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Economics of Farm Flock Sheep Production in Northern Utah

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ECONOMICS OF FARM FLOCK SHEEP PRODUCTION IN NORTHERN UTAH

by

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Bruce E. Nielson

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

Throughout the history of mankind, sheep have played a very important and unique part in the economies of the world. They have been a source of meat, milk, skins and fiber. They have become adapted to nearly every kind of husbandry, from nomadic types to intensively managed flocks on small farms and have thrived under nearly all climatic conditions, ranging from sub-artic regions of Greenland to hot areas of the Mediterranean countries; from desert areas of Africa to wet lowland of England.

Domestic sheep were introduced on the American continent by Spanish discoverers and conquerors in 1493. (8, p. 281) The other route by which they came was from England in 1607. (3, p. 21)

History of Sheep in Utah

The first recorded incident whereby sheep were being maintained in the area which is now the State of Utah, pertained to a dozen head which Miles Goodyear held at his stockade and trading post on the Weber River, in 1847. In November of that year, these were sold to the Mormons of the Salt Lake Valley; thus, began commercial sheep production in Utah. (11, p. 182)

After the initial immigration of the Mormons, all Utah bound companies included sheep among their holdings. The numbers were added to by importations from New Mexico, and from efforts made by civic and church leaders to bring in improved rams and breeds. Utah had, by 1851, about fifty-five hundred sheep of eastern origin

and a number of Spanish origin. Because of improved breeding methods and careful stock selection, Utah woolgrowers gained high prominence in the field of sheep and wool production. In 1878, Utah sheep were shearing 5.67 pounds of wool per head as compared to 1.5 pounds per head for sheep from New Mexico. (11, p. 226)

Utah's sheep population increased rapidly between 1850 and 1890. The census of 1850 listed only 3,262 sheep, by 1860 the number had reached 37,332 head, and in 1870, 59,672 head were reported in Utah. By 1890, the million mark was officially passed and claims were made that sheep outnumbered other farm animals in Utah at a rate of three to one. (3, p. 808) (Table 1).

Table 1. Livestock on farms in Utah, 1880 to 1959[a]

Year	Cattle and calves	Horses and mules	Hogs and pigs	Sheep and lambs	Total all livestock classes
			(number)		
1880	132,655	41,029	20,621	523,121	717,426
1890	278,313	88,422	27,046	1,936,906	2,330,687
1900	264,750	106,147	65,147	2,553,134	2,989,763
1910	379,292	113,274	42,107	1,670,390	2,205,563
1920	505,576	128,264	99,361	1,691,795	2,424,998
1930	393,848	92,741	40,657	2,458,652	2,985,898
1940	373,635	78,853	66,816	1,597,346	2,116,652
1950	561,566	53,728	71,742	1,101,324	2,108,000
1958	706,000	34,000	80,000	1,288,000	2,108,000
1959[b]	720,000	33,000	88,000	1,301,000	2,137,000

Census of Agriculture, Bureau of the Census, 1940, 1950 and Agriculture Statistics, 1959.

a The Censuses of Agriculture were taken as of June 1 for 1880-90 and as of April 1 for 1910-50. 1958 and 1959 numbers as of January 1.
b Preliminary.

Number of sheep in Utah has fluctuated considerably since 1890. The industry has shown a steady growth up to 1931, at which time a maximum sheep population of 2,755,000 head was reached. Since then, the number has decreased gradually and in recent years been around 1,400,000 head (table 2).

Table 2. Stock sheep and lambs on farms in Utah, 1890-1959[a]

Year	Number	Year	Number
	(thousands)		(thousands)
1890	1,937	1943	2,396
1900	2,553	1944	2,276
1910	1,671	1945	2,139
1920	1,692	1946	1,632
1930	2,750	1947	1,469
1931	2,775	1948	1,469
1932	2,770	1949	1,381
1933	2,560	1950	1,326
1934	2,560	1951	1,332
1935	2,452	1952	1,412
1936	2,403	1953	1,426
1937	2,451	1954	1,383
1938	2,377	1955	1,383
1939	2,377	1956	1,369
1940	2,329	1957	1,301
1941	2,352	1958	1,288
1942	2,470	1959[b]	1,301

a Agriculture Statistics Series 1936-1959, United States Department of Agriculture Special Reports prior to 1936.
b Preliminary.

Importance of the Sheep Industry in Utah's Economy

Despite this declining trend, the sheep industry remains important in Utah's economy. Agriculture statistics for 1959 reported 1,301,000 sheep in Utah. This places Utah as the seventh ranking state in sheep production in the United States, (table 3).

Table 3. Production of stock sheep and lambs in the United States, ten leading states - January 1, 1959[a]

Country and state	Number
United States	28,364,000
Texas	5,170,000
Wyoming	2,121,000
California	1,600,000
Montana	1,668,000
South Dakota	1,329,000
Colorado	1,302,000
Utah	1,301,000
New Mexico	1,233,000
Iowa	1,132,000
Ohio	1,055,000

a United States Department of Agriculture - Agriculture Statistics, 1959, preliminary.

From 1931 to 1959, there has been a decline of 46.6 percent in sheep numbers in Utah, although the value of sheep has increased by 69.0 percent. (10) This value increase could be attributed to both improved quality of sheep and rising price levels. In 1958, approximately 8.1 percent of the total cash farm income received by farmers in Utah came from the sale of sheep, lambs, and wool. Sheep and sheep products accounted for 10.6 percent of the total income from sales of livestock and livestock products in Utah. (10)

Value of all sales from sheep and sheep products plus value of home consumption in Utah during 1958 was 13,815,000 dollars.[1] (10)

Types of Sheep Production in Utah

There are three main types of sheep production in Utah: range operations, feedlot enterprises, and farm flocks. Range operations are located generally throughout the state and utilize mountain ranges of the state. Feedlot enterprises are located primarily along the

1. Preliminary.

Wasatch front and in the Sevier Valley of Central Utah. Farm flocks are located in nearly every section of the state, but are more highly concentrated in irrigated farming and pasture valley.

Even though the major portion of production of sheep in Utah has been from range operations, the farm flock has become a significant part. Attractive lamb and wool prices, unused waste land, and the need for alternative livestock enterprises, have helped to stimulate interest in farm flock sheep production. Another important influence which could be considered is government sponsored support-incentive programs.

This study was centered on production of farm flock sheep in Utah.

OBJECTIVES OF THE STUDY

The objectives of the study were: (a) to determine the nature and amounts of physical factors required in the production of farm flock sheep, (b) to calculate costs and returns of producing farm flock sheep based on the 1959 level of price, and (c) to associate various production practices with success or failure of the operation.

REVIEW OF LITERATURE

There have been no major studies concerning the economies of producing farm flock sheep in Utah or any of its counties. However, studies have been made in other sections of the United States which considered the economic aspects of producing farm flock sheep. Even though conditions in other areas may not be exactly like those in Utah, studies which might contribute to this study were reviewed herein. Two Utah studies concerning the economics of producing range sheep were also reviewed.

In 1929, Esplin, et al., presented an economic survey of the ranch situation in Utah as of 1925. (4) This study contained historical, descriptive and economic analysis of the range sheep industry in Utah and reported data collected by personal interview. Farm flock sheep were not included. Approximately 137,000 head or about five percent of the total sheep in Utah at that time were included in the study. Important conclusions were concerned with relationships between profit-producing factors and percentages of profit. Conclusions were: (a) large investment in land tended to decrease profit, (b) percentage profit increased as size of sales increased, (c) lamb crop influenced percentage profit, and (d) percentage profit increased as proportion of investment in sheep increased.

Another economic study in Utah was made by Broadbent, et al., in 1946. (2) Only ranches with flocks of 100 or more breeding ewes not confined to the farm were selected. Analysis of both the entire

ranch business and specific sheep enterprise on the ranch were included. Profit obtained per breeding ewe was used as the measure of success and several factors were considered as to effect upon cost and return. Results of the study pointed out: (a) little association between size of flock and profit per ewe, (b) lamb crop was clearly associated with profit per ewe, (c) value of fleece was positively associated with profit per ewe, and (d) loss of lambs after docking was associated with profit per ewe, and (e) ranches with the greatest and least proportion of total investment in land made less profit than the ranches with average land investment. (2, p. 63)

A cost and return study concerning sheep on farms in Yates County, New York was conducted in 1939 by T. E. LaMont and M. S. Parsons. (5) The average size flock contained 91 head of sheep. Average cost for keeping the flock was 9.98 dollars per head. Feed and bedding made up the largest cost items, being responsible for 53 percent of total costs. Man labor costs were second most important, making up 12 percent of total costs with 5.1 hours labor required per sheep. Total receipts amounted to 8.54 dollars per sheep of which lamb sales were 5.48 dollars and wool sales 1.82 dollars. Number of lambs sold per sheep was .79 and wool production averaged 7.8 pounds per sheep. Factors affecting returns on sheep were listed as size of flock, lamb crop, feed costs, building costs, man labor, and wool sales. Return per man hour of labor was the measure of success. Medium size flocks returned 16 cents and small flocks returned (-) 24 cents per man hour. Average return per man hour of labor for all flocks was (-) three cents. Average lamb crop for all flocks was 93 percent, with a range of 0 to 112 percent. Cost-return relationships revealed

lowest feed costs per sheep resulted in highest return per man hour labor, whereas, highest feed costs per sheep returned the smallest amount. Farms having highest building costs per sheep also had highest death loss and lowest lamb crop. Flocks having lowest labor costs returned the greatest profit. Less than 4.5 man hours per sheep returned (-) 54 cents per sheep, whereas more than 4.5 hours returned an average of (-) 1.90 dollars per sheep. Value of wool sales was the last important success factor considered. Results of the study indicated heavier fleeces resulted in higher return. Fleece weights ranged from 6.7 to 9.2 pounds per sheep.

