Commercial FAMILY-OPERATED SHEEP RANCHES

Intermountain Region

1930-50

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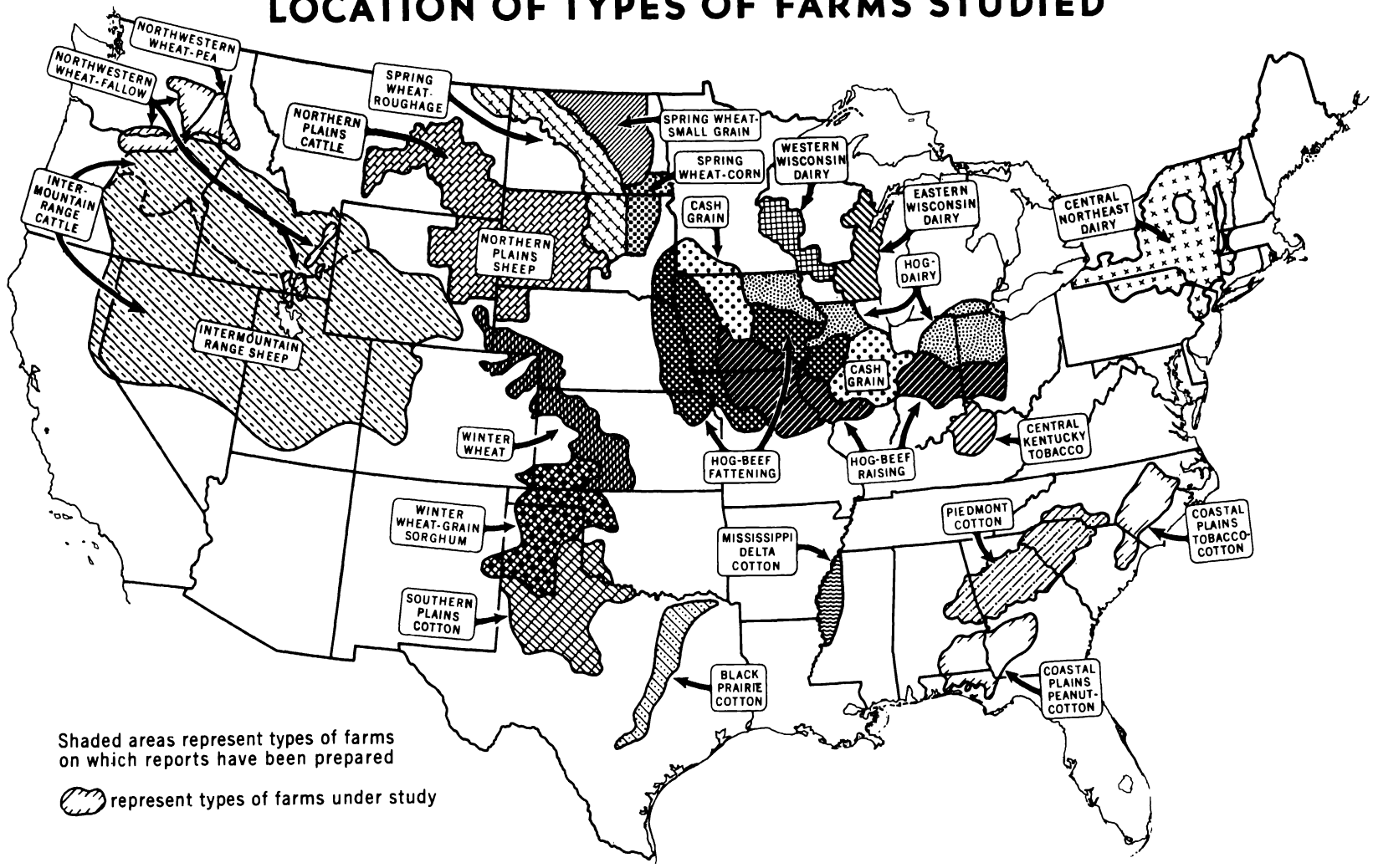
LOCATION OF TYPES OF FARMS STUDIED



U. S. DEPARTMENT OF AGRICULTURE

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COMMERCIAL FAMILY-OPERATED SHEEP RANCHES, INTERMOUNTAIN REGION, 1930-50 ORGANIZATION, COSTS, AND RETURNS 1/

By H. R. Hochmuth, Agricultural Economist

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INTRODUCTION

This publication reports the organization, investment, production, costs, and expenses from 1930 to 1950 on commercial family-operated sheep ranches in the Intermountain region. 2/

1/ Assistance and cooperation of the Utah Agricultural Experiment Station is acknowledged. Assistance was also obtained from the Colorado, Idaho, and Nevada Agricultural Experiment Stations.

2/ This report is a portion of a Nation-wide study of commercial farms and ranches by types and sizes in important farming regions of the United States, conducted by the Bureau of Agricultural Economics under the supervision of Wylie D. Goodsell. Objectives, methodology, procedure, and terms used in these studies are comparable. A statistical summary of these data for various types-of-farming regions was reported in Bureau of Agricultural Economics publication F.M. 55, "Typical Family-Operated Farms, 1930-45. Adjustments, Costs and Returns." The latest publication in this series is F.M. 82, "Farm Costs and Returns, 1950 with Comparisons, 16 Commercial Family-Operated Farms in 7 Major Farming Regions." F.M. 71 reports data for cattle ranches similar to the data in this report. See map on inside of cover page for location of types of farms studied.

Data presented here deal specifically with one-summer-band sheep ranches. In this area these one-band ranches are common operating units. Usually they average about 1,500 head of breeding animals, although the sheep ranches in the region range in size from 500 to 3,000 head. Of all sheep ranches in this region, 45 percent fall within this size range, and 41 percent of the stock sheep in the region are found on these ranches. 3/ Data collected in the study upon which this report is based deal exclusively with ranches in this size range. However, the results apply primarily to the average ranch within this range and no attempt is made to adjust the costs and returns data to the extreme limits of the range.

The western range sheep industry has changed greatly during the 21-year period included in the study. Total sheep numbers declined drastically, a disastrous drought occurred, prices received reached the lowest and highest points in history, experienced herders became scarce, and the Taylor Grazing Act became law. These and other forces are reflected in the costs and returns here reported.

The objectives of the study upon which this report is based were to measure and describe the changes in organization of sheep ranches, the costs and returns, ranch size, investment, and other items for the 21-year period. In addition, the study and resultant data can be compared with similar studies in other types-of-farming regions. Data in these series are kept current and published each year.

DESCRIPTION OF THE AREA

The Intermountain region has been described as "that area which separates California from the rest of the United States." The eastern resident who travels westward from the Great Plains may be inclined to agree with this statement. He sees mountain and plain, desert and salt flat, pine and spruce, sage brush and juniper. With the exception of irrigated areas and high mountains, the region seems one of vast unproductive space. However, this apparently barren area supports vegetation that is the foundation of the range livestock industry.

The Intermountain range-livestock area covered in this report extends south from the Snake River plains of Idaho to the southern borders of Utah, and west from the western slope of the Rockies of Colorado to the Sierra Nevada mountains of California (fig. 1).

3/ From an analysis of the Sixteenth Census of Agriculture (1939 data). Preliminary data for 1949 indicate that this size range has a greater percentage of all sheep ranches than the 1939 data. Many larger and smaller ranches have converted to cattle. The one-band sheep ranch, however, remains a stable operating unit.

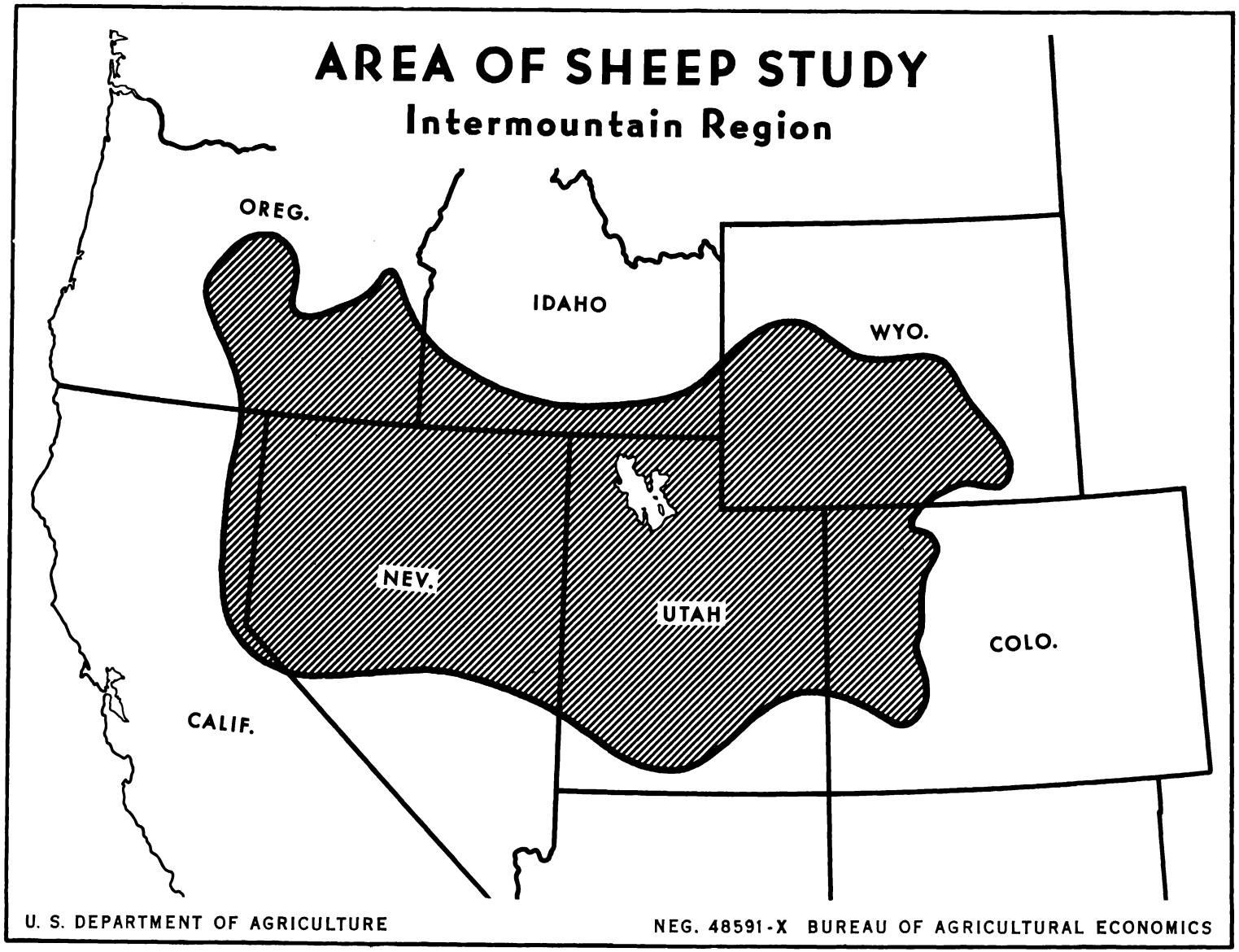

Figure 1.- The Intermountain region and surrounding areas comprise a vast pasture for range livestock. Sheep graze over most of the region in seasonal migrations to obtain the yearly forage requirement. The general movements of sheep to summer range outside of the study area are to the East, North, and West.

This region is characterized by vast stretches of grassland and brush-covered areas surrounding occasional mountain ranges that support timber of varying densities. These grassland and brush areas furnish winter and spring-fall grazing; the mountains furnish the summer grazing. Among or adjacent to the mountains are small fertile valleys in which crops are grown by irrigation.

The climate varies from subtropical in southern Nevada, where the elevation is less than 1,000 feet, to subartic in the high mountains of Colorado and Utah. Rainfall generally is sparse except in the high mountains where annual precipitation may exceed 40 inches. In desert areas annual precipitation may average only 5 inches.

Water in its various forms is the key to crop and livestock agriculture in this region. Storage of water by snow pack, by dams, or a combination of both, permits crop farming to flourish under irrigation. Without crops the range livestock industry could not survive in its present form on large areas of range land. Water helps to grow the feedstuffs that tide livestock over the winter period when forage is gone or is covered by snow.

Rain or snow is "liquid gold" so far as the rancher is concerned. The scant range vegetation produces only a small unit volume of forage, even under favorable conditions. In periods of less than normal precipitation the volume of forage declines to a low level and a disastrous shortage of forage faces the rancher. In this situation his only relief from calamity is rain and more rain.

Geography and topography and their effect on precipitation determine to a large extent the type of grazing economy in the Intermountain region. Topography and precipitation are the principal factors that determine seasonal ranges and seasonal range use. Range grazing is segregated into three fairly well-defined seasons of use. The summer range in the mountains has more than 20 inches of precipitation and summer forage is lush. Deep snows prevent grazing at other seasons. In the arid areas, winter range is at the lower elevations. This range is little used at other seasons mainly because of lack of water. In the winter months, water for sheep is obtained from melting snow and temporary water holes.

Spring-fall range in the foothills lies between winter and summer range. Here in the spring, after water is gone from the winter range, the sheep herds pause for a few weeks to lamb, to be sheared, and to await growth of forage in the high mountains. Again

in the fall, the herds pause on this range after leaving summer range. At this time lambs are sold and ewes are bred. When snow comes to the desert the herds are again trailed or shipped to the winter range. This completes the yearly cycle of operation and the sheep rancher's adaptation to topography and climate.

Irrigated fields of a wide variety of crops occupy the valley floors. Most of the specialty crops are produced on other types of operating units and are not a part of the ranch livestock organization. They make up the "crop-specialty" farms and part of the "general" farms that are found only in the valleys. Some hay land and small acreages of grains, however, are included in the sheep ranch organization. These lands supply pasture and winter-feed supplements for the herd. The range-livestock economy of this region is based upon the interdependent relationship of irrigated hay and pasture lands and the large acreages of private and public range lands.

SOURCES OF DATA

Data for this publication were drawn from many sources. Chief among these were: Crop and livestock correspondent records of the Bureau of Agricultural Economics, farm-and-ranch-management records including production rates from studies by the Land-Grant Colleges, livestock trend sheets of the Production Credit Associations of the Farm Credit Administration, licensed and permitted use records and commensurate property records of the Bureau of Land Management and the Forest Service, the many agricultural statistics compiled by the Bureau of Agricultural Economics and other agencies of the United States Department of Agriculture, and data relating to individual ranches classified by type and size from the United States Census of Agriculture and from special field surveys.

RANCH SIZE AND TYPE

In the many types-of-farming regions in the United States various measures are used to determine farm size. Measures of size used in cropping areas include, for example, crop acreages, numbers of cows milked, and gross income. In the range-livestock region and particularly for sheep ranches, crop acreage as a measure of size cannot be used. In the public range States, total ranch acreage is not a good measure of size. The proportion of private to public land, the type of range, and the considerable differences in grazing capacity combine to make acreage comparisons for size unusable.

Much forage is obtained from extensive use of open public grazing lands. Sheep graze by permit on public lands and the size of the permit may not be directly related to the acreage of land owned. Grazing privileges on public ranges are allotted on a per head basis, and the acreage over which the sheep graze is not easily measured. Allotments for public range use vary in acreage per head because of the greatly varying grazing capacities of range lands. In addition, grazing capacity may vary each year because of varying climatic conditions.

The size of the public grazing permit may be due to prior use of open range, location of ranch, control of water, demand for public grazing permits, and land commensurability. 4/ In the case of sheep ranches, use of public range before 1934 may be the determining factor in the number of sheep presently permitted on grazing district lands. Therefore, the past history of public range use is a factor in the size of ranch and the method of operation. Sheep ranchers who wish to increase their size of operations usually must obtain additional use of public lands. Normally this can be accomplished only by purchasing private land or livestock, either of which may carry grazing permits for public land.

The basic measure for size of sheep ranches is the number of sheep that are operated by the individual rancher. Cash receipts are associated to a high degree with the number of sheep on the ranch. The principal products produced are lamb, mutton, and wool. Very little income is derived from other sources.

Some ranches in the Intermountain region have both cattle and sheep enterprises. The sheep enterprise may be family sized in numbers but the combined sheep and cattle enterprises may place the ranch well above family size. These ranches did not meet the requirements as to size, and thus were not included in the study.

The region has many small mixed cattle and sheep ranches, with 50 to 100 head of cattle and perhaps 250 to 500 sheep. These ranches are family units in size but they did not meet the criteria for inclusion in the study, because they have no definitely defined single major enterprise.

The commercial family-operated sheep ranch may have a few head of beef cattle and some cropland. Hay and grain are the chief crops grown. Feed crops grown on the ranch are fed to the livestock;

4/ Commensurability is used in the public lands range States as a measure of the complementary relationship between public and private lands. A seasonal range must complement another seasonal range or use. Private lands have commensurability when a portion of public range is necessary for successful operation of the private lands.

generally none is sold. As a rule, sheep ranches do not grow all of the feed and supplements they require. Each year some purchases of protein and mineral supplements are necessary and normal. In years of adverse climatic conditions, large expenditures for feed are mandatory and these expenditures may force the ranch into severe financial stress.

Numbers of sheep ranches in the Intermountain region in 1940 with specified numbers of sheep and proportion of total income per ranch from livestock are given in table 1. Because sheep numbers are the best single measure of size, they are used in conjunction with gross income to set the lower limits of family-sized ranches. Ranches classified as sheep ranches in this study must derive at least 50 percent of the gross ranch income from sales of lambs, mutton, and wool. This combination of income and size limitation eliminates the mixed cattle and sheep ranches.

Calculations from table 1 show that ranches in the Intermountain region with less than 500 sheep constitute 38 percent of all ranches with sheep and 4 percent of the sheep numbers. Similarly, ranches with 500 to 3,099 sheep make up 45 percent of all ranches and contain 41 percent of all stock sheep. Ranches with more than 3,100 sheep per ranch comprise 17 percent of the total ranches in the region and have 55 percent of the total stock sheep.

This study deals with the middle group of ranches that have a yearly average of about 1,500 sheep. Sheep ranches larger than this have a gross income and investment considerably in excess of the practicable income and investment limits of commercial family-operated farms. 5/ Ranches with less than 1,000 sheep and particularly those with less than 500 sheep generally are mixed cattle and sheep ranches and do not obtain the majority of income from sheep.

5/ The range in size limits of commercial family-operated, part-time, and large-scale farms and ranches was determined by a comprehensive analysis of 1945 census schedules classified by type of farm in a large number of type-of-farming areas and for the United States. Three important criteria (value of products, value of land and buildings, and days of operator work off farm) were used to set the limits of the various economic classes of farms. In 1944, commercial family-operated farms generally included those farms which met the qualifications for type, had value of products ranging from $1,000 - $19,999, and on which the operator worked off the farm less than 100 days. Farms which began or discontinued (sold out) operations in the year enumerated were omitted.

Table 1.- Number of sheep farms by number of sheep in flock and percentage income from livestock, Intermountain region, 1940 1/

Income from livestock (percent)	Ranches in sample	Ranches with flock of-																			
		0-99	100-299	300-499	500-699	700-1,099	1,100-1,499	1,500-1,899	1,900-2,299	2,300-2,699	2,700-3,099	3,100-3,499	3,500-3,899	3,900-4,299	4,300-4,699	4,700-5,099	5,100-5,499	5,500-5,899	5,900-6,299	6,300 & over
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1-35																					
36-40	1	1																			
41-45	2	2																			
46-50	9		6	1	1	1															
51-55	8	1	4	1		1	1														
56-60	10	2	5		1				1		1										
61-65	15	1	7	4	1	1		1													
66-70	24	5	8	6	1	1	2			1											
71-75	22	4	8	4	4	1								1							
76-80	29	3	11	2	6	4	2	1													
81-85	50	8	14	5	6	7	3	3	1	1	1	1									
86-90	29	2	11	3	2	5	3	1		1				1							
91-95	52	5	11	9	2	5	9	4				2	2		3						
96-100	519	26	74	37	23	60	55	42	27	31	21	8	15	17	5	11	7	7	4	49	
Total	770	60	159	72	47	86	75	52	29	34	23	11	17	19	8	11	7	7	4	49	

1/ Obtained from a sample of livestock farms in the region, U. S. Census of Agriculture 1940. This table includes all farming units in the sample on which the major source of income was from livestock and the dominant enterprise was sheep.

The lower limit of size of range sheep operations has additional rigid limitations other than income. Range sheep are herded on the open range and the unit labor cost is high if the herd is small. Experience, and sometimes the requirements of public land agencies, dictate the minimum and maximum size of the herd.

Range sheep are usually herded in bands of 2,000 to 3,000 ewes in the winter and 1,200 to 1,500 ewes in the summer. The summer band also contains the lambs. This makes the total number of sheep in the summer band about the same as the winter band. Two summer bands usually are combined after selling the lambs and cull ewes to form a winter band. A band of this size is considered the practicable number that one herder can handle satisfactorily, and from the viewpoint of labor cost it is the more economical. Operators who have herds of less than band size usually combine their herds with other small herds on the range to reduce herding labor costs. If they do not combine on the range with other operators, they operate under fence as a farm flock.

