

Technical Bulletin 223

# Cost of Producing Crops in the Irrigated Southwest

***PART V-UTAH***

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Tucson, Arizona

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## FOREWORD

The information developed in this project is a necessary input to achieving two basic objectives in the economic enhancement of Southwestern states:

1. To provide information needed for maximizing the agricultural base in the Southwestern States
2. To permit realistic planning of profit-making agri-businesses related to a sound agricultural base in these areas.

Some of these Southwest lands are already under irrigated cultivation and use, and additional acreages could be put under irrigation provided this would have economic advantages over other possible uses for the water and land.

The overall objective is to maximize the use of these irrigated lands as a basis for establishing and/or maintaining profit-making businesses suitable for each particular area. Such enterprises will provide living-wage jobs and assure continued prosperity in these regions.

The information in this project has been developed by the Department of Agricultural Economics of the University of Arizona under a contract with the Agribusiness Program, Agricultural Research Service, United States Department of Agriculture. The procedures for determining the various yields, costs, returns, and other data have been the same for each area and each state in order that the results will afford legitimate comparisons between the various crops and types of livestock in these areas. Each of the Experiment Stations and State Universities of the five states has participated in preparing the data and final reports. Separate reports have been prepared for each participating state; the findings of each report can be compared directly with the others since each has been prepared using the same guidelines.

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## GLOSSARY

*Calendar of operation:* A list of the different operations in sequence of their occurrence throughout the crop year. While the crop year falls within the calendar year for most crops, in some cases production falls within two calendar years and there are times when final harvesting operations may not be completed until early in the next calendar year.

*Cost of establishing a stand:* Cost of planting a perennial crop one year for harvesting several years thereafter, e.g., alfalfa.

*Fixed costs:* Costs that the farmer will experience whether or not a crop was planted. If the crop is not planted, the farmer will have certain costs depending upon the length of time his machinery, land, and management facilities are not used. If it is a year, then most costs except the actual operating costs of the machinery, labor, fertilizer, and part of the water costs would be incurred. A part of the water costs could be charged, depending upon the situation. If pump irrigation is used, there would be no charges for irrigation water if none was used; only the depreciation on the well and distribution system would be charged. If surface water is used, a minimum "water users" assessment is generally charged, whether water was used or not.

*Machinery complement:* The various machines used in the farming operation. In cases where the operations require more than one machine of a specific kind, the number of machines is stated.

*Nurse crop:* Usually a grain crop, such as wheat, which is used in some regions because it establishes quickly and is generally sown in advance of the alfalfa, so as to shelter the alfalfa seedlings from wind and/or water erosion of soil particles. In this report, costs of planting, growing, and harvesting the nurse crop are excluded from the production costs for alfalfa hay and alfalfa seed so that costs will be comparable among regions and also because the value of the grain and mixed hay (alfalfa and wheat straw) more than compensated for the nurse crop costs. Net returns from the sale of grain were credited to another account in the farm records. Mixed hay was generally fed to livestock on the farm.

*Variable costs:* Costs that are incurred only if the crop is planted, i.e., costs of inputs used directly in growing and harvesting the crop, including seed, fertilizer, water, machinery, and labor. Also included as "miscellaneous variable costs" are charges for certain items of expense that are incurred if the land is generally used for agricultural production instead of lying idle, such as charges for transportation, maintenance, office and bookkeeping expenses, management, and other expenses of running a farm.

## INTRODUCTION

The purpose of this study was to determine the cost of producing crops on irrigated land in Utah. These costs were determined in such a manner as to be comparable with similar costs in other states. Since a synthetic budgeting method was used, costs were based on the more efficient uses of agricultural inputs, at 1972 prices.<sup>1</sup>

Because different people desire information on costs in various amounts of detail, this report is divided into three sections: 1) a summary, 2) a detailed description of the areas and the cost of producing each crop by area, and 3) an appendix containing detailed tables of variable costs. The purpose of the latter is to make it possible to use this information as a bench-mark or a base, and to incorporate the latest cost data in order to update the estimates of the costs of producing these crops.

More than three-fourths of a million acres of crops were produced on irrigated land in Utah in 1971 and 1972 (Table 1). Hay was the major irrigated crop, produced on the greatest land area, and barley ranked second. Both of these crops were important in the production of livestock. One of the major reasons for producing crops on irrigated land in Utah is to provide feed for livestock during the winter, when natural forage is covered with snow. All hay accounted for almost two-thirds of the total irrigated acreage, while barley accounted for 14 and 13 percent, respectively, in 1971 and 1972. Corn silage was next in rank, using 7 and 9 percent of the irrigated land, respectively, in the two years.

TABLE 1  
Acreage of Irrigated Crops in Utah, 1971 and 1972

Crop	1971		1972	
	Acres	Percent	Acres	Percent
All Hay	502,000	65	508,000	66
Barley	106,000	14	99,000	13
Corn Silage	56,000	7	69,000	9
All Wheat	40,000	5	41,000	5
Other Field Crops	27,000	4	15,000	2
Sugar Beets	24,000	3	22,000	3
All Vegetables	17,000	2	15,000	2
Total	772,000	100	769,000	100

<sup>1</sup>There are five states involved in this study—Arizona, Colorado, Nevada, New Mexico, and Utah. For comparability of the base year costs, 1972 prices were used for each state.

## SUMMARY OF ESTIMATED COSTS

Estimated costs for producing the major irrigated crops in six regions of Utah in 1972 were as follows:

### High Mountain Region

Alfalfa Hay	\$31.19 per ton
Meadow Hay	34.25 per ton
Barley	2.05 per cwt

### Wasatch Front Region

Alfalfa Hay	31.22 per ton
Barley	2.43 per cwt
Corn Silage	7.93 per ton
Sugar Beets	12.97 per ton

### Western Region

Alfalfa Hay	34.12 per ton
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### Sevier River Region

Alfalfa Hay	32.16 per ton
Barley	2.90 per cwt
Corn Silage	6.77 per ton

### Southeast Region

Alfalfa Hay	\$29.40 per ton
Barley	2.92 per cwt
Corn Silage	6.52 per ton

### Southwest Region

Alfalfa Hay	31.57 per ton
Barley	2.79 per cwt
Sorghum Silage	6.80 per ton

Following is a list of crops giving production costs in order of lowest to highest cost region:

### Alfalfa Hay

Southeast	\$29.40 per ton
High Mountain	31.19 per ton
Wasatch Front	31.22 per ton
Southwest	31.57 per ton
Sevier	32.16 per ton
Western	34.12 per ton

### Barley

High Mountain	\$ 2.05 per cwt
Wasatch Front	2.43 per cwt
Southwest	2.79 per cwt
Sevier	2.90 per cwt
Southeast	2.92 per cwt

### Silage

Southeast (corn)	\$ 6.52 per ton
Sevier (corn)	6.77 per ton
Southwest (sorghum)	6.80 per ton
Wasatch Front (corn)	7.93 per ton

The crop that showed the greatest regional difference in production cost was barley—a range of \$2.05 to \$2.92 per hundredweight. It was likely that farmers in the Southeastern region were unable to sell their barley at prices that would cover the total costs unless there was a general shortage of barley in the State.

Sorghum silage grown in the Southwest region is included with corn silage. There is not enough difference in the feed value to list it separately. The Wasatch region had a somewhat higher cost for the production of silage than the other regions, approximately \$1.40 a ton higher than the lowest cost. If this is reduced to a dry matter basis, the difference would be about \$4.20 a ton. However, since it is transported wet, transportation cost would soon make up the difference in the cost of producing it in the lowest cost region.

## Regions

The state of Utah was divided into six regions, each of which are more or less homogeneous as to production costs. These regions are designated as the High Mountain region, Wasatch Front region, Western re-

gion, Sevier River region, Southeast region and the Southwest region (Figure 1). Their location within the State, water resources, and marketing problems will be discussed in succeeding sections.

## WATER RESOURCES

### *High Mountain Region*

The High Mountain region includes all of Rich, Morgan, Summit and Wasatch Counties. Principal crop producing areas are located along the Bear River in Rich County, Weber Basin of Morgan and Summit Counties, and the Heber Valley in Wasatch County.

Annual rainfall varies from 9 to 16 inches. Frost free days range from 60 to 120 days in the irrigated areas, although some of the high mountain valleys have less than 20 frost free days per year.

Most of the irrigation water in this region is diverted from streams and is used to flood the fields. A few sprinkler systems are being used. The region has a surplus of water during the spring runoff, but can have a shortage of water during the summer. Summer shortages do not occur often enough, however, to discourage the irrigation of additional land. Furthermore, any new land brought into production would very likely have to be the land that would not receive water during shortages. A major problem over much of this region is the short growing season.

### *Wasatch Front Region*

All of Cache, Weber, Davis, Salt Lake and Utah Counties, plus the eastern half of Box Elder and Tooele Counties are included in this region. Major crop producing areas are Cache Valley in Cache County, Lower Bear River area of Box Elder County, Weber Basin in Weber and Davis Counties, Salt Lake area of Salt Lake County, Utah Lake area of Utah County, and the Tooele-Rush Valley area of Tooele County.

Rainfall in the region ranges from 9 to 18 inches per year. Frost free days vary from 100 to 180 days. The longer growing season prevails in the area adjacent to Great Salt Lake and Utah Lake.

The Wasatch Front region is irrigated by surface water from the nearby mountains. Both flood and sprinkler irrigation are used. Many of the sprinkler systems do not require any additional power to pressure the system because they have a sufficiently large head of water. Surplus water is available during the spring runoff in much of this area. Several of the irrigation districts have constructed holding dams to store spring runoff water so as to extend the supply over the entire growing season.

### *Western Region*

This region includes the western half of Box Elder, Tooele, Juab, Millard, Beaver, and Iron Counties. Major crop producing area is Grouse Creek-Park Valley area of Box Elder County. There is a small amount of irrigation in the Great Salt Lake Desert in Tooele and Juab Counties, Snake Valley area of Millard and Beaver Counties and the Escalante Desert in Iron County.

Average annual rainfall varies from 5 to 12 inches, and the growing season is from 80 to 160 days.

Both pump and surface water are used for irrigation. Water is diverted from streams when and where available but much of the region must depend upon pumped ground water. Several new pump areas are being developed in the southern part of the region. Many farmers are using sprinkler irrigation systems. It is possible that a limited amount of additional land may be developed and irrigated with pump water.

### *Sevier River Region*

The eastern half of Juab, Millard, Beaver and Iron Counties, and all of Sanpete, Sevier and Piute Counties comprise this region. Major crop producing areas are the Sanpete-North Sevier River area of Sanpete County, South Sevier River drainage area of Sevier and Piute Counties, Delta Area of Juab and Millard Counties, Fillmore area of Millard County, Beaver-Milford area of Beaver County and the Parowan-Cedar Valley area in Iron County.

Annual rainfall averages 8 to 14 inches in the crop producing areas. The growing season ranges from 100 to 160 days. Most of the irrigated fields on the headwaters of the Sevier River use surface water from the local streams. Many of these fields use flood irrigation although a few sprinkler systems are presently being installed. Because a specific amount of water must be guaranteed to downstream users before any can be stored for local use, there is a shortage of water at the headwaters of the Sevier River. The downstream users near Delta use surface water from the Sevier River and supplement it with pumped ground water. The Sevier River has been over-allotted during many years.