In 1962, an economic appraisal of sheep production in Mississippi was conducted. (7) Data for the study were obtained by personal interview with producers in the prairie sections of Mississippi. Major areas of interest were investment, costs, and receipts. Investment included breeding stock, land, buildings and fences. Average investment was 65 dollars per ewe with pasture land fences making up 64 percent of the total. Stock investment averaged 33 percent, and buildings resulted in three percent of total investment. Total cost for producing sheep amounted to 7.82 dollars per ewe, but did not include some overhead charges. Primary cost items were feed and pasture which accounted for 68 percent of total costs. Labor was second most important, making up 14 percent. Receipts amounted to 19.89 dollars per ewe, consisting of sales, wool sales, and pasture credits. Lamb sales made up 74 percent and wool sales were 11 percent of total receipts. Net return to capital investment was the measure of success, and averaged 12.07 dollars per ewe. Labor required to care for the average flock was approximately three hours per ewe. Death loss of mature sheep averaged 5.4 percent

and lamb crop averaged 104 percent. Lamb sales amounted to approximately .70 lambs per ewe, and 5.1 pounds of wool was produced by each ewe.

D. C. Myrick conducted a study in Montana during 1952 concerning farm flocks of sheep on irrigated farms. (6) Primary data were collected by personal interview with farmers. Averages were calculated and applied to budget analysis. Net return averaging 11 dollars per ewe for labor, management, and pasture was realized from a flock of 60 ewes on the basis of 1954 prices. Total costs were 14 dollars per ewe, with feed costs being responsible for 60 percent of the total. Total receipts were 25 dollars per ewe with lamb sales making up 67 percent of total receipts. Average lamb crop was 130 percent and death loss of lambs after docking was 8 percent. Death loss of mature sheep averaged 9 percent per flock. One lamb was sold per ewe, and each ewe produced 10.4 pounds of wool.

The budget method was used in analyzing economics of sheep production in South Carolina in 1956. (9) Input-output information was obtained from several producers and applied to conditions in South Carolina. A 25 ewe flock was the basis of analysis, and was considered to be the smallest unit recommended for commercial sheep production. Estimated costs and returns were based on 1955 prices and the measure of success was return to management. Annual total costs averaged 23.41 dollars per ewe and were calculated as charges for feed, labor, death loss and replacement costs, and overhead costs. Feed costs represented 54 percent of total annual costs, with pasture costs being 30 percent of the total. About five hours labor was required for each ewe at a cost of two dollars. A 10 percent death loss of mature sheep

and replacement costs amounted to approximately 2.28 dollars or 10 percent of total costs. Overhead costs represented 28 percent of total costs. Receipts averaged 24.97 dollars per ewe with lamb sales accounting for 35 percent of the total. Wool sales made up 15 percent of total receipts. One and two tenths lambs and seven pounds of wool were sold per ewe. Net return to management was 1.56 dollars per ewe. Return to management and labor was 3.56 dollars per ewe, and return to management, labor and investment was 6.49 dollars per ewe.

Oklahoma Experiment Station published a bulletin in 1959 which provided economic analysis of alternative sheep enterprises. (1) It considered both commercial ewe flocks and feeder lamb flocks. Survey and budget methods were used in obtaining and analyzing 1957 data for the report. Specific objectives were: (a) estimate physical input-output relationships for selected sheep systems, and (b) budget income expectations for selected sheep systems. Estimates were based on a 100 ewe flock. Capital investment per ewe was 32.80 dollars with pasture land being the largest single investment item. Total cost per ewe was 17.65 dollars, of which 63 percent was due to feed costs. Labor was not included in the study as a direct cost item. Receipts amounted to 32.22 dollars per ewe, with lamb sales providing 76 percent of the total. Lamb crop averaged 97 percent and fleece weight averaged 10.45 pounds. Return to labor, capital, equipment, land and management was the final measure of success. It amounted to 14.68 dollars per ewe. The study also compared costs and returns for a normal year with those of a sub-normal year.

SOURCE OF DATA AND DEFINITION OF TERMS

Data were obtained by personal interview, using survey techniques. Trained enumerators interviewed producers of farm flock sheep, and with the aid of a prepared schedule, recorded detailed information concerning all phases of production inputs and outputs with their associated costs, resultant returns, and individual management practices. This study included nearly all farm flocks of sheep in Box Elder, Cache and Weber Counties, (table 4). Approximately 10 percent of the producers in these counties were unable to give the needed information or were unavailable. Six records obtained were eliminated by editing processes. Flocks in the extreme western Box Elder County areas were not included in this study.

A list of producers was compiled from membership rolls of wool marketing co-operatives, county agent lists, Agriculture Stabilization and Conservation Office records, and personal inquiry with producers.

After the data were collected, extensions and summaries were made. Information was transferred from the original records to tabulation sheets which provided cross-checks for error detection and aided in summarizing and analyzing the data. Data from the tabulation sheets and from the original records were placed on cards and sorted manually to determine the relations that existed between various factors.

Table 4. Location and number of farm flocks of sheep, Box Elder, Cache and Weber Counties, Utah, 1959

County and Community	No. of flocks
Box Elder County	
Howell and Blue Creek	12
Thatcher and Bothwell	6
Tremonton vicinity	10
Collinston, Garland, Fielding, Plymouth	11
Brigham City, Corrine, Deweyville, Honeyville	12
Total	51
Cache County	
Cove, Lewiston, Richmond, Smithfield	8
Logan vicinity	5
Cornish, Mendon, Trenton	5
Newton, Nibley, Young Ward	7
Avon, Hyrum, Paradise	4
Total	29
Weber County	
Eden, Huntsville, Liberty	9
Ogden, vicinity	7
Total	16
Grand Total	96

So terms used throughout this study will be more adequately understood, some are here defined and clarified by explanation.

Definition of Terms

Animal unit

One animal unit is equal to five mature ewes and their lambs, five yearlings, or five rams. If lambs were kept in the flock after weaning and were part of the 1959 ending inventory, January to March lambs were considered .13 animal units, and April to June lambs were considered .08 animal units.

Enterprise

A complete undertaking in a commodity line on a farm; vis: sheep, dairy, crops, etc.

Farm flock sheep

Sheep which were maintained and cared for on the farm. Any operation where the flock was placed on public lands, maintained as a 4-H or FFA project, or any strict pure-bred operation was not included. Size of flock was limited to at least 20 head of mature ewes on the farm throughout the year. This limit was selected in an attempt to eliminate small "back-yard" scavanger sheep and those receiving only haphazard care. It was assumed that a commercial sheep operation would include at least 20 head of breeding ewes. No upper limit was designated so long as the previous mentioned requirements were met.

Flock

A homogeneous grouping of like animals, used interchangeably with enterprise throughout this study.

Capital investment

Investment in all stock sheep, buildings, fences, land used for buildings, feedyards, and corrals, and other assets chargeable directly to the sheep enterprise. Crop and pasture land was not included.

Lamb crop

Percentage figure obtained by dividing number of lambs docked by number of ewes in the flock at lambing time.

Death loss

Lamb. Percentage figure obtained by dividing number of lambs died after docking by number of lambs docked.

Sheep. Percentage figure obtained by dividing number of mature sheep died by average number of mature sheep in the flock.

Inventory values

Beginning inventory. Dollar value of property at the beginning of the 1959 year. Beginning value for all buildings and fences was calculated as depreciated replacement cost. Beginning value for land, stock sheep, equipment and machinery was based on estimates of current market value.

Ending inventory. Dollar value of property at the end of the 1959 production year. Calculated as beginning inventory value plus purchases, major repair or improvements minus sales and depreciation allowances. Any expenditure amounting to 10 percent or more of beginning value was considered to be a major repair.

Cost items

Depreciation. Value allowed for wear, tear and obsolesence of stock, buildings, and equipment. Straight line depreciation rates were used for buildings and fences and were applied to a replacement cost of

the item. Straight line depreciation was applied to beginning inventory values of stock, equipment and machinery. Depreciation was given as the percentage of useful life considered to be consumed each year.

Feed cost per 100 dollars receipts. Total feed cost, including value of value divided by total receipts adjusted to hundredths.

Interest. The price for use of money invested or used in the operation of the enterprise. A rate of six percent was allowed for investment in land and buildings, and seven percent was allowed for other capital investment, machinery, equipment, and operating capital.

Labor cost. Cost of labor per man hour spent in the operation of the enterprise; operator, family or hired. Children 16 years old or more were equal to one man. One-eighth man was deducted for each year under 16.

Wool classification of breed

Fine wool breeds. Sheep with merino ancestory producing fleeces that grade 80's, 70's, or 64's under the English system. (The English numerical system of grading refers only to the diameter of fiber and indicates the number of hanks of yarn spun from wool required to weigh one pound. One hank equals 560 yards.)