A major objective of these studies of costs and returns on commercial family-operated farms and ranches is to compare directly the income, costs, and related items on farms of given types within an area and among type-of-farming areas. This particular report deals with only one group of ranches in a series of several. Within the size limitations of this group of sheep ranches, the income and cost data here presented are comparable to data in other reports in the series.

PHYSICAL CONDITIONS

The range sheep operator depends mainly on range lands to supply annual feed and forage requirements for his sheep. Feed from the cropland is used for supplemental feeding during the lambing and breeding seasons and on the winter grazing grounds. Feed grains and other concentrate feeds are bought to supplement farm-grown feeds during years of adverse climatic conditions and reduced crop production.

This program suffices for most years. However, during periods of extreme cold or heavy snows a sheepman operates under severe handicaps. The 1948-49 winter is an example of near disaster which a sheepman occasionally faces. Sheep on isolated winter ranges were unable to graze in the deep snow, and feeding was necessary. In some cases, hay dropped from low-flying aircraft was the only way in which some bands could be saved even though the cost was almost prohibitive.

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Heavy winter feeding of sheep is costly and when this is necessary, a sheepman makes little or no profit from the year's operations. Climatic conditions alone can vary death losses from the normal or usual average of 10 to 50 percent or more. In good forage years lambs may average as much as 80 pounds or more when sold, and in poor forage years they may average less than 60 pounds per lamb.

The success of a sheep ranch depends to some extent upon the weather and the volume of range forage produced. Although temperature and other climatic factors are involved, precipitation is the rancher's principal weather interest. From 1930-36 the index of precipitation was below the 1937-41 average. This was a period of great stress in the ranch country. Since 1937, precipitation has been near or above the average except for the adverse year of 1939.

The index of range feed condition is a measure of forage production. The level of this index generally is associated with variations in precipitation. Range feed condition, like precipitation, was below average during the 1931-35 period, and generally near or above average from 1940 to 1948. The index declined in 1949 and 1950 owing to the adverse winter weather of those years.

Two additional measures of general production conditions are the index of sheep condition and hay yields. The index of sheep condition is closely associated with range feed condition and has about the same pattern of departure from the average. Production of hay is not a major enterprise on sheep ranches, but to some extent the feeding program is based on the quantity of hay produced. Much of this is native hay and the amount of precipitation in winter and spring affects its production. Abundant spring water aids yield, and lack of run-off water reduces yield. Stored irrigation water further affects the yield of hay. Yields of hay were low during 1930-35 but for most years since 1935 they were well above average.

Net production, or net turn-off of livestock and livestock products, is directly affected by the lamb crop and by death loss. The effect of these two factors on net production is apparent in the year of occurrence and in one or more subsequent years. The level of the lamb crop is indirectly related to the level of precipitation. The high precipitation in 1941 was associated with one of the two highest reported lamb-crop years. The lowest average death occurred in 1941. However, other factors, and particularly temperature, during the lambing and shearing periods, influence the lamb

crop and death losses. Adverse weather after spring shearing increases the death loss in ewes. When cold weather occurs during or following lambing, additional losses of lambs are to be expected because most lambing is accomplished on the open range.

The years of less than average precipitation in the early 1930's were also years of less than average lamb crops. The greatest death loss occurred in 1932. In later years, the death loss lessened somewhat because drought brought forced sales and severe culling. These factors all combined to produce the disaster years of 1932-34 when net production declined to 72 percent of the 1937-41 average.

RANCH ORGANIZATION

Methods of Operation

Sheep ranching in most of the Intermountain region is highly extensive in character. Much of the range land is low in productivity as compared to croplands. Seemingly it has no higher economic use than for grazing by livestock, storage of water, and protection of the watershed. Except for large expanses of so-called winter range, many areas on the range are grazed in common by cattle and sheep. Winter range is generally restricted to use during the winter season because sufficient stock water is lacking during the summer. In the winter, sheep can graze the winter range by watering from snow or standing water resulting from melting snows.

Extensive migration is necessary so that sheep can graze the winter, spring-fall, and summer ranges. As a general rule, ranch headquarters are located in or near the spring-fall range area. The yearly cycle consists of lambing and shearing on spring range, migration to the high mountains for summer grazing, and thence migration to fall range. In the fall, lambs are sold, the breeding herd is culled, the ewes are bred and then moved to the winter ranges for 6 month's grazing. A return in April to spring range completes the cycle.

Some ranchers have private lands and public range grazing privileges so arranged that extensive migration of the herd is not necessary. Other ranchers must trail, truck, or ship their sheep by rail a one-way distance in excess of 100 miles. In recent years, trucking or rail shipment of sheep between seasonal ranges has increased. This has increased cash costs but in return the death loss is reduced and the lamb crop and gain per animal are greater.

Operators of family-sized one-band sheep ranches usually buy most of the breeding ewe replacements. Operators of ranches of this size and smaller find it difficult to operate on a dual basis, which requires raising the ewe replacements. Because ewes are kept for a dual purpose, that is, to produce both wool and market lambs, they must be crossbred. Breeding ewes are kept for their shearing and wool-producing qualities. However, wool-type breeds such as Rambouillet or Corriedale do not produce large, meaty-type lambs unless crossbred to mutton-type rams. Therefore, the ewes are bred to rams of such breeds as Suffolk, Hampshire, and Lincoln. The lambs produced are inferior for replacement of ewes and production of wool but they have the desired qualities for market lambs.

Range ewes are usually culled and sold if they have survived 6 years on the range. Aged ewes survive the trying range conditions only with difficulty. As they grow older, their teeth become defective or fall out from feeding on the harsh, dry, winter forage. Consequently, aged ewes become thin from improper nutrition and soon die. In recent years, aged cull range ewes have brought excellent prices. When placed on irrigated pasture or shipped east of the Rockies to softer feed they may have several more productive years.

Land and Crops

Total private land in the average family-operated sheep ranch decreased from 2,987 acres in 1930 to 2,294 acres in 1935, a decrease of 23 percent (table 2). Since 1935, the acreage of owned and leased land has more than doubled and in 1948 it totaled 5,257 acres, a record high. During the 21-year period, the proportion of land owned to total land operated increased from a low of 46 percent in 1930 to a high of 70 percent in 1949. In 1948, total land in the average ranch was 196 percent of the 1935-39 average and sheep numbers were 106 percent of the 1935-39 average.

It is not practicable to calculate the total acres per animal unit grazed by sheep ranches, as almost two-thirds of the animal-unit months of forage are obtained from public lands. However, an estimate of the acres per animal-unit month of use obtained from private lands has considerable meaning. Acreage per animal unit on these lands more than doubled during the period 1935 to 1950 (table 3). The peak of range ownership was reached in 1950 with 17.2 acres per animal unit. Since 1948, however, acres per animal unit have remained relatively stable.

One might expect that, with better range conditions and increased grazing capacity in the 1940's, animal units per acre of range land would increase. However, this has not been the case. There were several reasons for the decreased stocking rate per acre during the 1940's. Some reduction in intensity of use of public

Table 2.- Land use, livestock numbers, and distribution of income and expense, family-operated sheep ranches, Intermountain region, 1930-50

Item	Unit	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Total land in ranch	Acre	2,987	2,881	2,707	2,572	2,456	2,294	2,496	2,684	2,884	3,062	3,258	3,492	3,705	4,016	4,189	4,484	4,606	4,852	5,257	5,190	5,161
Proportion of ranch land in:																						
Cropland harvested	Percent	1.5	1.4	1.6	1.6	1.5	1.7	1.6	1.6	1.5	1.4	1.3	1.3	1.1	1.0	1.0	0.9	0.9	0.9	0.8	0.8	0.9
All other land	do.	98.5	98.6	98.4	98.4	98.5	98.3	98.4	98.4	98.5	98.6	98.7	98.7	98.9	99.0	99.0	99.1	99.1	99.1	99.2	99.2	99.1
Crops harvested:																						
Grain	Acre	14	12	12	11	9	11	12	12	14	12	12	15	13	13	12	13	12	13	12	12	14
Hay	do.	31	28	29	28	26	28	28	29	29	30	29	30	28	28	28	28	28	30	31	30	29
Other crops	do.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hay yield (Index numbers 1937-41=100)	Percent	93	81	93	89	84	94	97	100	102	92	101	105	102	100	100	98	101	100	103	105	107
Livestock on ranch January 1:																						
Cattle	Number	13.4	13.9	13.7	13.6	13.4	12.4	12.3	11.6	11.2	11.8	12.5	12.6	12.6	12.5	12.7	12.5	12.5	12.4	12.3	12.2	12.2
Hogs	do.	1.3	1.2	1.2	1.3	1.4	1.5	1.5	1.5	1.6	1.7	1.8	1.9	2.0	2.2	2.4	2.5	2.4	2.2	2.1	2.0	1.9
Poultry	do.	18	17	16	16	18	20	24	24	24	24	23	26	25	30	29	28	26	30	32	28	25
Horses	do.	6.9	7.9	7.9	8.0	8.5	8.0	8.0	7.9	7.7	6.9	7.5	7.9	7.9	8.0	7.9	8.0	7.9	7.7	7.7	7.5	7.4
Sheep	do.	1,486	1,494	1,463	1,453	1,453	1,434	1,443	1,451	1,449	1,451	1,448	1,437	1,425	1,419	1,420	1,428	1,444	1,493	1,537	1,540	1,498
Ranches with tractors	Percent	12	12	12	12	13	13	14	16	18	19	23	31	40	43	45	48	50	53	56	57	57
Proportion of cash receipts from:																						
Livestock	Percent	71	69	70	49	51	59	59	59	66	62	62	63	62	62	65	63	69	74	71	68	69
Livestock products	do.	29	31	30	48	41	36	38	38	29	32	34	33	35	35	31	34	28	23	27	30	30
Other	do.	0	0	0	3	8	5	3	3	5	6	4	4	3	3	4	3	3	3	2	2	1
Proportion of cash expenditures for:																						
Feed and seed	Percent	19	24	20	26	32	28	25	22	20	20	16	15	19	18	18	16	15	14	17	16	14
Livestock	do.	32	19	20	20	19	22	28	31	27	29	37	32	31	30	30	29	33	37	28	19	31
Labor	do.	23	27	23	20	19	18	18	17	19	18	16	19	22	26	28	29	26	25	27	31	24
Power and machinery	do.	9	10	11	13	11	13	11	13	16	17	16	20	14	14	14	14	13	12	14	18	18
General ranch	do.	9	11	16	10	9	9	9	9	9	8	8	7	7	5	5	6	8	7	8	10	8
Miscellaneous	do.	8	9	10	11	10	10	9	8	9	8	7	7	7	7	5	6	5	5	6	6	5

Table 3.- Animal units (AU) of sheep, acres of deeded land, and acres per animal unit, family-operated sheep ranches, Intermountain region, 1930-50 1/

Year	Animal units 2/	Cropland harvested					Range and pasture		Idle and waste	Total land	
		Grains	Hay	Other crops	Total	Crops per AU	Per ranch	Per AU		Per ranch	Per AU
	Number	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
1930	297	14	31	1	46	0.15	2,890	9.7	51	2,987	10.1
1931	299	12	28	1	41	.14	2,790	9.3	50	2,881	9.6
1932	293	12	29	1	42	.14	2,619	8.9	46	2,707	9.2
1933	291	11	28	1	40	.14	2,488	8.5	44	2,572	8.8
1934	291	9	26	1	36	.12	2,378	8.2	42	2,456	8.4
1935	287	11	28	1	40	.14	2,215	7.7	39	2,294	8.0
1936	289	12	28	1	41	.14	2,413	8.3	42	2,496	8.6
1937	290	12	29	1	42	.14	2,596	9.0	46	2,684	9.3
1938	290	14	29	1	44	.15	2,791	9.6	49	2,884	9.9
1939	290	12	30	1	43	.15	2,967	10.2	52	3,062	10.6
1940	290	12	29	1	42	.14	3,161	10.9	55	3,258	11.2
1941	287	15	30	1	46	.16	3,387	11.8	59	3,492	12.2
1942	285	13	28	1	42	.15	3,600	12.6	63	3,705	13.0
1943	284	13	28	1	42	.15	3,906	13.8	68	4,016	14.1
1944	284	12	28	1	41	.14	4,077	14.4	71	4,189	14.8
1945	286	13	28	1	42	.15	4,366	15.3	76	4,484	15.7
1946	289	12	28	1	41	.14	4,487	15.5	78	4,606	15.9
1947	299	13	30	1	44	.15	4,726	15.8	82	4,852	16.2
1948	307	12	31	1	44	.14	5,121	16.7	91	5,257	17.1
1949	308	12	30	1	43	.14	5,059	16.4	88	5,190	16.9
1950	300	14	29	1	44	.15	5,029	16.8	88	5,161	17.2

1/ Includes all deeded, owned, and leased lands but not Federal lands.
2/ January 1 sheep numbers converted to AU on basis of 5 sheep per AU.

lands occurred but this was not a major contributing cause. The chief cause was the Taylor Grazing Act with its commensurability standards which required increased ownership and leasing of private lands to form stable ranching units.

Before 1935 many sheep operations of one band and larger were entirely nomadic in character. Sometimes they obtained 100 percent of their forage from nonowned lands. Through the administration of public lands this type of operation has disappeared from the western scene. Nomadic ranchers who did not obtain ranch bases and private lands upon which to operate during a portion of the year discontinued operations. The Taylor Grazing Act was intended as a step toward greater stability of ranch operations and conservation of range lands and it has proved successful in these respects.

Ranchers have become more conservation minded and many have instituted a policy of reduced stocking on their range lands. This requires a larger acreage per animal unit of grazing. In addition, a rancher now feels a greater degree of security if he owns or controls larger acreages of private range lands.

Sheep operators are concerned principally with two types of Federal land ownership (table 4). These major divisions of Federal lands are: National forests administered by the Forest Service of the United States Department of Agriculture and grazing districts administered by the Bureau of Land Management of the United States Department of the Interior. The bulk of grazing permitted on the national forests in the Intermountain region occurs during the summer, although some grazing on other seasonal range types is available. On the other hand, grazing districts contain large acreages of winter range land and lesser acreages of spring-fall and summer range. All of these types of seasonal range, regardless of ownership, are necessary for the yearly operation of range sheep. Most one-band and larger sheep ranches in the Intermountain region use both types of Federal lands in their yearly operations.

Family-operated sheep ranches obtain an average of about 2,500 animal-unit months of grazing from public lands. National forests furnish 35 percent of this use and 65 percent is furnished by grazing districts. National forests, which are generally at higher elevations, have a comparatively short grazing season of 3 to 4 months. Here vegetal growth starts late in the spring after the snow has melted and is rapid in the summer until it is halted by early fall frosts and snows.

Table 4.- Amount of sheep-grazing permitted on Federal lands per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	National forest			Sheep owned	Grazing districts		Total sheep-months of grazing 2/
	Sheep permitted	Average grazing season	Sheep-months of grazing		Average grazing season 1/	Sheep-months of grazing	
	Number	Months	Months	Number	Months	Months	Sheep-months
1930	1,441	4.00	5,764	1,486	--	--	5,764
1931	1,442	3.97	5,725	1,494	--	--	5,725
1932	1,404	3.93	5,518	1,463	--	--	5,518
1933	1,386	3.88	5,378	1,453	--	--	5,378
1934	1,377	3.83	5,274	1,453	--	--	5,274
1935	1,352	3.76	5,084	1,434	--	--	5,084
1936	1,355	3.70	5,014	1,434	5.5	7,936	12,950
1937	1,357	3.62	4,912	1,451	5.5	7,980	12,892
1938	1,352	3.55	4,800	1,449	5.5	7,969	12,769
1939	1,351	3.48	4,701	1,451	5.5	7,980	12,681
1940	1,347	3.40	4,580	1,448	5.5	7,964	12,544
1941	1,335	3.39	4,526	1,437	5.5	7,903	12,429
1942	1,322	3.37	4,455	1,425	5.5	7,837	12,292
1943	1,315	3.36	4,418	1,419	5.5	7,804	12,222
1944	1,315	3.34	4,392	1,420	5.5	7,810	12,202
1945	1,321	3.32	4,386	1,428	5.5	7,854	12,240
1946	1,334	3.30	4,402	1,444	5.5	7,942	12,344
1947	1,377	3.28	4,517	1,493	5.5	8,211	12,728
1948	1,414	3.26	4,610	1,537	5.5	8,453	13,063
1949	1,415	3.25	4,599	1,540	5.5	8,470	13,069
1950	1,378	3.25	4,478	1,498	5.5	8,239	12,717

1/ Grazing district administration began in 1936. The length of grazing season has not changed but in some instances sheep ranches have nonuse permits and do not graze all their permitted numbers on the grazing districts.

2/ Includes only National forest use prior to 1936.

Grazing permits for sheep on grazing districts at lower elevations average about 5.5 months in length. However, national forest ranges with a shorter season and lesser acreage probably produce as much or more forage per animal grazed than do the grazing districts. In addition, ewes on the summer range are accompanied by their lambs and consumption of forage by lambs is not counted in animal-unit months of forage consumed.

Public lands furnish the greater part of the yearly feed and forage requirements of family-operated sheep ranches (table 5). In recent years, public lands have furnished 71 percent of the annual feed and forage requirements, whereas private lands supplied 29 percent. About 8 percent of the total comes from cropland and 21 percent from private range and pasture. These data do not include the supplemental feeds bought.

A gradual but small decrease in use of public land by sheep of the ranches included in the study has taken place since 1930. Some of this decrease comes from the shortening of the grazing season on national forests by the Forest Service to protect and improve the range. However, much of the change can be credited to the significant increases in private land purchases and leases by sheep ranchers. Present data indicate that family-sized sheep ranches which remained in operation over the 1930-50 period were not greatly affected by reduction policies of public land agencies. These data do not apply to sheep ranches that have discontinued operations or have changed to cattle. In total, use of public lands by sheep has declined greatly because of the large reduction in numbers of sheep in the Intermountain region.

Acreages of cropland on family-operated sheep ranches changed very little in the 21-year period 1930-50 (table 6). About 42 acres are in cropland. All of this is irrigated or sub-irrigated. The 12 to 14 acres of grains account for about 29 percent of the cropland. Principal grains are wheat, oats, and barley grown as feed for ranch stock. Hay is produced on the remaining 30 acres of cropland. About a third of the hay land is in alfalfa and two-thirds is other tame and wild hay. The yield of hay averages about 1.5 tons per acre. In drought years when spring run-off water is short, hay fields may yield less than 1 ton per acre. The average family-sized sheep ranch produces from 40 to 50 tons of hay each year, all of which is used for spring and fall feed and to supplement range forage through the winter. Cropland furnishes less than 10 percent of the annual feed and forage requirements and is less important than range land in the operating scheme of a sheep ranch.

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Table 5.- Distribution of animal units of feed and forage for sheep by types of land, family-operated sheep ranches, Intermountain region, 1930-50

Year	AUM's of feed and forage per ranch 1/				Percentage distribution of AUM's				Private range per animal unit month
	Crop land	Range land		Total	Crop land	Range land		Total	
		Public 2/	Private			Public	Private		
	AUM	AUM	AUM	AUM	Percent	Percent	Percent	Percent	Acres
1930	282	2,788	496	3,566	8	78	14	100	5.8
1931	231	2,788	567	3,586	6	78	16	100	5.7
1932	268	2,712	531	3,511	8	77	15	100	4.9
1933	251	2,674	562	3,487	7	77	16	100	4.4
1934	222	2,653	612	3,487	6	76	18	100	3.9
1935	261	2,596	585	3,442	8	75	17	100	3.8
1936	266	2,589	608	3,463	7	75	18	100	4.0
1937	283	2,577	622	3,482	8	74	18	100	4.2
1938	288	2,553	637	3,478	8	73	19	100	4.4
1939	275	2,536	671	3,482	8	73	19	100	4.4
1940	288	2,509	733	3,530	8	71	21	100	4.3
1941	305	2,486	658	3,449	9	72	19	100	5.1
1942	276	2,459	685	3,420	8	72	20	100	5.3
1943	276	2,443	687	3,406	8	72	20	100	5.7
1944	276	2,440	692	3,408	8	72	20	100	5.9
1945	271	2,448	708	3,427	8	71	21	100	6.2
1946	276	2,469	721	3,466	8	71	21	100	6.2
1947	295	2,544	744	3,583	8	71	21	100	6.4
1948	312	2,613	764	3,689	8	71	21	100	6.7
1949	305	2,615	776	3,696	8	71	21	100	6.5
1950	296	2,544	755	3,595	8	71	21	100	6.7

1/ Sheep converted to animal units on basis of 5 sheep = one AU. An animal unit month (AUM) of forage as used here does not imply the quantity or quality of forage but it indicates a time basis only.

2/ Includes only Federal lands. State lands considered as private. Use on public domain prior to 1936 considered as 5.5 months grazing season.

