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## Field Corn Production for Grain or Silage in Northern Utah 1962 Costs and Returns

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**Field corn  
production  
for grain  
or silage  
in northern Utah  
1962**

**Costs and returns**

**by Earnest M. Morrison**

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## INTRODUCTION

Field corn for grain, silage, or pasturing has been produced in Utah since its settlement by the Mormon pioneers. Those reporting data, however, have made no division of production and value of the different uses of corn until recent years. Previous to 1959 all field corn was reported in grain equivalents for the state as a whole. No county data are reported in Utah except by the Agricultural Census and, hence, only at 5 year intervals. While there has always been some corn harvested for grain each year, the bulk of corn grown in Utah has been for silage. In recent years, however, there has been increased interest in producing grain corn because shifting price relations with other feed grains have made corn production more attractive.

The latest census data show that in 1959 there were 44,536 acres of corn grown in Utah of which 4,232 acres was for grain and 38,770 acres for silage; the balance was for pasture. The product was valued at \$4,684,676. This was an increase of 50 percent in acreage and 101 percent in dollar value above the crop of 1950.

There were seven counties in Utah where farmers grew more than 100 acres of grain corn in 1959 (table 1). Of these, Davis County grew 1,520 acres or 36 percent of the total Utah acreage of grain corn. Utah County had 16 percent of the total acreage. Duchesne and Emery each had more than 400 acres planted to grain corn.

There were 12 counties in Utah where farmers produced at least 1,000 acres of silage corn. In 1959, farmers in Box Elder County grew 5,712 acres of silage corn which was 14.7 percent of the total silage corn acreage in the state. Utah County in the same year grew 5,232 acres. Davis, Millard, and Weber Counties all grew more than 3,000 acres of silage corn in 1959.

In 1959 there were 3,511 farmers in Utah who produced field corn. Using the 1959 prices and yields, the average value per farm for that crop was \$1,334.28. Thus, corn was important to the economy of Utah. Field corn represented 6.6 percent of the total value of all crops harvested

Table 1. Acreages of grain and silage corn by counties, Utah, 1959

County*	Grain		Silage	
	Acres	Percent of total	Acres	Percent of total
Beaver	†	-	1,011	2.6
Box Elder	†	-	5,712	14.7
Davis	1,520	35.9	3,750	9.7
Duchesne	478	11.3	2,305	5.9
Cache	†	-	2,823	7.3
Emery	443	10.5	1,399	3.6
Millard	†	-	3,136	8.1
Salt Lake	155	3.7	2,398	6.2
Sevier	†	-	2,536	6.5
Uintah	166	3.9	1,356	3.5
Utah	667	15.8	5,272	13.6
Weber	329	7.8	3,084	7.9
Remaining counties	524	11.3	4,688	10.4
Total state	4,232	100.0	38,770	100.0

\*Counties with more than 1,000 acres silage corn or 100 acres of grain corn.

†Under 100 acres.

in Utah in 1959. As a general rule, most grain and silage corn was produced for feeding by the grower. In Davis County some farmers have recently produced corn as a cash crop exclusively for sale.

The U.S.D.A. Statistical Reporting Service has reported state totals for grain and silage corn since the 1959 census (table 2).

#### PURPOSE OF STUDY

Even though grain corn has been grown in some small quantity during the entire history of the state and has been grown on a larger scale in various areas in more recent years, and even though silage corn has been an important forage crop in many areas, no cost of production studies

Table 2. Acreage production and value of corn for grain and corn for silage in Utah, 1960-63

