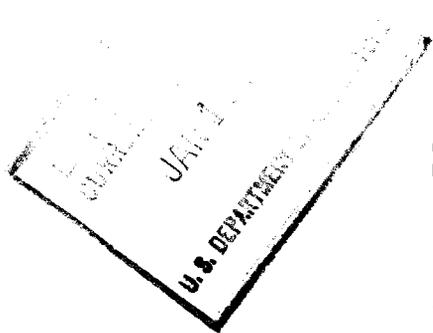


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# FARM PRODUCTION PRACTICES COSTS AND RETURNS



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## EXPLANATION

Agriculture in the United States has undergone revolutionary changes and has been subjected to many stresses and strains in periods of depression and prosperity, war and peace, severe droughts and ideal weather, surpluses and unlimited demand--all within the last two decades. Farm production increased sharply during the war years in response to war-created demands. High levels of production that were created in the war emergency continue, although market shortages are rapidly disappearing.

Technological developments, increased knowledge on the part of farmers, favorable weather, and other factors made it possible to meet these new demands for food and fiber. Prices of farm products increased rapidly from prewar depression levels. Higher prices with increased production pushed farm incomes to still higher levels in the complex and thoroughly inter-related economy in which we now live. But farm costs also have risen. Farming today is a vastly different operation than it was in the 1930's-- with new techniques, new and more widely adopted practices and machines, and with both production and costs at high levels.

To appraise and evaluate properly the meaning of these rapid changes and their effects on the welfare of farmers and upon our agricultural industry requires the development and keeping current of much factual information as to where we are and what changes are taking place from year to year. Such information must cover a wide variety of subjects, and must be both general and specific--for change may be strikingly different in various areas or regions or between one commodity and another.

This report brings together available information on Farm Production, Practices, Costs, and Returns prepared in the Bureau of Agricultural Economics. Many persons in the State Agricultural Colleges and in the Department of Agriculture either collected or assisted in the collection of the basic data from which these estimates are obtained. These statistical series are to be kept up-to-date and it is expected that similar reports will be released periodically in order to provide current information promptly and in readily usable form. These data should help materially in providing an understanding of the changes taking place in farm production and in the business side of farming in the United States.

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## FARM PRODUCTION, PRACTICES, COSTS, AND RETURNS

### INTRODUCTION

Farm production in 1948 was the largest on record and was obtained with the greatest degree of efficiency yet achieved. This position climaxed a long period of technological advance and adoption of improved practices in agriculture. Outstanding progress was made during World War II and the postwar years when expanded markets and high prices for farm products proved effective stimulants to all-out production.

This all-out production required large expenditures of production resources. Production expenses in 1948 were the highest on record, and in that year farmers paid out more for operating their farms than they had been getting in gross farm income in any year prior to 1942. Quantities of machinery, fuel, fertilizer, and feed used were at record or near record levels. In addition, prices and wages paid for goods and services used were at an all-time high. But costs have not increased at the same rate on all types of farms. Generally, the greatest proportionate increases were on dairy and cotton farms.

Despite record production expenditures, net farm income in 1948 was close to the all-time high of 1947. A large volume of output was produced with a high degree of efficiency, and combined with peak prices received for farm products to give this near record net income. However, as usual, net income varied widely among types of farms. Net incomes were higher in 1948 than in 1947 on Corn Belt farms, but were lower on the other types of farms studied.

Increased production per worker, per acre, and per animal have keynoted the rise in farm output and the gains in efficiency of production. The large increase in crop production during the last 10 years resulted from a sharp rise in yields owing to greatly expanded use of fertilizer and lime, improved seeds, especially hybrid corn, more timely cultural practices due to greater mechanization, other improved practices, and generally more favorable weather than in the prewar period.

Not all farms responded equally to these improved techniques and generally more favorable weather. The widely separated locations of the different farms and the degree to which they were able to adopt and benefit from technological improvement enabled some to increase yields more than others. Wheat farms in the Great Plains and livestock farms in the Corn Belt, generally, showed the greatest increase in yields during the last 10 to 15 years. On the other hand, cotton farms in the drier areas of Oklahoma and Texas have hardly maintained the level of yields of 10 years ago. Total acreage of cropland has changed very little during the last three decades in the United States as a whole.

Livestock production per breeding unit has shown a long-time upward trend, but did not increase greatly during World War II. In contrast most of the increase in production of crops per acre has occurred during the last 15 years. Production of meat animals and animal products rose greatly during the war as the number of animal units of breeding livestock increased sharply, along with the greatly expanded output of feed grains and hay.