Table 6.- Harvested acres, yield and production of small grain, and hay per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	Small grains			Alfalfa			Other hay			Total hay produced	All hay yield
	Acres	Yield	Produced	Acres	Yield	Produced	Acres	Yield	Produced		
	Acres	Bushels	Bushels	Acres	Tons	Tons	Acres	Tons	Tons	Tons	Tons
1930	14	27.8	389	8	2.12	17.0	23	1.16	26.7	43.7	1.41
1931	12	21.6	259	8	1.87	15.0	20	1.01	20.2	35.2	1.26
1932	12	25.1	301	8	2.08	16.6	21	1.21	25.4	42.0	1.45
1933	11	22.8	251	8	1.99	15.9	20	1.16	23.2	39.1	1.39
1934	9	20.1	181	8	1.88	15.0	18	1.05	18.9	33.9	1.30
1935	11	25.0	275	9	2.10	18.9	19	1.15	21.9	40.8	1.46
1936	12	24.9	299	9	2.22	20.0	19	1.18	22.4	42.4	1.51
1937	12	26.3	316	10	2.16	21.6	19	1.23	23.4	45.0	1.55
1938	14	27.2	381	10	2.19	21.9	19	1.25	23.8	45.7	1.58
1939	12	26.3	316	10	2.07	20.7	20	1.12	22.4	43.1	1.44
1940	12	26.4	317	10	2.20	22.0	19	1.24	23.6	45.6	1.57
1941	15	30.9	464	10	2.29	22.9	20	1.32	26.4	49.3	1.64
1942	13	30.1	391	9	2.21	20.0	19	1.27	24.1	44.1	1.58
1943	13	28.8	374	9	2.23	20.1	19	1.23	23.4	43.5	1.55
1944	12	29.5	354	9	2.26	20.3	19	1.23	23.4	43.7	1.56
1945	13	29.9	389	9	2.23	20.1	19	1.20	22.8	42.9	1.53
1946	12	30.5	366	9	2.23	20.1	19	1.26	23.9	44.0	1.57
1947	13	31.4	408	10	2.35	23.5	20	1.17	23.4	46.9	1.56
1948	12	31.4	377	10	2.38	23.8	21	1.23	25.8	49.6	1.60
1949	12	30.9	371	10	2.41	24.1	20	1.25	25.0	49.1	1.64
1950	14	29.4	412	12	2.28	27.4	17	1.22	20.7	48.1	1.66

Livestock

The average number of sheep per ranch on family-operated sheep units has not varied greatly over the 21-year period 1930-50. Average numbers per ranch on January 1 reached a low of only 1,419 head in 1943 and a high of 1,540 in 1949, a variation of 121 head (table 7). There are definite reasons for stability of size in range sheep operations. Sheep are herded in ewe bands in a certain size range, usually 1,000 to 1,500 ewes per band for summer range and 2,000 to 3,000 ewes for winter range. The size is determined by the land-tenure pattern, public-grazing privileges, and over-all investment requirements. Once a band size (number of breeding ewes) is adapted to physical production factors, the operator seldom varies his numbers greatly except to add or subtract units of band size. This is not so true of small sheep ranches with less than band size or farm flocks. These ranches operate mostly under fence and on private lands. The size of these units depends almost wholly upon available feed and forage and alternative opportunities.

Labor also affects the size of range sheep units, accounting for about 25 percent of the cash costs. A large share of the labor costs are fixed. Sheep must have at least one herder and if the number of sheep in the band is greatly reduced, the labor cost per head becomes almost prohibitive. This factor alone accounts for the relative stability in number of sheep on family-operated sheep ranches.

Although the number of sheep per family-operated ranch has remained fairly constant, the total number of sheep in the Intermountain region has declined. This reduction in numbers has been particularly precipitous since 1941 (fig. 2). The number of sheep in the region dropped from 16.4 million head in 1931 to 7.3 million head in 1950,a decline of 55 percent. During this period the number of cattle increased steadily.

Prices of lambs and wool rose during this period. Lambs averaged $24.73 per hundredweight in 1950 compared with an average of $5.46 per hundredweight in 1930-34. Wool sold at 56 cents a pound in 1950 and about 16 cents in the 1930-34 period. Since 1938, prices of lamb have increased in about the same proportion as prices of beef. However, the ratio value per head of cattle to value per head of lamb and wool indicates that cattle had a slightly better price advantage compared with sheep in the postwar years (fig. 3).

Although in recent years cattle have had a slight price advantage over sheep, this in itself cannot account for the great reduction in numbers of sheep. Sheep units that have maintained

Table 7.- Livestock inventory per ranch January 1, family-operated sheep ranches, Intermountain region, 1930-50

Year	Sheep							Total sheep	Other livestock				
	Breeding ewes				Other sheep								
	Yearlings	2-5 years	Aged	Total breeding ewes	Lambs	Bucks	Wethers		All hogs	Chickens	All horses	Cows milked	Other cattle
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1930	230	841	170	1,241	200	30	15	1,486	1.3	18	6.9	1.7	11.7
1931	209	881	179	1,269	180	32	13	1,494	1.2	17	7.9	1.5	12.4
1932	161	878	205	1,244	174	31	14	1,463	1.2	16	7.9	1.5	12.2
1933	163	832	221	1,216	192	30	15	1,453	1.3	16	8.0	1.4	12.2
1934	174	814	203	1,191	218	31	13	1,453	1.4	18	8.5	1.3	12.1
1935	204	793	189	1,186	204	30	14	1,434	1.5	20	8.0	1.2	11.2
1936	216	836	174	1,226	173	31	13	1,443	1.5	24	8.0	1.3	11.0
1937	189	884	174	1,247	160	31	13	1,451	1.5	24	7.9	1.4	10.2
1938	174	912	160	1,246	159	31	13	1,449	1.6	24	7.7	1.5	9.7
1939	203	899	131	1,233	174	31	13	1,451	1.7	24	6.9	1.7	10.1
1940	232	825	145	1,202	203	30	13	1,448	1.8	23	7.5	1.9	10.6
1941	259	776	158	1,193	201	30	13	1,437	1.9	26	7.9	2.0	10.6
1942	256	770	185	1,211	171	30	13	1,425	2.0	25	7.9	1.8	10.8
1943	213	863	184	1,260	113	32	14	1,419	2.2	30	8.0	1.7	10.8
1944	185	905	199	1,289	85	32	14	1,420	2.4	29	7.9	1.7	11.0
1945	143	953	200	1,296	86	32	14	1,428	2.5	28	8.0	1.6	10.9
1946	159	950	202	1,311	87	32	14	1,444	2.4	26	7.9	1.6	10.9
1947	149	953	224	1,326	119	33	15	1,493	2.2	30	7.7	1.6	10.8
1948	169	905	246	1,320	169	33	15	1,537	2.1	32	7.7	1.5	10.8
1949	210	830	272	1,312	180	33	15	1,540	2.0	28	7.5	1.5	10.7
1950	195	822	255	1,272	179	32	15	1,498	1.9	25	7.4	1.4	10.8

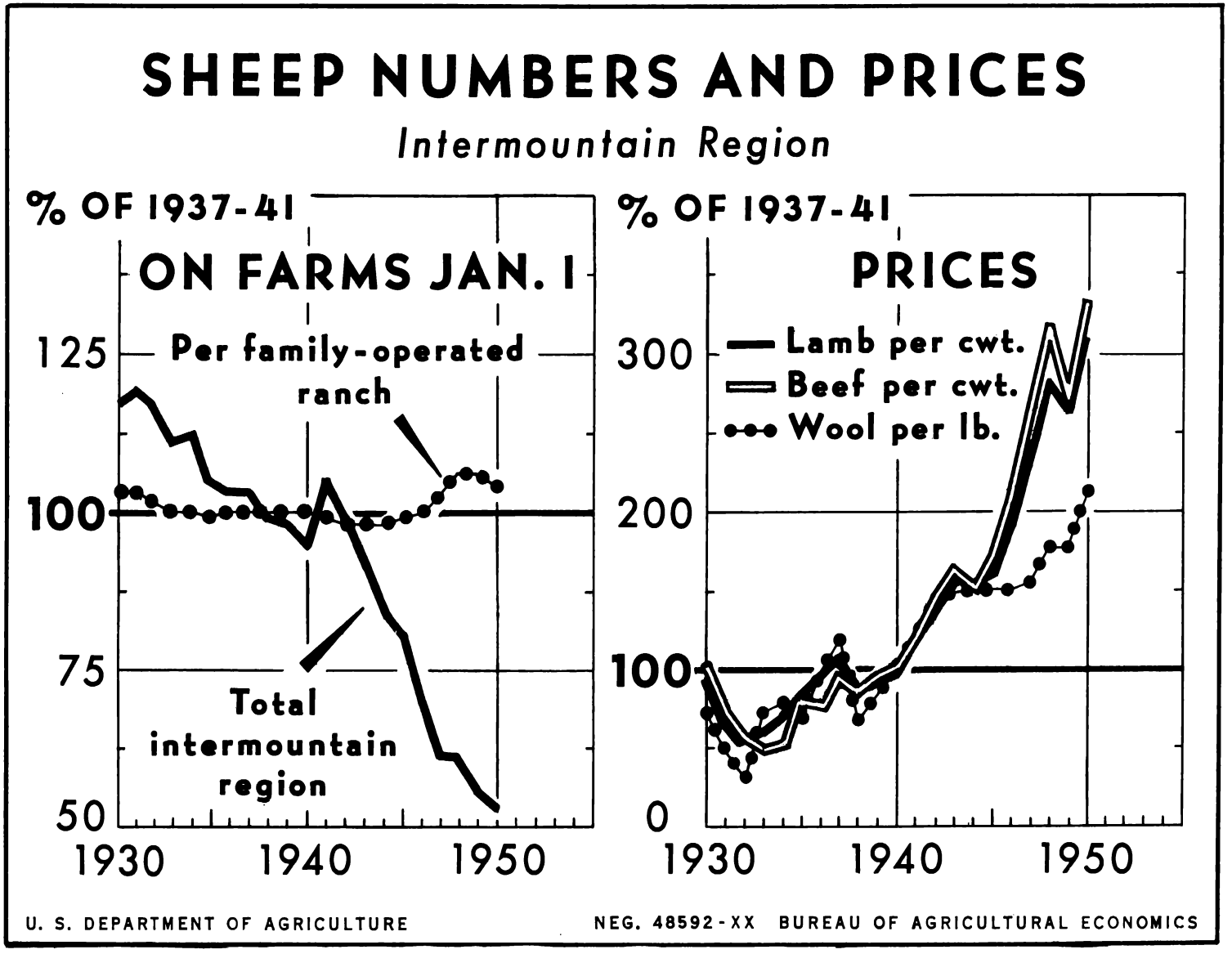

Figure 2.- Total sheep on farms in the Intermountain region in 1950 were less than half of the 1931 numbers while sheep numbers on family-operated ranches in the regions remained relatively stable from 1930 to 1950. Lamb and wool prices were almost six times as great in 1950 as in 1932. Lamb and beef prices closely paralleled each other throughout the 21 years.

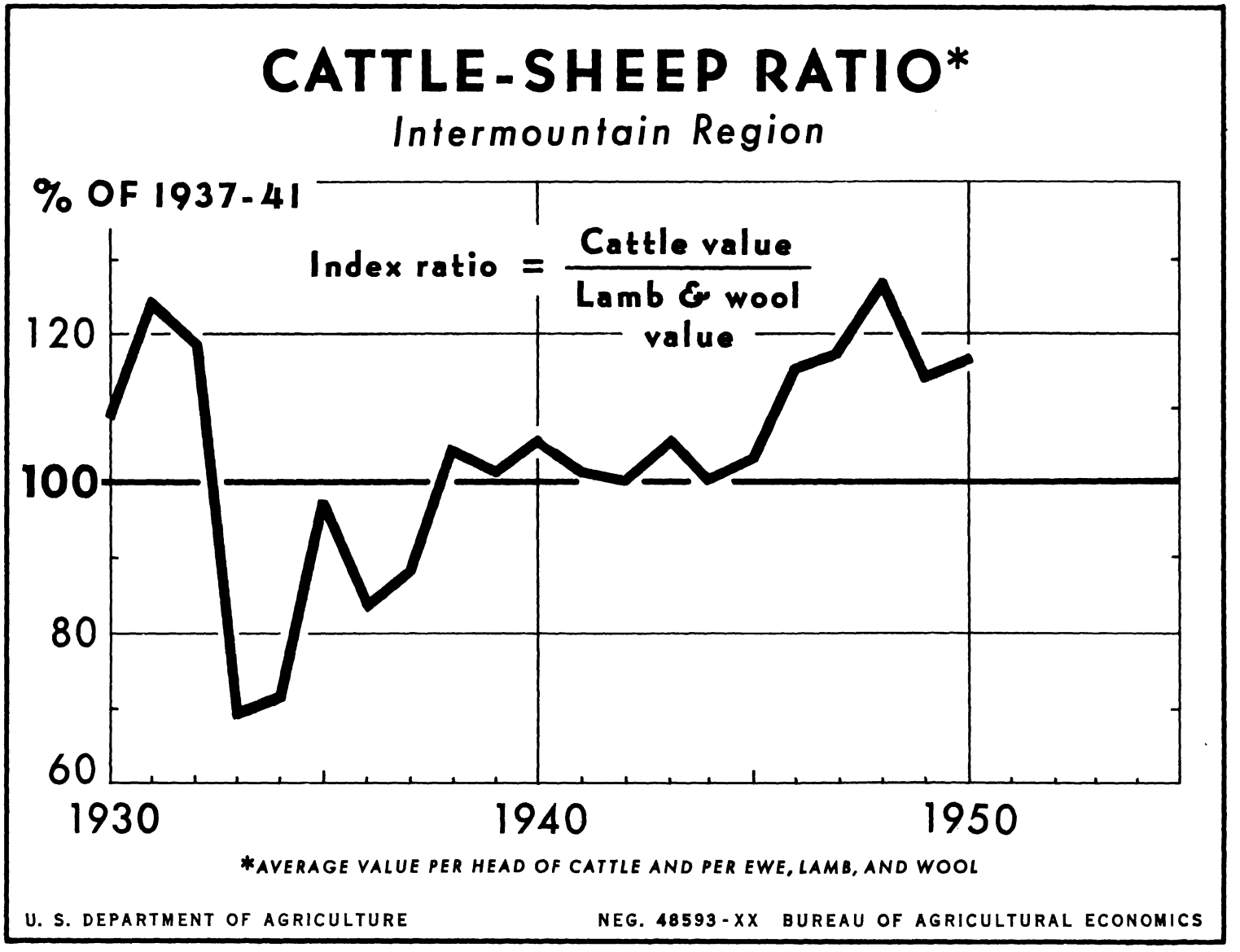

Figure 3.- Sheep numbers have decreased and cattle numbers have increased since 1933. The ratio index of cattle values to lamb and wool values has shown a general increase from 1933 to 1948, indicating a more favorable gross price relationship of cattle over sheep.

numbers have received fair to good returns in recent years. These units did not contribute to the reduction in sheep numbers. The reduction can be attributed to combination cattle and sheep units that eliminated the sheep enterprise and to large sheep ranches that have converted completely to cattle.

The difficulty of obtaining good labor and herders is the paramount reason given by most ranchers for converting from sheep to cattle. Sheep herding is a specialized type of animal husbandry. A poor or untrained herder can destroy a large investment in a matter of hours by poor judgment or lack of initiative. The younger generation of native-born Americans are not attracted to sheep herding as an occupation. Herders usually are recruited from Spain and Mexico, and from the Indian tribes of the Intermountain region and the Southwest.

Additional but little stressed reason for reduction in sheep in the Western States is the large investment required to maintain a range band of sheep. Total investment for a ranch grazing 1,200 to 1,500 sheep at postwar prices is usually not less than $50,000 and may exceed $75,000. Young men who wish to enter sheep ranching usually do not have sufficient credit or capital to buy a unit already in operation. The day has passed when the enterprising could start with a few head of sheep and build into an economic ranching unit. Existing ranch units are sold off as the older generation relinquishes control because the heirs do not wish to enter the business of sheep ranching. Purchasers have been inclined to sell the sheep and stock the ranches with cattle.

The depreciation rate on range ewes is high, varying from 15 to 25 percent among ranches. The normal life of the breeding ewe in the breeding flock is about 5 to 6 years. Average death losses of 10 percent, plus tough, harsh forage that damages teeth, and long trails, contribute to the relatively short productive life of the range ewe (table 8). Old ewes are sold either for mutton or to farmers with farm flocks. The old ewes may have two to four additional years of productive life if given proper care and soft or more suitable feed. Aged ewes from the western range are a good source of breeding stock for farm flocks of the Great Plains and the Corn Belt.

Sales of lambs on family-operated sheep ranches do not vary greatly from year to year because few replacements are kept. When sales of lambs are down in any year, the cause is usually a combination of poor production conditions or poor management. In some years

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Table 8.- Sheep production, sales, and purchases per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	Inventory Jan. 1	Lambs born	Purchased			Sold			Died			Slaughtered	Inventory Dec. 31
			Lambs	Ewes	Bucks	Lambs	Ewes and wethers	Bucks	Lambs	Ewes	Other sheep		
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1930	1,486	1,067	73	105	4	855	183	-	92	94	2	15	1,494
1931	1,494	1,079	61	90	1	855	189	-	96	105	2	15	1,463
1932	1,463	833	48	101	2	607	140	-	67	162	3	15	1,453
1933	1,453	851	39	110	4	590	177	-	69	150	3	15	1,453
1934	1,453	953	42	61	8	702	181	7	74	102	2	15	1,434
1935	1,434	878	13	118	10	626	176	7	79	106	2	14	1,443
1936	1,443	993	38	118	9	770	161	7	87	109	2	14	1,451
1937	1,451	998	51	161	10	795	206	7	81	116	3	14	1,449
1938	1,449	1,072	23	116	7	820	186	5	87	102	2	14	1,451
1939	1,451	1,073	104	104	5	877	208	4	83	101	2	14	1,448
1940	1,448	1,070	140	151	7	916	268	5	79	95	2	14	1,437
1941	1,437	1,098	60	168	7	893	264	5	80	87	2	14	1,425
1942	1,425	1,041	11	170	7	845	192	3	80	99	2	14	1,419
1943	1,419	1,058	13	187	7	886	163	4	86	108	3	14	1,420
1944	1,420	1,083	34	209	7	916	161	4	101	126	3	14	1,428
1945	1,428	1,101	26	231	7	931	188	3	96	114	3	14	1,444
1946	1,444	1,181	98	244	7	1,039	196	4	106	119	3	14	1,493
1947	1,493	1,220	113	243	7	1,045	249	4	104	119	3	15	1,537
1948	1,537	1,201	35	171	7	935	231	4	106	117	3	15	1,540
1949	1,540	1,128	-	102	8	830	172	5	104	150	4	15	1,498
1950	1,498	1,119	-	137	8	847	126	4	95	129	4	14	1,543

climatic conditions are such that the lamb crop is low and the death loss is high. Examples of great variations in numbers of lambs sold, because of production conditions, are the years 1933 and 1946. In 1933, 590 lambs were sold from a herd averaging about 1,450 head January 1. In 1946, 1,039 lambs were sold from a slightly smaller herd of about 1,444 head. The lamb crop was low and the death loss of ewes was high in 1933. In 1946, this situation was reversed.

Over the 1930-50 period, the lamb crop varied from a low of 67 to a high of 92 percent, with an average of 84 percent (table 9). From 1932 to 1937 the lamb crop was considerably below average. These were the years of poor production conditions, less than normal precipitation, scant range forage, and generally below-average condition of sheep. Low lamb crops, greater than average death losses, a reduction in the weight of lambs, and depressed prices for lamb and wool almost spelled disaster for the sheep operator during the period from 1932 to 1936.

The variation in the lamb crop is as great between individual ranches as between good and bad years. Lamb crops on ranches with poor resources and poor management may average less than 75 percent. Generally speaking, these ranches also produce light-weight lambs. Ranches with consistently poor lamb crops and light weights are marginal producers. At the other end of the scale are range-sheep operators who have lamb crops of 100 percent and even more, and who are producing fat lambs at 85 pounds. These are the efficient producers with sound management and excellent arrangement of their land and capital resources.

Except in years of abnormal climatic conditions, average death losses from all causes remain relatively stable on the average ranch. The death loss of ewes on family-operated sheep ranches averaged about 9 percent with a high of 13 percent in 1932 and a low of 7.3 percent in 1941. Death loss of lambs averaged about 8.4 percent, with a low of 7.3 and a high of 9.3 percent.

The income of any sheepman depends to a considerable extent on the weight and condition of the lambs he produces. During the 21-year period, the average weight of lambs sold from family-operated ranches was 71 pounds. In 1934, lambs were sold at an average weight of 63 pounds and in 1941 they sold at 79 pounds. Lambs that weigh from 75 to 80 pounds or more can be sold directly for slaughter. Usually lambs of lesser weights are sold for additional feeding or for fattening in feed lots before going to slaughter. Most of the lambs in the Intermountain region are sold as feeders. Exceptions are noted for early lambs raised in southern Idaho and lambs from ranches in areas that have high-capacity summer range.