Year	Acres	Production		Value	
		Per acre	Total	Unit	Total
Corn for silage					
		<u>tons</u>	<u>tons</u>	<u>per ton</u>	
1960	39,000	14.5	566,000	\$8.20	\$4,641,000
1961	36,000	14.5	522,000	8.00	4,176,000
1962	38,000	13.8	524,000	7.40	3,878,000
1963*	30,000	17.0	510,000	7.60	3,876,000
Corn for grain					
		<u>bushels</u>	<u>bushels</u>	<u>per acre</u>	
1960	3,000	60.0	180,000	\$1.50	\$ 270,000
1961	3,000	64.0	192,000	1.52	292,000
1962	3,000	59.0	177,000	1.59	281,000
1963*	3,000	64.0	128,000	1.63	209,000
Total					
1960	42,000	-	-	-	\$4,911,000
1961	39,000	-	-	-	4,468,000
1962	41,000	-	-	-	4,159,000
1963*	33,000	-	-	-	4,085,000

\*Preliminary

have been made. Data to assist in management decisions of crop selection and combination have not been available.

A detailed survey study was conducted in 1962 to provide physical input data and the costs involved in producing both grain and silage corn in northern Utah. Such data should furnish basic information on which annual adjustments can be made to estimate annual costs of production.

#### SOURCE OF DATA

The data for this study came from a survey made of farmers who produced grain or silage corn in 1962. Enterprises from four counties, Cache, Box Elder, Weber, and Davis, were included in the survey.

Data for grain corn came from schedules obtained from 26 producers in Davis and Weber Counties. The silage corn data were obtained from producers of all four counties. Forty-eight silage corn enterprise schedules were included in the study. Thirteen of the silage corn producers interviewed also grew grain corn.

Corn producers were located through information received from county agents, equipment and supply dealers, residents of corn producing areas, and other corn producers. Each of the cooperating producers was visited by a trained enumerator who used a detailed questionnaire as a guide in obtaining and recording desired information.

Main emphasis of this study was on physical inputs, costs, and net return to the two types of corn production. In the receipts and income sections, emphasis was changed. In these sections the assumption was made that farmers own all capital inputs in corn production. Using this assumption, it was possible to study the contribution that each type corn enterprise made to family farm income.

#### CORN FOR GRAIN

In corn grown for grain only the grain from the ears or the whole ears was used. In the areas studied there were few differences in methods used to grow grain or silage corn. Both were planted during the early part of May, after barnyard manures had been applied and the soil had been plowed and tilled. Field corn was planted in rows using corn drills that were set for desired plant population. Some operators applied commercial fertilizer at the time of planting. After the corn plants had emerged from the ground the field was cultivated to control weeds and furrowed to facilitate irrigation. Weeds were also controlled by spraying with 2,4-D. Soil moisture was controlled by irrigation. For grain corn, the water application ceased relatively early in August to facilitate ripening.

Hybrid varieties were used for both grain and silage production. In a third of the corn enterprises studied no

determination of whether the corn would be cut for silage or harvested as grain was made until near harvest time. In such cases this decision was dependent on storage facilities, land conditions at harvest time, price of silage and grain, as well as expected yields.

Grain corn in Davis and Weber Counties was harvested after the middle of October. Some fields of grain corn were still standing at the end of December due to excessive moisture in the grain. (Most years the harvesting of grain corn had been completed by the end of November.)

### Labor requirements

Labor requirements for 26 grain enterprises were divided into three classifications: land preparation, which included all operations previous to seeding; growing operations which included labor requirements from planting until harvesting, and harvesting labor requirements which included picking and delivering the ears to the factory and anything done with the stocks. Labor requirements were summarized also by labor performed by hired help and by the operator and his family (table 3). Operator and hired labor has been reported separately to assist anyone wanting to deduct operator's labor as a cost in calculating return to such labor.

Total labor requirements for land preparation were 5.4<sup>1</sup> hours per acre of which 5.2 was family labor and .2 was hired.

Of the operations used in preparation of land for the seedbed, manuring and plowing required man hours equal to a fifth of the total labor used.

Total labor for the growing operations was 7.0 hours per acre. The operator and his family supplied 6.8 hours

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<sup>1</sup>Farmers were asked to convert woman and child labor to man hours. Farmers' estimates were based on the time they estimated it would have taken them to perform the particular jobs.