Medium wool breeds. Sheep that produce fleeces grading 62's, 60's, 58's, 56's, and 50's. Black-faced and cross-bred sheep were included as medium wool breeds in this study.

Long wool breeds. Sheep that produce fleeces grading 46's, 44's, 40's and 36's. The long wool breed in this study was Cotswold.

Operations

Culling. The process of sorting out of the flock all old, infirm or undesirable sheep.

Docking. The process of cutting the lamb's tail short. Castration of buck lambs was also included in this term.

Tagging. Removal of tags or locks of wool and dirt from about the dock. Usually performed on ewes just prior to breeding.

Method of selling

Consignment. Sending of property to a person or company for care sale, or shipment; entrusting to the care of another. Many producers interviewed for purposes of this study sold their wool on this basis.

Direct. Sale and transfer of sheep and sheep products from the producer to the processor without making use of services offered by agencies located at public markets.

Central market. Sale through a market where assembly of livestock takes place, and that has facilities to receive, unload, sell, or reship the large volume of stock which flows to them by rail, truck, or drive. Union stockyards were referred to as central markets in this study.

Data association or relation from cross-tabular analysis

Direct or positive. Having the same pattern of occurances where one factor or condition frequently accompanies another.

Inverse. Having the opposite pattern of occurances where one factor or condition does not ordinarily accompany another.

Cross-tabular analysis

Method of analysis which associates gross effect of one relatively constant factor with some resultant measure or condition.

Survey

A method of collecting data from respondents which employes the use of prepared schedules or questionnaires designed to provide the

maximum useful information. Personal survey approach was used in gathering data for this study.

Size, Value and Land Use of Farms

Of farms on which sheep were studied, the largest was 7,000 acres in size and the smallest was two acres. Three hundred and ninety-four acres was the average of all farms studied, (table 5). Large acreage included chiefly dry farm ground and foothill area.

Table 5. Acreage, value and use of land for farms having sheep enterprises, by Counties, Northern Utah, 1959[a]

County	Irr. crop		Dry crop		Pasture land		Total	
	No. acres	Total value	No. acres	Total value	No. acres	Total value	No. acres	Total value
		(dollars)		(dollars)		(dollars)		(dollars)
Box Elder	90	30,882	162	16,692	316	8,289	578	55,863
Cache	54	16,753	60	8,014	109	8,707	223	33,474
Weber	54	24,459	13	6,738	45	7,709	112	38,906
Average of three counties	73	25,544	106	12,411	214	8,319	394	46,274

a Number of acres includes both owned and rented or leased lands. Values were given by the farmer and were based on current market rates. Total acreage did not include farmstead.

Livestock Organization

Although farms were selected because they had farm flock sheep, 90 of the 96 farms studied had at least one other livestock enterprise, (table 6). In terms of value, only beef enterprises were more important than sheep on farms studied in Box Elder County. In Cache County, both beef and dairy enterprises were more important, and farms studied in Weber County had sheep as the primary livestock enterprise. On

the average of all farms studied beef was the only enterprise showing a higher value than sheep.

Table 6. Livestock enterprises, average value as of December 31, 1959, on farm flock sheep farms studied, by counties, 1959[a]

County	Sheep value	Beef value	Dairy value	Hog value	Poultry value	Other value	Total stock
			(dollars)				
Box Elder	1,723	1,887	1,222	86	799	228	5,945
Cache	1,411	1,425	2,272	41	7	355	5,511
Weber	1,545	1,020	1,027	342	85	355	4,374
Average all counties	1,599	1,603	1,507	115	441	287	5,552

a Inventory as of December 31, 1959 was used because of ease and accuracy. Values were given by the farmer and were based on current market prices.

The Sheep Enterprise

Most of the farm flocks of sheep were enterprises on diversified farms that produced cash crops as well as other livestock and livestock products. However, there were several farms with sheep as the only income producing livestock enterprise.

The average size flock in all counties studied was 77 head. This was an average of ewes, rams, yearlings and lambs on the farm at the beginning and end of the year. The average size flock in Box Elder County was 82 head, in Cache County 69 head, and in Weber County 75 head. The largest flock in all three counties had 285 head, while the smallest had 21 head. In the average flock (77 head), there were

64 ewes, 2 rams, 3 yearlings and 8 lambs or 83.1 percent, 2.6 percent, 3.9 percent and 10.4 percent of the total, respectively.

Average lamb crop for all flocks was 130 percent. Average percentage range among counties was: Cache, 137 percent; Box Elder, 133 percent; and Weber, 111 percent. The largest lamb crop reported was 268 percent and the smallest was 48 percent. Extremely large crops resulted from ewes lambing more than once during the year. However, in several instances, a lamb crop of over 200 percent resulted from one lambing per year.

Of lambs docked, a number died or were lost during the summer. This loss was 11.3 percent of lamb crop for the average flock. Lamb death loss for Box Elder flocks was 10.7 percent, 11.9 percent for Cache, and 12.4 percent for Weber. Primary causes for lamb losses were reported as disease, drowning, and loss from predatory animals.

Death loss of ewes amounted to 6.5 percent per flock for the year. The highest ewe death loss of any flock was 21 percent, and 12 flocks had no ewe death loss. Death loss of rams and yearlings was only slight and appeared rather insignificant. Number of sheep slaughtered for home use was small. There were no rams or lambs slaughtered and only a few ewes and yearlings. These yearlings were mostly wethers which had been held over from the previous year. Of the total average number of sheep in all counties, only seven-tenths percent were slaughtered for home use.

One replacement ram was purchased during the year for the average flock. In some instances, there was simply a "trade" of rams between flocks, but in nearly every case, the same ram was not kept for more than two breeding seasons. Approximately the same number of rams were

sold as were purchased. Most producers recognized the importance of good rams and nearly every flock used at least one ram which was, or could have been, registered. The breeds of rams in the 96 flocks studied were:

Breed of rams	Number of flocks
Suffolk	38
Columbia	16
Columbia and Suffolk	15
Hampshire	15
Hampshire-Suffolk cross	7
Columbia and Hampshire	2
Rambouillet	2
Targhee	1
Total	96

An average of 18 ewes per flock were purchased as replacements or additions. Growth of flocks appeared more prevalent in Box Elder County with an average of 25 ewes being purchased per flock. An average of 11 ewes per flock were purchased in Cache County and four ewes per flock in Weber County. Purchase of yearlings and lambs was negligible and occurred only in Box Elder County flocks.

The average length of time the ewes were kept in the flock varied among years and among flocks. Under normal conditions, ewes that were raised by the producer for replacement remained in the flock from six to eight years. Those that had been purchased as range culls were held only two to three years.

Breed of ewes in the flocks varied greatly. The majority were of a mixed blood line, coming from mixed ancestry and pure-bred rams. An accurate description of the flocks was not possible since many of the ewes were originally obtained as range culls and producers were not completely sure of the ancestry. However, enumerators attempted to classify the ewes as to the wool they produced. Ewes in each flock

were classed as fine wool, medium wool, and long wool breeds. A classification and number of flocks in each class was:

Breed of Ewes	Number of flocks
Fine wool	41
Medium wool	44
Long wool	2
Fine and medium wool	8
Fine and long wool	-
Medium and long wool	1
Total	96

Capital Investment

Capital investment in the enterprise was for stock sheep, buildings, fences, land used for buildings, feed and beddings, feed and bedding material and equipment. These items averaged 230.62 dollars per animal unit, (table 7).

Stock sheep comprised the largest single investment and amounted to 104 dollars per animal unit or 45 percent of total capital investment. Mature ewes were the largest class included in stock sheep and made up 81 percent of the investment in all sheep. Values were calculated by multiplying the average number of sheep on the farm during the year by average price per head.

Buildings, fences and land used for buildings, feedyards, and corrals was the second largest investment and accounted for 35 percent of the total, or 79.74 dollars per animal unit. Value of buildings and fences was determined by a replacement cost depreciated at a standard rate. Information was obtained concerning details on size, type of construction, kinds of material, age, length of life, and condition. This was used to calculate replacement cost and to estimate a depreciation rate for each building and fence. Current market value of land used for buildings, feedyards, and corrals was

Table 7. Capital investment in the farm flock sheep enterprise per animal unit and per breeding ewe, Northern Utah, 1959

Item	Per animal unit (dollars)	Per breeding ewe[a] (dollars)	Approximate percent of total (percent)
Stock sheep			
Ewes	84.30	18.68	36
Lambs	8.32	1.86	4
Rams	7.29	1.63	3
Yearlings	4.09	.91	2
Total	104.00	23.08	45
Buildings, fences, land			
Open shed	21.21	4.71	9
Lambing shed	13.63	3.02	6
Sheep barn	7.34	1.63	3
Granary	5.96	1.32	2
Ram shed	.34	.08	*
Pasture shed	.10	.02	*
Lambing bunks	.10	.02	*
Fence	19.53	4.33	8
Land used for buildings feedyards & corrals	11.53	2.56	5
Total	79.74	17.69	35
Feeding and bedding material			
Roughage	16.40	3.63	7
Pasture	11.30	2.51	5
Concentrates	6.56	1.46	3
Salt	.44	.10	*
Mineral	.30	.07	*
Other	.36	.08	*
Bedding material	1.09	.24	*
Total	36.45	8.09	16
Equipment and machinery			
Manger	3.95	.87	2
Lambing partitions/panels	2.50	.55	1
Shear machine/vet. equipment	1.21	.27	*
Grain trough	.97	.22	*
Self feeders	.42	.09	*
Leading shute	.35	.08	*
Creep feeders	.32	.07	*
Trailer	.28	.06	*
Water equipment	.25	.06	*
Other	.18	.04	*
Total	10.43	2.31	3
Total capital investment	230.62	51.17	100

* Less than one percent.

a Based on one breeding ewe and does not include lambs, yearlings or rams. rams.

used in every case. Of investment in these items, sheep barns and lambing sheds comprised 52 percent, fences 25 percent and land used for buildings, feedyards, and corrals 14 percent. Other small items were ram sheds, pasture sheds, lambing bunks, granaries, and miscellaneous buildings.