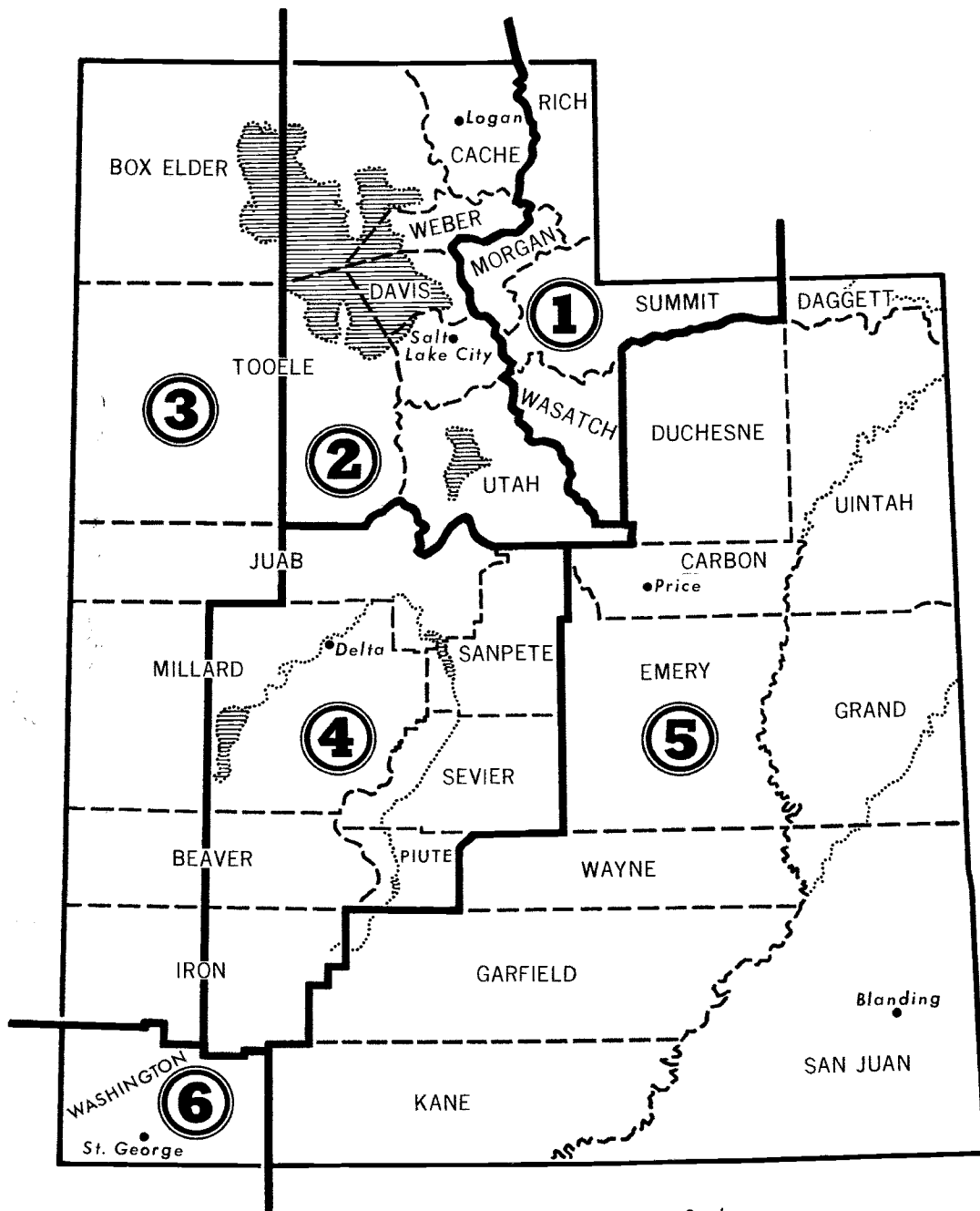
Very little possibility exists for additional land to be irrigated. The Sevier River ends in a dry lake bed near Delta. Any additional irrigation would have to be from pumped ground water.

### *Southeast Region*

All of Daggett, Duchesne, Uintah, Carbon, Emery, Grand, Wayne, Garfield, Kane and San Juan Counties make up this region. The principal crop producing areas are the Uintah Basin and the Upper Green River drainage and its tributaries in Daggett, Uintah and Duchesne Counties.

Rainfall averages from 6 to 12 inches per year. Average frost free days vary from 80 to 160. A few low areas along the lower Colorado and San Juan Rivers have 180 to 200 frost free days.

A majority of irrigated fields are small and located along rivers and their tributaries. Most fields are flood irrigated by gravity water. Dirt ditches are used. A few of the farms have gone to sprinkler systems and cement ditches.



Utah



IRRIGATED CROP PRODUCING REGIONS

- ① High Mountain Region
- ② Wasatch Front Region
- ③ Western Region
- ④ Sevier River Region
- ⑤ Southeast Region
- ⑥ Southwest Region

Prepared by Department of Agricultural Economics

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FIGURE 1  
Irrigated Crop Producing Regions in Utah

The Southeast region is in the Upper Colorado River water system and this surface water is allotted by the Colorado River Agreement. Very little additional surface water is available for agricultural use in this region. A considerable saving of water could be realized by use of more efficient distribution systems and methods of application. Little ground water is pumped for irrigation purposes in this region.

#### *Southwest Region*

The Southwest region consists of Washington County. The major crop producing area is along the Virgin River and near St. George.

Average rainfall is 8 to 10 inches per year. Frost free days vary from 180 to 220 days. This region has the longest growing season of any crop producing area in Utah.

Most of the irrigated cropland in the Southwest region is irrigated by surface water from the Virgin River. Some sprinkler systems are being used although the majority of fields are being flood irrigated. A surplus of water is available during the spring runoff but water shortages can occur during the summer growing season. The possibility of flash floods are a hazard to irrigation systems. Little additional land can be irrigated in this region because the streams are part of the Colorado River system and all water is allotted by decree.

### **MARKETING OF UTAH CROPS**

There were no major problems in marketing crops grown on irrigated land in Utah. Most crops are used locally, and in many instances, the crops support beef and dairy cattle and sheep production.

#### *High Mountain Region*

Local ranchers and dairy producers use the majority of the alfalfa hay produced in this region. Some surplus hay goes to the Salt Lake City area. Barley is used locally or sold in the Salt Lake City area. The majority of the meadow hay is fed on the ranch where it is produced. Some meadow hay goes to the pleasure horse industry in the Salt Lake City area.

#### *Wasatch Front Region*

This area has four major crops—alfalfa hay, barley, corn silage and sugar beets. Alfalfa hay and corn silage are used by the local dairy and livestock producers. Barley is used in the local livestock and poultry industries.

Sugar beets are processed in only one local plant. Several of the sugar beet processing plants in Utah have closed and the beets must be transported greater distances in order to be processed. One of the problems is that most of the farms are so small that it is difficult to justify the investment in specialized beet harvesters and other equipment needed to produce the sugar beets efficiently. In order to surmount this problem, there is an effort to combine land resources by contractual agreement. Beet processors have contracted with farmers for the use of their land and the processors are performing some of the field operations on a custom rate basis.

#### *Western Region*

Alfalfa hay is the only major crop produced in this region. It is a necessary product for the livestock indus-

try and most of the hay is used locally. Some of the hay produced in the southern portion of the region is shipped to the Las Vegas, Nevada, area for use by the pleasure horse industry and for dairy feeding.

#### *Sevier River Region*

There are three major crops marketed in this region—alfalfa hay, barley, and corn silage. The alfalfa hay is fed to livestock locally. Barley is mostly used by the turkey-growing industry in the region. The next largest outlet for barley is for the livestock and dairy industry. The dairy industry is the main user of corn silage.

#### *Southeast Region*

The Southeast region has the same major crops as the Sevier River region. The local dairy industry and cattle ranches are the biggest users of the alfalfa hay. Surplus hay is transported south into the Navajo Indian reservation. The local cattle industry is the biggest user of barley, but surplus grain is sold in the Southwest region. Corn silage is used primarily by the local dairy industry.

#### *Southwest Region*

As in other regions, most of the alfalfa, barley, and grain sorghum silage is used within the region. Some of the alfalfa hay is shipped to Las Vegas, Nevada, to be used in dairy production and for feeding pleasure horses located in and near that city. Most of the barley is used by the local livestock industry and any surplus is shipped to the south and west, into Las Vegas, Nevada, with some of it going on to Arizona and California. Sorghum silage is used primarily by the local dairy industry.

### **ESTIMATES OF PRODUCTION COSTS**

#### *Method of determining Costs*

A synthetic budgeting method was used to determine cost estimates. These budgets are based on extensive use of machinery throughout most of the year, as would have been expected in a commercial farming

operation in 1971 and 1972. Information on operating times and on the practical efficiency of the various machines was obtained from farm operators who used them extensively on large farms in Arizona. On the basis of this information and knowledge of prevailing

practices in the production of the specified crops in Utah, estimates of annual machine usage were developed as shown in Table 2.

TABLE 2  
Annual Use of Selected Farm Machines in  
Utah Irrigated Crop Budgets

Machine	Hours per year
90-100 HP Tractor	2000
65-75 HP Tractor	2000
Grain Combine	600
Swather	600
Hay Baler	500
Bale Wagon	500

The factor that limited the size of operation in this study was usually the harvesting machine. The size of operation was based on the area over which a specific harvesting machine or a combination of harvesting machines could be used most efficiently. For example, in the production of alfalfa hay, the machine that has the greatest limiting effect is the swather (harvester). It can cover only a limited number of acres in a given time. Efficient equipment is important because hay must be harvested within a given time to be of good quality. If a farmer's operation is not large enough to use his harvesting machinery efficiently, he probably would not be able to produce at unit costs as low as the estimates in this report. An alternative for overcoming this problem is to use custom harvesters.

A typical machinery complement for each specific operation was established with the objective of performing that operation at the lowest cost (Appendix B). Certain problems and variations had to be considered in estimating machinery use. Farmers located in areas with shorter growing seasons tend to make more repairs to their machinery, so as to extend its life over a longer number of hours of use than if the machine were used where the growing season is longer, i.e., 300 to 325 days per year. In the latter case, as the machine becomes worn, it is impractical to replace many of the parts. In the former case, if the farmer or rancher has time when his opportunity cost is near zero, he may find it more profitable to repair the machine and extend its life rather than to replace it.

Machinery costs were calculated using 1972 costs for new machinery. Fuel and repair costs were based on the Agricultural Engineering Handbook formulas. In some instances, where experience indicated that the Agriculture Engineering Handbook formulas were underestimating costs, the costs were increased in accordance with more current information. Interest, depreciation, insurance and other fixed costs were included.

Labor rates include social security, industrial insur-

ance, Occupational Safety and Health Act insurance, employment compensation, and vacation costs. The amount and type of materials used and the per unit costs of these materials are based on the best information available. The components should be adjusted when local conditions indicate the information included in this report is not appropriate. Understandably, there is a limit to the extent of refinement of cost estimates developed in a study of this type, if it is to serve as a more or less generalized reference. Thus, for example, allowances were not made for different rates of application of fertilizer, water, etc., by soil types and other physical aspects for each small locality.