The rapidly increasing productivity of farm workers has been perhaps the best single measure of progress in efficiency in agriculture. Workers on farms in the United States have matched their industrial counterparts in long-time gains in productivity. Production per farm worker rose sharply during World War II. Increased yields of crops and livestock have aided materially in raising production per man-hour and per worker in agriculture, but the dominating force for a long time has been our progress in farm mechanization. Each worker on nearly all types of farms studied produced more in 1948 than in the years immediately preceding World War II. On wheat farms in the Southern Plains production per hour of man labor in 1948 was about three times as high as in 1935-39. On the other hand, production per worker in 1948 on dairy and cotton farms was only a fourth higher than in 1935-39. In 1948 returns per hour to all labor used averaged about \$1.20 on dairy farms, 85 cents on cotton farms, and about \$2.50 on winter wheat farms.

Displacement of horses and mules by tractors, motor trucks, and automobiles brought about a rapid conversion from animal to mechanical power on United States farms during the last third of a century. This process has added greatly to the production of food and fiber for human use, as more than 60 million acres of cropland have been released from production of feed for horses and mules. The decline in number of work stock on farms has contributed greatly to the increase in numbers of animal units of other grain and roughage-consuming livestock and has increased our output of milk, meat, and eggs. Mechanical power and associated modern labor-saving machinery and equipment also have meant greater timeliness in farming operations and hence increased production.

In addition, some of these factors have made possible an increase in the size of commercial farms. Greater crop and livestock yields, increased mechanization, and other production-increasing factors and larger farms have meant that in many areas production per farm has gone up more than the over-all production for the country. Similarly, the gross income of commercial family-operated farms has gone up more than the gross income of all farms. Gross income from agriculture and Government payments in the United States was nearly three and a half times as high in 1948 as the average of the period 1935-39. Of 15 important types of commercial family-operated farms for which data are available, the gross income per farm for 12 of these in 1948 was more than three and a half times the average of the 1935-39 period; for one group of farms the increase was the same as the rate of increase for all of our agriculture, and for only two types was the increase in gross income less than three and a half times the 1935-39 average.

Mechanization now prevails to a greater degree in production of small grain crops than in production of any other group of major crops. Production of corn is being rapidly mechanized and important gains are being made in the mechanization of haymaking. Mechanical power and labor-saving machines are gaining in importance in the cotton fields but the time-consuming harvest job is still almost wholly a hand operation.

Technological advance in agriculture over the years, especially progress in farm mechanization, has made possible the transition from a rural nation to an industrial nation that still produces food enough for its growing population and a surplus for export. One farm worker in the United States now produces food and fiber for himself and almost 14 others; a century ago one farm worker produced enough for himself and only slightly more than 3.5 others. And prospects are that agriculture will continue to raise its output and increase its production efficiency.

## FARM PRODUCTION BY COMMODITY GROUPS

Farm output for human use in the United States has risen by more than two-thirds since 1910 (fig. 1). The long-time upward trend was greatly accelerated during World War II. By the end of the war, farm output was 30 percent above the prewar average of 1935-39. The greatest volume of record was produced in 1948 when it rose to 40 percent above prewar (table 1). In each of the 7 years since 1941 volume of output for human use has been greater than prewar by 25 or more percent.

Changes in production have not been uniform among the various groups of products. The tremendous corn crop of 1948 brought production of feed grains to the highest of record. There have been long-time upward trends in production of fruits and nuts, and truck crops. Production of food grains, in contrast, has shown no general tendency to increase, except for the sharp, upward spurt during World War II and the postwar years.

Since 1918 the upward trend in output of meat animals and animal products has been closely associated with the decrease in production of animal power on farms. The release of feed and other resources owing to the decline in numbers of horses and mules made possible an increase in production of meat animals and animal products during the interwar period, even though total production of feed grains, hay, and pasture increased little.

A large decrease in numbers of horses and mules and a rapid increase in production of feed formed the basis for the sharp rise in output of meat animals and animal products during World War II. The big drop in production of feed grains in 1947 was reflected in a relatively low production of meat animals and animal products in 1948. The very large production of feed grains in 1948 and the prospective good crops in 1949 will make possible a recovery of livestock production from the set-backs in 1946-48.