Investment in feed and bedding material amounted to 36.45 dollars per animal unit and made up 15 percent of total capital investment. Approximately 50 percent of total feed and bedding costs were included which was the average value of feed and bedding on hand during the year. Both home grown and purchased feed and bedding material were included in calculating investment for these items.

Equipment investment averaged 10.43 dollars per animal unit and was responsible for five percent of total capital investment. This category consisted of all equipment and special machinery used for sheep. Beginning inventory values were estimated for each piece of equipment or machinery and a standard depreciation rate was applied to calculate an ending inventory value. Average value of items used by the sheep enterprise was determined to calculate investment. Mangers for feeding roughage represented 38 percent, lambing partitions and panels, 24 percent; and shearing machine and veterinary equipment, 12 percent of total investment for equipment and machinery. Other items of this group made up 26 percent.

Analysis of Cost Items

Cost items were grouped into six main categories for purposes of this study. These categories were feed cost, labor cost, flock maintenance and inventory decrease, overhead cost, power cost and material cost. Of total cost, feed accounted for 36.24 percent, labor 19.25

percent, flock maintenance and inventory decrease 17.11 percent, overhead 14.75 percent, power 6.73 percent and material 5.92 percent. Total costs amounted to 188.97 dollars per animal unit.

Feed cost

The largest single cost to the sheep enterprise was feed, which amounted to 68.48 dollars per animal unit. All feed, whether home grown or purchased, and pasture value was included. Roughage and pasture were the main components of feed utilized by the sheep with cost of roughage amounting to 31.97 dollars per animal unit or 47 percent and pasture value 22.10 dollars per animal unit or 32 percent of total feed cost, (table 8).

Table 8. Amount and cost of feed per animal unit for producing farm flocks of sheep, Northern Utah, 1959

Item	Number of pounds	Feed cost	Percent of total
	(pounds)	(dollars)	(percent)
Roughage	3307.0	31.97	47.0
Pasture		22.10	32.0
Concentrates	831.0	13.96	19.0
Salt	22.6	.46	.7
Mineral	4.6	.19	.3
Other	16.9	.79	1.0
Total	----	68.48	100.0

In most cases roughage consisted of cured alfalfa hay; however, a few flocks were fed entirely on mixed grass hay and two flocks were

fed only wild hay and pea silage as roughage. In general, quality of hay fed and methods of feeding varied very little. Most hay was of high quality and was fed loose, either on the ground or in mangers. Only two flocks were given chopped hay and that was given during lambing season. Pasture values were estimated from information given by each producer and was based on current market prices. Quality of pasture varied greatly and ranged from choice irrigated alfalfa to dryland weed patches. Generally, however, pastures were lands which could not be used efficiently in production of other crops and in some cases, land which was nearly inaccessible by other types of livestock. Most producers praised sheep for their ability to utilize these poor pastures and for their adaptability to eating weeds and browse.

Concentrates were fed to nearly every flock and amounted to 12.96 dollars per animal unit or 19 percent of the total feed costs. Barley and oats were the main constituents, with four flocks receiving soybean meal and three flocks being fed cottonseed cake. In many cases, concentrates were fed only prior to and during lambing. Little was fed during pasture season or early winter. Concentrates played an important part in creep feeding of lambs and feeding of rams prior to the breeding season.

Salt and mineral costs amounted to .65 dollars per animal unit or one percent of the total feed costs. All flocks had free access to salt and approximately one-fourth of the flocks were fed minerals at some time during the year.

Other feed consisted of silage, beet pulp, beet tops, and special supplements, which made up one percent of total feed costs.

Labor cost

Labor was the second most important cost item and made up 19.25 percent of total cost. In most instances, labor was performed by the operator with a nominal amount of family help. Twenty percent of the farms used some hired labor, and one flock was tended exclusively by hired help. Labor of the sheep shearer was not included as labor cost since shearing was considered a service and cost in itself. However, all other labor required during shearing was included as a labor cost. A uniform rate of 1.25 dollars per man hour was allowed for payment to the operator, family and hired labor. On the average farm, 29.09 man hours of labor was required per animal unit at a cost of 36.37 dollars, of this amount, operator and family made up 95.7 percent, (table 9). January, February and March were months requiring the greatest amount of labor. This was due to lambing, care of the new born lambs, and keeping dry, clean bedding material available to the sheep.

Labor required during April and May was for docking, shearing, fence and equipment repair, and working with the sheep during the early stages of pasture season. Throughout the remainder of the year, labor requirements were for feeding, marketing, culling, tagging, fence repair and moving the flock.

Table 9. Amount and cost of labor used per animal unit for producing farm flocks of sheep, by month. Northern Utah, 1959[a]

Month	Labor		Total cost
	Operator and family	Hired	
	(hours)	(hours)	(dollars)
January	4.34	.05	5.49
February	5.02	.25	6.59
March	4.09	.21	5.37
April	2.99	.16	3.94
May	2.21	.33	3.18
June	1.28	.02	1.62
July	1.10	.02	1.40
August	1.07	.04	1.39
September	1.07	.04	1.39
October	1.28	.02	1.62
November	1.45	.06	1.89
December	1.93	.06	2.49
Total	27.83	1.26	36.37

a Does not include labor of sheep shearer.

Flock maintenance and inventory decrease

Flock maintenance and inventory decreases were both considered as operating cost items in this study, and amounted to 32.33 dollars per animal unit, or 17 percent of total costs. Flock maintenance was the purchase of stock sheep for replacement and appeared as a cost item off-setting inventory decrease. Inventory decrease was loss to the enterprise resulting from death of stock sheep and decrease in value of stock sheep over the year. Sheep purchases amounted to 20.72 dollars and value of inventory decrease was 11.61 dollars per animal unit. Of the sheep purchased, stock breeding ewes made up a percent, rams five percent, and yearlings and stocker lambs seven percent.

Overhead cost

Overhead costs were 27.68 dollars per animal unit and made up 14.75 percent of total costs. Overhead consisted of interest, depreciation, general overhead, taxes, repair, and miscellaneous expense. The largest overhead cost was interest charged on capital investment and operating capital and amounted to 19.47 dollars. A rate of six percent was charged for investment in land and buildings, and seven percent was charged for other capital investment and operating capital. Depreciation on land, buildings, equipment and machinery was the second largest overhead cost and amounted to 4.16 dollars. Depreciation was figured as the difference between the beginning and ending inventory value. A charge of 2.34 dollars per animal unit was made to cover general farm overhead expenses which was a cost recognized because there are some expenses around the farm that cannot be attributed to one single enterprise. This cost was ✓

calculated as 20 percent of all cash costs. Taxes on the enterprise amounted to 1.56 dollars per animal unit and were calculated for all sheep, buildings and equipment used by the sheep. Tax valuations and mill levy was applied to each enterprise. Building and equipment repair was .27 dollars per animal unit and included all repairs made during 1959. If a repair cost was 10 percent or more of the beginning value, it was treated as capital improvement and became part of the average inventory value. Miscellaneous expenses were eight cents per animal unit and included costs other than those previously listed.

Power and machine cost

Total power and machine costs were calculated by adding together all pickup, truck, tractor, car, and horse costs chargeable to the enterprise. For the average flock, these costs amounted to 12.72 dollars per animal unit, (table 10). A standard hourly rate of 2.50 dollars was allowed for pickups and cars, 3.20 dollars for trucks larger than pickups, 1.80 dollars for small and medium tractors and .90 dollars per horse. A total of 4.95 machine hours was used per animal unit, with pickups providing 2.72 hours or 54.9 percent of the total. Trucks were used 1.41 hours; tractors, .54 hours; cars .07 hours and horse power .21 hours per animal unit. The primary use of transportation equipment was for feeding operations during winter months. Next in importance was transporting of lambs, sheep and wool to markets.

Table 10. Amount and cost of power used per animal unit in production of farm flocks of sheep. Northern Utah, 1959

Source of power	Hours used (number)	Total cost (dollars)
Pickup	2.72	6.80
Truck	1.41	4.68
Tractor	.54	.97
Car	.07	.18
Horse	.21	.19
None	---	---
Total	4.95	12.72

Material cost

Costs of material included such items as commission and yardage, bedding material, shearing and tagging, medicine and veterinary needs, hauling, feed preparation, electricity, supplies, water, and breeding services. These costs amounted to 11.19 dollars per animal unit and accounted for 5.92 percent of total costs, (table 11). Commission and yardage was the largest expense item in this group and was 2.66 dollars per animal unit or 24 percent of total material costs. These were incurred from marketing lambs, sheep, and wool and were paid to brokers, stock yards, auction companies, and wool warehouses. Ninety-five percent of the producers reported a commission and yardage cost; whereas, the remaining five percent made direct sales and did not incur these expenses.