Table 9.- Sheep production rates in current year, per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	Breeding ewes January 1	Lamb crop 1/	Death loss		Weight per head lambs sold	Sheep sheared	Wool clip per head
			Lambs	Other sheep			
	Number	Percent	Percent	Percent	Pounds	Number	Pounds
1930	1,241	86	8.6	7.6	77	1,430	8.84
1931	1,269	85	8.9	8.3	68	1,433	8.99
1932	1,244	67	8.1	13.0	71	1,368	8.17
1933	1,216	70	8.1	12.3	67	1,363	8.52
1934	1,191	80	7.8	8.6	63	1,391	8.31
1935	1,186	74	9.0	8.9	67	1,371	8.12
1936	1,226	81	8.8	8.9	72	1,378	9.06
1937	1,247	80	8.1	9.3	71	1,384	8.37
1938	1,246	86	8.1	8.2	76	1,390	8.61
1939	1,233	87	7.7	8.2	68	1,392	8.76
1940	1,202	89	7.4	7.9	72	1,390	9.18
1941	1,193	92	7.3	7.3	79	1,385	8.94
1942	1,211	86	7.7	8.2	74	1,367	8.86
1943	1,260	84	8.1	8.6	72	1,358	9.70
1944	1,289	84	9.3	9.8	72	1,350	8.46
1945	1,296	85	8.7	8.8	73	1,365	9.81
1946	1,311	90	9.0	9.1	72	1,378	9.36
1947	1,326	92	8.5	9.0	74	1,426	9.52
1948	1,320	91	8.8	8.9	70	1,469	9.66
1949	1,312	86	9.2	11.4	67	1,452	9.19
1950	1,272	88	8.5	8.9	68	1,434	9.43

1/ Lambs born as a percentage of breeding ewes January 1.

Wool per head of sheep sheared averaged 8.9 pounds for the period 1930-50. The lowest wool clip of 8.1 pounds per head was obtained in 1935 and the highest in 1945 with 9.8 pounds per head. The wool clip per head depends mainly upon two factors: (1) The breed or breeds of sheep, and (2) the level of physical production factors. Some relation is found between forage supply, sheep condition, and wool clip. The best of wool breeds will not produce a top wool clip if forage conditions are such that the nutritional level and vigor of the sheep is lowered. However, this relationship is not as pronounced as is the relationship between the weight of lambs and the supply of forage.

The average family-operated sheep ranch maintains about seven horses. The number of horses varies very little from year to year. The horses are mostly saddle stock but some are used for draft, principally to move the sheep camps from place to place. One team of draft horses is kept to assist in haying and general ranch work.

Minor livestock on the ranch is mainly for home consumption. Most of the pork, poultry, eggs, and dairy products are consumed on the ranch. The average sheep ranch has about 11 head of combination beef-dairy type cattle. One to two cows are milked and about 9 head of cattle are raised to be eaten or sold as beef. The cash income from this enterprise is small.

Labor Requirements

Labor requirement rates did not change greatly on sheep ranches during the period 1930-50 (table 10). Some decrease in labor requirements for crops is evident because of increased use of machinery. The labor rate for sheep shows only a slight decrease from a total per head of 6.0 hours in 1930-34 to 5.7 hours per head in 1945-49. Much of this decrease is due to the shearing and winter supplemental feeding. Before the advent of power shears and mobile contractors with portable machinery one man might shear 30 to 40 sheep a day. Now the average is nearer 70, and some shearers average more than 100 head a day.

Numbers of motortrucks per sheep ranch gradually increased. Use of more mechanical power decreased the amount of man labor necessary to haul supplements to sheep on winter range. In addition, trucking of sheep between seasonal ranges increased. This decreased the additional labor required to trail the sheep over long distances. Other labor requirements necessary to maintain the band remained about the same. The herder rate stayed the same because the number of sheep in the band did not fluctuate greatly from 1930 to 1950. Herding is a full-time job whether the herd contains 1,000 or 2,000 head.

Table 10.- Man labor required per acre of crops and per unit of livestock, family-operated sheep ranches, Intermountain region 1930-50

Period	Crops									Livestock					
	Small grains			Alfalfa			Other hay			All sheep	Cows milked	Other cattle and calves	All horses	All chickens	Hogs per 100 pounds pork produced
	Preharvest	Harvest	Total	Preharvest	Harvest	Total	Preharvest	Harvest	Total						
	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours
1930-34	8.2	9.3	17.5	7.0	19.4	26.4	3.8	6.7	10.5	6.0	170	14.0	27.0	1.5	4.0
1935-39	7.8	8.7	16.5	7.0	18.8	25.8	3.8	6.5	10.3	5.8	165	13.5	24.0	1.4	4.0
1940-44	7.5	8.5	16.0	6.9	18.4	25.3	3.8	6.2	10.0	5.7	155	12.5	25.0	1.4	4.0
1945-50	7.5	8.5	16.0	6.9	17.3	24.2	3.8	6.1	9.9	5.7	155	13.0	25.0	1.4	4.0

Total labor requirements for family-operated sheep ranches show no great degree of fluctuation over the period studied (table 11). This is to be expected as labor requirements have not changed significantly on these ranches and livestock and crop acres have remained nearly constant. The low in total labor required to operate the 1-band sheep ranch occurred during the war years. It required 950 man-days. The highest year was in 1930 with 1,034 man-days. The war years with their attendant labor shortages forced ranchers to reduce use of labor wherever possible. Management was forced to perform some labor that normally would have been hired, particularly during lambing and shearing.

INVESTMENT

Total investment in the average ranch varied from a low of about $17,000 in 1933 to a high of $82,000 in 1950 (table 12). The postwar years witnessed the sharpest increase in total investment owing to great increases in livestock prices (table 13), and the accompanying rapid upward movement in real estate values.

Investment in land, buildings, and livestock averages from 90 to 95 percent of total investment. Investment in land usually is greater than investment in livestock. However, during the period 1936-38, livestock prices rose more rapidly than did real estate values and investment in livestock exceeded investment in land. During the 5-year period 1930-34, investment in land, buildings, and improvements averaged 51.9 percent of the total investment in the average ranch. The investment in livestock averaged 41.3 percent of the total (table 14, fig. 4). During the 1935-39 period, prices of livestock increased 39 percent, values of land increased only 8 percent, and investment in livestock exceeded slightly investment in land and buildings. Under the impetus of excellent production conditions and price control on livestock, real estate values climbed rapidly during the war. During this period, investment in land and buildings again exceeded investment in livestock. In 1945-49, prices of livestock increased about 108 percent and values of land rose about 50 percent. However, sheep ranchers increased their holdings of land to the extent that total current investment in land and buildings rose to 53.7 percent of total investment, as compared to 40.2 percent for livestock.

Average investment in land and buildings on family-operated sheep ranches in the Intermountain region varies from 50 to 55 percent of the total current investment. Since 1935, stock sheep ranches have gradually increased their holdings of land, both owned and leased. The Taylor Grazing Act accounts in part for this trend. Permittees on grazing districts are now required to maintain certain ranch holdings

Table 11.- Average labor requirement per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	Crops			Livestock			Total labor	Total man days 1/
	Hay	Other	Total crops	Sheep	Other	Total		
	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Days
1930	455	295	750	8,916	671	9,587	10,337	1,034
1931	423	260	683	8,964	672	9,636	10,319	1,032
1932	434	260	694	8,778	667	9,445	10,139	1,014
1933	423	242	665	8,718	654	9,372	10,037	1,004
1934	402	208	610	8,718	652	9,370	9,980	998
1935	428	232	660	8,317	575	8,892	9,552	955
1936	428	248	676	8,369	595	8,964	9,640	964
1937	454	248	702	8,416	598	9,014	9,716	972
1938	454	281	735	8,404	602	9,006	9,741	974
1939	464	248	712	8,416	623	9,039	9,751	975
1940	443	242	685	8,254	652	8,906	9,591	959
1941	453	290	743	8,191	682	8,873	9,616	962
1942	418	258	676	8,123	653	8,776	9,452	945
1943	418	258	676	8,088	649	8,737	9,413	941
1944	418	242	660	8,094	648	8,742	9,402	940
1945	406	258	664	8,140	639	8,779	9,443	944
1946	406	242	648	8,231	632	8,863	9,511	951
1947	440	258	698	8,501	632	9,133	9,831	983
1948	450	242	692	8,761	618	9,379	10,071	1,007
1949	440	242	682	8,778	606	9,384	10,066	1,007
1950	458	274	732	8,539	589	9,128	9,860	986

1/ Ten man-hours per day.

Table 12.- Investment, income, and related factors per ranch, commercial family-operated sheep ranches, Intermountain region, 1930-50

Item	Unit	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Land in ranch	Acre	2,987	2,881	2,707	2,572	2,456	2,294	2,496	2,684	2,884	3,062	3,258	3,492	3,705	4,016	4,189	4,484	4,606	4,852	5,257	5,190	5,161
Cropland harvested	do.	46	41	42	40	36	40	41	42	44	43	42	46	42	42	41	42	41	44	44	43	44
Labor used:																						
Operator and unpaid family	Hour	5,337	5,279	5,219	5,187	5,130	5,072	5,040	5,006	4,981	4,951	4,921	4,736	4,562	4,413	4,232	4,053	4,051	4,021	4,051	4,106	4,080
Hired	do.	5,000	5,040	4,920	4,850	4,850	4,480	4,600	4,710	4,760	4,800	4,670	4,880	4,890	5,000	5,170	5,390	5,460	5,810	6,020	5,960	5,780
Total	do.	10,337	10,319	10,139	10,037	9,980	9,552	9,640	9,716	9,741	9,751	9,591	9,616	9,452	9,413	9,402	9,443	9,511	9,831	10,071	10,066	9,860
Investment:																						
Land and buildings	Dollar	16,665	15,591	12,282	9,684	9,358	9,185	10,154	11,078	11,609	12,146	12,902	13,991	15,682	18,250	21,859	25,948	29,406	34,416	41,951	38,885	39,527
Machinery and equipment	do.	1,318	1,262	1,192	1,141	1,143	1,138	1,174	1,250	1,329	1,383	1,461	1,665	1,965	2,063	2,202	2,281	2,333	2,633	3,054	3,442	4,399
Livestock	do.	18,437	10,522	6,765	6,027	8,853	8,055	11,262	12,125	12,062	11,002	12,672	13,133	16,102	18,242	17,471	17,047	18,772	25,054	32,895	33,809	37,079
Crops on hand	do.	480	456	368	368	542	393	485	490	372	414	416	425	555	933	864	885	969	1,091	1,330	1,140	1,129
Total	do.	36,900	27,831	20,607	17,220	19,896	18,771	23,075	24,943	25,372	24,945	27,451	29,214	34,304	39,488	42,396	46,161	51,480	63,194	79,230	77,276	82,134
Cash receipts	Dollar	8,468	5,454	2,998	4,566	5,894	5,678	8,569	9,611	7,526	8,333	10,304	12,511	13,422	14,692	14,519	15,892	18,547	24,659	25,230	20,832	25,605
Cash expenditures	do.	6,818	5,159	3,788	3,371	4,173	4,305	4,969	5,992	5,008	5,557	6,628	6,809	7,751	9,222	10,765	11,614	14,296	17,470	17,615	15,204	18,993
Net cash ranch income	do.	1,650	295	- 790	1,195	1,721	1,373	3,600	3,619	2,518	2,776	3,676	5,702	5,671	5,470	3,754	4,278	4,251	7,189	7,615	5,628	6,612
Value of perquisites	do.	469	354	291	282	294	395	412	442	402	403	422	515	600	703	708	772	878	1,123	1,215	1,050	1,294
Net change in inventory and depreciation	do.	35	- 232	- 205	- 143	- 366	107	106	- 37	- 29	34	9	60	20	- 275	- 310	- 6	650	781	- 7	- 824	1,017
Net ranch income	do.	2,154	417	- 704	1,334	1,649	1,875	4,118	4,024	2,891	3,213	4,107	6,277	6,291	5,898	4,152	5,044	5,779	9,093	8,823	5,854	8,923
Charge for real estate capital	Dollar	1,000	935	737	581	543	505	518	543	546	559	593	630	690	903	962	1,168	1,353	1,583	1,930	1,789	1,818
Charge for working capital	do.	1,376	832	566	490	685	604	788	818	784	704	800	822	1,006	1,147	1,109	1,092	1,214	1,583	2,050	2,112	2,343
Total	do.	2,376	1,767	1,303	1,071	1,228	1,109	1,306	1,361	1,330	1,263	1,393	1,452	1,696	1,950	2,071	2,260	2,567	3,166	3,980	3,901	4,161
Return to operator and family for labor and management	Dollar	- 222	-1,350	-2,007	263	421	766	2,812	2,663	1,561	1,950	2,714	4,825	4,595	3,948	2,081	2,784	3,212	5,927	4,843	1,953	4,762
Return per hour to operator and family	do.	- .04	- .26	- .38	.05	.08	.15	.56	.53	.31	.39	.55	1.02	1.01	.90	.49	.69	.79	1.47	1.20	.48	1.17
											Index numbers (1937-41=100)										
Gross ranch income	Percent	90	57	32	48	60	62	90	99	79	87	106	129	142	154	152	167	200	265	264	211	279
Net ranch income	do.	53	10	17	33	40	46	100	98	71	78	100	153	153	144	101	123	141	222	215	143	218
Net ranch production	do.	106	91	71	72	73	77	91	90	98	95	106	111	99	102	99	109	117	123	108	90	102
Net production per hour of man labor	do.	100	85	67	69	71	78	91	90	97	94	107	112	102	105	102	112	119	121	104	87	100
Operating expenses per unit of production	do.	111	95	90	78	94	92	91	109	86	97	104	103	134	158	189	184	210	244	275	279	315
Total cost per unit of production	do.	125	109	100	83	98	95	93	109	89	97	102	103	134	160	188	183	205	236	275	291	311
Total input per unit of production	do.	92	99	118	109	109	107	98	106	93	102	102	97	104	105	113	107	108	109	119	131	123
Power machinery (quantity)	Percent	96	100	97	94	93	89	90	93	97	97	103	110	117	119	122	125	128	130	133	137	139
Prices received for products sold	do.	90	62	43	64	74	76	98	110	80	89	101	120	144	150	155	157	175	221	249	236	285
Prices paid including wages to hired labor	do.	123	99	78	68	87	87	94	102	95	95	101	107	125	145	158	164	183	210	226	211	247

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Table 13.- Inventory value per head of sheep and minor livestock, family-operated sheep ranches, Intermountain region, 1930-50

Year	Sheep 1/					Horses	Hogs	Chickens
	Ewe lambs	Yearling ewes	Ewes 2-5	Aged ewes	Bucks			
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	9.12	12.00	12.78	6.25	23.56	51	17	0.67
1931	5.32	5.88	6.89	3.20	22.55	46	12	.59
1932	3.11	4.50	4.56	1.84	11.91	37	6	.42
1933	3.26	3.64	4.19	1.64	9.16	38	5	.38
1934	4.53	6.21	6.25	2.44	14.57	47	8	.46
1935	3.73	5.56	5.48	2.32	12.18	58	15	.63
1936	5.98	7.47	7.50	3.73	15.99	75	17	.55
1937	5.98	7.88	8.18	3.76	16.26	81	17	.63
1938	6.13	8.14	8.05	3.69	18.31	73	12	.59
1939	5.54	7.30	7.22	3.44	16.71	65	12	.50
1940	6.23	8.58	8.57	4.29	18.04	60	9	.55
1941	6.70	8.94	8.79	4.44	19.75	52	15	.67
1942	8.69	11.32	10.82	6.04	24.65	53	25	.84
1943	9.56	12.22	12.61	6.32	23.95	64	29	1.01
1944	9.67	12.08	11.34	7.31	29.70	63	41	1.01
1945	8.66	12.22	11.47	6.20	20.90	53	27	1.01
1946	11.12	13.34	12.18	6.93	26.57	47	36	1.05
1947	14.34	17.54	15.76	10.10	35.05	47	45	1.13
1948	18.50	22.74	20.90	13.23	36.55	44	54	1.26
1949	19.48	21.96	22.20	12.57	49.94	43	39	.97
1950	20.35	25.65	26.45	12.76	42.34	33	31	.97

1/ Data for sheep from Bureau of Agricultural Economics Special Western Sheep Survey.

Table 14.- Investment per ranch January 1, family-operated sheep ranches, Intermountain region, 1930-50

Year	Land and buildings				Machinery and equipment					Livestock	Feed and seed	Total ranch investment
	Land	Buildings: Dwelling	Buildings: Service buildings	Total	Tractors	Trucks	Autos	Other machinery	Total			
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
1930	14,606	1,132	927	16,665	53	236	158	871	1,318	18,437	480	36,900
1931	13,539	1,131	921	15,591	55	242	154	811	1,262	10,522	456	27,831
1932	10,506	1,065	711	12,282	54	234	148	756	1,192	6,765	368	20,607
1933	8,186	974	524	9,684	51	230	146	714	1,141	6,027	368	17,220
1934	7,838	958	562	9,358	56	232	150	705	1,143	8,853	542	19,896
1935	7,591	988	606	9,185	62	235	146	695	1,138	8,055	393	18,771
1936	8,448	1,023	683	10,154	68	269	149	688	1,174	11,262	485	23,075
1937	9,396	1,009	673	11,078	77	335	157	681	1,250	12,125	490	24,943
1938	10,060	1,007	542	11,609	87	394	172	676	1,329	12,062	372	25,372
1939	10,562	1,030	554	12,146	92	446	174	671	1,383	11,002	414	24,945
1940	11,229	1,070	603	12,902	107	506	184	664	1,461	12,672	416	27,451
1941	12,306	1,078	607	13,991	149	632	205	679	1,665	13,133	425	29,214
1942	13,829	1,148	705	15,682	195	829	244	697	1,965	16,102	555	34,304
1943	16,338	1,185	727	18,250	202	885	267	709	2,063	18,242	933	39,488
1944	19,569	1,328	962	21,859	241	951	290	720	2,202	17,471	864	42,396
1945	23,230	1,494	1,224	25,948	259	1,002	291	729	2,281	17,047	885	46,161
1946	26,326	1,694	1,386	29,406	303	1,033	284	713	2,333	18,772	969	51,480
1947	30,811	1,982	1,623	34,416	356	1,239	305	733	2,633	25,054	1,091	63,194
1948	37,794	2,286	1,871	41,951	423	1,413	348	870	3,054	32,895	1,330	79,230
1949	35,032	2,196	1,657	38,885	469	1,525	397	1,051	3,442	33,809	1,140	77,276
1950	34,289	3,376	1,862	39,527	489	1,673	439	1,798	4,399	37,079	1,129	82,134

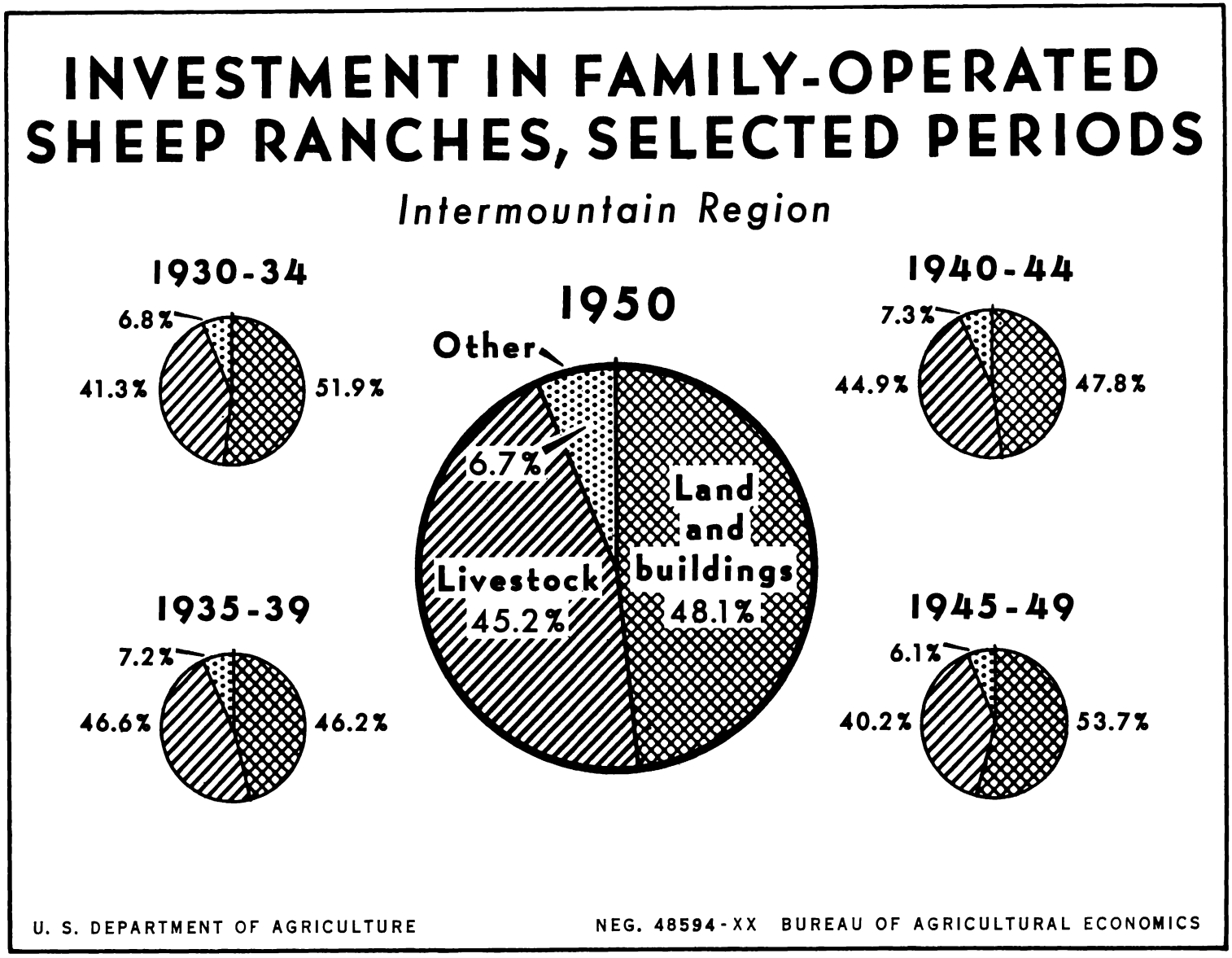


Figure 4.- About half of the sheep-ranch investment is in livestock. On the average this ratio is slightly less than for family-operated cattle ranches, but has less variation than the ratio for cattle ranches. Most other types of farms have considerably less investment in livestock relative to land, buildings, machinery, and related items.

that were not a requirement for grazing on public lands before the Taylor Grazing Act was passed. In addition, the large reduction in sheep numbers has made additional range land available for sale or lease to sheep ranches that continue to operate sheep.

