75	2.42	1.44
Trucks .....	.08	.06	.36
Labor	9.58	7.94	4.39
FIXED COSTS			
Land Taxes			
Value Per Acre	335.48	350.00	288.33
Interest Per Acre (5%)	16.77	17.50	14.42
Cost of Irrigation Water	3.54	3.21	2.91
Maintenance of Irrigation			
Equipment .....	.37	.42	.28
Cost of Crop Insurance			
Depreciation Share:			
Tractors	6.59	3.14	2.10
Special Machinery ¹ / _*	7.40	1.36	1.28
Multi-use Machinery ² / _*	1.55	1.19	1.15
Average Value Share: ³ / _*			
Tractors	1.46	2.65	1.33
Special Machinery	6.38	2.21	.72
Multi-use Machinery .....	.45	.53	.65
TYPICAL COSTS PER ACRE ⁴/_*			
Total Variable Cost	52.38	37.44	32.58
Total Fixed Cost	40.92	31.69	25.59
Total Cost Per Acre	93.30	69.13	58.17
Average Yield (tons)	3.57	3.60	3.53
Average Cost Per Ton	26.13	19.20	16.47

* See footnotes at end of appendix

Appendix Table XX: Typical Costs of Operations of Producing Alfalfa Hay Per Acre and Ton, Sidney District, 1966.

VARIABLE COSTS OF VARIOUS OPERATIONS	Average Cost Per Acre for Growers With:		
	0-20 acres (dollars)	21-50 acres (dollars)	51 Acres and over (dollars)
Preharvest:			
Equipment			
Machinery .....	.10	.17	.12
Tractors			
Less than 50 draw bar horse power .....		.22	.11
More than 50 draw bar horse power .....	.25	.74	.29
Labor	4.12	4.40	4.83
Materials			
Seed	2.38	2.24	1.87
Herbicide	1.22	2.72	2.85
Commercial Fertilizer	5.00	4.48	11.38
Organic Manure			
Insect Control		4.53	
Contract Labor			
Thinning			
Hoeing			
Other	4.73	2.28	.85
Housing .....	.42	.46	.50
Custom Work	21.24	14.73	23.28
Harvest:			
Equipment			
Machinery	10.56	6.75	4.61
Tractors			
Less than 50 draw bar horse power		2.18	1.96
More than 50 draw bar horse power	3.70	2.24	2.37
Trucks .....	.05	.21	.24
Labor	5.48	4.12	4.79
FIXED COSTS			
Land Taxes	1.20	1.19	1.35
Value Per Acre	335.00	325.97	307.08
Interest Per Acre (5%)	16.75	16.30	15.35
Cost of Irrigation Water	4.31	4.67	4.35
Maintenance of Irrigation			
Equipment .....	.57	.65	.36
Cost of Crop Insurance			
Depreciation Share:			
Tractors	5.85	2.69	3.13
Special Machinery 1/*	5.24	2.57	3.63
Multi-use Machinery 2/*	1.16	2.24	2.51
Average Value Share: 3/*			
Tractors	3.63	1.52	1.70
Special Machinery	4.79	2.36	1.83
Multi-use Machinery .....	.87	1.43	1.34
TYPICAL COSTS PER ACRE 4/*			
Total Variable Cost	37.16	31.57	29.27
Total Fixed Cost	38.03	33.10	32.07
Total Cost Per Acre	75.19	64.66	61.34
Average Yield (tons)	3.45	3.79	3.53
Average Cost Per Ton	21.79	17.09	17.37

* See footnotes at end of appendix

Appendix footnotes:

- 1/ Special machinery refers to implements used specifically for certain crops. For example, a sugar beet harvester is only used to harvest sugar beets and therefore is special to that crop.
- 2/ Multi-use machinery represents equipment used in more than one crop. For example, plows, harrows, cultivators, and planters are used to prepare the soil and seed many different crops. The cost allocated to any one crop for this type of machinery is dependent upon the amount of time it is used on that crop.
- 3/ The average value is calculated by adding the purchase cost and the salvage value and dividing the two. In this study insurance accounted for a cost of .6 percent of the average value of machinery. Taxes, interest and housing as a cost of ownership were 1, 5, and 1 percent respectively of the average value of an implement. Thus, the average value of machinery multiplied by the cost of ownership (7.6 percent) and divided by the number of acres the machinery covers is equal to the average value share.
- 4/ Typical costs per acre are the weighted average costs of all operations used by all growers sampled. However, the individual cost items are the weighted average costs of all those producers who used that specific practice. Therefore, in the appendix tables the total variable costs and the total fixed costs will not equal the summation of the specific items under the heading "Variable Costs of Various Operations" or "Fixed Costs," respectively.



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