Included under variable costs are interest charges on the variable costs in the budget. A charge has been added for management, office overhead, bookkeeping, maintenance, transportation, and other expenses of running a farm.

Since taxes vary among the different locations in the region, it is difficult to determine a representative cost figure. Furthermore, taxes vary from year to year. Thus, it was considered preferable to calculate taxes as a regional average rather than to develop estimates for each county within a region. For example, in the High Mountain region, there would be four different tax rates due to the differences in county taxes and there could be further variation within the counties due to different school tax rates. To develop estimated costs of production for specific localities within a region, it would be necessary to recalculate the costs using the local tax rate.

Interest cost in the amount of a 6 percent charge on capital investment in land was included in the fixed costs. Although interest rates for loans on agricultural land rose sharply in 1970 and then receded in subsequent years, the rate on new loans in 1972 was still higher than 6 percent. Nevertheless, the average interest rate on outstanding loans was more likely around 6 percent than the 1972 prevailing rates of 7 percent or higher. Thus, the more conservative rate of 6 percent was selected as the interest charge on the investment in land.

#### *Updating Cost Estimates*

Because prices and charges for the various factors of production are constantly changing, it is well recognized that findings in any cost study will soon be out of date. Thus, one of the major objectives of this project was to develop a system for categorizing and presenting the findings so as to facilitate updating of the estimates by changing applicable items of cost.

The procedure for updating cost estimates appears in the Appendix, along with tables showing detailed cost information for the variable costs of producing the various crops.

## REGIONAL COST ESTIMATES FOR PRODUCING IRRIGATED CROPS

### *High Mountain*

The total costs for producing an acre of barley in the High Mountain region in 1972 were estimated to be \$61.61 (Table 3). The expected yield with the level of inputs included in the budget was 3,000 pounds of bar-

ley per acre. Thus, the average cost per hundredweight was \$2.05

Tables 4 and 5 present the estimated costs of producing an acre of alfalfa in the High Mountain region. Variable costs for establishing an acre of alfalfa were

TABLE 3  
**Estimated Costs for Producing One Acre of Barley  
in the High Mountain Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 7.03
2. Planting	5.15
3. Growing	
a. Fertilization	\$ 4.65
b. Irrigation	5.47
c. Insect Control	<sup>1</sup>
d. Chemical Weed Control	<sup>1</sup>
	10.12
4. Harvesting	3.15
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	1.44
Total Variable Costs	\$37.39
<i>Fixed Costs</i>	
1. Machinery	6.53
2. Water	1.50
3. Taxes	2.69
4. Interest on Land Investment (\$225 @ 6%)	13.50
Total Fixed Costs	24.22
Total Producing Costs/Acre	\$61.61

Yield: 3000 pounds of grain per acre. Cost per hundred-weight of grain =  $\frac{\$61.61}{30} = \$2.05$  per cwt.

<sup>1</sup> No cost generally incurred.

estimated to be \$37.01 (Table 4). Total costs were \$65.11 per acre, including the fixed costs of \$28.10.

The variable costs for producing an acre of alfalfa once the stand had been established were \$38.95. With the additional fixed costs of \$39.02, the total costs

TABLE 4  
**Estimated Costs for Establishing One Acre of Alfalfa  
in the High Mountain Region of Utah**

	Alfalfa	Nurse Crop <sup>1</sup>
<i>Variable Costs</i>		
1. Land Preparation	\$ 7.03	—
2. Planting	5.26	\$ 3.91
3. Growing		
a. Fertilization	\$ 5.00	
b. Irrigation	7.30	
c. Insect Control	<sup>2</sup>	
d. Chemical Weed Control	<sup>2</sup>	
	12.30	—
4. Harvesting	—	8.98
5. Misc. Variable Costs	10.50	—
6. Interest on Variable Costs (8% for 6 Months)	1.92	—
Total Variable Costs	\$37.01	\$12.89
<i>Fixed Costs</i>		
1. Machinery	9.91	—
2. Water	2.00	—
3. Taxes	2.69	—
4. Interest on Land Investment (\$225 @ 6%)	13.50	—
Total Fixed Costs	28.10	—
Total Producing Costs/Acre	\$65.11	\$12.89

<sup>1</sup> Nurse crop was used for establishing the stand. Total costs for establishing alfalfa plus nurse crop costs: \$65.11 + \$12.89 = \$78.00 per acre. Estimated nurse crop yield per acre was 1500 pounds of grain and 1.25 tons of mixed hay, with a value assumed at least equal to cost of the nurse crop.

<sup>2</sup> No cost generally incurred.

amounted to \$77.97 per acre (Table 5). The yield of alfalfa hay in this area was expected to be 2-1/2 tons per acre and the stand was expected to be productive for five years. With this yield, the average cost per ton of alfalfa hay was \$31.19.

The year the stand was established, 1500 pounds of grain and 1-1/4 tons of mixed hay were produced per acre. The nurse crop costs were not included with hay production costs in order to make the costs comparable with other areas, and because the output from the nurse crop was assumed to be at least equal in value to nurse crop costs. The extra costs incurred for the nurse crop were \$12.89 per acre. With a five-year productive life, the proportion of establishing costs to be charged to each year's production costs, as part of the fixed costs, was \$13.02 (see bottom of Table 5).

TABLE 5  
**Estimated Costs for Producing One Acre of Alfalfa  
in the High Mountain Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 1.10
2. Planting	<sup>1</sup>
3. Growing	
a. Fertilization	\$ 5.20
b. Irrigation	7.30
c. Insect Control	<sup>2</sup>
d. Chemical Weed Control	<sup>2</sup>
	12.50
4. Harvesting	13.35
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	1.50
Total Variable Costs	\$38.95
<i>Fixed Costs</i>	
1. Machinery	7.81
2. Water	2.00
3. Taxes	2.69
4. Interest on Land Investment (\$225 @ 6%)	13.50
5. Establishing the Stand (prorated over 5 years)	13.02 <sup>3</sup>
Total Fixed Costs	39.02
Total Producing Costs/Acre	\$77.97
Cost per ton of alfalfa hay (Estimated yield: 2.5 tons per acre):	
	$\frac{\$77.97}{2.5} = \$31.19$ per ton

<sup>1</sup> Included in Table 4 under costs of establishing the stand.

<sup>2</sup> No cost generally incurred.

<sup>3</sup> Annual cost for establishing the alfalfa stand (Table 4) distributed over a 5 year productive life =  $\frac{\$65.11}{5} = \$13.02$

In the high mountain meadows the growing season is so short that it is not possible to produce very much other than meadow hay. It can be fed to any of the ruminant animals and to horses. It is a preferred feed for pleasure and race horses.

Table 6 gives the estimated costs of producing an acre of meadow hay. Variable costs of \$29.40 and fixed costs of \$21.98 were included in the estimate of \$51.38 per acre. The yield was estimated at one and one-half tons per acre and thus the average estimated costs were \$34.25 per ton of meadow hay. This hay is more expensive to produce than alfalfa. Although alfalfa hay is more nutritious, meadow hay is preferred for feeding horses.



TABLE 6

**Estimated Costs for Producing One Acre of Meadow Hay  
in the High Mountain Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 0.51
2. Planting	1
3. Growing	
a. Fertilization	\$ 2.60
b. Irrigation	7.18
c. Insect Control	1
d. Chemical Weed Control	1
	<hr/>
	9.78
4. Harvesting	7.48
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	1.13
Total Variable Costs	<hr/>
	\$29.40
<i>Fixed Costs</i>	
1. Machinery	4.29
2. Water	1.50
3. Taxes	2.69
4. Interest on Land Investment (\$225 @ 6%)	13.50
Total Fixed Costs	<hr/>
	21.98
Total Producing Costs/Acre	<hr/>
	\$51.38

Yield: 1.5 tons of meadow hay per acre. Cost per ton of \$51.38.

<sup>1</sup> No cost generally incurred.

*Wasatch Front*

The major crops in this region are barley, sugar beets, alfalfa hay and corn silage. The estimated costs for producing an acre of barley included \$51.48 for variable costs and \$45.76 for fixed costs or a total of \$97.24 per acre (Table 7). The estimated yield was 4,000 pounds per acre, resulting in an average cost of \$2.43 per hundred pounds.

TABLE 7

**Estimated Costs for Producing One Acre of Barley  
in the Wasatch Front Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 6.44
2. Planting	6.65
3. Growing	
a. Fertilization	\$ 9.55
b. Irrigation	9.80
c. Insect Control	1
d. Chemical Weed Control	2.79
	<hr/>
	22.14
4. Harvesting	3.77
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	1.98
Total Variable Costs	<hr/>
	\$51.48
<i>Fixed Costs</i>	
1. Machinery	7.36
2. Water	2.00
3. Taxes	6.40
4. Interest on Land Investment (\$500 @ 6%)	30.00
Total Fixed Costs	<hr/>
	45.76
Total Producing Costs/Acre	<hr/>
	\$97.24

Yield: 4000 pounds of grain per acre. Cost per hundred-weight of grain =  $\frac{\$97.24}{40}$  = \$2.43 per cwt.

<sup>1</sup> No cost generally incurred.

This is the only region in Utah in which sugar beets are a major crop. The estimated cost for producing an acre of sugar beets was \$259.37 (Table 8). The variable costs amounted to \$212.70, considerably more than the fixed costs of \$46.67. Thus, the out of pocket costs for producing this crop were very substantial. The estimated yield was 20 tons of sugar beets per acre, indicating an average cost of \$12.97 per ton. A return of approximately \$1 per ton of beets harvested can be expected for the beet tops. If this credit is subtracted from the total costs, the cost per ton would have been reduced by \$1.00 to \$11.97.

TABLE 8

**Estimated Costs for Producing One Acre of Sugar Beets  
in the Wasatch Front Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 8.17
2. Planting	5.59
3. Growing	
a. Fertilization	\$22.58
b. Irrigation	16.20
c. Insect Control	1
d. Chemical Weed Control	7.50
e. Fumigation	37.50
f. Hand Labor	40.00
g. Cultivation	5.48
	<hr/>
	129.26
4. Harvesting	51.00
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	8.18
Total Variable Costs	<hr/>
	\$212.70
<i>Fixed Costs</i>	
1. Machinery	6.77
2. Water	3.50
3. Taxes	6.40
4. Interest on Land Investment (\$500 @ 6%)	30.00
Total Fixed Costs	<hr/>
	46.67
Total Producing Costs/Acre	<hr/>
	\$259.37

Yield: 20 tons of sugar beets per acre.  
Livestock pasture—\$1.00/ton of beets harvested.  
Cost per ton of sugar beets =  $\frac{\$259.37}{20}$  = \$12.97

<sup>1</sup> No cost generally incurred.