Table 11. Cost of producing farm flock sheep, per animal unit and per breeding ewe. Northern Utah, 1959

Cost item	Cost per animal unit (dollars)	Cost per breeding ewe[a] (dollars)	Percent of total cost (percent)
Feed cost			
Roughage	31.98	7.09	16.95
Pasture	22.10	4.90	11.68
Concentrates	12.96	2.88	6.86
Other	1.44	.32	.75
Total	68.48	15.19	36.24
Labor cost			
Operator/family	34.79	7.72	18.41
Hired	1.58	.35	.84
Total	36.37	8.07	19.25
Flock maintenance and inventory decrease			
Sheep purchases	20.72	4.60	10.97
Inventory decrease	11.61	2.58	6.14
Total	32.33	7.18	17.11
Overhead cost			
Interest on capital invest.	15.39	3.41	8.14
Interest on op. capital	4.08	.90	2.16
Building/equipment deprec.	4.16	.92	2.17
General overhead	2.34	.52	1.24
Taxes	1.56	.35	.83
Building/equipment repair	.27	.06	.14
Miscellaneous expenses	.08	.02	.07
Total	27.88	6.18	14.75
Power cost			
Pickup	6.80	1.51	3.60
Truck	4.58	1.01	2.42
Tractor	.97	..22	.51
Car	.18	.04	.10
Horse	.19	.04	.10
Total	12.72	2.82	6.73
Material cost			
Commission and yardage	2.66	.59	1.41
Bedding material	2.28	.51	1.20
Shearing and tagging	2.20	.49	1.16
Medicine and veterinary	.94	.21	.50
Hauling	.87	.19	.46
Feed preparation	.70	.15	.37
Electricity	.62	.14	.33
Supplies	.56	.12	.30
Water	.30	.07	.15
Breeding service	.06	.01	.04
Total	11.19	2.48	5.92
Total costs	188.97	41.92	100.00

a Based on one breeding ewe and does not include lambs, yearlings or rams.

Bedding material amounted to 2.28 dollars per animal unit and made up 22 percent of material costs. All bedding, whether home grown or purchased, was considered a cost to the enterprise. Approximately half was home grown with the remainder being purchased from feed and supply houses or other farmers. Straw was the principle bedding material and was used rather extensively by all producers, especially during winter months and lambing season. Wood shavings and sawdust were used by two flocks and hay stems were used by some enterprises.

Shearing and tagging operations amounted to 2.20 dollars per animal unit or 19 percent of material costs. This was usually done on a per head basis and averaged about 40 cents per ewe, yearling or lamb and 80 cents per ram. Tagging ewes cost four cents per head. Shearing was done during the early spring months and was completed, in most cases, by May. Tagging operations were done during late summer and early fall just prior to breeding season. Most flocks were sheared by professional sheep shearers and was accomplished by moving a portable unit from one enterprise to another. Only seven producers sheared their own flocks; however, a large majority performed tagging operations.

Analysis of Receipts

Total receipts amounted to 151.52 dollars per animal unit, 51.30 percent of which was from the sale of lambs[1] 18.56 percent from wool and pelt sales, 13.20 percent resulting from increased inventory value, 8.06 percent from manure credits, 7.49 percent from government payments, 5.93 percent from sale of sheep and .46 percent from value of home use, (table 12).

1. Includes value of meat and wool produced by lambs.

Table 12. Receipts from farm flock sheep production per animal unit and per breeding ewe, Northern Utah, 1959

Source of receipts	Receipts per animal unit	Receipts per breeding ewe[a]	Percent of total
	(dollars)	(dollars)	(percent)
Sale of lambs	77.72	17.23	51.30
Wool and pelts	20.64	4.55	13.56
Inventory increase	20.00	4.44	13.20
Manure credit	12.22	2.71	8.06
Government payments	11.35	2.52	7.49
Sale of sheep	8.99	1.99	5.93
Home use value	.70	.15	.46
Total	151.52	33.59	100.00

a Based on one breeding ewe and does not include lambs, yearlings or rams.

Since lamb sales made up over 50 percent of receipts and was the major product of the farm flock, they became the primary factor for calculating income. An average of four lambs were sold per animal unit, 83 percent resulting from fat lamb, 16 percent from feeder, and one percent from breeding ewe lamb sales. In addition to actual numbers sold, the weight of market lambs was important. Weights ranged from 80 to 130 pounds per head with an average of 104 pounds for fats, 87 pounds for feeders, and 84 pounds for breeding ewe lambs. Twenty percent of the producers reported sales of feeder lambs and two percent reported breeding ewe lamb sales.

Average price received for fat lambs was 19 cents per pound. Feeder lambs sold for an average of 18 cents per pound. Breeding

ewe lambs were usually sold on a per head basis and averaged 23.00 dollars each.

Most fat lambs were sold through central markets, local slaughter houses, and auction markets. Only seven percent of the producers sold fat lambs at the farm, whereas, all feeders and breeding ewe lambs were sold directly at the farm. Of the total lambs docked, 74 percent were sold, 15 percent were kept as replacements and 11 percent died.

Wool and pelt sales were the second most important source of income and provided 13.62 percent of total receipts.[2] Value of wool and pelts amounted to 20.54 dollars per animal unit, 20.42 dollars from wool and .12 dollars from pelts. Weight and quality of fleece, plus price received per pound, were important factors in determining receipts from wool and pelt sales. Forty-seven pounds of wool and .5 pelts were sold per animal unit with an average fleece weight of 9.5 pounds for ewes and yearlings, and 12 pounds for rams. Quality of fleece depended primarily upon fineness of fiber and length of staple which was associated with breed, age, care and condition of the sheep. There was considerable variation between flocks as to condition and quality of wool. Price received for wool, after marketing charges and deductions, averaged 43.4 cents per pound (grease basis), with a high of 60 cents and a low of 32 cents per pound. Pelts sold at an average price of 2.60 dollars each.[3]

The major portion of wool was marketed through wool pools which consisted of local growers combining their clips in order to attract

2. Does not include value of wool produced by market lambs.
3. Does not include government incentive payment provided by the National Wool Act.

buyers interested in larger quantities. Box Elder and Cache County growers participated rather extensively in wool pool organizations; whereas little such activity was carried on in Weber County. Pooled wool was sold on a consignment basis and producers received partial payment at time of delivery. Final payment was not received until settlement of contract with the buyer after the wool was delivered, graded and all marketing and association expenses were deducted. A few producers sold their clips directly to buyers, and in most instances, their wool was not graded.

Increased inventory value amounted to 20.00 dollars per animal unit and provided 13.20 percent of total receipts. This was calculated as the difference between ending and beginning inventory values. The increase resulted from sheep purchases, lambs being held as replacement stock, lambs moving into mature sheep classes and in some cases actual increased value of the same sheep. Value of sheep could appreciate because of higher conditioning, by improving as a wool and lamb producer, or as a result of rising prices.

Manure credits, government payments, mature sheep sales and value of home use were the remaining items making up receipts. As a group, these totaled 33.26 dollars or 21.94 percent of total receipts.

Estimates of manure value were made by calculating the elemental worth of manure resulting from various types of feed the sheep received. Digestion coefficients and average excretion amounts were used in determining content of N., P., K. Cost of applying manure to land and loss in recovery of manure was estimated and deducted from manure value. It was assumed that manure was recovered to a high degree and that producers utilized a large portion of the high

quality fertilizer. Manure dropped on pasture and waste bedding material was also calculated as part of the total value. Government payments were those received under the authority of the National Wool Act of 1954 and were paid on shorn wool and unshorn lambs. Only one producer failed to apply to the County Agriculture Stabilization and Conservation Office for payment on wool; whereas, 16 failed to apply for payment on unshorn lambs.

Mature sheep sales resulted primarily from sale of cull ewes and rams. Yearlings were sold from only three percent of the flocks. Most mature sheep were sold in late fall or early winter and went to local auctions or other farmers in the area. Home use value appeared to be a relatively insignificant item making up receipts. It was considered to be value of sheep killed for meat in the home, which was primarily mutton, either old ewes or yearling wethers.

Net Return, Return to Management, Operator and Family Labor and Return To Pasture

Net return was calculated by deducting total costs from total receipts. The range was from minus 298.62 dollars to plus 29.25 dollars per animal unit, with an average of minus 37.45 dollars, (table 13). Only 16 producers or 17 percent reported positive returns. Net return to the enterprise was considered to closely approach return for management since no charge for management was included in calculation of costs.

Although net return to enterprise and management averaged minus 37.45 dollars per animal unit, employment for operator and family labor, and use of pasture areas, which may not otherwise have been used, was provided by raising sheep. While labor charges and pasture values were costs to the enterprise, they were also returned to

operator and family to the extent of operator labor and ownership of pasture.