Inherent in the sheep-ranch investment is the effect of public land grazing privileges and grazing fees on investment values of land and livestock. Per-head grazing fees on public lands generally are less than the cost of leasing comparable private range. Underpricing of forage on public land has tended, over the years, to transfer values of public land into capital values of private land for those ranches having grazing permits on public land.

Sheep owned by family-operated sheep ranches in the Intermountain region graze a major portion of the year on public lands. No doubt all, or a large part, of the value of these grazing permits is capitalized into the private land investment. An erroneous picture of livestock investment would be given, however, if the value of these permits were added to the normal market value of the sheep. In cases of permit transfers, grazing permits on public land are not property rights and cannot be legally sold; however, permits are frequently transferred in connection with the sale of either livestock or commensurate ranch property. The permit is frequently transferred with the sheep as an added cost per head for the sheep, but the actual investment is tied to the land because of the commensurability requirements of public land agencies.

Investments in machinery on sheep ranches have increased considerably during the postwar years. However, the percentage that machinery is of total investment has not changed to any great extent because other investment values also have increased. The greatest increase in machinery investment is in power. Some increase in number of tractors is noted, but most of the increase was in number of motortrucks (table 14). Sheep ranchers have increased their investment in trucks to stay abreast of changes in operating methods. The practices of trucking lambs to shipping points and of moving the breeding herd between seasonal ranges are more common now than they were two decades ago. The average family sheep rancher does not have enough trucks to move the total breeding herd, so he trucks only the weaker sheep. When the entire breeding herd is trucked between seasonal ranges, most of the trucking is contracted.

Total investment per sheep and per ranch have increased in about the same proportion (compare tables 12 and 15). In 1945-49, total average investment per ranch and per sheep was more than double the annual average during 1930-34. Because the number of sheep per ranch has remained about the same throughout the period, the increase in investment per sheep is accounted for directly by the increases in acreage per ranch, and by the values of the land and livestock.

Table 15.- Average income and costs per sheep, family-operated sheep ranches, Intermountain region, 1930-50

Item	Unit	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Sheep on ranch January 1	Number	1,486	1,494	1,463	1,453	1,453	1,434	1,443	1,451	1,449	1,451	1,448	1,437	1,425	1,419	1,420	1,428	1,444	1,493	1,537	1,540	1,498
Land in ranch:																						
Cropland harvested	Acre	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	1/
Other land	do.	2.1	1.9	1.9	1.5	1.7	1.6	1.7	1.8	2.0	2.1	2.2	2.4	2.6	2.8	2.9	3.1	3.2	3.2	3.4	3.4	3.4
Total	do.	2.1	1.9	1.9	1.8	1.7	1.6	1.7	1.8	2.0	2.1	2.2	2.4	2.6	2.8	2.9	3.1	3.2	3.2	3.4	3.4	3.4
Proportion of cash receipts from sheep	Percent	99	99	98	97	92	94	96	96	94	95	95	96	96	97	96	96	96	96	98	98	98
Investment:																						
Land and buildings	Dollar	11.21	10.44	8.39	6.66	6.44	6.41	7.04	7.63	8.01	8.37	8.91	9.73	11.00	12.88	15.40	18.17	20.36	23.06	27.29	25.25	26.39
Machinery and equipment	do.	.89	.84	.81	.79	.79	.79	.81	.86	.92	.95	1.01	1.16	1.38	1.46	1.55	1.60	1.62	1.76	1.99	2.24	2.93
Livestock	do.	12.41	7.04	4.63	4.15	6.09	5.62	7.80	8.36	8.32	7.58	8.75	9.14	11.30	12.87	12.30	11.94	13.00	16.78	21.40	21.95	24.76
Crops on hand	do.	.32	.31	.25	.25	.37	.27	.34	.34	.26	.29	.29	.30	.39	.66	.61	.62	.67	.73	.87	.74	.75
Total	do.	24.83	18.63	14.08	11.85	13.69	13.09	15.99	17.19	17.51	17.19	18.96	20.33	24.07	27.87	29.86	32.33	35.65	42.33	51.55	50.18	54.83
Cash receipts:																						
Livestock	Dollar	4.07	2.53	1.44	1.55	2.10	2.37	3.51	3.97	3.46	3.59	4.43	5.54	5.89	6.49	6.67	7.05	8.92	12.34	11.81	9.32	11.77
Livestock products	do.	1.63	1.12	.61	1.52	1.67	1.40	2.25	2.47	1.49	1.85	2.41	2.87	3.25	3.63	3.22	3.75	3.57	3.73	4.34	4.07	5.06
Other	do.	.00	.00	.00	.07	.29	.19	.18	.18	.24	.30	.28	.30	.28	.25	.33	.33	.35	.45	.26	.14	.26
Total	do.	5.70	3.65	2.05	3.14	4.06	3.96	5.94	6.62	5.19	5.74	7.12	8.71	9.42	10.37	10.22	11.13	12.84	16.52	16.41	13.53	17.09
Cash expenses:																						
Feed and seed	Dollar	.88	.83	.53	.62	.94	.85	.90	.94	.72	.80	.77	.73	1.07	1.20	1.40	1.34	1.53	1.75	1.95	1.66	1.83
Livestock expense	do.	1.49	.68	.51	.47	.55	.64	.95	1.29	.92	1.09	1.69	1.53	1.66	1.95	2.28	2.37	3.28	4.26	3.29	1.88	3.94
Power and machinery	do.	.42	.33	.29	.29	.31	.40	.40	.52	.55	.64	.76	.94	.77	.90	.99	1.08	1.20	1.41	1.55	1.76	2.29
Buildings	do.	.07	.13	.19	.04	.03	.06	.06	.11	.05	.05	.07	.06	.07	.07	.12	.24	.36	.24	.18	.13	.06
Hired labor	do.	1.04	.92	.60	.46	.53	.55	.61	.69	.64	.70	.70	.89	1.22	1.70	2.08	2.37	2.61	2.94	3.09	3.01	3.02
All taxes	do.	.35	.27	.23	.19	.23	.20	.23	.27	.27	.26	.29	.27	.29	.29	.28	.30	.44	.54	.79	.84	.93
Miscellaneous	do.	.34	.29	.24	.25	.28	.30	.29	.31	.30	.29	.30	.32	.36	.39	.43	.43	.48	.56	.61	.59	.61
Total	do.	4.59	3.45	2.59	2.32	2.87	3.00	3.44	4.13	3.45	3.83	4.58	4.74	5.44	6.50	7.58	8.13	9.90	11.70	11.46	9.87	12.68
Net cash ranch income	Dollar	1.11	.20	-.54	.82	1.19	.96	2.50	2.49	1.74	1.91	2.54	3.97	3.98	3.87	2.64	3.00	2.94	4.82	4.95	3.66	4.41
Value of perquisites	do.	.32	.24	.20	.19	.20	.28	.29	.30	.28	.28	.29	.36	.42	.49	.50	.54	.61	.75	.79	.68	.87
Net change in inventory and depreciation	do.	.02	-.16	-.14	-.10	-.25	.07	.07	-.03	-.02	.02	.01	.04	.01	-.19	-.22	.00	.45	.52	.00	-.54	.68
Net ranch income	do.	1.45	.28	-.48	.91	1.14	1.31	2.86	2.76	2.00	2.21	2.84	4.37	4.41	4.17	2.92	3.54	4.00	6.09	5.74	3.80	5.96
Charge for real estate capital	Dollar	.67	.62	.50	.40	.37	.35	.36	.37	.38	.39	.41	.44	.48	.56	.68	.82	.94	1.06	1.26	1.16	1.21
Charge for working capital	do.	.93	.56	.39	.34	.47	.42	.55	.56	.54	.48	.55	.57	.71	.81	.78	.76	.84	1.06	1.33	1.37	1.57
Total	do.	1.60	1.18	.89	.74	.84	.77	.91	.93	.92	.87	.96	1.01	1.19	1.37	1.46	1.58	1.78	2.12	2.59	2.53	2.78
Return to operator and family for labor and management	Dollar	-.15	-.90	-1.37	.17	.30	.54	1.95	1.83	1.08	1.34	1.88	3.36	3.22	2.80	1.46	1.96	2.22	3.97	3.15	1.27	3.18

1/ Less than 0.5.

Although the total investment per sheep in the 1945-49 period is almost four times greater than total investment per sheep during the depression years, this does not appear to be inconsistent with the present price level. On the basis of five to seven sheep per animal unit, the investment per animal unit on sheep ranches is not so great as that reported on family-operated cattle ranches.

These high investment values reflect the price level and to some extent the potential earning power of sheep ranches in the postwar years. A combination of excellent production years and increased prices of lamb and wool have produced higher cash incomes than formerly. The returns, although relatively high in comparison to former years, have lagged behind the returns per unit from cattle ranches. As sheep ranching is relatively hazardous, a series of poor forage years, lowered prices, or both, would greatly reduce earnings and make financial survival difficult for those ranches that might have a large burden of indebtedness encumbered at the 1946-50 price level.

MORTGAGE DEBT

Operators of family-sized sheep ranches had average mortgage debts on land of about $1,000 in 1933-34 (table 16). Average mortgage debts on land rose gradually to the sum of $4,080 in 1948. However, during this period land ownership increased from 1,348 acres to 3,675 acres per ranch--an increase of 173 percent. The net result was that, in 1948, only 9.7 percent of total land investment was mortgaged while in 1933 the mortgage debt on land was 10.2 percent of total investment in land.

Mortgage indebtedness or production credit on livestock, which is almost totally sheep, has decreased greatly since 1933. In 1948, the average mortgage debt on livestock was $1,230 compared with $5,870 in 1933. In 1933, livestock was mortgaged at 97 percent of market value, compared with 3.7 percent in 1948. This reflects the changed financial situation on the average sheep ranch in the postwar years and the financial recovery achieved from the distress in 1931-35.

EXPENSE AND INCOME

Cash Expenditures

Average total cash expenditures on commercial family-operated sheep ranches varied from about $3,370 in 1933 to $18,990 in 1950 (table 17). The big increase came in the postwar years.

Table 16.- Mortgage debt of land and livestock and interest paid per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	Mortgage debt		Interest rate		Mortgage interest paid			Percentage mortgage debt -		
	Land	Livestock	Land	Livestock	Land	Livestock	Total	Of owned land	Of all livestock	Of total ranch investment
	Dollars	Dollars	Percent	Percent	Dollars	Dollars	Dollars	Percent	Percent	Percent
1930	1,475	3,150	6.0	6.8	89	214	303	8.9	17.1	12.5
1931	1,439	4,452	6.0	6.8	86	303	389	9.2	42.3	21.2
1932	1,201	5,618	6.0	6.8	72	382	454	9.8	83.0	33.1
1933	987	5,870	6.0	6.5	59	382	441	10.2	97.3	39.8
1934	1,002	5,492	5.8	6.5	58	357	415	10.7	62.0	32.6
1935	1,046	3,528	5.5	6.3	58	222	280	11.4	43.7	24.4
1936	1,204	3,550	5.1	6.1	61	217	278	11.9	31.5	20.6
1937	1,334	2,583	4.9	5.9	65	152	217	12.0	21.3	15.7
1938	1,416	3,478	4.7	5.7	67	198	265	12.2	28.8	19.3
1939	1,469	3,337	4.6	5.5	68	183	251	12.1	30.3	19.3
1940	1,542	3,301	4.6	5.5	71	182	253	12.0	26.0	17.6
1941	1,625	2,759	4.5	5.4	73	149	222	11.6	21.0	15.0
1942	1,721	2,251	4.4	5.4	76	122	198	11.0	13.9	11.6
1943	1,918	1,958	4.4	5.4	84	106	190	10.5	10.7	9.8
1944	2,101	2,045	4.4	5.4	92	110	202	9.6	11.7	9.8
1945	2,224	1,885	4.5	5.4	100	102	202	8.6	11.0	8.9
1946	2,677	1,675	4.6	5.5	123	92	215	9.1	8.9	8.5
1947	3,224	1,403	4.6	5.5	148	77	225	9.4	5.5	7.3
1948	4,080	1,230	4.6	5.5	188	68	256	9.7	3.7	6.7
1949	3,933	1,417	4.6	5.5	181	78	259	10.1	4.1	6.9
1950	3,631	1,925	4.6	5.5	167	106	273	9.2	5.2	6.8

Table 17.- Cash expenditures per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	Feed, seed and supplements	Livestock	Power and machinery	Ranch buildings	Hired labor	Taxes	Miscellaneous expenditures	Total cash expenditures
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	1,308	2,216	631	107	1,525	527	504	6,818
1931	1,242	1,009	498	194	1,382	404	430	5,159
1932	784	740	428	272	872	332	360	3,788
1933	898	683	416	65	674	269	366	3,371
1934	1,362	796	456	44	771	330	414	4,173
1935	1,217	940	573	79	787	283	426	4,305
1936	1,287	1,374	575	87	880	337	429	4,969
1937	1,361	1,865	761	163	998	387	457	5,992
1938	1,035	1,340	799	77	934	393	430	5,008
1939	1,154	1,577	923	78	1,014	384	427	5,557
1940	1,122	2,448	1,095	106	1,011	416	430	6,628
1941	1,064	2,192	1,345	84	1,276	395	453	6,809
1942	1,534	2,361	1,102	93	1,739	409	513	7,751
1943	1,717	2,753	1,277	97	2,403	409	566	9,222
1944	2,004	3,242	1,404	164	2,950	400	601	10,765
1945	1,910	3,381	1,542	346	3,391	423	621	11,614
1946	2,213	4,730	1,739	520	3,775	630	689	14,296
1947	2,602	6,361	2,103	364	4,395	807	838	17,470
1948	2,997	5,050	2,389	282	4,755	1,211	931	17,615
1949	2,563	2,894	2,702	198	4,650	1,296	901	15,204
1950	2,741	5,907	3,429	93	4,524	1,391	908	18,993

Some changes in the distribution between major items of expense occurred during the 21-year period. Labor costs rose from a low of 17 percent of total cash expenses in the 1935-39 period to a high of 27 percent in the 1945-49 period (table 18). The proportion of cash expenditures in livestock purchases has been higher during the war and postwar years. Family sheep ranches buy most of their ewe replacements and the price of replacements has kept pace with the increased prices of lamb and wool.

Cash expenditures for feed, seed, and mineral supplements vary according to production conditions and the general price level. Quantities of hay and protein supplements fed depend to some extent upon climatic conditions. During the 1932-35 period, poor forage conditions were widespread and sheep ranchers were forced to supplement the range forage with other feeds. During this period, expenditures for feed went up in relation to other cash expenditures.

Grazing fees paid for use of public lands are another item of cash feed costs. Before 1936, no grazing fees were in force for the public-domain lands. From 1936 to 1946, the grazing fee on grazing districts was one cent per head per month for sheep. Since 1946 the fee has been 1.6 cents per head per month. Further increases in fees are in prospect for grazing on the grazing districts in 1951.

Grazing fees on national forests differ among forests and are varied each year in relation to the prices of livestock. The average grazing fee per sheep month on national forests included in this study was approximately 2.2 cents in 1933. National forest fees reached a peak of 11.9 cents per sheep month in 1949. On the average, cash expenditures for grazing fees amount to 18 percent of the total cash expenses for feed, forage, and supplements.

The cost of labor merits discussion because of the difficulty sheep ranches have had in obtaining labor for a decade or more. From 1930 to 1947, available family labor on sheep ranches in this region decreased about 25 percent (table 19). At the same time, wage and herder rates rose from a low of $1.20 per day in 1933 to $7.00 per day in 1948--an increase of about 480 percent. Herders are hired by the month and their wage rates have risen from $40 per month in 1930 to more than $200 per month in the postwar years. These rates include board and lodging.

Shearing labor costs per head increased from 9.5 cents in 1933 to 47.0 cents in 1948. Because of increased efficiency in shearing, this increase was not as large in proportion as were increases in the other ranch labor costs. In 1930, each shearer averaged 40 head per 8-hour day. In 1950, the average was 67 head. These rates include the labor overhead required to shear and bag wool.

Table 18.- Percentage distribution of cash expenditures, family-operated sheep ranches, Intermountain region, averages 1930-49, annual 1950

Period	Cash expenditures for:							
	Live-stock purchased	Hired labor	Feed, seed and supple-ments	Power and machin-ery	Miscel-laneous costs	Taxes	Build-ings and improve-ments	Total
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930-34	23	22	24	11	9	8	3	100
1935-39	28	17	23	14	9	7	2	100
1940-44	32	22	18	15	6	5	2	100
1945-49	29	27	17	13	6	5	3	100
1950	31	24	14	18	5	7	1	100
Average	28	22	20	14	7	6	3	100

Table 19.- Labor force and hired labor costs, family-operated sheep ranches, Intermountain region, 1930-50

Year	Family workers	Work days family 1/	Ranch labor requirements	Hired labor			Wage rate per day 3/	Cost of hired labor		
				Shearing 2/	Other	Total		Other	Shearing	Total
	Man-years	Days	Days	Days	Days	Days	Dollars	Dollars	Dollars	Dollars
1930	1.78	534	1,034	36	464	500	2.70	1,253	272	1,525
1931	1.76	528	1,032	34	470	504	2.49	1,170	212	1,382
1932	1.74	522	1,014	31	461	492	1.56	719	153	872
1933	1.73	519	1,004	30	455	485	1.20	546	128	674
1934	1.71	513	998	29	456	485	1.37	625	146	771
1935	1.69	507	955	27	421	448	1.50	631	156	787
1936	1.68	504	964	26	434	460	1.64	712	168	880
1937	1.67	501	972	25	446	471	1.81	807	191	998
1938	1.66	498	974	24	452	476	1.64	741	193	934
1939	1.65	495	975	23	457	480	1.80	823	191	1,014
1940	1.64	492	959	22	445	467	1.84	819	192	1,011
1941	1.58	474	962	22	466	488	2.26	1,053	223	1,276
1942	1.52	456	945	21	468	489	3.10	1,451	288	1,739
1943	1.47	441	941	21	479	500	4.22	2,021	382	2,403
1944	1.41	423	940	21	496	517	5.02	2,490	460	2,950
1945	1.35	405	944	21	518	539	5.53	2,865	526	3,391
1946	1.35	405	951	21	525	546	6.10	3,203	572	3,775
1947	1.34	402	983	22	559	581	6.72	3,756	639	4,395
1948	1.35	405	1,007	22	580	602	7.00	4,060	695	4,755
1949	1.37	411	1,007	22	574	596	6.94	3,984	666	4,650
1950	1.36	408	986	21	557	578	6.94	3,866	658	4,524

1/ Three hundred working days per year.
2/ Separated from other hired labor because of varying wage rates.
3/ Does not include shearing labor.

Costs of power and machinery have increased in two ways. Sheep ranchers gradually have added units of power and machinery and per unit operating costs have kept pace with the general price level. The largest increase in power and machinery has been in motortrucks. (table 20). Operating distance driven per truck has increased from an average of 6,900 miles in 1932 to 13,250 miles in 1950.

The average number of automobiles per ranch is less than one; it changed very little over the 21-year period (table 21). Many ranches have a one-fourth ton truck or pick-up that serves also for a family automobile. Operating costs per mile for automobiles have about doubled from 1931 to 1950. However, all costs of operating an automobile are not chargeable to the ranch. A 1949 survey indicated that about 45 percent of the automobile costs are chargeable to the ranch business. This is used as a flat rate over the 1930-50 period.

During the war and postwar years, sheep ranches have shown significant increases in use of tractors and other machinery (table 22). Tractors and hay balers are supplanting old methods of haying. Much hay is now baled in contrast to storing it loose in the stack. It is easier to transport baled hay to winter range for emergency feeding. Tractor costs per hour increased from 26 cents in 1933 to 41 cents in 1950, an increase of about 60 percent. In comparison, truck operating costs per mile increased by 75 percent.

Cash Receipts

Total cash receipts dropped from about $8,500 in 1930 to $3,000 in 1932. Thereafter they rose steadily to about $15,000 during 1943-45 (table 12). Substantial increases in receipts began again in 1946 and reached a high of about $26,000 in 1950. Prices were somewhat lower in 1949 and this, coupled with a severe 1948-49 winter, contributed to a decline in income in 1949.