Tables 9 and 10 show the estimated costs of establishing a stand of alfalfa and producing an acre of alfalfa hay in the Wasatch Front region. The total cost of establishing the stand was estimated to be \$90.51. Since a stand had an estimated productive life of four years, it was necessary to prorate the cost of establishing the stand as an annual charge of \$22.63 to the fixed costs. The cost of the nurse crop was not included in the cost of establishing the stand because the yield of grain and hay had a value that compensated for the nurse crop costs. The total cost for producing an acre of alfalfa hay, including the cost of establishing the stand, was \$124.85. With a yield of four tons per acre, the per ton cost was \$31.22.

Estimated costs for producing an acre of corn silage in the Wasatch Front region amounted to \$158.58 (Table 11). The yield was estimated to be 20 tons of silage per acre, delivered to the silo. With this yield, the average cost per ton was \$7.93. According to a rule of

TABLE 9

**Estimated Costs for Establishing One Acre of Alfalfa  
in the Wasatch Front Region of Utah**

	Alfalfa	Nurse Crop <sup>1</sup>
<i>Variable Costs</i>		
1. Land Preparation	\$ 7.54	—
2. Planting	5.26	\$ 4.45
3. Growing		
a. Fertilization	\$ 5.50	
b. Irrigation	10.75	
c. Insect Control	<sup>2</sup>	
d. Chemical Weed Control	<sup>2</sup>	
	16.25	—
4. Harvesting	—	9.37
5. Misc. Variable Costs	10.50	—
6. Interest on Variable Costs (8% for 6 Months)	2.13	—
Total Variable Costs	\$41.68	\$13.82
<i>Fixed Costs</i>		
1. Machinery	10.43	—
2. Water	2.00	—
3. Taxes	6.40	—
4. Interest on Land Investment (\$500 @6%)	30.00	—
Total Fixed Costs	48.83	—
Total Producing Costs/Acre	\$90.51	\$13.82

<sup>1</sup> Nurse crop was used for establishing the stand. Total costs for establishing the stand plus nurse crop costs: \$90.51 + \$13.82 = \$104.33. Estimated nurse crop yield per acre was 2400 pounds of grain and one ton of mixed hay, with a value assumed at least equal to cost of the nurse crop.

<sup>2</sup> No cost generally incurred.

TABLE 10

**Estimated Costs for Producing One Acre of Alfalfa  
in the Wasatch Front Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 0.90
2. Planting	<sup>1</sup>
3. Growing	
a. Fertilization	\$ 5.20
b. Irrigation	12.25
c. Insect Control	<sup>2</sup>
d. Chemical Weed Control	<sup>2</sup>
	17.45
4. Harvesting	20.55
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	1.98
Total Variable Costs	\$ 51.38
<i>Fixed Costs</i>	
1. Machinery	11.94
2. Water	2.50
3. Taxes	6.40
4. Interest on Land Investment (\$500 @6%)	30.00
5. Establishing the Stand (prorated over 5 years)	22.63 <sup>3</sup>
Total Fixed Costs	73.47
Total Producing Costs/Acre	\$124.85

Cost per ton of alfalfa hay (Estimated yield: 4 tons per acre):  
\$124.85 = \$31.22 per ton.

<sup>4</sup>

<sup>1</sup> Included in Table 9 under costs of establishing the stand.

<sup>2</sup> No cost generally incurred.

<sup>3</sup> Annual cost for establishing the alfalfa stand, distributed over a 4 year productive life =  $\frac{\$90.51}{4} = \$22.63$

4

TABLE 11

**Estimated Costs for Producing One Acre of Corn Silage  
in the Wasatch Front Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 6.44
2. Planting	6.76
3. Growing	
a. Fertilization	\$15.04
b. Irrigation	14.70
c. Insect Control	<sup>1</sup>
d. Chemical Weed Control	3.01
	32.75
4. Harvesting	30.88
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	3.49
Total Variable Costs	\$ 90.82
<i>Fixed Costs</i>	
1. Machinery	28.36
2. Water	3.00
3. Taxes	6.40
4. Interest on Land Investment (\$500 @6%)	30.00
Total Fixed Costs	67.76
Total Producing Costs/Acre	\$158.58

Yield: 20 tons of corn silage per acre, delivered to the silo.

Cost per ton of silage:  $\frac{\$158.58}{20} = \$7.93$  per ton.

<sup>1</sup> No cost generally incurred.

thumb that 3 tons of silage are equal to 1 ton of dry hay, the cost of producing the equivalent of dry hay would be 24.00.

*Western*

Alfalfa is the only major crop produced in the Western region. Tables 12 and 13 give the estimated costs for establishing a stand and producing an acre of alfalfa after the stand has been established. Total costs for establishing a stand of alfalfa were \$72.24 per acre, including variable costs of \$39.44 and fixed costs of \$32.80 per acre.

The estimated costs for producing an acre of alfalfa hay after the stand had been established amounted to \$102.35 (Table 13). The extra costs for the nurse crop (\$15.60 per acre) were not included as a production cost because it yielded hay and grain that had a combined value which more than compensated for nurse crop costs.

The stand was expected to last for four years. The annual share of the cost of establishing the stand was \$18.06, which was added to fixed costs. The yield in the Western Region of Utah was estimated to be 3 tons of hay per acre, and thus the average cost was estimated to be \$34.12 per ton.

*Sevier River*

Barley, alfalfa hay and corn for silage are the major crops produced in this region. The estimated costs for producing barley consisted of variable costs of \$47.90 and fixed costs of \$39.22, bringing total production costs to \$87.12 per acre (Table 14). It was estimated that a yield of 3,000 pounds per acre should be produced with this level of inputs. Thus, the average cost per hundred pounds of barley was \$2.90.

TABLE 12

**Estimated Costs for Establishing One Acre of Alfalfa  
in the Western Region of Utah**

	Alfalfa	Nurse Crop <sup>1</sup>
<i>Variable Costs</i>		
1. Land Preparation	\$ 8.37	—
2. Planting	7.90	\$ 4.45
3. Growing		
a. Fertilization	<sup>2</sup>	
b. Irrigation	\$10.60	
c. Insect Control	<sup>2</sup>	
d. Chemical Weed Control	<sup>2</sup>	
	10.60	—
4. Harvesting	—	11.15
5. Misc. Variable Costs	10.50	—
6. Interest on Variable Costs (8% for 6 Months)	2.07	—
Total Variable Costs	\$39.44	\$15.60
<i>Fixed Costs</i>		
1. Machinery	12.34	—
2. Water	4.00	—
3. Taxes	2.96	—
4. Interest on Land Investment (\$225 @ 6%)	13.50	—
Total Fixed Costs	32.80	—
Total Producing Costs/Acre	\$72.24	\$15.60

<sup>1</sup> Nurse crop was used for establishing the stand. Total costs for establishing alfalfa plus nurse crop costs: \$72.24 + \$15.60 = \$87.84. Estimated nurse crop yield per acre was 2400 pounds of grain and one ton of mixed hay, (alfalfa and straw) with a return value assumed at least equal to the cost of the nurse crop.

<sup>2</sup> No cost generally incurred.

TABLE 13

**Estimated Costs for Producing One Acre of Alfalfa  
in the Western Region of Utah**

<i>Variable Costs</i>		
1. Land Preparation		<sup>1</sup>
2. Planting		<sup>1</sup>
3. Growing		
a. Fertilization	\$ 6.36	
b. Irrigation	14.00	
c. Insect Control	<sup>2</sup>	
d. Chemical Weed Control	<sup>2</sup>	
	\$20.36	
4. Harvesting	19.67	
5. Misc. Variable Costs	10.50	
6. Interest on Variable Costs (8% for 6 Months)	2.02	
Total Variable Costs	\$ 52.55	
<i>Fixed Costs</i>		
1. Machinery	11.28	
2. Water	4.00	
3. Taxes	2.96	
4. Interest on Land Investment (\$225 @ 6%)	13.50	
5. Establishing the Stand (prorated over 5 years)	18.06 <sup>3</sup>	
Total Fixed Costs	49.80	
Total Producing Costs/Acre	\$102.35	

Cost per ton of alfalfa hay (Estimated yield: 3 tons per acre):  
\$102.35 = \$34.12 per ton.

3

<sup>1</sup> Included in Table 12 under costs of establishing the stand.

<sup>2</sup> No cost generally incurred.

<sup>3</sup> Annual cost for establishing the alfalfa stand (Table 12), distributed over a 4 year productive life =  $\frac{\$72.24}{4} = \$18.06$

4

TABLE 14

**Estimated Costs for Producing One Acre of Barley  
in the Sevier River Region of Utah**

<i>Variable Costs</i>		
1. Land Preparation		\$ 7.27
2. Planting		6.91
3. Growing		
a. Fertilization	\$ 4.65	
b. Irrigation	11.80	
c. Insect Control	<sup>1</sup>	
d. Chemical Weed Control	<sup>1</sup>	
		16.45
4. Harvesting		4.93
5. Misc. Variable Costs		10.50
6. Interest on Variable Costs (8% for 6 Months)		1.84
Total Variable Costs		\$47.90
<i>Fixed Costs</i>		
1. Machinery		8.82
2. Water		3.00
3. Taxes		3.40
4. Interest on Land Investment (\$400 @ 6%)		24.00
Total Fixed Costs		39.22
Total Producing Costs/Acre		\$87.12

Yield: 3000 pounds per acre. Cost per hundredweight of grain =  $\frac{\$87.12}{30} = \$2.90$  per cwt.

<sup>1</sup> No cost generally incurred.

TABLE 15

**Estimated Costs for Establishing One Acre of Alfalfa  
in the Sevier River Region of Utah**

	Alfalfa	Nurse Crop <sup>1</sup>
<i>Variable Costs</i>		
1. Land Preparation	\$ 7.27	—
2. Planting	9.95	\$ 5.81
3. Growing		
a. Fertilization	\$10.45	
b. Irrigation	14.75	
c. Insect Control	<sup>2</sup>	
d. Chemical Weed Control	<sup>2</sup>	
	25.20	—
4. Harvesting	—	11.15
5. Misc. Variable Costs	10.50	—
6. Interest on Variable Costs (8% for 6 Months)	2.80	—
Total Variable Costs	\$55.72	\$16.96
<i>Fixed Costs</i>		
1. Machinery	12.52	—
2. Water	3.75	—
3. Taxes	3.40	—
4. Interest on Land Investment (\$400 @ 6%)	24.00	—
Total Fixed Costs	43.67	—
Total Producing Costs/Acre	\$99.39	\$16.96

<sup>1</sup> Nurse crop was used for establishing the stand. Total costs for establishing alfalfa plus nurse crop costs: \$99.39 + \$16.96 = \$116.35. Estimated nurse crop yield per acre was 3000 pounds of grain and one ton of mixed hay, (alfalfa and straw) with a return value assumed at least equal to the cost of the nurse crop.

<sup>2</sup> No cost generally incurred.

As in all other regions, alfalfa is an important crop. Variable costs for establishing a stand were estimated to be \$55.72 while the total fixed costs were \$43.67 per acre (Table 15). Costs for the nurse crop used in estab-

lishing the stand amounted to \$16.96 but were not included in the cost of establishing the stand, because the value of the grain and mixed hay produced by the nurse crop exceed its costs. The total costs for establishing the stand, \$99.39 per acre, were prorated as an annual charge of \$19.88 to fixed costs of producing hay over the estimated 5-year life of the stand (Table 16). The total costs of producing an acre of alfalfa hay for a year were \$112.56. With an estimated yield of 3.5 tons per acre, the average cost was \$32.16 per ton of hay.