Table 13. Net return from farm flock sheep production, per animal unit and per breeding ewe. Northern Utah, 1959

Item	Per animal unit (dollars)	Per breeding ewe (dollars)
Total receipts	151.52	33.59
Total costs	188.97	41.92
Net return	(-) 37.45	(-) 8.33

If cost of operator and family labor was added to net return, a return of minus 2.66 dollars per animal unit to the enterprise, management, and to operator and family labor was obtained. If charge for operator and family labor was omitted as a cost item, receipts still lacked 2.66 dollars of equaling costs. Thus, at the break-even point, return to operator and family labor amounted to minus 9.6 cents per hour, or in other words, operator and family were paying for the privilege of working with the sheep enterprise. In the same manner, if cost of pasture was added to net return to enterprise, management, and operator and family labor, a return of plus 19.44 dollars per animal unit to enterprise, management, operator and family labor, and pasture was realized, (table 14).

Table 14. Measures of return from farm flock sheep production, per animal unit and per breeding ewe. Northern Utah, 1959

Item	Per animal unit (dollars)	Per breeding ewe (dollars)
Net return to enterprise and management	(-) 37.45	(-) 8.33
Cost of operator and family labor	34.79	7.72
Return to enterprise, and operator and family labor	(-) 2.66	(-) .61
Cost of pasture	22.10	4.90
Return to enterprise, management, operator and family labor and pasture	19.44	4.29

Factors Associated With Success of the Farm Flock Sheep Enterprise

Cross tabular analysis was used in analyzing the relation which existed between various factors studied. This method allowed comparison of variation in one factor with that of others. The records were classified into groups according to one factor (casual) in an effort to hold the affect of that factor relatively constant within classes. Averages were then calculated for other factors. In that way, it was shown whether the average of other factors increased or decreased as the casual factor changed from one level to another. Net return per animal unit was the primary measure of success used.

Number of animal units per flock

Size of enterprise generally measures efficiency in use of the factors of production. Up to a point, larger sized enterprises usually employ resources more efficiently, which is often reflected in lower per unit cost.

In order to note the relation between size of enterprise and various factors, the records were sorted on the basis of number of animal units per flock. They were divided into three major groups, those with less than 7.99, averaging six animal units, eight to 14.99 with an average of 11 animal units, and 15 or more averaging 29 animal units, (table 15). A total of 1420.03 animal units were included in this study. The average sized flock for all enterprises consisted of 15 animal units with a range of 4.20 to 54.90 animal units.

There was a consistent positive relation between size of enterprise and net return per animal unit, as size increased, so did net return. Net return increased from minus 74 to minus 26 dollars per animal unit as size increased from a class average of six to 29 animal units.

There was an inverse relation between size of enterprise and total cost per animal unit. As size of enterprise increased, total cost per animal unit consistently decreased, going from a class high of 213 dollars to a low of 177 dollars per animal unit. Diminishing costs were reflected through decreasing labor and overhead costs. Since overhead costs were relatively fixed, more units divided into the total resulted in lower cost per unit. Labor cost per animal unit decreased from an average of 60 dollars per animal unit on small enterprises to 28 dollars per animal unit on the larger ones. Average labor cost for all enterprises was 36 dollars per animal unit.

There appeared to be no relation between size of enterprise and feed cost per animal unit. Size of enterprise also appeared to be unrelated to power cost per animal unit.

Table 15. Relation of number of animal units to cost, net return, and other factors for 96 farm flock sheep enterprises. Northern Utah, 1959

Animal units per enterprise		Number of records	Building/ equipment investment per A. U.	Cost per animal unit			Net return per animal unit
Range	Average			Labor	Overhead	Total	
(A.U.)	(number)	(number)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
0 - 7.99	6	33	118	60	33	213	(-) 74
8.0 - 14.99	11	32	113	45	31	207	(-) 48
15.0 and over	29	31	75	28	26	177	(-) 26
All enterprises	15	96	90	36	28	189	(-) 37

As size of enterprise increased, building and equipment investment consistently decreased, with the major change resulting from lower building investment which was responsible for approximately 89 percent of total building and equipment investment.

Hours of man labor

Due to the relative importance of labor as an input in most farm enterprises, and especially in the case of farm flock sheep production where it was the second most important cost item, efficient use of labor is of great importance to success of an enterprise. Labor efficiency is usually considered a measure of accomplishments per worker and is estimated by output units per man. For purposes of this study labor efficiency was measured as hours of man labor per animal unit. Analysis of data, indicated that fewer hours of man labor per animal unit reflected more efficiency. In some instances, fewer hours could mean neglect and insufficient care of the enterprise; however, in this study there was little evidence to show that the average producer in the low hour class was not giving proper care to the flock. Neglect and waste of man labor could also be present in the groups with larger number of hours but did not seem to be the case for most flocks included in this study.

The records were sorted on the basis of number of man hours of labor per animal unit in order to determine the association between that factor and net return. They were divided into three groups: those with less than 28.99 hours per animal unit averaging 17 man hours per animal unit, 29.0 to 46.99 hours per animal unit averaging 38 man hours per animal unit, and 47.0 or more hours per animal unit with an average of 62 man hours per animal unit, (table 16).

Table 16. Relation of hours of man labor per animal unit to cost, net return and other factors for 96 farm flock sheep enterprises. Northern Utah, 1959

Hours of man labor per animal unit		Number of records	Number of animal units	Building/ equipment investment per A.U.	Sheep & lamb death loss	Total cost per A.U.	Net return per A.U.
Range	Average						
(hours)	(number)	(number)	(number)	(dollars)	(percent)	(dollars)	(dollars)
0 - 28.99	17	39	21	74	21	167	(-) 18
29.0 - 46.99	38	33	18	101	19	202	(-) 50
47.0 and over	62	24	12	137	17	258	(-)101
All enterprises	29	96	15	90	19	189	(-) 37

There was an inverse relation between man hours of labor per animal unit and net return per animal unit. As number of hours increased from a class average of 17 to 62 per animal unit, net return decreased from minus 18 to minus 101 dollars per animal unit. Number of man hours for all flocks was 29 per animal unit and net return averaged minus 37 dollars per animal unit.

There was a positive relation between man hours of labor and total cost per animal unit. Labor cost increased in the same ratio as hours of labor since a standard rate of pay was applied.

A consistent positive relation existed between man hours of labor and building and equipment investment per animal unit. As investment in building and equipment increased, hours of labor also went up. This relation seems to be contrary to the usual conditions, since capital investment is generally thought to substitute for labor. Conclusions were that building and equipment investment was related to factors other than labor and that they were not of the type to provide reduction in labor requirements.

There was a consistent inverse relation between man hours of labor and size of enterprise. An average of 17 hours was required by the largest flocks averaging 21 animal units and 38 hours for the flocks averaging 18 animal units.

An inverse relation between man hours of labor and percentage lamb and sheep death loss also existed. The high death loss was 21 percent for the least number of hours and the low death loss was 17 percent for the highest number of hours.

Man hours of labor was directly associated with time of lambing with the flocks lambing during January and February requiring more

hours labor than those lambing later in the spring.

Feed cost per 100 dollars receipts

Efficient use of feed generally reduces costs and may bring higher net returns. To measure feeding efficiency, the cost of feed required to produce 100 dollars receipts was selected and a sort made on that basis. This was assumed to measure differences in feed, animals and feeding practices.

The records were divided into three groups ranging from the lowest to the highest feed cost per 100 dollars receipts. The low cost group included feed costs of less than 39.99 dollars with an average of 26 dollars. The next group ranged from 40 to 59.99 dollars feed cost with an average of 49 dollars and the high cost group had feed costs of over 60 dollars with an average of 89 dollars, (table 17). Average feed costs per 100 dollars receipts amounted to 51 dollars for all enterprises.

There was an inverse relation between average feed costs per 100 dollars receipts and net return per animal unit. With feed cost averaging 26 dollars, net return amounted to minus 18 dollars per animal unit, 49 dollars feed cost returned minus 37 dollars, and feed cost of 89 dollars resulted in minus 84 dollars return per animal unit.

As feed cost per 100 dollars receipts increased, total cost per animal unit also increased. There seemed to be very little association between feed cost and size of enterprise.

Feed cost per 100 dollars receipts was inversely related to length of pasture season. A pasture season of 214 days was associated with the lowest average feed costs of 26 dollars, 192 days on pasture resulted in average feed cost of 49 dollars, and 178 days on

Table 17. Relation of feed costs per 100 dollars receipts to cost, net return and other factors on 96 farm flock sheep enterprises. Northern Utah, 1959

Feed cost per $100.00 receipts		Number of	Number of	Sheep & lamb death	Days on	Feed cost per	Total cost per	Total receipts per	Net returns per
Range	Average	records	animal units	loss	pasture	A.U.	A.U.	A.U.	A.U.
(dollars)	(dollars)	(number)	(number)	(percent)	(days)	(dollars)	(dollars)	(dollars)	(dollars)
0 - 39.99	26	34	17	16	214	44	173	155	(-) 18
40.0 - 59.99	49	38	14	21	192	76	192	155	(-) 37
60.0 and over	89	24	14	23	178	99	211	127	(-) 84
All enterprises	51	96	15	19	194	68	189	152	(-) 37

pasture gave the highest average feed cost of 89 dollars. Average length of pasture season for all flocks was 194 days and was associated with an average feed cost of 51 dollars per 100 dollar receipts.