Table 3. Man hours of labor used to produce grain corn on 26 farms, northern Utah, 1962

Item	Man hours of family labor		Hired	Total
	Per enterprise	Per acre	Labor per acre	per acre
Preparation:	<u>hours</u>	<u>hours</u>	<u>hours</u>	<u>hours</u>
Manuring	21.0	2.0	-	2.0
Fertilizing	2.2	0.2	0.1	0.3
Plowing	11.5	1.1	0.1	1.2
Harrowing	7.8	0.7	-	0.7
Leveling	2.8	0.3	-	0.3
Disking	6.4	0.6	-	0.6
Digging	0.6	0.1	-	0.1
Ditching	2.3	0.2	-	0.2
Sub-total	54.5	5.2	0.2	5.4
Growing:				
Drilling	5.3	0.5	0.1	0.6
Cultivating	21.4	2.1	-	2.1
Spraying	2.4	0.2	*	0.2
Irrigating	38.3	3.7	*	3.7
Hoeing	2.3	0.2	0.1	0.3
Miscellaneous	1.3	0.1	-	0.1
Sub-total	71.0	6.8	0.2	7.0
Harvesting:	10.2	1.0	1.3	2.3
Total	135.7	13.0	1.7	14.7

\*Less than .1 hour per acre.

of labor and .2 hour was hired. Most time consuming of various growing operations was irrigating and cultivating. Growing operations accounted for 48 percent of the total labor requirement in growing grain corn.

Harvesting grain corn took 2.3 hours per acre. Hired labor was used on 22 out of 26 enterprises in harvesting operations. On twelve of these enterprises the entire harvesting was done by hired labor. Fifty-seven percent of the harvest labor or 1.3 hours per acre were hired.

Harvesting took one hour of family labor per acre. Since the harvesting operations were all performed simultaneously, no attempt was made to separate the picking and hauling operations for labor requirements.

Total labor requirements for producing grain corn were 1.7 hours of hired labor, 13.0 hours of family labor, with a sum of 14.7 hours of labor per acre.

### Cost of production

Cost of production includes all costs, both cash and non-cash, that were incurred on 26 grain corn enterprises. These costs were classified as material, labor and equipment, taxes and assessments, and interest (table 4).

All manure is not of the same value and losses of value are not the same for all methods of handling. To arrive at a value for manure, average amounts and values of nitrogen, phosphorus, and potassium were calculated using standard coefficients and from the total were subtracted losses and handling costs. The resulting manure cost was estimated at \$1.50 per ton. Farmers were asked to report by years all manure applied in the three previous years on 1962 corn ground. A practice generally accepted and used in this study was to allocate 50 percent of manure value the year it was applied, 30 percent the following year, and 20 percent on the third year. This resulted in an average application of 3.4 tons per acre at a cost of \$5.13. Manure cost was 4.6 percent of the total cost of producing corn. The cost of applying the manure was all charged to the year of application but was a part of labor costs.

Commercial fertilizer was most costly of all materials used. The cost was cost of nitrogen and phosphate applied to corn ground. Nitrogen was valued at \$83.75 per ton of 33 percent  $N_2$  or 12.5 cents per pound of  $N_2$ . Phosphate was valued at \$75.50 per ton of 45 percent analysis or 8.3 cents per pound of available  $P_2O_5$ . In this study cost of commercial fertilizer application for the 1962 crop constituted the total charge. Granted that there was residual value from fertilizer applied in 1962 and in previous