TABLE 16

**Estimated Costs for Producing One Acre of Alfalfa in the Sevier River Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 1 <sup>1</sup>
2. Planting	1 <sup>1</sup>
3. Growing	
a. Fertilization	\$ 5.20
b. Irrigation	16.75
c. Insect Control	2 <sup>2</sup>
d. Chemical Weed Control	2 <sup>2</sup>
	<u>21.95</u>
4. Harvesting	15.65
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	<u>1.92</u>
Total Variable Costs	\$ 50.02
<i>Fixed Costs</i>	
1. Machinery	10.76
2. Water	4.50
3. Taxes	3.40
4. Interest on Land Investment (\$400 @ 6%)	24.00
5. Establishing the Stand (prorated over 5 years)	<u>19.88<sup>3</sup></u>
Total Fixed Costs	<u>62.54</u>
Total Producing Costs/Acre	\$112.56

Cost per ton of alfalfa hay (Estimated yield: 3.5 tons per acre:  $\frac{\$112.56}{3.5} = \$32.16$  per ton.

<sup>1</sup> Included in Table 15 under costs of establishing the stand.

<sup>2</sup> No cost generally incurred.

<sup>3</sup> Annual cost for establishing the alfalfa stand (Table 15) distributed over a 5 year productive life =  $\frac{\$99.39}{5} = \$19.88$

For producing one acre of corn silage in the Sevier River region, the variable costs were estimated to be \$72.29 and the fixed costs, \$49.55 per acre (Table 17). Total production costs were \$121.84. It was estimated that 18 tons of corn silage per acre would be delivered to the silo. Thus, the estimated cost per ton was \$6.77.

**Southeast**

The major crops produced in this region are typical for Utah—barley, alfalfa hay, and silage. The variable costs for producing one acre of barley were estimated to be \$42.99 and fixed costs were \$27.02, resulting in total production costs of \$70.01 per acre (Table 18). The expected yield in this region with this level of inputs was 2,400 pounds of barley per acre. With this yield, the average cost was estimated to be \$2.92 per hundred pounds.

Table 19 presents the estimated costs for establishing one acre of alfalfa and Table 20 shows the esti-

mated costs of producing one acre of alfalfa hay after the stand has been established. Establishing one acre of alfalfa was estimated to cost \$72.55. The proportionate share that each year's hay production had to bear for establishing the stand was \$18.14 (over a 4-year productive life). With the inclusion of this annual

TABLE 17

**Estimated Costs for Producing One Acre of Corn Silage in the Sevier River Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 7.83
2. Planting	6.48
3. Growing	
a. Fertilization	\$ 9.09
b. Irrigation	14.75
c. Insect Control	1 <sup>1</sup>
d. Chemical Weed Control	1 <sup>1</sup>
e. Cultivation	<u>1.45</u>
	25.29
4. Harvesting	19.41
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	<u>2.78</u>
Total Variable Costs	\$ 72.29
<i>Fixed Costs</i>	
1. Machinery	18.40
2. Water	3.75
3. Taxes	3.40
4. Interest on Land Investment (\$400 @ 6%)	<u>24.00</u>
Total Fixed Costs	<u>49.55</u>
Total Producing Costs/Acre	\$121.84

Yield: 18 tons of corn silage per acre, delivered to the silo.

Cost per ton of silage:  $\frac{\$121.84}{18} = \$6.77$  per ton.

<sup>1</sup> No cost generally incurred.

TABLE 18

**Estimated Costs for Producing One Acre of Barley in the Southeast Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 7.34
2. Planting	6.07
3. Growing	
a. Fertilization	\$ 4.70
b. Irrigation	7.80
c. Insect Control	1 <sup>1</sup>
d. Chemical Weed Control	1 <sup>1</sup>
	<u>12.50</u>
4. Harvesting	4.93
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	<u>1.65</u>
Total Variable Costs	\$42.99
<i>Fixed Costs</i>	
1. Machinery	8.62
2. Water	2.00
3. Taxes	2.90
4. Interest on Land Investment (\$225 @ 6%)	<u>13.50</u>
Total Fixed Costs	<u>27.02</u>
Total Producing Costs/Acre	\$70.01

Yield: 2400 pounds of grain per acre. Cost per hundred-weight of grain:  $\frac{\$70.01}{24} = \$2.92$  per cwt.

<sup>1</sup> No cost generally incurred.

TABLE 19  
Estimated Costs for Establishing One Acre of Alfalfa  
in the Southeast Region of Utah

	Alfalfa	Nurse Crop <sup>1</sup>
<i>Variable Costs</i>		
1. Land Preparation	\$ 7.34	—
2. Planting	5.26	\$ 4.41
3. Growing		
a. Fertilization	\$ 5.50	
b. Irrigation	10.70	
c. Insect Control	<sup>2</sup>	
d. Chemical Weed Control	<sup>2</sup>	
	16.20	—
4. Harvesting	—	11.15
5. Misc. Variable Costs	10.50	—
6. Interest on Variable Costs (8% for 6 Months)	2.19	—
Total Variable Costs	\$41.49	\$15.56
<i>Fixed Costs</i>		
1. Machinery	12.16	—
2. Water	2.50	—
3. Taxes	2.90	—
4. Interest on Land Investment (\$225 @ 6%)	13.50	—
Total Fixed Costs	31.06	—
Total Producing Costs/Acre	\$72.55	\$15.56

<sup>1</sup> Nurse crop was used for establishing the stand. Total costs for establishing alfalfa plus nurse crop costs: \$72.55 + \$15.56 = \$88.11. Estimated nurse crop yield per acre was 2400 pounds of grain and one ton of mixed hay, (alfalfa and straw) with a return value assumed at least equal to cost of the nurse crop.

<sup>2</sup> No cost generally incurred.

TABLE 20  
Estimated Costs for Producing One Acre of Alfalfa  
in the Southeast Region of Utah

<i>Variable Costs</i>		
1. Land Preparation		<sup>1</sup>
2. Planting		<sup>1</sup>
3. Growing		
a. Fertilization	\$ 4.65	
b. Irrigation	9.75	
c. Insect Control	4.00	
d. Chemical Weed Control	<sup>2</sup>	
	\$18.40	
4. Harvesting	13.35	
5. Misc. Variable Costs	10.50	
6. Interest on Variable Costs (8% for 6 Months)	1.69	
Total Variable Costs		\$43.94
<i>Fixed Costs</i>		
1. Machinery	7.23	
2. Water	2.50	
3. Taxes	2.90	
4. Interest on Land Investment (\$225 @ 6%)	13.50	
5. Establishing the Stand (prorated over 4 years)	18.14 <sup>3</sup>	
Total Fixed Costs		44.27
Total Producing Costs/Acre		\$88.21

Cost per ton of alfalfa hay (Estimated yield: 3 tons per acre):  
\$88.21 = \$29.40 per ton.

<sup>3</sup>

<sup>1</sup> Included in Table 19 under costs of establishing the stand.

<sup>2</sup> No cost generally incurred.

<sup>3</sup> Annual cost for establishing the alfalfa stand (Table 19) distributed over a 4 year productive life =  $\frac{\$72.55}{4} = \$18.14$

prorated charge, the total costs of producing alfalfa hay were \$88.21 per acre. The average cost was estimated to be \$29.40 per ton of alfalfa hay in the Southeast region, the lowest cost of all regions in Utah.

To produce one acre of corn silage in the Southeast region, total costs were estimated to be \$104.39 with almost two-thirds of this consisting of variable costs, \$67.09 (Table 21). A yield of 16 tons per acre would have been expected from an acre of corn silage with this level of inputs. Thus, the cost per ton delivered to the silo was estimated to be \$6.52

TABLE 21  
Estimated Costs for Producing One Acre of Corn Silage  
in the Southeast Region of Utah

<i>Variable Costs</i>		
1. Land Preparation		\$ 7.83
2. Planting		6.48
3. Growing		
a. Fertilization	\$ 9.09	
b. Irrigation	9.75	
c. Insect Control	<sup>1</sup>	
d. Chemical Weed Control	<sup>1</sup>	
e. Cultivation	1.45	
		20.29
4. Harvesting		19.41
5. Misc. Variable Costs		10.50
6. Interest on Variable Costs (8% for 6 Months)		2.58
Total Variable Costs		\$ 67.09
<i>Fixed Costs</i>		
1. Machinery		18.40
2. Water		2.50
3. Taxes		2.90
4. Interest on Land Investment (\$225 @ 6%)		13.50
Total Fixed Costs		37.30
Total Producing Costs/Acre		\$104.39

Yield: 16 tons of corn silage per acre delivered to the silo.  
Cost per ton of silage:  $\frac{\$104.39}{16} = \$6.52$  per ton.

<sup>1</sup> No cost generally incurred.

### Southwest

The three major crops produced in this region were barley, alfalfa, and sorghum for silage. For the production of one acre of barley, the total estimated cost was \$111.53, consisting of variable costs estimated to be \$60.53 and fixed costs amounting to \$51.00 (Table 22). Assuming the yield expected from an acre of barley was 4,000 pounds, the average cost was \$2.79 per hundredweight.

Production of alfalfa hay involved a first-year cost of \$64.30 for establishing a one-acre stand (Table 23). This cost was distributed over the 4-year productive life of the stand by including a prorated annual charge of \$16.07 in the fixed costs for hay production, which totaled \$72.64 (Table 24). Variable costs of producing an acre of alfalfa after the stand had been established were determined to be \$85.20, bringing total production costs to \$157.84. The estimated yield of alfalfa hay in the Southwest region was 5 tons per acre, the highest of all regions in Utah. With this yield, the estimated average cost was \$31.57 per ton of hay.

Table 25 presents the estimated costs of producing one acre of sorghum silage. Variable costs were estimated to be \$101.78 per acre and fixed costs, \$68.13 per acre. The total production costs were estimated at \$169.91 per acre, and with a yield of 25 tons per acre, the average cost per ton of this silage was estimated to be \$6.80.

TABLE 22

**Estimated Costs for Producing One Acre of Barley in the Southwest Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$10.02
2. Planting	6.65
3. Growing	
a. Fertilization	\$ 8.55
b. Irrigation	12.90
c. Insect Control	<sup>1</sup>
d. Chemical Weed Control	<sup>1</sup>
	21.45
4. Harvesting	9.58
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	2.33
<b>Total Variable Costs</b>	<b>\$ 60.53</b>
<i>Fixed Costs</i>	
1. Machinery	13.19
2. Water	2.00
3. Taxes	5.81
4. Interest on Land Investment (\$500 @ 6%)	30.00
<b>Total Fixed Costs</b>	<b>51.00</b>
<b>Total Producing Costs/Acre</b>	<b>\$111.53</b>

Yield: 4000 pounds per acre. Cost per hundredweight of grain:  $\frac{\$111.53}{40} = \$2.79$  per cwt.

<sup>1</sup> No cost generally incurred.