Value of lamb sales

When the records were sorted into four groups on the basis of value of lamb sales per animal unit there were 18 enterprises with sales of less than 35.99 dollars with the average being 17 dollars, 23 enterprises had sales of 36 to 70.09 dollars averaging 52 dollars, sales of 71 to 105.99 dollars with an average of 89 dollars were found in 23 enterprises and the remaining group of 31 enterprises had sales in excess of 106 dollars which averaged 127 dollars. The average value of lamb sales for all enterprises was 78 dollars per animal unit, (table 18).

There was a consistent relationship between value of lamb sales per animal unit and net return per animal unit. For the average sale of 17 dollars, net return amounted to minus 67 dollars, a 52 dollar sale returned minus 40 dollars, net return of minus 32 dollars was realized from sales averaging 89 dollars, and an average sale of 127 dollars resulted in minus 23 dollars net return. Average net return to all enterprises was minus 37 dollars per animal unit, with average lamb sales of 78 dollars per animal unit.

There was an inverse relation between value of lamb sales and percent lamb death loss. The highest lamb death loss of 18 percent was recorded for the lowest value lamb sales and the lowest lamb death loss of eight percent was in the group having the highest value lamb sales.

Table 18. Relation of value of lamb sales to net return and other factors for 96 farm flock sheep enterprises. Northern Utah, 1959

Value of lamb sales per animal unit		Number of records	Lambs sold per A.U.	Price per pound	Percent per crop	Percent lamb death loss	Total cost per A.U.	Total receipts per A.U.	Net return per A.U.
Range	Average								
(dollars)	(dollars)	(number)	(number)	(cents)	(percent)	(percent)	(dollars)	(dollars)	(dollars)
0 - 35.99	17	18	.92	14	115	18	180	113	(-) 67
36.0 - 70.99	52	23	2.99	19	121	14	172	132	(-) 40
71.0 - 105.99	89	24	4.76	20	124	9	186	154	(-) 32
106.0 and over	127	31	6.23	21	150	8	212	189	(-) 23
All enterprises	78	96	4.05	19	130	11	189	152	(-) 37

Value of lamb sales varied directly with percent lamb crop as sales increased, so did percent lamb crop. Percentage lamb crop range between classes was from 115 percent to 150 percent, with an average of 130 percent for all enterprises. As value of lamb sales increased, number of lambs sold per animal unit also went up. The smallest number of lambs sold per animal unit was .92 and the largest number was 6.29 with an overall average of 4.05.

Value of lamb sales was definitely affected by price received per pound of lamb, with higher prices received corresponding directly with higher value lamb sales.

Value of wool sales

Sale of wool was the second most important item providing receipts to the enterprise and was responsible for 13 percent of total receipts. The records were sorted on the basis of value of wool sales per animal unit into three groups: those with wool sales of less than 14.99 dollars per animal unit with a class average of 13 dollars per animal unit, 15 to 21.99 dollars per animal unit with a class average of 18 dollars per animal unit, and over 22 dollars per animal unit having a class average of 29 dollars per animal unit, (table 19).

There seemed to be no consistent relation between value of wool sales per animal unit and net return per animal unit. Net return first decreased and then began to increase. Class range of net return was from an average of minus 26 dollars to minus 49 dollars, with minus 37 dollars being the average net return for all flocks.

There was a direct relation between value of wool sales and total receipts. Total receipts was smallest for the group with the smallest

Table 19. Relation of value of wool sales to net return and other factors for 96 farm flock sheep enterprises. Northern Utah, 1959[a]

Value of wool sales per animal unit		Number of records	Wool sold per A.U.	Price per pound	Percent sheep death loss	Feed cost per A.U.	Total cost per A.U.	Total receipts per A.U.	Net return per A.U.
Range	Average								
(dollars)	(dollars)	(number)	(pounds)	(cents)	(percent)	(dollars)	(dollars)	(dollars)	(dollars)
0 - 14.99	13	20	30	37	4	55	174	142	(-) 32
15.0 - 21.99	18	46	44	42	10	67	195	146	(-) 49
22.0 and more	28	30	63	44	8	80	193	167	(-) 26
All enterprises	20	96	47	43	7	68	189	152	(-) 37

a Excluding pelts and value of wool produced by market lambs.

value of wool sales and largest for the group with the largest value of wool sales per animal unit.

A positive association between value of wool sales and feed costs per animal unit was evident. As feed cost increased, the number of pounds of wool sold per animal unit also went up. For an average wool sale of 13 dollars per animal unit, feed cost amounted to 55 dollars per animal unit, an 18 dollar sale resulted from a 67 dollar feed cost, and feed costs were 80 dollars per animal unit for a wool sale of 28 dollars per animal unit.

Lamb crop

Success or failure of the sheep enterprise could be closely related to the number of lambs saved, since the largest portion of receipts comes from sale of lambs. The records were sorted on the basis of percent lamb crop and were separated into four groups; those with under 106.99 percent with a class average of 81 percent, 107.0 to 128.99 percent having a class average of 120 percent, 129.0 to 145.99 percent with a class average of 138 percent, and over 146.0 percent having a class average of 173 percent, (table 20). Average lamb crop for all flocks was 130 percent.

As percent lamb crop increased, there was a tendency for net return per animal unit to also increase. A direct association existed between percent lamb crop and total receipts, which was reflected through the value of lamb sales. The increased value of lamb sales was dependent upon number and weight of lambs sold since there was little difference in price received per pound.

A direct relation also existed between percent lamb crop and total cost per animal unit. Total costs ranged from a low of 177 dollars to

Table 20. Relation of percent lamb crop to net return and other factors on 96 farm flock sheep enterprises. Northern Utah, 1959

Percent lamb crop		Number of records	Number animal units	Value lamb sales A.U.	Feed cost per A.U.	Labor cost per A.U.	Total cost per A.U.	Total receipts per A.U.	Net return per A.U.
Range	Average								
(percent)	(percent)	(number)	(number)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
0 - 106.99	81	19	14	45	59	33	177	112	(-) 65
107 - 128.99	120	29	15	73	66	41	188	146	(-) 42
129.0 - 145.99	138	25	15	80	68	32	182	158	(-) 24
146.0 and over	173	23	16	103	79	38	206	179	(-) 27
All enterprises	130	96	15	78	68	36	189	152	(-) 37

206 dollars per animal unit. Increasing total costs were reflected through higher feed cost, higher labor cost, and increased transportation and commission charges.

There seemed to be no apparent relation between percent lamb crop and size of enterprise. Each class contained nearly the same number of animal units and was very near the average for all flocks, although the smallest enterprises tended to have smaller lamb crops than the largest enterprises.

Percent of lamb crop seemed to have little effect upon death loss of lambs after docking. Lamb death loss ranged from a low of eight percent for the group averaging a 120 percent lamb crop to a high of 14 percent for the group averaging 81 percent.

There was an association between percent lamb crop and time of lambing. Flocks that lambed during March and April produced larger crops than those lambing during January and February, the primary reason for this was weather conditions during both lambing and breeding season. More lambs were saved when weather conditions were not severe and ewes conceived much better in the cooler months of late fall and early winter than those bred during the late summer months.

Breed of ewes

Although the exact breed of ewes was not determined in this study, a breakdown of flocks as to white-faced ewes, black-faced ewes, and a combination of both was made. On that basis the records were sorted and divided into three groups, 73 flocks of white-faced ewes, 13 flocks of black-faced ewes, and 10 flocks for the mixed ewe flock class, (table 21).

Table 21. Relation of breed of ewes to net return and other factors for 96 farm flock sheep enterprises. Northern Utah, 1959

Breed of ewes	Number of records	Bldg/equip investment per A.U.	Repair cost per A.U.	Labor cost per A.U.	Lamb/ wool sales A.U.	Total cost per A.U.	Total receipts per A.U.	Net return per A.U.
	(number)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
White-faced	73	86	.23	34	102	182	154	(-) 28
Black-faced	13	109	.54	48	71	197	121	(-) 76
Mixed	10	107	.35	54	95	240	152	(-) 88
All enterprises	96	90	.27	36	98	189	152	(-) 37

Flocks consisting of white-faced ewes provided highest net return per animal unit of minus 28 dollars, mixed ewe flocks returned smallest net return of minus 88 dollars, and black-faced ewe flocks returned an average of minus 76 dollars. Average net return for all enterprises was minus 37 dollars per animal unit.

Total receipts per animal unit were slightly higher for white-faced flocks than for mixed flocks; however, they were approximately 1/5 larger than receipts from black-faced ewe flocks. This was reflected through the value of lamb and wool sales which were also about 1/5 larger.

Total cost was highest for mixed ewe flocks and lowest for the white-faced ewe flocks. Labor was the major item making up total cost difference and ranged from an average of 34 dollars per animal unit for white-faced ewe flocks to an average of 54 dollars per animal unit for mixed ewe flocks. Labor costs for black-faced ewe flocks averaged 48 dollars per animal unit with an average of 36 dollars per animal unit for all flocks. Repair costs for buildings and equipment was nearly twice as high for black-faced than for white-faced ewe flocks, the costs being 23 and 54 cents per aniaml unit, respectively.