Table 4. Cost of producing grain corn on 26 farms, northern Utah, 1962

Item	Quantity per acre	Per acre bushel		Percent of total
Material:		dollars		
Manure	3.4 tons	5.13	.05	4.8
Fertilizer	239.0 pounds	9.72	.10	8.7
Spray	1.5 pints	.74	.01	.7
Seed	15.3 pounds	3.23	.03	2.9
Sub-total	*	18.82	.20	16.9
Labor and equipment:				
Family labor	13.0 hours	16.66	.18	15.0
Hired labor	1.7 hours	2.11	.02	1.9
Owner machine	*	15.50	.16	14.0
Hired machine	*	14.26	.15	12.8
Sub-total	*	48.53	.51	43.7
Taxes and assessments:				
Land tax	*	5.97	.06	5.4
Equipment tax	*	1.06	.01	1.0
Water assessments	*	8.60	.09	7.7
Sub-total	*	15.63	.16	14.1
Interest:				
Land and equipment	\$535.00 at 5%	26.78	.28	24.2
Working capital	21.50 at 6%	1.29	.02	1.1
Sub-total	*	28.07	.30	25.3
Total cost	*	111.05	1.17	100.0

\*No common measurement.

years, but no generally accepted measure has yet been developed that could be used to make that adjustment. It was assumed that an amount equal to 100 percent of the fertilizer applied in 1962 was used by the 1962 corn crop.

Of applications of commercial fertilizer on grain corn enterprises, 70 percent was nitrogen and 30 percent phosphate or an average 239 pounds per acre. Average cost of these applications was \$9.72 per acre.

Spray in the form of 2,4-D, was used to control weeds in grain corn. Price of 2,4-D was \$3.90 per gallon.

Seed price was obtained from seed dealers and farm operators. Grain corn seed averaged 21 cents per pounds. There were 15.3 pounds of grain corn seed planted per acre.

Materials used in grain corn production cost \$.20 per bushel of corn produced or \$18.82 per acre. These costs represented 16.9 percent of the total cost of production.

Labor and equipment costs include value of family labor, cost of hired labor, cost of operating equipment, and cost of hired machines.

The value of family labor was determined using the average cost of hired labor of \$1.25 per hour.

Owner machine cost included depreciation, fuel, oil, and repairs. For depreciation cost, a charge of 10 percent of closing equipment inventory was used. A charge of 50 cents per operating hour was used in determination of fuel and oil costs for power equipment. Repair cost was equal to 2.6 percent of equipment value except in the case of specialized equipment. Repairs were higher on corn pickers and were figured on an hourly basis comparable to custom rates. Owner machine costs averaged \$15.50 per acre.

Hired machine cost was taken directly from farmers' costs figures and from custom rates. Hired machines cost grain corn growers \$14.26 per acre most of which was cost of harvesting and shelling corn.

To determine taxes on land, 1962 mill rates for the county where a corn crop was grown were applied to assessed valuation for first class land. Mill rates were applied to assessed valuation of equipment to obtain equipment tax.

Most operators owned water rights and were charged annual assessments for maintenance of distribution systems. Other operators rented specific quantities of water, but all such costs were reported as water assessments. The

value of the water right or water stock was assumed to be included in land values.

Charges of 5 percent were made against average equipment inventory and land value to determine interest on land and equipment investment. This was largest of all cost items and amounted to 24.2 percent of total cost.

There was a cost for all types of capital used for corn production. Cost for working capital included interest on materials, labor, and money which was used during the producing season for grain corn production. A rate of 6 percent was charged for the time for which capital was employed.

The total cost of producing grain corn was \$1.16 per bushel and \$111.05 per acre.

#### Receipts and returns

Receipts for grain production came from two sources. First and most important was grain which was valued at \$1.40 per bushel, an average of values given by producers. Receipts from grain were \$1,393.22 per enterprise and \$133.42 per acre (table 5). The second source of income was value of stover left in the field after grain was harvested. This was valued at \$5.00 per acre resulting in an enterprise value of \$52.21. Stover value came from its use as live-stock feed and its value as organic matter for improving soil structure. Average gross receipts from 26 grain corn enterprises were \$1,445.43 per enterprise, \$138.42 per acre, or \$1.45 per bushel of corn produced.