TABLE 23

**Estimated Costs for Establishing One Acre of Alfalfa in the Southwest Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 7.71
2. Planting	10.98
3. Growing	
a. Fertilization	\$10.45
b. Irrigation	5.50
c. Insect Control	<sup>1</sup>
d. Chemical Weed Control	<sup>1</sup>
	15.95
4. Harvesting	<sup>1</sup>
5. Misc. Variable Costs	5.25 <sup>2</sup>
6. Interest on Variable Costs (8% for 6 Months)	1.60
<b>Total Variable Costs</b>	<b>\$41.49</b>
<i>Fixed Costs</i>	
1. Machinery	3.91
2. Water	1.00
3. Taxes	2.90 <sup>2</sup>
4. Interest on Land Investment (\$500 @ 6%)	15.00 <sup>2</sup>
<b>Total Fixed Costs</b>	<b>22.81</b>
<b>Total Costs/Acre</b>	<b>\$64.30</b>

<sup>1</sup> No cost generally incurred.

<sup>2</sup> One-half year because of fall planting.

TABLE 24

**Estimated Costs for Producing One Acre of Alfalfa in the Southwest Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 1.10
2. Planting	<sup>1</sup>
3. Growing	
a. Fertilization	\$ 9.85
b. Irrigation	29.40
c. Insect Control	<sup>2</sup>
d. Chemical Weed Control	<sup>2</sup>
	39.25
4. Harvesting	31.07
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	3.28
<b>Total Variable Costs</b>	<b>\$ 85.20</b>
<i>Fixed Costs</i>	
1. Machinery	15.76
2. Water	5.00
3. Taxes	5.81
4. Interest on Land Investment (\$500 @ 6%)	30.00
5. Establishing the Stand (prorated over 4 years)	16.07 <sup>3</sup>
<b>Total Fixed Costs</b>	<b>72.64</b>
<b>Total Producing Costs/Acre</b>	<b>\$157.84</b>

Cost per ton of alfalfa hay (Estimated yield: 5 tons per acre):  $\frac{\$157.84}{5} = \$31.57$  per ton.

<sup>1</sup> Included in Table 23 under costs of establishing a stand.

<sup>2</sup> No cost generally incurred.

<sup>3</sup> Annual cost for establishing the alfalfa stand (Table 23) distributed over a 4 year productive life =  $\frac{\$64.30}{4} = \$16.07$

TABLE 25

**Estimated Costs for Producing One Acre of Sorghum Silage in the Southwest Region of Utah**

<i>Variable Costs</i>	
1. Land Preparation	\$ 8.87
2. Planting	4.05
3. Growing	
a. Fertilization	\$16.55
b. Irrigation	18.30
c. Insect Control	<sup>1</sup>
d. Chemical Weed Control	<sup>1</sup>
e. Cultivation	1.00
	35.85
4. Harvesting	38.60
5. Misc. Variable Costs	10.50
6. Interest on Variable Costs (8% for 6 Months)	3.91
<b>Total Variable Costs</b>	<b>\$101.78</b>
<i>Fixed Costs</i>	
1. Machinery	28.82
2. Water	3.50
3. Taxes	5.81
4. Interest on Land Investment (\$500 @ 6%)	30.00
<b>Total Fixed Costs</b>	<b>68.13</b>
<b>Total Producing Costs/Acre</b>	<b>\$169.91</b>

Yield: 25 tons of silage per acre, delivered to the silo. Cost per ton of silage:  $\frac{\$169.91}{25} = \$6.80$  per ton.

<sup>1</sup> No cost generally incurred.

### Procedure for Updating Cost Estimates

Appendix B presents the machinery complement used in this study and the variable and fixed costs per hour for each operation, such as land preparation, irrigation preparation, growing, etc. Appendixes C through Y show the calendar of operations; variable costs for machines, labor, materials and water; and the number of hours required for each of the operations. These have been transferred to the respective tables in the main body of the report. For example, Table 3 includes costs for land preparation, planting, growing, and harvesting costs for producing barley, taken from Appendix C.

#### Variable Costs

Variable costs can be brought up-to-date by determining the present costs listed in Appendix B and transferring the variable costs to the respective appendix table. In addition, it will be necessary to obtain new cost data for labor, materials, and water.

Cost of water pumped for irrigation may be the most difficult to determine. The most popular types of energy used to pump irrigation water from underground are electricity and natural gas. If this information is not readily available, reasonable estimated costs can be derived by using the following formulas:

The annual variable costs for pumping an acre-foot of irrigation water with electricity =

$$(1.024) (\text{price per KWH}) \frac{(\text{lift in ft.})}{\text{The overall efficiency of the pumping plant (See below)}} \div \frac{\text{Total cost of repairs}}{(\text{No. of acre-ft. pumped})}$$

The annual fixed costs for an electrically powered well can be determined with the following equation:

$$\text{Annual fixed costs per acre-foot} = \frac{\text{Cost of well}^1}{\text{No. of yrs. life}} \div \text{Acre-feet pumped per year}$$

These estimates should be determined by using present costs. If the costs are for an area where no new wells are being established it is suggested information be obtained from another area where new wells are being developed. The cost of wells powered with natural gas can be determined by using the following formulas:

$$\text{Annual variable cost per acre-foot pumped} = \frac{(.00318) (\text{price of MCF of Gas}) (\text{lift in ft.})}{\text{overall efficiency}} \\ \text{See below} \\ + \frac{\text{Total costs of repairs, lubrication and attendance for one year}}{\text{No. of acre-feet pumped}}$$

$$\text{Annual fixed cost per acre-foot pumped} = \frac{\text{Cost of well}^1}{\text{No. of yrs. life}} \div \text{Acre-feet pumped per year}$$

As stated above, these estimates should be attained by using present costs.

Energy consumption is a direct function of input over time. Input may be expressed either as horse-

power or in units of energy (electrical or chemical). In terms of horsepower the equation is as follows:

$$\text{Input horsepower} = \frac{\text{Water horsepower}}{\text{Overall efficiency}}$$

in which water horsepower is the energy requirement based upon lift and gallons per minute.

In terms of electrical energy the requirement to pump one acre-foot of water is:

$$\text{KWH} = \frac{1.024 (\text{lift in ft.})}{\text{Ee}}$$

where KWH stands for kilowat hours and Ee stands for overall efficiency of the electric motor and pump combined, expressed as a decimal.

It is suggested that .517 be used as the overall plant efficiency of electrical powered wells if this efficiency has not been determined for the wells in the Region. This was the overall plant efficiency of electrical powered wells for farms in a study conducted by the Agricultural Experiment Station, The University of Arizona.<sup>2</sup>

For natural gas powered wells, the quantity of gas (MCF) required to pump one acre-foot of water is:

$$\text{MCF} = \frac{.00318 (\text{lift in ft.})}{\text{Eg}}$$

where MCF stands for thousand cubic feet of natural gas and Eg stands for the overall efficiency of the natural gas engine and pump combined expressed as a decimal.

As is indicated by each equation, fuel consumption is a direct function of overall efficiency of the pumping plant. In a study conducted by the Agricultural Experiment Station, The University of Arizona, the overall plant efficiency of natural gas powered wells averaged 13.2 percent.<sup>3</sup> These efficiencies may be used if the efficiency of the local wells is not known.

After the new costs have been estimated the total variable costs for each of the Appendix tables can be calculated. These costs then are transferred to the appropriate tables located in the main body of this publication.

The "Miscellaneous Variable Costs" need to be re-estimated for each crop, also. This can be done by increasing the present figure in the respective tables by an appropriate index number, such as the index of wholesale prices, or by making new estimates. The interest to be charged for financing the variable costs should be determined by using current interest rates for loans to finance comparable items.

#### Fixed Costs

Items for machinery, water, taxes, and interest on land investment must be reexamined and revised as necessary for the updating of costs. Before proceeding with these revisions, it would be helpful to review the explanation of the derivation of these items in the section on "Method of Determining Costs."

<sup>1</sup>Includes cost of drilling well, casing, equipment, and testing.

<sup>2</sup>Nelson, Aaron G. and Charles D. Busch, *Cost of Pumping Irrigation Water in Central Arizona*, Agricultural Experiment Station Technical Bulletin 182, The University of Arizona, Tucson, April 1967, pp. 21-22.

<sup>3</sup>Ibid.

Machinery fixed costs per acre can be reestimated by updating the hourly costs in Appendix B on the basis of the proportions of variable and fixed costs indicated there. These revised hourly costs must then be applied to the operating times shown in the respective Appendixes C through Y.

The current cost of gravity water can be obtained from the irrigation district. Water costs for pump irrigation should be reexamined and updated when the variable water costs are recalculated, as explained earlier in this section.

Land costs can be revised by multiplying present market value of the land by the current interest rate.

The price of land may be greater than its agricultural productive value. Quite often agricultural producers will continue operations even though they are not deriving a return from their land commensurate with the present price times current interest rates. Farmers can continue to operate as long as all costs except a return to land are covered, provided they own the land. Nevertheless, land is one of the necessary costs of entering into agriculture. If new land is brought into production, one should include the interest on the cost of developing the land plus the cost of interest on the raw land instead of the interest on the market value of the land.

APPENDIX B  
Equipment Inventory and Costs for Machinery Used in  
Calculating 1972 Irrigated Crop Budgets for Utah

Operation	Machinery	Cost per hour		Operation	Machinery	Cost per hour		
		Variable	Fixed			Variable	Fixed	
(dollars)				(dollars)				
Land Preparation	90-110 HP Diesel Tractor	1.90	1.15	Planting	90-110 HP Diesel Tractor	1.90	1.15	
	5 Bottom 16" Plow	1.70	1.75		Shape Bed and Plant	2.65	3.20	
	Total	3.60	2.90		Total	4.55	4.35	
	90-110 HP Diesel Tractor	1.90	1.15	Growing	65-75 HP Diesel Tractor	1.50	.90	
	13.5' Offset Disc	1.30	1.55		4-Row Cultivator	.75	.65	
	Total	3.20	2.70			Total	2.25	1.55
	65-75 HP Diesel Tractor	1.50	.90		65-75 HP Diesel Tractor	1.50	.90	
	Border Disc	.25	.30		Dry Fertilizer Spreader	.65	.70	
	Total	1.75	1.20			Total	2.15	1.60
	90-110 HP Diesel Tractor	1.90	1.15		12 Row Sprayer (SP)	3.50	4.00	
	12' x 30' Land Plane	.60	1.35		90-110 HP Diesel Tractor	1.90	1.15	
	Total	2.50	2.50		4-Row Cultivator with			
	120 + HP Diesel Crawler	3.85	3.30		Fertilizer Attachments	3.50	3.80	
	3 Shank HD Chisel	1.25	1.30		Total	5.40	4.95	
	Total	5.10	4.60	Hauling	1/2-Ton Pickup	1.90	1.85	
	90-110 HP Diesel Tractor	1.90	1.15		Diesel Grain Truck	3.20	4.60	
	4-Row Lister	.55	.65	(10 Wheels)				
	Total	2.45	1.80	Grain Harvest	16' Combine (SP)	4.85	7.50	
	90-110 HP Diesel Tractor	1.90	1.15	Silage Harvest	Forage Harvester(SP)	3.80	5.30	
	Roto-Mulcher	.75	1.00		Wagon	1.10	1.35	
	Total	2.65	2.15			Total	4.90	6.65
	65-75 HP Diesel Tractor	1.50	.90		90-110 HP Diesel Tractor	1.90	1.15	
	Spike-Tooth Harrow	.25	.25	PTO Forage Harvester	1.75	2.30		
	Total	1.75	1.15	Wagon	1.10	1.35		
	65-75 HP Diesel Tractor	1.50	.90		Total	4.75	4.80	
	4-Row Stalk Cutter	.75	1.15	Hay Harvest	14' Diesel Swather (SP)	4.95	4.80	
	Total	2.25	2.05		Buck Rake	2.00	1.50	
	90-110 HP Diesel Tractor	1.90	1.15		65-75 HP Diesel Tractor	1.50	.90	
	Rotary Hoe	.40	.55		Side-Delivery Rake	.55	.60	
	Total	2.30	1.70			Total	2.05	1.50
Irrigation Preparation	65-75 HP Diesel Tractor	1.50	.90		Baler (SP)	3.90	6.45	
	Row-Bucker	.30	.40		90-110 HP Diesel Tractor	1.90	1.15	
	Total	1.80	1.30		Baler (Aux Engine)	1.80	3.50	
	90-110 HP Diesel Tractor	1.90	1.15			Total	3.70	4.65
	Ditcher	.30	.40		Automatic Bale Wagon (SP)	4.80	6.55	
	Total	2.20	1.55	90-110 HP Diesel Tractor	1.90	1.15		
Planting	65-75 HP Diesel Tractor	1.50	.90	Bale Wagon (PTO)	1.30	2.35		
	4-Row Precision Planter	1.80	2.15		Total	3.20	3.50	
	Total	3.30	3.05					
	65-75 HP Diesel Tractor	1.50	.90					
	12' Grain Drill	1.50	2.10					
	Total	3.00	3.00					
	65-75 HP Diesel Tractor	1.50	.90					
	Broadcast Seeder	.65	.70					
	Total	2.15	1.60					