Livestock and livestock products account for 96 to 99 percent of the total cash receipts. Almost all of this return is from sheep and wool. However, the beef enterprise contributes a small amount which has averaged about $200 per year in the postwar years.

Sales from ewes, lambs, and bucks account for about two-thirds of cash receipts from the sheep enterprise; one-third from sale of wool (table 23). This percentage varies somewhat from year to year depending upon the price relationship between lamb and wool. In addition, production conditions that affect grade and weight of lambs also is a controlling factor in the relative proportion of income from meat and wool.

Table 20.- Operating costs and depreciation of motortrucks, family-operated sheep ranches, Intermountain region, 1930-50

Year	January 1	Annual distance driven: Per truck	Annual distance driven: Per ranch	Operating costs per mile	Operating cost	Annual depreciation	Total operating and depreciation costs
	Number	Miles	Miles	Cents	Dollars	Dollars	Dollars
1930	.423	6,950	2,940	9.0	265	57	322
1931	.440	6,950	3,060	8.0	245	53	298
1932	.430	6,900	2,970	8.0	238	50	288
1933	.422	7,150	3,020	7.8	236	50	286
1934	.414	7,500	3,100	7.8	242	51	293
1935	.406	7,800	3,170	7.6	241	62	303
1936	.456	8,050	3,670	7.6	279	77	356
1937	.550	8,300	4,560	7.8	356	91	447
1938	.632	8,400	5,310	7.6	404	101	505
1939	.702	8,650	6,070	7.8	473	116	589
1940	.781	8,850	6,910	7.6	525	143	668
1941	.921	9,100	8,380	8.0	670	177	847
1942	1.081	8,700	9,400	7.8	733	172	905
1943	1.072	8,900	9,540	9.2	878	188	1,066
1944	1.055	9,150	9,650	9.8	946	209	1.155
1945	1.033	9,850	10,170	9.8	997	233	1,230
1946	1.037	10,350	10,730	10.4	1,116	248	1,364
1947	1.068	11,000	11,750	11.4	1,339	302	1,641
1948	1.100	11,550	12,700	11.8	1,499	346	1,845
1949	1.155	12,650	14,610	12.6	1,841	355	2,196
1950	1.178	13,250	15,930	13.3	2,118	399	2,517

Table 21.- Operating costs and ranch share of costs of automobiles, family-operated sheep ranches, Intermountain region, 1930-50

Year	Number January 1	Miles driven: Per auto	Miles driven: Per ranch	Operating costs: Per mile	Operating costs: Per ranch	Ranch share of auto 1/: Operating cost	Ranch share of auto 1/: Replacements and net depreciation	Total operating and depreciation costs
	Number	Miles	Miles	Cents	Dollars	Dollars	Dollars	Dollars
1930	.788	6,050	4,767	2.6	124	56	43	99
1931	.770	5,850	4,505	2.3	104	47	29	76
1932	.749	5,600	4,194	2.4	101	45	18	63
1933	.733	5,850	4,288	2.3	99	45	17	62
1934	.714	6,050	4,320	2.4	104	47	28	75
1935	.697	6,150	4,287	2.3	99	45	40	85
1936	.700	6,300	4,410	2.4	106	48	43	91
1937	.704	6,300	4,435	2.4	106	48	48	96
1938	.710	6,300	4,473	2.4	107	48	44	92
1939	.716	6,400	4,582	2.4	110	50	52	102
1940	.725	6,400	4,640	2.4	111	50	62	112
1941	.736	6,400	4,710	2.5	118	53	68	121
1942	.744	5,700	4,241	2.6	110	50	18	68
1943	.737	5,300	3,906	2.8	109	49	20	69
1944	.730	5,400	3,942	3.2	126	57	23	80
1945	.722	5,500	3,971	3.4	135	61	33	94
1946	.717	6,300	4,517	3.6	163	73	55	128
1947	.723	6,500	4,700	4.1	193	87	86	173
1948	.732	6,800	4,978	4.3	214	96	118	214
1949	.750	7,150	5,362	4.5	241	108	161	269
1950	.786	7,450	5,856	4.8	281	126	180	306

1/ Forty-five percent chargeable to ranch.

Table 22.- Operating costs of tractors and other machinery equipment per ranch, family-operated sheep ranches, Intermountain region, 1930-50

Year	Tractors						Other machinery and equipment		
	Ranches with tractors	Hours used 1/	Operating cost per hour	Operating costs	Annual depreciation	Total operating costs and depreciation	Repairs	Annual depreciation	Total repairs and depreciation costs
	Percent	Hours	Cents	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	12	25	31.3	8	15	23	52	113	165
1931	12	23	26.4	6	14	20	49	105	154
1932	12	25	26.1	7	14	21	45	98	143
1933	12	25	25.6	6	14	20	43	93	136
1934	13	24	27.2	7	15	22	42	92	134
1935	13	28	27.0	8	19	27	42	90	132
1936	15	31	27.5	9	21	30	41	89	130
1937	16	35	28.1	10	24	34	41	89	130
1938	18	39	27.8	11	26	37	41	88	129
1939	19	42	27.0	11	26	37	40	87	127
1940	23	53	26.4	14	44	58	40	86	126
1941	31	74	27.2	20	59	79	41	88	129
1942	40	85	29.1	25	56	81	42	91	133
1943	43	88	30.0	26	58	84	43	92	135
1944	48	90	30.5	27	68	95	43	94	137
1945	50	93	30.5	28	72	100	44	95	139
1946	53	95	31.1	30	85	115	43	93	136
1947	56	107	34.1	36	101	137	44	95	139
1948	57	115	38.2	44	111	155	52	113	165
1949	57	113	38.8	44	123	167	63	137	200
1950	58	115	41.1	47	128	175	108	270	378

1/ Average tractor hours of use on all ranches, including those without tractors.

Table 23.- Cash receipts from sheep and wool, family-operated sheep ranches, Intermountain region, 1930-50

Period	Cash receipts from:	
	Ewes, lambs, and bucks	Wool
	Percent	Percent
1930-34	64	36
1935-39	64	36
1940-44	65	35
1945-49	72	28
1950	71	29
Average	68	32

In 1932, 69 percent of the cash receipts was from sales of sheep; 31 percent was from sales of wool. During that year, lambs sold at $4.16 per hundredweight and wool sold at $0.08 a pound (table 24). In the following year lambs brought $4.85 per hundredweight and wool sold at $0.19 a pound. In addition, climatic and forage conditions were below average. Under these production and price relationships, income from the sheep enterprise in 1933 was split 50-50 between sheep and wool.

Climatic conditions during the postwar years generally have been favorable to production of sheep. Also prices of lambs have increased proportionally more than prices of wool. As a consequence, in the 1945-49 period, income from the sheep enterprise was distributed 72 percent from sheep and 28 percent from wool. The largest spread between sheep and wool returns appeared in 1947, when sheep produced 77 percent of the income from the sheep enterprise and wool produced 23 percent. Satisfactory income from wool is necessary to the financial success of the sheep enterprise. However, during the last decade producers of range sheep placed more emphasis on production of meat and increased the proportion of income from meat compared with wool.

In 1950, prices of wool rose 9 cents a pound over prices in 1949. This rise in price contributed to profitable returns on sheep ranches in 1950. If future wool prices prevail at this level or higher, and maintain about the same relationship to lamb prices and costs as in 1950, wool will produce a satisfactory share of total income to the sheep enterprise.

The volume of ranch perquisites or living furnished the ranch household remained about the same over the 1930-50 period. Over-all labor requirements of ranches remained relatively stable. The value of ranch perquisites amounted to $282 in 1933 and reached a high of $1,294 in 1950. The net rental of the ranch home also has kept pace with the price level.

Net Ranch Income

Net ranch income is a better measure of ranch returns than is total cash income. Net ranch income is the annual return to the operator and his family and to total ranch investment after cash operating expenses are paid and net inventory changes, depreciation and perquisites are accounted for. Net ranch income in 1931 averaged about $420. This indicates that individual operators received very little for their labor and management and had no return on their investments. In 1932, the financial condition of ranches was even

Table 24.- Average prices received for livestock and wool sold, family-operated sheep ranches, Intermountain region, 1930-50

Year	Lambs per hundredweight	Ewes per head	Wool per pound	Cattle per hundredweight
	Dollars	Dollars	Dollars	Dollars
1930	7.36	6.25	0.19	7.27
1931	5.33	3.20	.13	5.14
1932	4.16	1.84	.08	4.04
1933	4.85	1.64	.19	3.44
1934	5.61	2.44	.21	3.56
1935	6.82	2.32	.18	5.76
1936	7.77	3.73	.26	5.59
1937	8.54	3.76	.31	6.72
1938	6.74	3.69	.18	6.09
1939	7.44	3.44	.22	6.79
1940	7.84	4.24	.27	7.12
1941	9.41	4.44	.33	8.47
1942	11.34	6.04	.38	10.17
1943	12.52	6.32	.39	11.48
1944	12.28	7.31	.40	10.92
1945	12.85	6.20	.40	12.18
1946	15.09	6.93	.40	14.52
1947	20.20	10.10	.41	18.70
1948	22.60	13.23	.47	22.21
1949	21.31	12.57	.47	19.23
1950	24.73	17.23	.56	23.33

worse. This was a distressing year for sheep operators. On an average they lost $704 on the year's operations and had either to borrow the money or to take it out of accumulated savings. Their labor and management went for nothing and their investment brought no return.

By 1936, net ranch income appeared more favorable and continued to rise until late in the war when it began to level off, although at a comparatively high level. A further rise of net ranch income took place in 1947--the peak year for income on sheep ranches. Net ranch income dropped off sharply in 1949 because of the break in the price of lambs, and also because the severe 1948-49 winter with large feed purchases reduced production markedly and raised costs.

A good measure of financial progress is net ranch income per head of sheep operated (table 15). Net ranch income per head operated varied from a minus $0.48 in 1932 to the 1950 high of $5.96. On the commonly used animal-unit basis of five sheep the net ranch income per animal unit of sheep was about $30 in 1950. In comparison, family-operated cattle ranches earned in excess of $60 per animal unit of cattle in 1950. Although income from sheep ranching has risen markedly from the early 1930's, it has not kept pace with per unit income from cattle ranches of comparable size.

The indexes (1937-41=100) of net ranch income and gross ranch income illustrate the effect on income of the depression years of the early 1930's and of price control during the war years (fig. 5). Expenditures were high in relation to sales and the index of net ranch income dropped to zero in 1932. Net ranch income was greatly reduced in 1949 due to the additional costs occasioned by the severe winter. From 1946 to 1950, the spread between the indexes of prices received and prices paid has remained relatively constant. During the same period there was a fairly wide spread between the index of gross ranch income and that of net ranch income.

The indexes of prices received and prices paid on family-operated sheep ranches point up the financial difficulties met by operators of sheep ranches in the early 1930's. Prices received and quantity of production were low in these years in relation to prices paid. Since 1940, except for 1944-46, the index of prices received has exceeded the index of prices paid. However, during the 1944-46 period this difference was not marked. With the release of price controls in 1947, the index of prices received rose and has since remained above the index of prices paid.

Operating expenses per dollar of gross ranch income during the 21-year period averaged 70 cents. 6/ In 1932, operating expenses exceeded each dollar of gross ranch income by 22 cents (fig. 6).

6/ Operating expenses include cash expenditures plus net depreciation of machinery and ranch buildings.

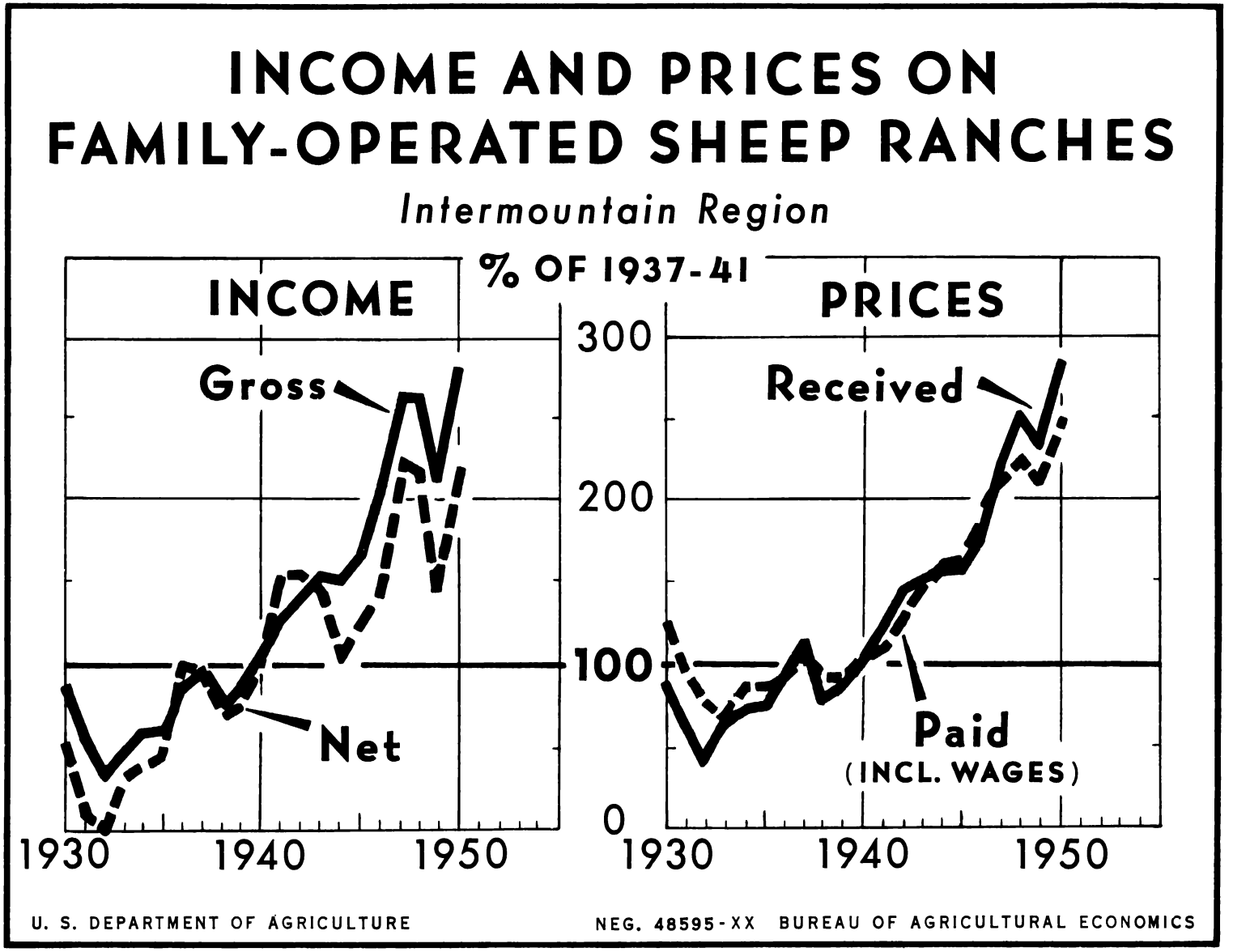
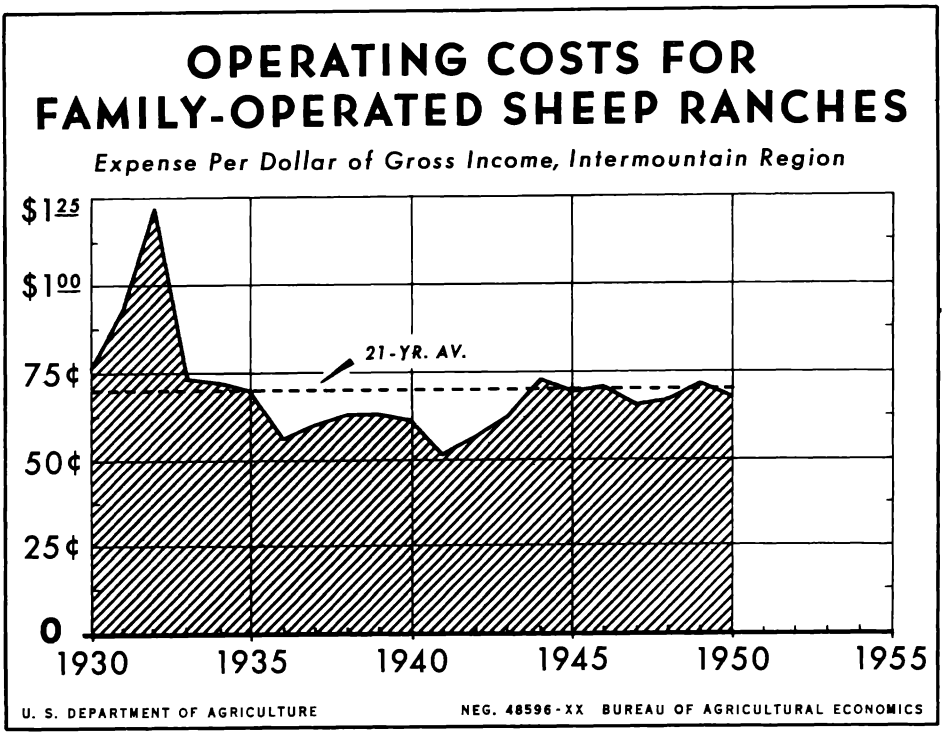


Figure 5.- The index of gross ranch income was greater than the index of net ranch income in the early 1930's and in the war and postwar years. The spread between the indexes of prices received and prices paid was greatest in 1930-32 and 1948-50. The spreads between the various indexes indicate the general areas of profit margin.



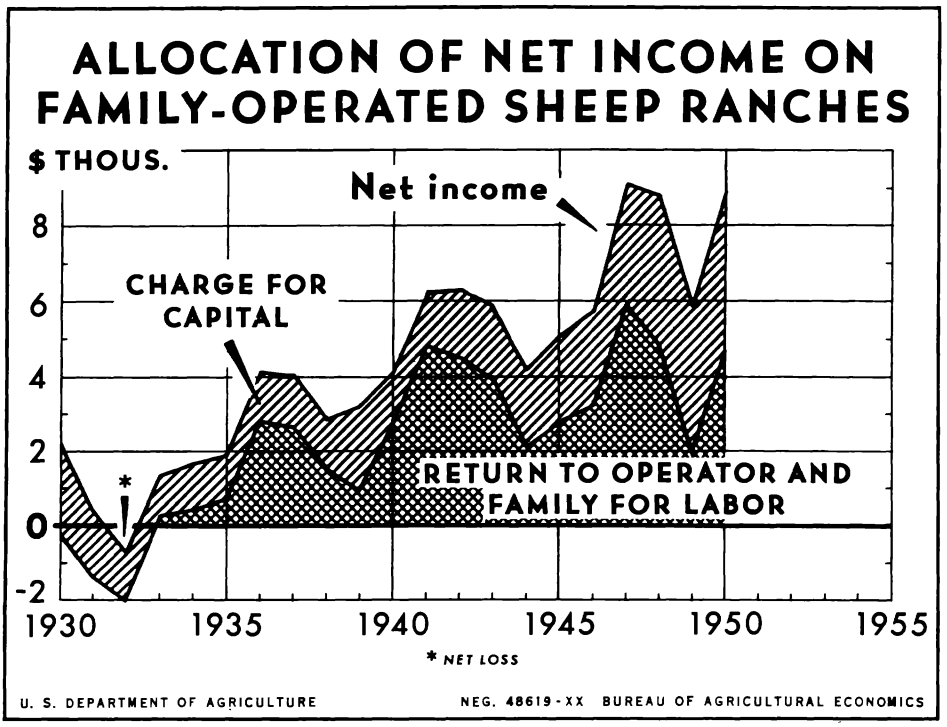


Figure 6.- Operating expense (total production expenses excluding charges for operation and unpaid family labor and management and for use of capital) per dollar of gross income averaged about 70 cents from 1930 to 1950. The ratio was not so favorable in the early 1930's, and in 1932 operating expenses alone exceeded gross income. In recent years, however, operations of family-sized sheep ranches in the Intermountain region have obtained fairly high returns for their labor and management after making nominal allowances for total capital invested in ranches.

Following this year of low prices and poor production, prices paid declined relative to prices received. In 1941, only 51 cents of each dollar of gross ranch income went to pay operating expenses. Operating expenses continued to rise during the war. Since 1944, sheep ranchers have spent between 66 and 72 cents for operating expenses for each dollar of gross ranch income received.

A comparison of these data with data for family-operated cattle ranches and family-sized farms in other types-of-farming areas reveals that family-sized sheep ranches usually have the smallest operating margin and the highest operating expense per dollar of gross income. 7/ Since 1930, sheep ranches have had a smaller operating margin than cattle ranches in every year except 1934. In addition, the operating expense per dollar of gross ranch income received on sheep ranches has exceeded that reported for 15 other types of farms in 14 out of 19 years.

In this series of analyses of family-operated farms, an attempt is made to allocate net farm or ranch income to factors of production (capital, labor, and management). The allocation is made first to real estate capital, second to working capital, with the residual to labor and management. No attempt is made in these studies to differentiate between operator's labor and operator's management.

A common method of determining return to real estate capital is to base that return on weighted average rentals if the farm is rented out under common rental arrangements. However, no such basis is available on sheep ranches so return to real estate capital is based on alternative investment opportunities. Annual return on fixed investment in this study is current investment times the average rate of interest on similar farm-mortgage investment in the region. Return to working capital is obtained by multiplying the current investment in working assets by the average current interest rate on intermediate or production credit in the region.