Building investment was also higher for black-faced ewe flocks than either white-faced or mixed ewe flocks. Investment per animal unit was 86 dollars for white-faced, 107 dollars for mixed, and 109 dollars for black-faced ewe flocks.

Death loss of mature sheep and of lambs after docking varied very little among flocks and, therefore, seemed to be a rather insignificant factor.

Number of measures better than average

In general, the enterprises that bring the greatest return are those which are above average in efficiency of performance of the important production operations. High efficiency in one measure offers no assurance of high net return, but as the number of measures above average increases, higher net return may be expected.

A sort was made on the basis of number of measures better than average to note relation with net return per animal unit, (table 22). Measures considered were, number of animal units per enterprise, hours of man labor per animal unit, feed cost per 100 dollars receipts, value of lamb sales per animal unit, value of wool sales per animal unit, and percent lamb crop.

There was a positive consistent relation between number of measures better than average and net return per animal unit. As number of measures increased from less than one to six, net return increased from minus 137 dollars to plus four dollars per animal unit.

Table 22. Relation of number of measures better than average to net return and other factors on 96 farm flock sheep enterprises. Northern Utah, 1959

Number of measures better than average	Number of records	Number of animal units	Labor per animal unit	Feed cost per $100 receipts	Value lamb sales per A.U.	Value wool sales per A.U.	Percent lamb crop	Total cost per A.U.	Total receipts per A.U.	Net return per A.U.
(number)	(number)	(number)	(hours)	(dollars)	(dollars)	(dollars)	(percent)	(dollars)	(dollars)	(dollars)
None	5	5.99	47	88	15	16	89	205	68	(-) 137
One	13	7.16	46	62	57	19	101	228	132	(-) 96
Two	24	11.63	35	49	61	18	120	201	135	(-) 66
Three	24	14.54	30	43	67	18	129	195	140	(-) 55
Four	17	19.40	23	38	81	18	135	171	163	(-) 8
Five	10	25.31	21	36	111	24	141	175	174	(-) 1
Six	3	28.68	20	41	115	29	154	172	176	4
All enterprises	96	15.00	29	51	78	20	130	189	152	(-) 37

SUMMARY

1. An economic study was made of 96 farm flocks of sheep in Box Elder, Cache, and Weber Counties, Utah. Size of flock ranged from 21 to 285 head with an average of 77 head for all flocks. The average flock consisted of 64 mature ewes, two rams, three yearlings, and eight lambs. Data were obtained from producers by use of survey techniques and pertained strictly to the 1959 production year.

2. Data were analyzed on the basis of one animal unit which was equal to five mature ewes and their lambs, five yearlings, or five rams. If lambs were part of the 1959 ending inventory, January to March lambs were considered .13 animal units and April to June lambs .08 animal units. The average flock was made up of 15 animal units.

3. Capital investment in the average enterprise was 230.62 dollars per animal unit and included investment in stock sheep, buildings, fences, land used for buildings, feedyards and corrals, feed and bedding material and equipment. Stock sheep were the largest single investment item and made up 45 percent of the total.

4. Average total cost for producing farm flock sheep was 188.97 dollars per animal unit. On a percentage basis, the costs were accounted for as follows: feed cost, 36.24 percent; labor cost, 19.25 percent; flock maintenance and inventory decrease, 17.11 percent; overhead cost, 14.75 percent; power cost, 6.73 percent; and material cost, 5.92 percent.

5. Average total receipts from the farm flock sheep enterprise amounted to 151.52 dollars per animal unit. Sale of lambs accounted for

51.30 percent; wool and pelt sales, 13.56 percent; value of inventory increase, 13.20 percent; manure credit 8.06 percent; government payments, 7.49 percent; sale of mature sheep, 5.93 percent; and value of home use, .46 percent of total receipts.

6. Net return to the enterprise and management was calculated by deducting total cost from total receipts, and amounted to minus 37.45 dollars per animal unit for the average flock. Only 16 of the 96 producers reported a positive return.

7. Net return to enterprise, management, operator and family labor, and pasture amounted to 19.44 dollars per animal unit for the average enterprise.

8. Number of animal units per enterprise was directly associated with net return per animal unit, as number of animal units increased, so did net return per animal unit. There was an inverse relation between number of animal units and total cost per animal unit, which was reflected through decreasing interest, labor, and overhead costs.

9. An inverse relation existed between man hours of labor per animal unit and net return per animal unit. Net return decreased from a class average of minus 18 to minus 101 dollars as number of hours increased from a class average of 17 to 62 per animal unit. Average man labor for all flocks was 29 hours per animal unit, and net return averaged minus 37 dollars per animal unit.

10. As feed cost per 100 dollars receipts increased, net return per animal unit decreased. Higher feed cost was associated with higher total cost, but had little effect upon total receipts. For the average flock, feed cost was 51 dollars per 100 dollars receipts. The

longest pasture season corresponded with lowest feed cost, and the shortest pasture season corresponded with highest feed cost.

11. There was a consistent direct relation between value of lamb sales and net return per animal unit. Net return ranged from a class average of minus 67 to minus 23 dollars for lamb sales ranging from a class average of 17 dollars to 127 dollars per animal unit. Average value lamb sales for all flocks was 78 dollars per animal unit and return minus 37 dollars per animal unit.

12. There seemed to be little association between value of wool sales and net return per animal unit. Value of wool sales averaged 20 dollars per animal unit and was associated with net return of minus 37 dollars per animal unit for all flocks. There was a positive association between value of wool sales and feed cost per animal unit; as wool sales increased, so did feed costs.

13. As percent lamb crop increased, there was a tendency for net return per animal unit to also increase, which was reflected primarily through increased total receipts. Total cost also increased as percent lamb crop increased and was due to higher feed, labor, and transportation costs. There was no apparent association between lamb crop and size of enterprise; however, lamb crop was effected by time of lambing. Flocks that lambed during March and April produced larger crops than those lambing in January and February. Average lamb crop of all flocks was 130 percent.

14. Net return was somewhat effected by breed of ewes. Flocks of white-faced ewes provided highest net return per animal unit with mixed white-faced and black-faced ewe flocks giving lowest net return per animal unit.

15. Number of efficiency measures better than average was associated positively with net return per animal unit. Net return increased from minus 137 dollars for the group with less than one measure better than average to plus four dollars for the enterprises with six measures better than average. The efficiency measures considered in this study were number of animal units per enterprise, hours of man labor per animal unit, feed cost per 100 dollars receipts, value of lamb sales per animal unit, value of wool sales per animal unit, and percent lamb crop.

CONCLUSIONS

The most successful enterprises were larger than average in size. Within the scope of this study the size of sheep enterprise was not encountered where net return decreased as size of flock increased. Since maximum size was not reached, increasing the number of sheep in the enterprise seemed to be a way of making the farm flock sheep enterprise more profitable or less unprofitable. However, in some instances, size could not be increased due to limited resources or inputs.

Lower feed cost resulted in lower total cost; thus, providing greater net return when total receipts remained the same. Lower feed cost often resulted from use of pasture and by elimination of waste through careful feeding practices. Since number of days the flock spent on pasture was a significant factor in cutting feed cost, it was concluded that the type of pasture utilized by sheep was somewhat different from other feeds and that pasture was given a lower dollar value than most feeds. Lower dollar values were placed upon pasture primarily for two reasons, lower quality feed, and smaller harvesting expense since sheep preformed the harvesting operation. Even though pasture feed was usually of lower quality and value, sheep were able to utilize it and still maintain production at relatively high levels. Many farms had ditch banks, weed patches, waste land, and land which could not be tilled that was utilized by the sheep. It was general consensus among producers that sheep utilized the feed growing in these areas better than any other type of livestock. The major portion

of pasture land had very few, if any alternative uses, Since feeding programs and pasture management were factors which a producer could control to a great extent, practices he used determined to a large degree his success in production.

Labor cost provided the greatest opportunity for reducing total cost and increasing net return. Labor cost per animal unit was cut by increasing the number of sheep in the flock and at no point did labor cost increase as size of enterprise increased. Adoption of labor saving techniques and utilizing buildings and equipment that was a substitute for labor greatly reduced labor cost. Producers should become aware of the fact that labor is an important input and one which can be controlled to a great extent.

Success in the farm flock sheep enterprise was associated with percent lamb crop which was influenced by various breeding and management practices. Opportunity existed for most of the enterprises, large or small, to increase materially the number of lambs produced and increasing the number of lambs provided one of the greatest possibilities of increasing net return.

Producers realized greater net return from white-faced ewe flocks than either black-faced or mixed ewe flocks. Since lower costs resulted in the production of particular breeds of sheep, producers should evaluate each breed as to potential production, physical requirement, and adaptability to environment. Personal preference often plays an important part in selection of breed and should not be disregarded.

Value of sales was an important determinant of financial success for the farm flock sheep enterprise. The producer decided when, where, and how much to sell, and made these decisions throughout the operation

of the enterprise. Since both lamb and wool sales are important items in providing receipts, producers should concentrate on maximizing production of each item.

In most cases, where other enterprises or other employment opportunities were available, producers of small flocks were actually forfeiting income. Only those producers with flocks consisting of large numbers of high quality breeding ewes, having access to large amounts of pasture, and preforming efficiently in all phases of production realized return which could be considered a fair wage to the operator or as an indicator for an economical enterprise.

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