Net return was the difference between total cost and gross receipts. Because no cost was assigned for management in this study, net return could be attributed to management of the enterprise. Net return was positive for 18 of 26 enterprises. Average net return was \$285.66 per operator and \$27.38 per acre.

Management and family labor return was value of family labor added to net return. This figure represented the

Table 5. Receipts and returns from 26 grain corn enterprises, northern Utah, 1962

Item	Per		
	Enterprise	Acre	Bushel
Receipts from grain	\$1,393.22	\$133.42	\$1.40
Value of stover	52.21	5.00	.05
Gross receipts	\$1,445.43	\$138.42	\$1.45
Total cost	1,159.77	111.04	1.17
Net return	\$ 285.66	\$ 27.38	\$ .28
Value of family labor	174.06	16.66	.18
Management and family labor return	\$ 459.72	\$ 44.04	\$ .46
Net return	285.66	27.38	.28
Interest	293.09	28.06	.30
Capital and management return	\$ 578.75	\$ 55.44	\$ .58
Value of family labor	174.06	16.66	.18
Return to family labor, capital, and management	\$ 752.81	\$ 72.10	\$ .76

value of manpower by the operator and his family, both physical and mental, involved in growing grain corn. Management and family labor return was \$459.72 per enterprise or \$44.04 per acre.

Capital and management return is not return plus the value of interest charged against grain corn for use of capital. In this study, interest and management received \$55.44 per acre.

Under the assumption that all capital used in growing grain corn was owned by the operator, the return to family labor, capital, and management would be available to him as income. This return to 26 farm families averaged \$752.81 per enterprise and \$72.10 per acre.

#### Factors associated with success of the grain corn enterprise

To find gross associations between factors, corn enterprise schedules were sorted and grouped in such a way that differences in one factor would be minimized. No controls of

variation were placed on the remaining factors. In the determination of number of schedules per group, the total number was divided in either halves or thirds, and comparisons made between the factor held relatively constant and factors measuring success. Acreage and yield were each held constant for different sorts and measuring financial success by net return per acre.

Generally, larger enterprises permit efficient use of factors of production such as labor, equipment, and overhead. For the 26 grain corn enterprises the half averaging 17.6 acres yielded a net return of \$29.68 per acre. The other half averaged 5.2 acres per enterprise with a net return of \$23.73 per acre.

In agricultural production, high yields are desirable. Producers can increase yields by regulating timing and use of inputs such as fertilizer, seed, and labor. When these factors are used to attain high yields, per unit costs of land are reduced since total fixed costs are constant and are not dependent upon yield. High yields result in high gross receipts and a high net return if the additional cost of obtaining the better yield is not higher than the price of the product produced.

For 14 of the 26 grain corn enterprises with an average yield of 65 bushels per acre, the average net return was -\$9.45. The other 12 enterprises had an average yield of 119 bushels of grain per acre and a net return of \$54.05 per acre.

#### CORN FOR SILAGE

Field corn that was cut and ensiled was classified as silage corn in this study. Most cultural practices were similar to those described previously for grain corn. Silage corn was planted in rows, usually 36 inches apart, although some growers reported planting rows as close as 26 inches and others as far apart as 40 inches. Planting spacings in the rows varied from 4 to 8 inches.

Both barnyard manure and commercial fertilizer were applied. Manure was used to help retain organic matter in

the soil. Both types of fertilizer were used to maintain soil fertility. Weeds were controlled through cultivating and spraying while soil moisture was maintained through irrigation. Farmers reported that they had little if any insect problem in producing silage corn.

Corn was harvested by high powered field forage choppers which chopped and blew stocks, stems, ears, and leaves into trucks or wagons. The corn was then hauled to pit, trench, or upright silos where it was ensiled.

### Labor requirements

Labor requirements were classified in three groups: preparation, growing, and harvesting. Separate but comparable schedules of hired and family labor were taken from each producer (table 6).