APPENDIX C  
Estimated Variable Costs for Producing One Acre of Barley—High Mountain Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Harrow	.30	1.75	.52	.35	2.20	.77				1.29
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (45-0-0)	\$82/ton	4.10	4.65
Harrow	.25	1.75	.44	.30	2.20	.66				1.10
Plant	.20	3.00	.60	.25	2.20	.55	80 # seed	\$5.00/cwt	4.00	5.15
Irrigate				1.50	1.90	2.85	1.5 AF Water	\$1.75/AF	2.62	5.47
Combine	.30	4.85	1.46	.35	2.20	.77				2.23
Haul	.15	3.20	.48	.20	2.20	.44				.92
Total			6.27			8.46			10.72	25.45

APPENDIX D  
Estimated Variable Costs for Establishing One Acre of Alfalfa—High Mountain Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Alfalfa										
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Harrow	.30	1.75	.52	.35	2.20	.77				1.29
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (11-48-0)	\$99/ton	4.45	5.00
Harrow	.25	1.75	.44	.30	2.20	.66				1.10
Plant	.15	2.15	.32	.20	2.20	.44	10 # seed alfalfa	\$45/cwt	4.50	5.26
Irrigate				2.00	1.90	3.80	2 AF Water	\$1.75/AF	3.50	7.30
Total			4.05			8.09			12.45	24.59
Nurse Crop										
Plant	.25	3.00	.75	.30	2.20	.66	50 # barley	\$5.00/cwt	2.50	3.91
Combine	.25	4.85	1.21	.30	2.20	.66				1.87
Haul Grain	.15	3.20	.48	.20	2.20	.44				.92
Swath	.30	4.95	1.48	.35	2.20	.77				2.25
Bale	.30	3.70	1.11	.35	2.20	.77	Twine (38 bales)	\$ .03/bale	1.14	3.02
Haul and Stack	.15	3.20	.48	.20	2.20	.44				.92
Total			5.51			3.74			3.64	12.89

APPENDIX E  
Estimated Variable Costs for Producing One Acre of Alfalfa—High Mountain Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)		(dollars)	(dollars)	(dollars)
Fertilize	.10	2.15	.22	.15	2.20	.33	100# (0-45-0)	\$93/ton	4.65	5.20
Irrigate				2.00	1.90	3.80	2 AF Water	\$1.75/AF	3.50	7.30
Corrugate	.25	1.75	.44	.30	2.20	.66				1.10
Swath (2x)	.60	4.95	2.97	.70	2.20	1.54			2.70	4.51
Bale (2x)	.60	3.70	2.22	.70	2.20	1.54	Twine (90 bales)	\$ .03/bale	2.70	6.46
Haul and Stack	.40	3.20	1.28	.50	2.20	1.10			10.85	2.38
Total			7.13			8.97				26.95

APPENDIX F  
Estimated Variable Costs for Producing One Acre of Meadow Hay—High Mountain Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)		(dollars)	(dollars)	(dollars)
Fertilize	.10	2.15	.22	.15	2.20	.33	50# (45-0-0)	\$82/ton	2.05	2.60
Drag	.10	1.75	.18	.15	2.20	.33				.51
Irrigate				2.40	1.90	4.56	1.5 AF Water	\$1.75/AF	2.62	7.18
Swath	.35	4.95	1.73	.40	2.20	.88			1.50	2.61
Bale	.35	3.70	1.30	.40	2.20	.88	Twine (50 bales)	\$0.3/bale	1.50	3.68
Haul and Stack	.20	3.20	.64	.25	2.20	.55			6.17	1.19
Total			4.07			7.53				17.77

APPENDIX G  
Estimated Variable Costs for Producing One Acre of Barley—Wasatch Front Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)			(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	80 # N 20# P	\$ .09/lb	9.00	9.55
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.20	3.00	.60	.25	2.20	.55	100 # seed	\$5.50/cwt	5.50	6.65
Chemical Weed Control	.10	3.50	.35	.20	2.20	.44	2 AF Water	\$3.00/AF	2.00	2.79
Irrigate				2.00	1.90	3.80			6.00	9.80
Combine	.35	4.85	1.70	.40	2.20	.88				2.58
Haul	.20	3.20	.64	.25	2.20	.55				1.19
Total			6.76			9.74			22.50	39.00

APPENDIX H  
Estimated Variable Costs for Producing One Acre of Sugar Beets—Wasatch Front Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)			(dollars)	(dollars)
Fumigate	Custom						25 gal/acre	\$1.50/gal	37.50	37.50
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.20	2.15	.43	.25	2.20	.55	160 # N 80 # P	\$ .09/lb	21.60	22.58
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.35	4.55	1.59	.40	2.20	.88	2.3 # seed	\$1.25/lb	3.12	5.59
Chemical Weed Control	Custom						3.5 AF Water	\$3.00/AF	7.50	7.50
Irrigate				3.00	1.90	5.70			10.50	16.20
Flextime Harrow (4x)	.60	1.75	1.05	.70	2.20	1.54				2.59
Cultivate (4x)	.60	2.25	1.35	.70	2.20	1.54				2.89
Hand Thin									20.00	20.00
Hoe (2x)									20.00	20.00
Dig Beets	Custom						20 tons	\$1.65/ton	33.00	33.00
Haul	Custom						20 tons	\$ .90/ton	18.00	18.00
Total			8.63			14.17			171.22	194.02

APPENDIX I  
Estimated Variable Costs for Producing One Acre of Corn Silage—Wasatch Front Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	200 # (16-20-0)	\$80/ton	8.00	8.55
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.30	3.30	.99	.35	2.20	.77	20 # seed	\$25/cwt	5.00	6.76
Sidress	.30	5.40	1.62	.35	2.20	.77	100 # (45-0-0)	\$82/ton	5.10	6.49
Irrigate	.10	3.50	.35	3.00	1.90	5.70	3 AF Water	\$3.00/AF	9.00	14.70
Chemical Weed Control	.10	3.50	.35	.20	2.20	.66			2.00	3.01
Chop Silage	3.30	4.75	15.68	3.50	2.20	7.70				23.38
Haul	1.50	2.65	3.98	1.60	2.20	3.52				7.50
Total			26.09			22.64			28.10	76.83

APPENDIX J  
Estimated Variable Costs for Establishing One Acre of Alfalfa—Wasatch Front Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Alfalfa										
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (11-48-0)	\$99/ton	4.95	5.50
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.15	2.15	.32	.20	2.20	.44	10 # seed alfalfa	\$45/cwt	4.50	5.26
Corrugate	.25	1.75	.44	.30	2.20	.66	2 AF Water	\$3.00/AF	6.00	1.10
Irrigate				2.50	1.90	4.75				10.75
Total			4.23			9.37			15.45	29.05
Nurse Crop										
Plant	.20	3.00	.60	.25	2.20	.55	60 # barley	\$5.50/cwt	3.30	4.45
Combine	.30	4.85	1.46	.35	2.20	.77				2.23
Haul Grain	.15	3.20	.48	.20	2.20	.44				.92
Swath	.30	4.95	1.48	.35	2.20	.77				2.25
Bale	.30	3.70	1.11	.35	2.20	.77	Twine (30 bales)	\$ .03/bale	.90	2.78
Haul and Stack	.20	3.20	.64	.25	2.20	.55				1.19
Total			5.77			3.85			4.20	13.82

APPENDIX K  
Estimated Variable Costs for Producing One Acre of Alfalfa—Wasatch Front Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)		(dollars)	(dollars)	(dollars)
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (0-45-0)	\$93/ton	4.65	5.20
Corrugate	.20	1.75	.35	.25	2.20	.55				.90
Irrigate				2.50	1.90	4.75	2.5 AF Water	\$3.00/AF	7.50	12.25
Swath (3x)	1.00	4.95	4.95	1.10	2.20	2.42				7.37
Bale (3x)	1.00	3.70	3.70	1.10	2.20	2.42	Twine (120 bales)	\$0.3/bale	3.60	9.72
Haul and Stack	.60	3.20	1.92	.70	2.20	1.54				3.46
Total			11.14			12.01			15.75	38.90

APPENDIX L  
Estimated Variable Costs for Establishing One Acre of Alfalfa—Western Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)		(dollars)	(dollars)	(dollars)
Alfalfa										
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.30	2.50	.75	.35	2.20	.77				1.52
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.20	3.00	.60	.25	2.20	.55	15 # seed alfalfa	\$45/cwt	6.75	7.90
Corrugate	.25	1.75	.44	.30	2.20	.66				1.10
Irrigate				2.00	1.90	3.80	2 AF Water	\$3.40/AF	6.80	10.60
Total			4.90			8.42			13.55	26.87
Nurse Crop										
Plant	.20	3.00	.60	.25	2.20	.55	60 # barley	\$5.50/cwt	3.30	4.45
Combine	.50	4.85	2.42	.60	2.20	1.32				3.74
Haul Grain	.20	3.20	.64	.25	2.20	.55				1.19
Swath	.30	4.95	1.48	.35	2.20	.77				2.25
Bale	.30	3.70	1.11	.35	2.20	.77	Twine (30 bales)	\$ .03/bale	.90	2.78
Haul and Stack	.20	3.20	.64	.25	2.20	.55				1.19
Total			6.89			4.51			4.20	15.60