Return to operator and family labor and management is that part of net ranch income that remains after returns to real estate capital and to working capital have been charged in the way described.

Return to investment has not fluctuated greatly from year to year, but has exhibited a general rise from a low in 1933. From 1934 to 1950, return to investment increased almost fourfold. A substantial increase in real estate values during this period, even

7/ See Statistical Bulletin No. 83. "Farm Production Practices, Costs and Returns." Bur. Agr. Econ. October 1949. p. 113.

though the interest rate was reduced, resulted in this increased charge for use of capital. In the more prosperous years, operator labor and management receives the larger share of the net ranch income. Return to operator labor, however, has not always been satisfactory. In 1932 net ranch income was so low that if a nominal return to investment was charged nothing remained as a return to the operator and his family for their labor and management of the ranch. Contrast that picture with 1947 when the return to operator and family labor and management was $5,927. Return per hour to operator and family labor and management was minus 38 cents in 1932 and $1.47 in 1947.

In general, in the early 1930's, family-operated sheep ranches in the Intermountain region struggled through difficult times and distressingly low incomes. After 1936, the situation improved somewhat. During the period 1943-46, net ranch income stabilized at about 27 percent above 1937-41. In the postwar years the income has been favorable.

A comparison of family-operated sheep ranch income with the family-operated cattle ranch income as reported in F.M. 71 reveals that by the various methods of measuring income, returns from sheep ranches, although low, were better than returns from cattle ranches during the 1930's. During the war and postwar years returns from sheep ranches have lagged behind those from cattle ranches. However, the differences in net income have not been great.

MEASURES OF PRODUCTION

Family-operated sheep ranches of one-band size are relatively large so far as organization of land is concerned when compared to family-operated crop and livestock farms. With the possible exception of machinery, sheep ranches are larger in most items of organization and investment. An average family-operated sheep ranch includes several thousand acres, sometimes comprising acreage units many miles apart. Almost two-thirds of the total yearly labor requirement is hired. The ranch owner acts chiefly in the capacity of a manager. A sheep ranch is a single-enterprise organization and the only alternative to sheep and wool production is beef production. Even this alternative is not open to all sheep ranches because of the peculiarities of the required ranch organization. Many sheep ranches do not have the cultivated feed base or types of range necessary to raise cattle.

Total output or production on many types of farms can be increased sharply by such things as heavier applications of fertilizer, use of improved and higher-yielding varieties of crops, shifting to more intensive crops, changing cropping rotations, and increased mechanization which permit operators to handle larger enterprises. (Shifting from horses and mules to mechanical power in essence increases farm output and sales through releasing horse and mule feed for direct production.) Most of these methods are not open to sheep ranchers. Production on sheep ranches has neither varied as much during the 21-year period nor has it increased as much in recent years as on crop farms.8/

The index of net ranch production 9/ (1937-41=100) rose from 71 in 1932 to 111 in 1941, dropped off slightly during the war years, then reached a peak of 123 in 1947 (fig. 7). The net production index of 90 in 1949 points to the direct effect of the bitter winter of 1948-49 on production.

The index of total input per unit of production has varied between 92 and 131 percent. Since 1941, production has been above average but input per unit of production has increased to a greater extent. Fair to good production and little fluctuation of input per unit of production prevailed during the postwar years but efficiency was not up to the level established in the 1937-41 period.

Input on sheep ranches remains relatively stable within band sizes even though production may vary widely because of such chance factors as drought and high death losses. A large part of the labor input is fixed even if the number of sheep is cut in half by death loss or forced sale. This situation can be contrasted with crop farms that suffer a crop failure. Under the latter circumstances at least part of the harvesting labor that would have been used may be dispensed with.

The indexes (1937-41) of operating expense per unit of production and total cost per unit of production are similar in character. Both reached a low in 1933 but costs increased gradually from 1933 to 1941, with the exception of 1938. After 1938, each index made sharp increases except for 1945, reaching a high in 1950 of 315 percent for operating expense and 311 percent for total cost.

8/ See footnote 7, p. 54.
9/ See Appendix for definitions of terms used.

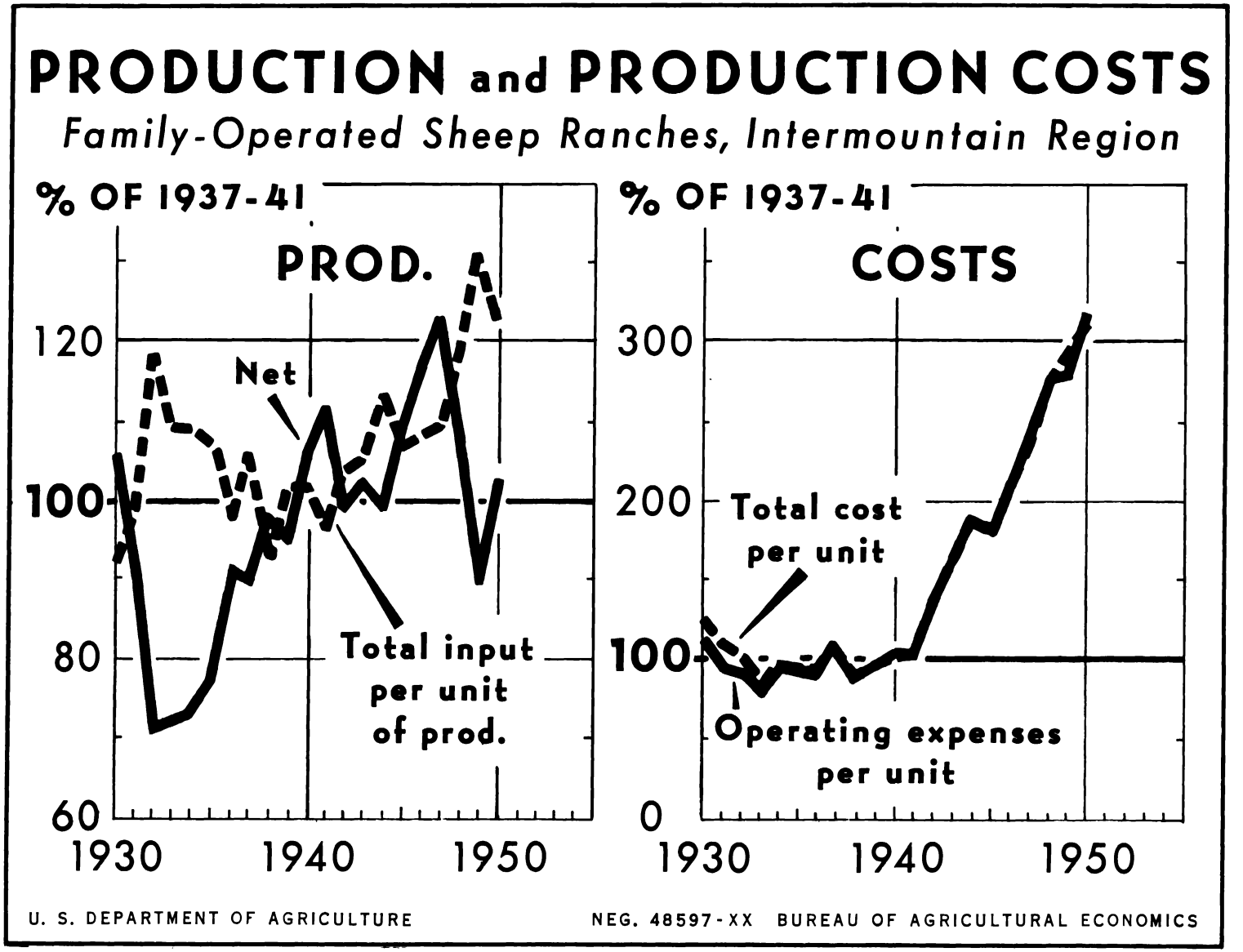


Figure 7.- Net production reached a low in 1932-34. Since then it has gone generally upward to a peak in 1947, then dropped off in 1948-49. Total input per unit of production rose rapidly from 1930 to 1932, then declined slightly. It remained relatively steady until the postwar years when it rose to new highs. Index numbers of total cost per unit of production and operating expense have followed similar patterns and have risen sharply since 1941.

The indexes (1937-41=100) (table 12) of gross and net ranch income offer a comparison between incomes on family-operated sheep ranches and family-operated cattle ranches. 10/ During the 1936-40 period, incomes from sheep ranches were slightly more favorable than from cattle ranches. Since 1941 relative incomes on cattle ranches have been higher than on sheep ranches.

From 1932 to 1936, net production per hour of labor on family-operated sheep ranches was below average. However, from 1940-48 net production per hour of labor was better than average, reaching a high of 121 percent in 1947. Generally, the tight labor situation and difficulty of obtaining herders forced sheep ranchers to contribute more labor to the ranches during the war and postwar periods than during more normal times.

The quantity of power and machinery used on sheep ranches increased during the 1930-50 period. Most of the increase was in trucks, although some increase in tractors occurred also. The index of quantity of power and machinery used on sheep ranches was 89 percent in 1935 (1937-41=100) and rose to 139 percent in 1950. During the war when it was difficult to obtain mechanical equipment, rubber tires, and to get repairs made, this index leveled off to about 122 percent of the 1937-41 period. Subsequently, a postwar recovery was evidenced. Sheep ranchers will doubtless continue to use increasing amounts of truck power to transport ewes from one seasonal range to another and to move the market lambs to shipping points.

ANIMAL UNIT COMPARISONS

Significant items of ranch organization, costs, and returns were calculated on a "per head of sheep" basis (table 15). Some of these items are comparable in character to items of expense and income on a ranch basis (table 12). Calculating the data on a per head basis permits a more direct comparison of these data with sheep ranches of varying size and with other types of farms and ranches. This is somewhat comparable to calculating data on crop farms on a per acre basis.

In ranch studies, direct comparisons of costs and returns per ranch as between ranches of varying size are difficult. In addition, comparisons between sheep ranches and cattle ranches are

10/ Compare results in this publication with F.M. 71 and F.M. 82 referred to in footnote 2, for differences between crop and livestock farms, cattle ranches, and sheep ranches in items of income, costs, and inputs per unit of production, power, and machinery used, and many other factors.

difficult to make because of the lack of a balanced common denominator. Some factors are used on a forage basis but these conversion factors on a ranch basis are not comparable when calculating costs and income. Therefore, table 15 is calculated on a per head rather than an animal-unit basis.

Much of the difficulty encountered when making comparisons of costs and returns between various sizes of livestock organizations may be overcome if due allowance is made for differences in size. Reducing such estimates to a per head basis overcomes many of the problems inherent in size differences. The results are reduced to an understandable common denominator for direct comparisons.

In addition to those just listed, comparisons can be made between sheep and cattle ranch studies by using conversion factors. These conversion factors may be for forage or feed requirements, for expenditures, or for capital investments. However, they may not be interchangeable. Five sheep may equal 1 cow (1 animal unit) for purposes of forage comparisons but this ratio may not exist when comparing capital investment between sheep and cattle ranches.

Although these various comparisons may not be exact, they can be especially useful in associating items of organization, costs and returns between various sizes and types of ranches (table 25).

COSTS OF PRODUCTION

Sheep ranches are single-enterprise farming units. In most years more than 95 percent of income is derived from sheep. Often 100 percent of cash income comes from the sheep enterprise. Under these circumstances, estimates of cost of production can be made with more validity than when overhead costs must be allocated among several enterprises.

Calculations of costs of producing lambs and wool on sheep ranches involve joint costs. Production costs of lambs and those of wool are inseparable because of the joint cost relationship. Dividing the joint costs on the basis of percentage of income derived from lambs and percentage of income derived from wool is the method generally adopted. This results in an arbitrary separation of costs, nevertheless, it is the method used in arriving at the cost of production data presented in table 26.

The proportions of income received from lambs and from wool varied from about 59 to 41 in 1935 to 72 to 28 in 1949. These relative proportions of income depend on a number of factors, among which are: (1) prices received for lambs and for wool, and

Table 25.- Investment, receipts, and income per animal unit, family-operated sheep ranches and cattle ranches, Intermountain region, 1930-50 1/

Year	Sheep ranches					Cattle ranches				
	Land	Investment	Cash receipts	Cash expenditures	Net ranch income	Land	Investment	Cash receipts	Cash expenditures	Net ranch income
	Acres	Dollars	Dollars	Dollars	Dollars	Acres	Dollars	Dollars	Dollars	Dollars
1930	10.1	124	29	23	2	7.9	211	20	9	18
1931	9.6	93	18	17	1	7.1	165	15	7	9
1932	9.2	70	10	13	-2	7.1	142	12	7	7
1933	8.8	59	16	12	5	7.2	114	10	6	6
1934	8.4	68	20	14	6	7.2	118	11	8	0
1935	8.0	65	20	15	7	7.9	147	15	7	11
1936	8.6	80	30	17	14	8.0	153	21	8	12
1937	9.3	86	33	21	14	9.4	179	20	9	16
1938	9.9	87	26	17	10	10.6	185	18	10	16
1939	10.6	86	29	19	11	10.6	184	17	10	14
1940	11.2	95	36	23	14	10.6	192	21	10	18
1941	12.2	102	44	24	22	10.5	211	27	11	28
1942	13.0	120	47	27	22	10.5	242	34	10	32
1943	14.1	139	52	32	21	10.2	269	41	12	32
1944	14.8	149	51	38	15	10.3	278	39	13	30
1945	15.7	161	56	41	18	10.6	308	46	14	36
1946	15.9	178	64	49	20	10.6	343	51	14	42
1947	16.2	211	82	58	30	10.4	435	59	18	59
1948	17.1	258	82	57	29	10.0	436	67	19	66
1949	16.9	251	68	49	19	10.1	409	71	23	49
1950	17.2	274	85	63	30	9.6	409	75	23	51

1/ Data for cattle ranches from F.M. 71 and F.M. 82 referred to in footnote 2, page 1.
Conversion to one animal unit is as follows; 5 sheep, 1 cow, 1 steer 2 years old and over, 0.7 heifer, 0.7 yearling steer, 0.4 calf, 1.25 bull.

Table 26.- Average cost of producing lambs and wool, family-operated sheep ranches, Intermountain region, 1930-50

Item	Unit	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Total number sheep, January 1	Head	1,486	1,494	1,463	1,453	1,453	1,434	1,443	1,451	1,449	1,451	1,448	1,437	1,425	1,419	1,420	1,428	1,444	1,493	1,537	1,540	1,498
Ranch expenditures:																						
Feed and seed	Dollar	1,308	1,242	784	898	1,362	1,217	1,287	1,361	1,035	1,154	1,122	1,064	1,534	1,717	2,004	1,910	2,213	2,602	2,997	2,563	2,741
Livestock	do.	2,216	1,009	740	683	796	940	1,374	1,865	1,340	1,577	2,448	2,192	2,361	2,753	3,242	3,381	4,730	6,361	5,050	2,894	5,907
Power and machinery	do.	631	498	428	416	456	573	575	761	799	923	1,095	1,345	1,102	1,277	1,404	1,542	1,739	2,103	2,389	2,702	3,429
Building repair	do.	107	194	272	65	44	79	87	163	77	78	106	84	93	97	164	346	520	364	282	198	93
Hired labor	do.	1,525	1,382	872	674	771	787	880	998	934	1,014	1,011	1,276	1,739	2,403	2,950	3,391	3,775	4,395	4,755	4,650	4,524
Taxes	do.	527	404	332	269	330	283	337	387	393	384	416	395	409	409	400	423	630	807	1,211	1,296	1,391
Miscellaneous expenses	do.	504	430	360	366	414	426	429	457	430	427	430	453	513	566	601	621	689	838	931	901	908
Net depreciation	do.	58	100	152	149	153	46	- 42	- 24	- 9	- 31	- 108	- 157	183	317	367	126	28	7	70	126	94
Total	do.	6,876	5,259	3,940	3,520	4,326	4,351	4,927	5,968	4,999	5,526	6,520	6,652	7,934	9,539	11,132	11,740	14,324	17,477	17,685	15,330	19,087
Ewes and rams sold	do.	1,144	605	258	290	503	459	668	843	741	756	1,190	1,231	1,204	1,087	1,248	1,204	1,422	2,599	3,144	2,312	2,888
Net operating expense for lambs and wool	do.	5,732	4,654	3,682	3,230	3,823	3,892	4,259	5,125	4,258	4,770	5,330	5,421	6,730	8,452	9,884	10,536	12,902	14,878	14,541	13,018	16,199
Interest on investment	do.	2,376	1,767	1,303	1,071	1,228	1,109	1,306	1,361	1,330	1,263	1,393	1,452	1,696	1,950	2,071	2,260	2,567	3,166	3,980	3,901	4,161
Cost excluding operator and family labor	do.	8,108	6,421	4,985	4,301	5,051	5,001	5,565	6,486	5,588	6,033	6,723	6,873	8,426	10,402	11,955	12,796	15,469	18,044	18,521	16,919	20,360
Operator and family labor at hired wage rates	do.	1,441	1,314	814	622	703	761	827	906	833	891	905	1,070	1,414	1,862	2,124	2,241	2,471	2,702	2,836	2,850	2,832
Total calculated cost of lambs and wool	do.	9,549	7,735	5,799	4,923	5,754	5,762	6,392	7,392	6,421	6,924	7,628	7,943	9,840	12,264	14,079	15,037	17,940	20,746	21,357	19,769	23,192
Net ranch income (return to investment and operator and family labor)	do.	2,154	417	- 704	1,334	1,649	1,875	4,118	4,024	2,891	3,213	4,107	6,277	6,291	5,898	4,152	5,044	5,779	9,093	8,823	5,854	8,923
Lambs produced	Cwt.	654.5	587.5	454.4	422.8	442.9	408.0	555.1	573.7	645.2	625.6	668.2	692.8	592.7	627.8	670.3	690.6	781.2	821.4	672.7	565.5	583.1
Wool produced	Pound	12,641	12,883	11,177	11,613	11,559	11,133	12,485	11,584	11,968	12,194	12,760	12,382	12,112	13,173	11,421	13,391	12,898	13,576	14,191	13,344	13,523
Income from sales of lamb and mutton 1/ 2/	Percent	70.3	70.2	63.8	60.7	59.0	58.6	61.9	63.7	64.2	65.3	65.9	64.9	65.3	65.2	66.5	69.7	71.3	71.5	72.0	72.1	70.6
Income from wool sales 1/ 2/	do.	29.7	29.8	36.2	39.3	41.0	41.4	38.1	36.3	35.8	34.7	34.1	35.1	34.7	34.8	33.5	30.3	28.7	28.5	28.0	27.9	29.4
Net operating expense per hundredweight lamb production 2/	Dollar	6.16	5.56	5.17	4.64	5.09	5.59	4.74	5.69	4.24	4.98	5.26	5.08	7.42	8.78	9.81	10.63	11.78	12.95	15.56	16.60	19.61
Net operating expense per pound wool production 2/	do.	.13	.11	.12	.11	.14	.14	.13	.16	.13	.14	.14	.15	.19	.22	.29	.24	.29	.31	.29	.27	.35
Cost excluding operator and family labor per hundredweight lamb 2/	do.	8.71	7.67	7.00	6.18	6.73	7.18	6.21	7.20	5.56	6.30	6.63	6.44	9.28	10.80	11.86	12.91	14.12	15.71	19.82	21.57	24.65
Cost excluding operator and family labor per pound wool 2/	do.	.19	.15	.16	.15	.18	.19	.17	.20	.17	.17	.18	.19	.24	.27	.35	.29	.34	.38	.37	.35	.44
Lamb price received per hundredweight	do.	7.36	5.33	4.16	4.85	5.61	6.82	7.77	8.54	6.74	7.44	7.84	9.41	11.34	12.52	12.28	12.85	15.09	20.20	22.60	21.31	24.73
Wool price received per pound	do.	.19	.13	.08	.19	.21	.18	.26	.31	.18	.22	.27	.33	.38	.39	.40	.40	.40	.41	.47	.47	.56

1/ 5-year moving averages.
2/ Data for 1949 and 1950 are preliminary.

(2) production conditions that greatly affect net production of lamb may have a much lesser effect on production of wool in the same year.

It becomes evident that proportionate incomes from lambs and from wool may show considerable variation, whereas proportionate costs of producing these products may vary only a little. To smooth the annual fluctuation in proportionate income, the percentage of income from lambs and that from wool were calculated on a 5-year moving average.

The proportions of income received from lamb and from wool are based on lambs sold as meat and wool sheared from the breeding herd. Although the lambs are sold primarily for meat, the price received for lambs also reflects the value of the lamb pelt. The lamb pelt has not been considered as income from wool. If it were so considered, the proportion of income received would be higher for wool and lower for lambs.

The cost per hundredweight (excluding operator and family labor) of producing lambs exceeded the price received during the 1930-35 period. In 1945 and again in 1949, the price received and the cost of production were approximately the same (fig. 8). The greatest spread between prices received and cost of production appeared in 1947. In that year, prices received exceeded cost of production as calculated here by approximately $4.50 per hundredweight of lamb produced.