Land preparation totaled 4.4 hours per acre, and of these 4.2 hours was family labor and .2 hour was hired.

Fifteen percent of total labor inputs was used for spreading manure and plowing. Preparation operations accounted for 24 percent of total labor inputs.

Labor used during the planting and growing season averaged 6.4 hours per acre. Family labor inputs were 6.3 hours per acre. Of these, 59 percent was used in irrigating and 27 percent in cultivating. Thirty-five percent of total labor inputs occurred during the planting and growing season.

Harvesting operations included cutting, hauling, unloading, and trampling the silage. No attempt was made to separate the labor for each operation, because all harvesting operations were performed simultaneously, and for most growers no basis existed to allocate the time to each operation.

A labor input of 7.4 hours per acre was used for harvesting. Of this, 2.2 hours were hired and the remaining labor, 5.2 hours, was performed by the family. Forty-one percent of total labor input was harvest labor.



Table 6. Hours of labor used to produce silage corn on 48 farms, northern Utah, 1962

Item	Man hours of family labor		Hired	Total
	Per enterprise	Per acre	Labor per acre	
Preparation:	hours	hours	hours	hours
Manuring	25.6	1.6	0.1	1.7
Fertilizing	3.3	0.2	*	0.2
Plowing	15.3	1.0	*	1.0
Harrowing	10.9	0.7	-	0.7
Leveling	3.7	0.2	-	0.2
Disking	4.3	0.3	-	0.3
Digging	1.9	0.1	*	0.1
Ditching	2.2	0.1	*	0.1
Sub-total	67.2	4.2	0.2	4.4
Growing:				
Drilling	7.1	0.4	*	0.4
Cultivating	27.43	1.7	*	1.7
Spraying	3.2	0.2	*	0.2
Irrigating	59.8	3.7	*	3.7
Hoeing	1.2	0.1	-	0.1
Miscellaneous	2.6	0.2	-	0.2
Sub-total	101.3	6.3	0.1	6.4
Harvesting:	83.0	5.2	2.2	7.4
Total	251.5	15.7	2.5	18.2

\*Less than .1 hour per acre.

Total labor requirements were 18.2 hours per acre. Of these, 2.5 hours were hired and 15.7 were family labor.

#### Cost of production

The cost of producing silage corn was determined by averaging costs incurred by the operators involved. The costs were classified and handled the same as for grain corn. Both cash and non-cash costs were included and divided into four divisions: material, labor and equipment, tax and assessments, and interest (table 7).

Table 7. Cost of producing silage corn on 48 farms, northern Utah, 1962

Item	Quantities used per acre	Cost per acre	Cost per ton	Percent of total cost
Material:		<u>dollars</u>		
Manure	4.2 tons	6.34	.35	6
Fertilizer	195.0 pounds	7.93	.44	7
Spray	.9 pint	0.41	.02	*
Seed	15.3 pounds	3.22	.18	3
Sub-total	†	17.90	1.00	16
Labor and equipment:				
Family labor	15.7 hours	19.55	1.10	18
Hired labor	2.5 hours	3.06	.17	3
Owner machine	†	17.76	.99	16
Hired machine	†	3.95	.22	4
Sub-total	†	44.32	2.48	41
Taxes and assessments:				
Land tax	†	5.65	.31	5
Machine tax	†	1.34	.08	1
Water assessments	†	9.55	.53	9
Sub-total	†	16.54	.92	15
Interest:				
Land and equipment	\$578.00 at 5%	28.94	1.61	26
Working capital	26.66 at 6%	1.60	.09	2
Sub-total	†	30.54	1.70	28
Total	†	109.30	6.10	100

\*Less than 1 percent.

†No common measure.

Fertilizer costs were figured the same as those for grain corn. For silage corn commercial fertilizer averaged 195 pounds per acre. This represented 7 percent of total cost.

Applied on silage corn for weed control was .9 pint of 2,4-D per acre. The average cost was \$3.90 per gallon.