APPENDIX M  
Estimated Variable Costs for Producing One Acre of Alfalfa—Western Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)			(dollars)	(dollars)
Fertilize	.10	2.15	.22	.15	2.20	.33	125# (0-45-0)	\$93/ton	5.81	6.36
Irrigate				2.00	1.90	3.80	3 AF Water	\$3.40/AF	10.20	14.00
Swath (3x)	.90	4.95	4.45	1.00	2.20	2.20				6.65
Bale (3x)	.90	3.70	3.33	1.00	2.20	2.20	Twine (100 bales)	\$0.3/bale	3.00	8.53
Haul and Stack	.75	3.20	2.40	.95	2.20	2.09				4.49
Total			10.40			10.62			19.01	40.03

APPENDIX N  
Estimated Variable Costs for Producing One Acre of Barley—Sevier River Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)			(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100# (45-0-0)	\$82/ton	4.10	4.65
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.25	3.00	.75	.30	2.20	.66	100# seed	\$5.50/cwt	5.50	6.91
Irrigate				2.00	1.90	3.80	2 AF Water	\$4.00/AF	8.00	11.80
Combine	.50	4.85	2.42	.60	2.20	1.32				3.74
Haul	.20	3.20	.64	.25	2.20	.55				1.19
Total			7.89			10.07			17.60	35.56

APPENDIX O  
Estimated Variable Costs for Establishing One Acre of Alfalfa—Sevier River Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
<b>Alfalfa</b>										
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	200 # (11-48-0)	\$99/ton	9.90	10.45
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.10	2.15	.22	.15	2.20	.33	20 # seed alfalfa	\$47/cwt	9.40	9.95
Irrigate				2.50	1.90	4.75	2.5 AF Water	\$4.00/AF	10.00	14.75
Total			4.30			8.82			29.30	42.42
<b>Nurse Crop</b>										
Plant	.25	3.00	.75	.30	2.20	.66	80 # barley	\$5.50/cwt	4.40	5.81
Combine	.50	4.85	2.42	.60	2.20	1.32				3.74
Haul Grain	.20	3.20	.64	.25	2.20	.55				1.19
Swath	.30	4.95	1.48	.35	2.20	.77				2.25
Bale	.30	3.70	1.11	.35	2.20	.77	Twine (30 bales)	\$ .03/bale	.90	2.78
Haul and Stack	.20	3.20	.64	.25	2.20	.55				1.19
Total			7.04			4.62			5.30	16.96

APPENDIX P  
Estimated Variable Costs for Producing one Acre of Alfalfa—Sevier River Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (0-45-0)	\$93/ton	4.65	5.20
Irrigate				2.50	1.90	4.75	3 AF Water	\$4.00/AF	12.00	16.75
Swath (3x)	.90	4.95	4.46	1.00	2.20	2.20				6.66
Bale (3x)	.90	3.70	3.33	1.00	2.20	2.20				5.53
Haul and Stack	.60	3.20	1.92	.70	2.20	1.54				3.46
Total			9.93			11.02			16.65	37.60

APPENDIX Q  
Estimated Variable Costs for Producing One Acre of Corn Silage—Sevier River Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (45-0-0)	\$82/ton	4.10	4.65
Disc	.25	3.20	.80	.30	2.20	.66				1.46
Plant	.25	3.30	.82	.30	2.20	.66	20 # seed	\$25/cwt	5.00	6.48
Cultivate	.30	2.25	.68	.35	2.20	.77				1.45
Sidress	.30	5.40	1.62	.35	2.20	.77	50 # (45-0-0)	\$82/ton	2.05	4.44
Irrigate				2.50	1.90	4.75	2.5 AF Water	\$4.00/AF	10.00	14.75
Chop Silage	2.00	4.75	9.50	2.20	2.20	4.84				14.34
Haul	1.00	2.65	2.65	1.10	2.20	2.42				5.07
Total			19.80			18.06			21.15	59.01

APPENDIX R  
Estimated Variable Costs for Producing One Acre of Barley—Southeast Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (45-0-0)	\$83/ton	4.15	4.70
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.30	3.00	.90	.35	2.20	.77	80 # seed	\$5.50/cwt	4.40	6.07
Corrugate	.20	1.75	.35	.25	2.20	.55				.90
Irrigate				2.00	1.90	3.80	2 AF Water	\$2.00/AF	4.00	7.80
Combine	.50	4.85	2.42	.70	2.20	1.32				3.74
Hauling	.20	3.20	.64	.25	2.20	.55				1.19
Total			7.78			10.51			12.55	30.84



APPENDIX S  
Estimated Variable Costs for Establishing One Acre of Alfalfa—Southeast Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
<i>Alfalfa</i>										
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100 # (11-48-0)	\$99/ton	4.95	5.50
Harrow	.20	1.75	.35	.25	2.20	.55				.90
Plant	.10	3.00	.30	.12	2.20	.26	10 # seed alfalfa	\$47/cwt	4.70	5.26
Corrigate	.20	1.75	.35	.25	2.20	.55				.90
Irrigate				3.00	1.90	5.70	2.5 AF Water	\$2.00/AF	5.00	10.70
Total			4.12			10.03			14.65	28.80
<i>Nurse Crop</i>										
Plant	.20	3.50	.60	.23	2.20	.51	60 # barley	\$5.50/cwt	3.30	4.41
Combine	.50	4.85	2.42	.60	2.20	1.32				3.74
Haul	.20	3.20	.64	.25	2.20	.66				1.30
Swath	.30	4.95	1.48	.35	2.20	.77				2.25
Bale	.30	3.70	1.11	.35	2.20	.77	Twine (30 bales)	\$.03/bale	.90	2.78
Haul and Stack	.20	3.20	.64	.20	2.20	.44				1.08
Total			6.89			4.47			4.20	15.56

APPENDIX T  
Estimated Variable Costs for Producing One Acre of Alfalfa—Southeast Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Fertilize	.10	2.15	.22	.15	2.20	.33				4.65
Irrigate				2.50	1.90	4.75	100 # (0-45-0)	\$62/ton	4.10	4.65
Insect Control	Custom						2.5 AF Water	\$2.00/AF	5.00	9.75
Swath (2x)	.60	4.95	2.97	.70	2.20	1.54			4.00	4.00
Bale (2x)	.60	3.70	2.22	.70	2.20	1.54	Twine (90 bales)	\$0.3/bale	2.70	4.51
Haul and Stack	.40	3.20	1.28	.50	2.20	1.10				6.46
Total			6.69			9.26			15.80	31.75

APPENDIX U  
Estimated Variable Costs for Producing One Acre of Corn Silage—Southeast Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	100# (45-0-0)	\$82/ton	4.10	4.65
Disc	.25	3.20	.80	.30	2.20	.66				1.46
Plant	.25	3.30	.82	.30	2.20	.66	20# seed	\$25/cwt	5.00	6.48
Cultivate	.30	2.25	.68	.35	2.20	.77				1.45
Sidedress	.30	5.40	1.62	.35	2.20	.77	50# (45-0-0)	\$82/ton	2.05	4.44
Irrigate				2.50	1.90	4.75	2.5 AF Water	\$2.00/AF	5.00	9.75
Chop	2.00	4.75	9.50	2.20	2.20	2.84				14.34
Haul Silage	1.00	2.65	2.65	1.10	2.20	2.42				5.07
Total			19.80			18.06			16.15	54.01

APPENDIX V  
Estimated Variable Costs for Producing One Acre of Barley—Southwest Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	200# (43-0-0)	\$80/ton	8.00	8.55
Disc	.25	3.20	.80	.30	2.20	.66				1.46
Corrugate	.25	1.75	.44	.30	2.20	.66				1.10
Plant	.20	3.00	.60	.25	2.20	.55	100# seed	\$5.50/cwt	5.50	6.65
Irrigate				3.00	1.90	5.70	2 AF Water	\$3.60/AF	7.20	12.90
Combine	.50	4.85	2.42	.60	2.20	1.32				3.74
Haul	1.00	3.20	3.20	1.20	2.20	2.64				5.84
Field Clean up	.06	2.25	.14	.50	1.90	.95				1.09
Total			11.33			15.67			20.70	47.70

APPENDIX W  
Estimated Variable Costs for Establishing One Acre of Alfalfa—Southwest Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.35	2.50	.88	.40	2.20	.88				1.76
Fertilize	.10	2.15	.22	.15	2.20	.33	200# (11-48-0)	\$99/ton	9.90	10.45
Plant	.20	2.15	.43	.25	2.20	.55	20# seed	\$50/cwt	10.00	10.98
Corrugate	.25	1.75	.44	.30	2.20	.66				1.10
Irrigate				1.00	1.90	1.90	1 AF Water	\$3.60/AF	3.60	5.50
Total			4.73			6.41			23.50	34.64

APPENDIX X  
Estimated Variable Costs for Producing One Acre of Alfalfa—Southwest Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Fertilize	.10	2.15	.22	.15	2.20	.33				9.85
Corrugate	.25	1.75	.44	.30	2.20	.66	200# (0-45-0)	\$93/ton	9.30	1.10
Irrigate (12x)				6.00	1.90	11.40	5 AF Water	\$3.60/AF	18.00	29.40
Swath (5x)	1.25	4.95	6.19	1.45	2.20	3.19				9.38
Bale (5x)	1.25	3.70	4.62	1.45	2.20	3.19	Twine (180 bales)	\$0.3/bale	5.40	13.21
Haul and Stack (5x)	1.00	3.20	3.20	2.40	2.20	5.28				8.48
Total			14.67			24.05			32.70	71.42

APPENDIX Y  
Estimated Variable Costs for Producing One Acre of Sorghum Silage—Southwest Region, Utah

Operation	Hours of Machine Time (1)	Machine Cost Per Hour (2)	Total Machine Cost (1 x 2)	Hours of Labor Required (4)	Wage Rate Per Hour (5)	Total Labor Cost (4 x 5)	Amount & Type of Material (7)	Cost Per Unit (8)	Total Material Cost (7 x 8)	Sub-Total Variable Cost (1 x 2) + (4 x 5) + (7 x 8)
	(hours)	(dollars)	(dollars)	(hours)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Plow	.50	3.60	1.80	.60	2.20	1.32				3.12
Disc	.30	3.20	.96	.35	2.20	.77				1.73
Level	.30	2.50	.75	.35	2.20	.77				1.52
Fertilize	.10	2.15	.22	.15	2.20	.33	400 # (43-0-0)	\$80/ton	16.00	16.55
Disc	.25	3.20	.80	.30	2.20	.66				1.46
List	.20	2.45	.49	.25	2.20	.55				1.04
Plant	.20	3.00	.60	.25	2.20	.55	10 # seed	\$29/cwt	2.90	4.05
Cultivate	.20	2.25	.45	.25	2.20	.55				1.00
Irrigate				3.00	1.90	5.70	3.5 AF Water	\$3.60/AF	12.60	18.30
Chop Silage	4.00	4.75	19.00	4.25	2.20	9.35				28.35
Haul Silage	2.00	2.65	5.30	2.25	2.20	4.95				10.25
<b>Total</b>			<b>30.37</b>			<b>25.50</b>			<b>31.50</b>	<b>87.37</b>