The cost per pound (excluding operator and family labor) of producing wool, as calculated in table 26, exceeded the price received per pound in 1931, 1932, and 1935. The greatest spread between prices received for wool and cost of production appeared in 1941 and 1942. In those years, prices received for wool exceeded the calculated cost by 14 cents per pound of wool sheared. In 1949, and again in 1950, this spread was 12 cents per pound of wool sheared.

During the 21-year period, the average cost of production of wool as calculated in this study was 24.4 cents per pound. During the same period the average price received per pound of wool sold was 30.6 cents, an average difference of 6.2 cents per pound of wool. With an average ewe shearing 9 pounds of wool, this means that the annual net margin per ewe for wool averaged about 56 cents. Included in this margin is the labor wage of the operator and his family.11/

11/ The net margin above calculated costs is affected by the arbitrary division of joint costs between lambs and wool. The net margin on one product might show a loss, yet the other might show sufficient return to make the entire sheep enterprise profitable. The charts in figure 8, for instance, show wool with a relatively larger net margin than lambs for most of the period since about 1940. By using some other method of dividing joint costs than that used here it would be possible to reverse this situation.

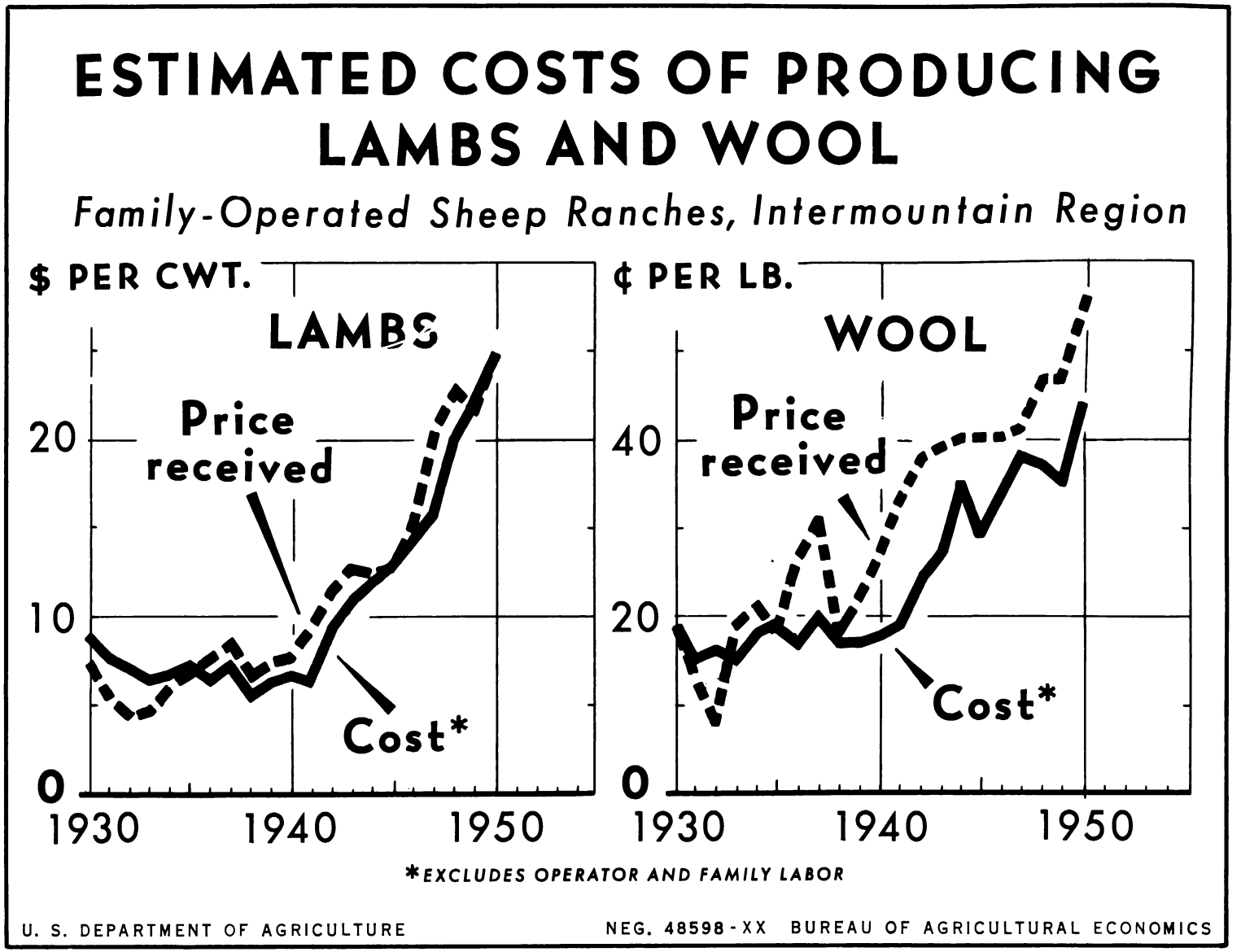


Figure 8.- Prices received for lambs and for wool have exceeded estimated unit costs of producing each during most of the 21 years from 1930 to 1950. During the war and postwar years the margins have been more pronounced, particularly for wool.

Wool produced per hundredweight of lambs produced varied from 16.5 pounds in 1946 and 1947 to a high of 27.5 pounds in 1933 (fig. 9). This fluctuation can be ascribed mostly to fluctuation in production of lambs. In 1931-34, production conditions were poor owing to drought. Lamb crops were down; death loss was high; and weights of lambs were 10 to 15 percent below average.

When these data are combined with price data to obtain the value of wool produced per dollar of lamb produced, an even greater variation is noted. The value of wool produced per dollar of lamb produced was $1.08 in 1933 on family-operated sheep ranches. In 1947, the value of wool produced was 34 cents per dollar of lamb produced. The average for the 21-year period was 62 cents.

These data indicate that costs of producing lamb and wool have been high, particularly in the war and postwar years. However, when costs are high sheep ranchers have comparatively high incomes. Net ranch income, or the amount available for interest on investment and for operator and family labor and management, averaged $3,224 in the 1935-39 period, $6,919 in the 1945-49 period, and $8,923 in 1950.

The average net ranch income per hundredweight of lamb produced was $3.60 during the 1935-39 period, $5.87 during the 1945-49 period, and $10.80 for 1950. Similarly, the average net ranch income per pound of wool sheared was 10 cents in the 1935-39 period, 15 cents during the 1945-49 period, and 19 cents in 1950.

APPENDIX

Definition of Terms Used

Although the analysis of family-operated ranches is rather detailed, an effort has been made to use accepted farm-management terms insofar as they are consistent and practicable for these purposes. The procedure employed is designed to evaluate, appraise, and allocate ranch income to resources of capital (real estate and working capital) and labor, including management. (See table 12, page 32, and example of ranch income statement, page 67.)

The study upon which this report is based followed the uniform procedure used in other family-operated farm analyses published by the Bureau of Agricultural Economics and by some of the State Experiment Stations cooperating on the Nation-wide project. Uniform procedure allows for comparisons between type-of-farming areas.

To clarify matters, wherever departures from the generally accepted meanings of terms were necessary, a brief discussion is given. It should be kept in mind that all items to which these terms apply, and which are given in the tables and figures, are on a per ranch basis and are limited to commercial family-operated sheep ranches in

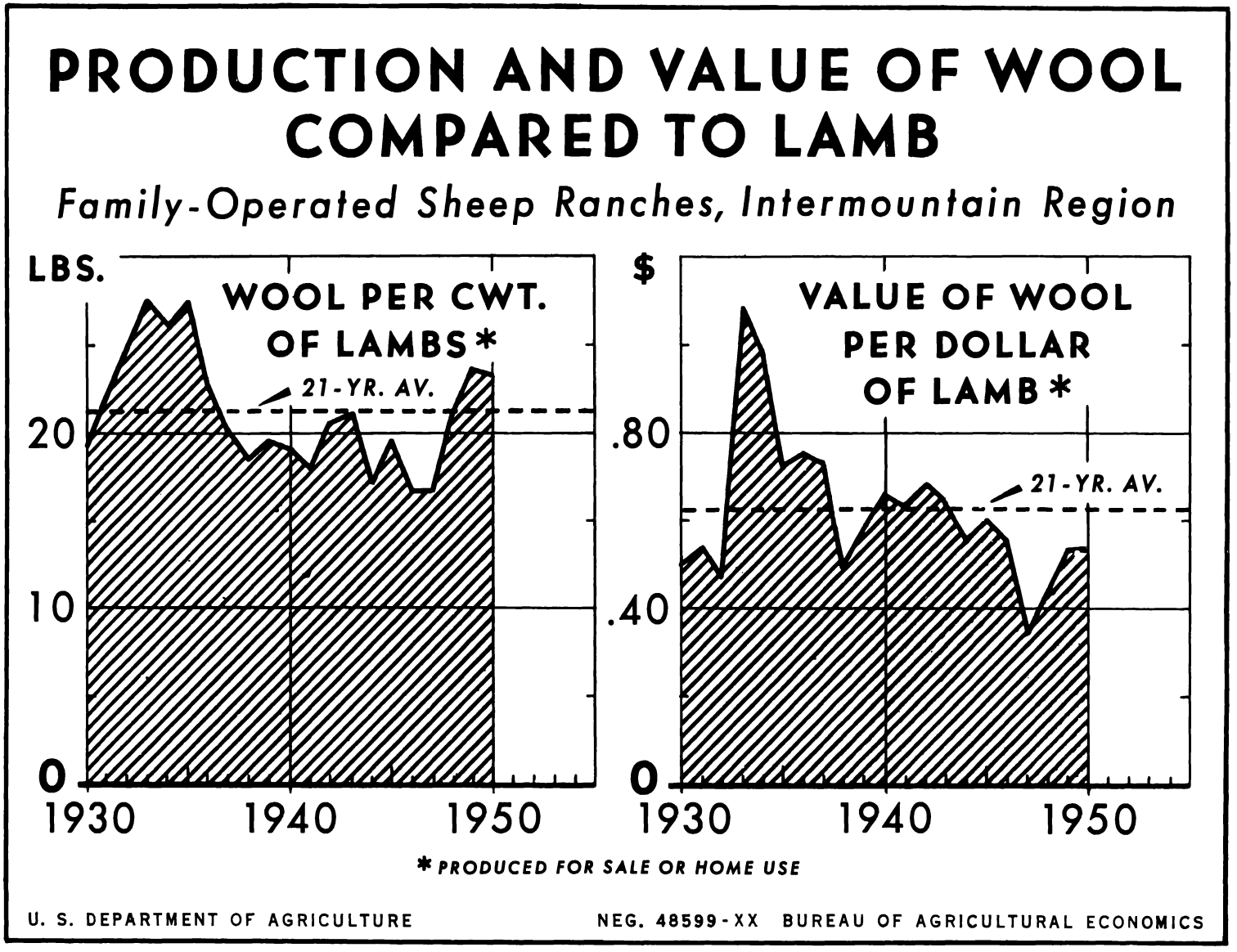


Figure 9.- Pounds of wool produced per 100 pounds of lamb produced varied from a low of 16.5 pounds in 1946 and 1947 to a high of 27.5 pounds in 1933. The average for the 21 years was about 21.1 pounds. The 21-year average value of wool produced per 100 pounds of lamb produced was about 62 cents, with a high of $1.08 in 1933 and a low of 34 cents in 1947. This shows the influence of poor production years and low price.

the Intermountain region. An exception is noted for table 15 which gives data on a per-head sizing of the ranches. Although the data in this table can be applied to ranches of varying size, its principal application is to family-sized sheep ranches.

Ranch Size, Investment, and Income

Total land in ranch - Total acreage in crops plus acreage of failure or abandoned farm land, fallow, idle, pasture, woodland, wasteland, house yards, barnyards, feed lots, roads, lanes, and fences operated under one unit. Pasture or grazing land rented on the basis of units of livestock grazed is not included here but is included in ranch expenditures as feed bought. This includes grazing fees paid for the use of public range lands.

Cropland harvested - Land from which cultivated crops were harvested; land from which hay (including wild hay) was harvested; and land in small grains and other crops.

Total labor used - Total hours of operator and unpaid family labor and management plus hired labor used in production of livestock and crops, in repair and maintenance of machinery, equipment and buildings, and in general management of the operating unit. It is labor used, not labor available.

Total investment - Estimated current value January 1 of land, service buildings, dwelling, improvements, machinery, equipment, livestock, and crops. Acres, numbers of each machine, livestock, and other numbered items are multiplied by their average value per unit January 1. For crops, the bushels, tons, or hundredweight in inventory January 1 are multiplied by respective prices December 15 of the previous year. This includes feed concentrates and mineral supplements bought.

Cash receipts - Total amount of cash received during the calendar year from sales of crops and livestock and livestock products, and from Government payments. All current marketings are included whether produced during the year or from inventories on hand January 1.

Cash expenditures - Total cash paid during the calendar year for goods and services used in production. Rent, interest payments, and purchases of additional land are not included. Only the ranch share of cash expenditures of operating the automobile is included. In this study, 45 percent of the cost of operating the automobile was charged to the ranch.

Example: Ranch Income Statement
Family-operated sheep ranches, 1950

1.	CASH RECEIPTS:		
2.	Crops	$ 29	
3.	Livestock	17,630	
4.	Livestock products	7,573	
5.	Government payments and miscellaneous	373	
6.	Total		$25,605
7.	CASH EXPENDITURES:		
8.	Labor hired	$ 4,524	
9.	Crop and livestock expense, incl. feeder cattle bought	8,648	
10.	Machinery and power (incl. ranch share of automobile)	3,429	
11.	Building repair and replacement (excl. dwelling) and purchases	93	
12.	Miscellaneous	908	
13.	Taxes	1,391	
14.	Total		$18,993
15.	NET CASH INCOME		$ 6,612
16.	PERQUISITES:		
17.	Food (used for human consumption on ranches where produced)	$ 843	
18.	Fuel	46	
19.	House rental	405	
20.	Total value of perquisites		$ 1,294
21.	NET CHANGE IN INVENTORY		$ 1,017
22.	NET RANCH INCOME		$ 8,923

ALLOCATION OF NET RANCH INCOME

23.	CHARGE FOR CAPITAL;		
24.	Charge for real estate capital	$ 1,818	
25.	Charge for working capital	2,343	
26.	Total		$ 4,161
27.	OPERATOR AND FAMILY LABOR AND MANAGEMENT		$ 4,762
28.	RETURN PER HOUR TO OPERATOR AND FAMILY		$ 1.17

Value of perquisites - Value at current farm prices of all quantities of livestock, livestock products, crops, and fuel and wood consumed during the calendar year in ranch households on ranches where produced, plus a nominal rental on the ranch dwelling. Net house rental is estimated at 8 percent of the current value of the house. This is in lieu of gross rental less depreciation and related costs.

Net change in inventory - Change in physical quantity from beginning to closing inventory of specified crops, livestock, machinery and equipment, and service buildings each valued at respective year-end price. For livestock, it is number in closing inventory minus number in beginning inventory, multiplied by year-end value per head of the respective livestock. Crops and feeds are handled similarly in units of bushels, hundredweight, or tons.

Changes in inventory of motor vehicles, other farm machinery, and service buildings are obtained by subtracting annual depreciation from current purchases of the respective items.

Net ranch income - The annual return to the operator for his labor and management and to the unpaid members of the household for services rendered on the ranch during the calendar year, and to total ranch investment regardless of ownership. In terms of the previous criteria, it is net cash income plus value of perquisites and net change in inventory.

Charge for real estate capital - Current investments in land and buildings times current interest rates on sheep-ranch mortgages in the Intermountain region.

Charge for working capital - Estimated current investment in or value of working assets on hand January 1 times interest rates on intermediate and short-term farm loans.

Return to operator and family management and labor used - The estimated return to the operator and unpaid members of the family for labor and management used on the ranch during the calendar year. This return is the residual after all production expenses have been met and appropriate charges have been made for the use of capital in the ranch business.

Index Numbers of Production, Costs, and Returns

An integral part of this project is the development and construction of several series of index numbers to give summary measures of changes in several items and to permit and facilitate direct comparisons of production, prices, costs, and returns. Considerations to be taken into account in explaining, measuring, and comparing incomes

are changes in production and changes in acreages of land and amounts of labor and capital that are employed, as well as the effectiveness with which they are utilized in production, and changes in prices and cost relationships.

In recent years, production and income have increased on nearly all farms and ranches but the extent to which they have risen and the causes for the increase differ materially from farm to farm. Some farmers and ranchers have increased production by operating more land, keeping more livestock, buying more feed, and hiring more labor. Other ranchers have increased production with substantially less labor, through the use of more machinery and equipment, and by operating more land. In some instances, substantial reductions have been made in costs of production, whereas in others costs have changed very little or have increased.

To provide a direct means of measuring the effects of production, farm practices, methods of production, mechanization, prices, costs, and related factors upon ranch income and economic well-being of ranch families, all items of expense and income (including perquisites and changes in inventory) were assigned weights, then all were appropriately combined into a series of index numbers. Prices received and prices paid by ranch operators each were weighted respectively by the quantity of the particular item sold or purchased. The formulae are weighted aggregates of actual prices and quantities. The formula for income or value is

$$\frac{\Sigma q_1 p_1}{\Sigma q_0 p_0}$$; for quantity or production $$\frac{\Sigma q_1 p_0}{\Sigma q_0 p_0}$$ and

for price, $$\frac{\Sigma q_1 p_1}{\Sigma q_1 p_0}$$;

where p_1 and q_1 are current-year prices and quantities, and p_0 and q_0 are weighted average prices and quantities respectively in the base years. $\Sigma q_0 p_0 = (\ q_1 p_1)_0$. In most instances, weighted average prices and quantities for the period 1935-39 were employed as base weights.

All indexes given in this series are presented on 1937-41=100. These indexes are useful in comparing like indexes for other family-operated farms in various types-of-farming areas. Index numbers are available for a large number of costs and returns items. A few selected numbers are presented in the tables in this report.

Gross ranch income - Total sales plus Government payments, ranch perquisites, and change in inventory of livestock and crops. The index is obtained by dividing gross ranch income in the current year by average gross income in the 1937-41 period.

Net ranch income - Net ranch income in the current year divided by net ranch income in the 1937-41 period.

Gross ranch production - Current quantities (q_1) of livestock, livestock products, and crops weighted by their respective base prices (p_0), plus current quantities of perquisites weighted by their respective base prices. It becomes total volume of produce sold, consumed on ranch where produced, plus net increase in inventory of products.

The index is obtained by dividing gross ranch production in current year by average gross ranch production in the 1937-41 period. It is used in computing three index series of cost ratios. These are:

(1) Operating expense per unit of production.
(2) Total cost per unit of production.
(3) Total input per unit of production.

Net ranch production - Gross ranch production minus feed, seed, and livestock purchased. The index is obtained by dividing current net ranch production by average net ranch production in the 1937-41 period.

Net production per hour of man labor - Obtained by dividing the index of net ranch production by the index of total hours of man labor used, both indexes based on 1937-41=100.

Operating expense per unit of production - Obtained by dividing the index of operating expense by the index of gross ranch production, both indexes based on 1937-41=100. This estimate represents the amount of direct expenses or outlay required to produce each unit of products sold, used, or available.

Total cost per unit of production - Obtained by dividing the index of total cost of production by the index of gross ranch production, both indexes based on 1937-41=100. This ratio presents current costs of producing each unit of product sold, used or available for sale or use.

Total input per unit of production - Obtained by dividing the index of total physical inputs charged at base prices by the index of gross ranch production. This ratio represents physical inputs required to produce a unit of output. Stated differently, it is cost, excluding price change, of producing each unit of gross output.

Power and machinery used - The number of work animals, tractors, trucks, automobiles, hay balers, and other items identified by number each multiplied by its respective average value in the base period (1935-39). To this is added the current value of other machinery

divided by the price index (1937-41) of these items. The series of these yearly estimates of current quantities at base values is divided by the 1937-41 average to obtain the index series.

Prices received for products sold - The sum of current-year prices received for each unit of product sold weighted by the quantity of the respective product sold in the current year divided by the sum of the base-year (1935-39) prices received for each item sold weighted by the quantity of the respective product sold in the current year. This series is then divided by its 1937-41 average to obtain the index 1937-41=100.

Prices paid including wages to hired labor - This is the sum of current-year prices paid for each item including wages, each multiplied by the quantity of the respective product bought or service hired in the current year ($\Sigma q_1 p_1$) divided by the sum of weighted base-year (1935-39) prices paid, including wages to hired labor weighted by the quantity of the respective product purchased or service hired in the current year ($\Sigma q_1 p_0$).

The formula for both prices received and paid is:

$$\frac{\Sigma p_1 q_1}{\Sigma p_0 q_1}$$

Prices and quantities are p_1 and q_1 respectively in the current year, and p_0 represents weighted average prices in the base period 1935-39. To obtain the index series 1937-41=100, the various ratios must each be divided by its respective 1937-41 average.

Crop yields - Obtained by: (1) Dividing annual yields of the specified crop by the average yield in the base period (1935-39), (2) Multiplying these ratios by the respective crop acreage in the same year, and (3) Dividing the sum of the annual products by the total acreage of these crops in the respective year.

For sheep ranches the important crop is hay (alfalfa, tame, and native) and the crop-yield index is based on the yield and production of these hays.

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