Seed cost averaged \$.21 per pound.

Total material cost was \$19.55 per acre, 16 percent of total cost, and \$1.00 per ton of silage corn produced.

Labor and equipment cost included cost of labor and operating equipment, both owned and hired. This was divided into four parts: family labor, hired labor, owned machine, and hired machine. Family labor included all labor performed by the operator and his family. This labor was valued at \$1.25 per man hour. Operators used 2.5 hours of hired labor per acre at an average cost of \$1.25 per hour. Included in owner machine costs were depreciation, repairs, fuel, and oil. Depreciation and repair costs were 12 percent of the value of equipment used in silage corn production. Fuel and oil costs averaged \$.50 per operating hour. Hired machine cost was computed using custom machine rates and physical data obtained from producers.

Total labor and equipment cost for producing silage corn was \$44.32 per acre, \$2.48 per ton of silage, or 43 percent of total cost.

Tax on property was calculated by applying appropriate mill rates to assessed valuations.

Water cost for silage corn was treated the same as for grain corn. Where water was owned only the annual assessment was included here. Cost of ownership was figured with land value and was included in interest cost. In cases where water was rented, the whole cost was included as a water assessment.

Total tax was \$16.54 per acre or \$.92 per ton of silage produced and 16 percent of total cost.

Interest charges were made for capital invested in production of silage corn. An annual rate of 5 percent was charged for investment in land and equipment. Interest on working capital was computed at a rate of 6 percent.

Total interest cost was \$30.54 per acre or \$1.70 per ton of silage produced. Interest cost was 28 percent of total cost.

Total cost of producing silage corn was \$109.30 per acre or \$6.10 per ton of silage. The cost of production of silage corn was ended when the ensilage was placed in a silo.

### Receipts and returns

Receipts to silage corn were derived from feed value of the corn. Silage from different enterprises varied and value of silage was dependent upon grain content and maturity of corn at harvest time. The value of silage was estimated by the farm operator and averaged \$7.25 per ton.

Gross receipts were \$2,087.84 per enterprise and \$129.77 per acre (table 8). Net return is the difference between gross receipts and total cost. Net return was positive in 29 out of 48 enterprises. Average net return was \$330.30 per enterprise or \$20.47 per acre. For one ton of corn silage, net return was \$1.15.

Management and family labor return from silage corn was \$40.02 per acre. Capital and management return was \$51.01 per acre and return to family labor, capital and management was \$70.56 per acre.

### Factors associated with success of the silage corn enterprise

Three sorts of enterprise schedules were made to find gross associations of net return with size of enterprise, yields per acre, and hours of pre-harvest labor per acre. A separate sort was made for each casual factor grouping schedules into three groups. The result was to minimize the difference of one factor while all other factors varied and to find the association between that factor and net return.

Size of an enterprise is generally related to financial success. In this study of 48 silage corn enterprises, net return was directly related to size. As the size increased from 5 to 12.7 to 34.2 acres, net return increased from -\$3.27 to \$9.04 to \$29.81 per acre.

Table 8. Receipts and returns from 48 silage corn enterprises, northern Utah, 1962

Item	Per		
	Enterprise	Acre	Ton
Gross receipts	\$2,087.84	\$129.77	\$7.25
Total cost	<u>1,757.54</u>	<u>109.30</u>	<u>6.10</u>
Net return	\$ 330.30	\$ 20.47	\$1.15
Value of family labor	<u>314.51</u>	<u>19.55</u>	<u>1.10</u>
Management and family labor return	\$ 644.81	\$ 40.02	\$2.25
Interest	490.72	30.54	1.70
Net return	<u>330.30</u>	<u>20.47</u>	<u>1.15</u>
Capital and management return	\$ 821.02	\$ 51.01	\$2.85
Value of family labor	<u>314.51</u>	<u>19.55</u>	<u>1.10</u>
Return to family labor, capital, and management	\$1,135.53	\$ 70.56	\$3.95

Since high yields are important in agricultural production, relations of yield to net return and other factors were studied. Net return increased as yield increased. A group of 14 enterprises that averaged 10.1 tons per acre had a net return of -\$31.36. A group of 16 enterprises that averaged 16.3 tons per acre had a net return of \$8.68. A third group of 18 enterprises that averaged 20.9 tons per acre had a net return of \$41.15.

Efficiency in labor use has an effect on net return. If a small amount of labor is used, there is a chance of neglect, or it can mean that labor is being used efficiently. If too much is used, there is extra cost. Pre-harvest labor was used as a sorting factor to minimize the effect of yield on labor needed.

Schedules of the 48 silage enterprises were sorted into three groups. As pre-harvest labor per acre increased, net return decreased from \$32.02 to \$25.04 to -\$7.10 per acre. This relation suggested that at high input levels, labor was used inefficiently. Enterprises with low labor inputs had high net return and were more successful financially than were enterprises with high labor inputs.

## SUMMARY

1. An economic study was made of production on corn enterprises in Utah in 1962. Included in the study were schedules of 26 grain corn and 48 silage corn enterprises.
2. Average size of grain corn enterprises was 10.4 acres. Land values averaged \$474 per acre. Average equipment value was \$61 per acre.
3. Labor requirements for land preparation, growing, and harvesting averaged 5.4, 7.0, and 2.3 hours per acre, respectively, resulting in a total requirement of 14.7 hours per acre to produce grain corn.
4. Average cost of production for grain corn was \$111.05 per acre. On a percentage basis, cost was: materials - 17 percent, labor and equipment - 44 percent, taxes - 14 percent, and interest - 25 percent.
5. Net return to grain corn production averaged \$27.38 per acre. Management and family labor return was \$44.04 per acre while the return to family labor, capital, and management was \$72.10 per acre.
6. Average size of silage corn enterprises was 16.1 acres. Land values averaged \$470 per acre, and the average value of equipment was \$108 per acre.
7. Labor requirements for land preparation, growing, and harvesting averaged 4.4, 6.4, and 7.4 hours per acre, respectively, resulting in a total labor requirement of 18.2 hours per acre to produce silage corn.
8. Average cost of production of silage corn was \$109.30 per acre. On a percentage basis, cost was: materials - 16 percent, labor and equipment - 41 percent, taxes - 15 percent, and interest - 28 percent.
9. Net return to silage corn production averaged \$20.47 per acre. Management and family labor return was \$40.02 per acre while the return to family labor, capital, and management was \$70.56 per acre.

10. In the production of silage corn direct associations were found between net return and size of enterprise and yields. There was an inverse relation between hours of pre-harvest labor and net return.

### CONCLUSIONS

Production of grain corn was economically feasible in Davis and Weber Counties. The growing season in areas studied was sufficiently long to grow and mature grain corn. Insect damage to grain corn was negligible.

One problem which confronted producers was high moisture content of corn at harvest time when weather conditions were adverse. There are alternative methods which could be used to solve this problem. One is to harvest wet corn and either sell it at a reduced price, artificially dry the corn, or risk storing wet corn. Another alternative could be to postpone harvest until moisture content was reduced sufficiently to store grain corn safely.

Grain corn enterprises that had highest net return used the various factors of production most efficiently. Large acreages resulted in efficient use of labor and capital, which in turn resulted in low total costs. When yield was high, return per acre of land was high.

Silage corn seems to be a crop that can be economically grown under Utah conditions where it is climatically adapted. Most enterprises had favorable net returns. Large acreage enterprises made the use of large, efficient equipment which helped to reduce labor cost and increase net return. Power equipment helped make possible the use of good cultural practices which resulted in high yield and high net return, even though cost was high. From this situation it might be concluded that most of the inputs, other than labor, used in silage corn production, could have been intensified.