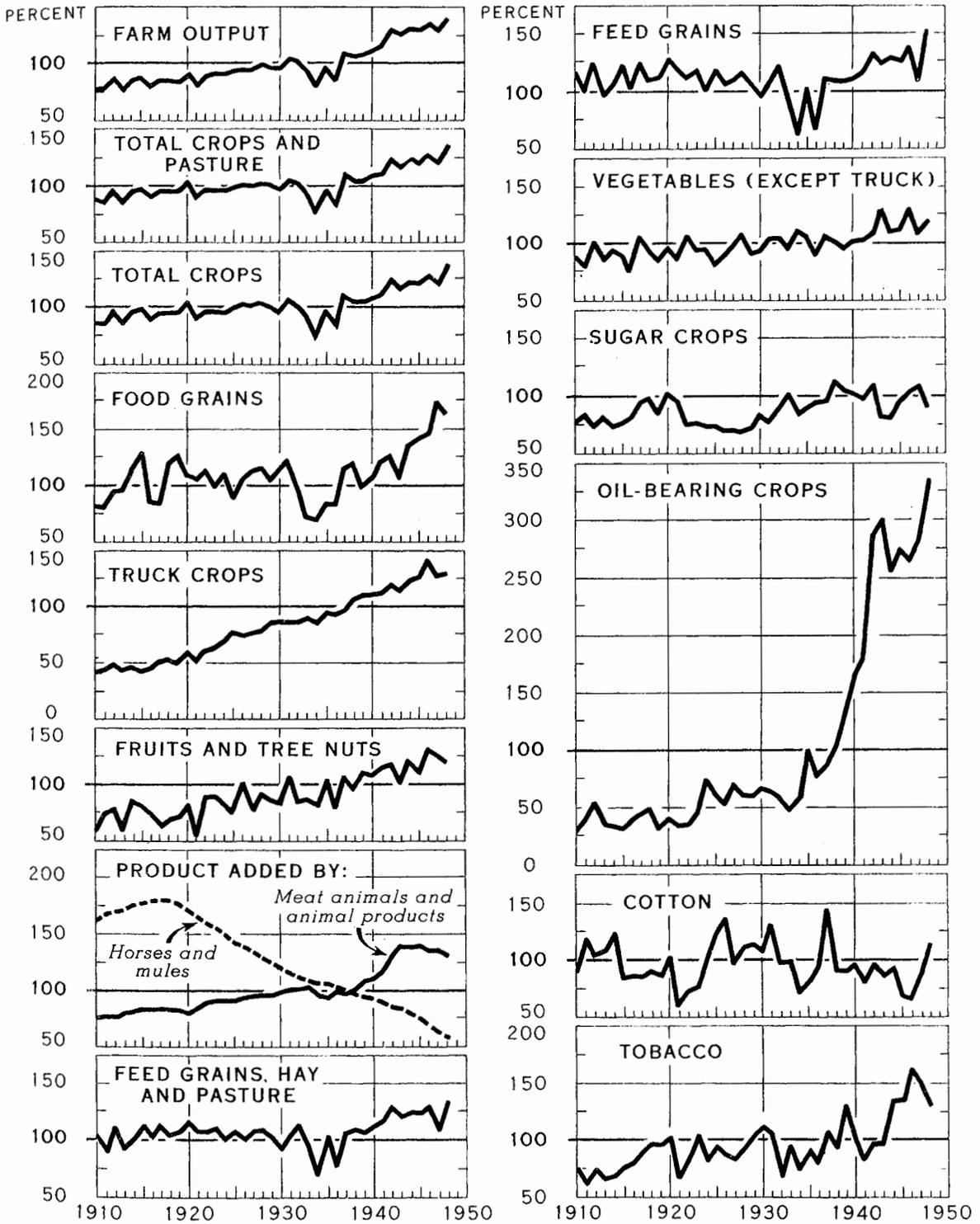
Production of oil-bearing crops showed the most phenomenal rise of any crop group during World War II. Output of oil crops in 1948 was the greatest on record. Production of vegetables which includes potatoes, sweetpotatoes, dry beans, and dry peas, has shown a long-time upward trend, although the rate of increase has not been as great as that of truck crops and fruits and nuts.

The volume of production of sugar crops, cotton, and tobacco has fluctuated considerably, but no definite long-time trends have been evident. Production of cotton has decreased generally during the last decade and a half, while production of tobacco has risen.

Annual fluctuations in production of the various commodity groups shown in figure 1 are due primarily to variations in weather conditions. Fortunately all commodities on a national basis are not affected in the same way or to the same extent in any single year. But, so important are the grains and forage crops in the total, that their combined pattern of production closely resembles the pattern of total crop and livestock production.

# VOLUME OF FARM OUTPUT, AND PRODUCTION BY GROUPS OF PRODUCTS, UNITED STATES, 1910-48

INDEX NUMBERS (1935-39=100)



DATA FOR 1947 AND 1948 ARE PRELIMINARY

FIGURE 1

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Table 1.- Index numbers of farm output, gross farm production, and production by groups of commodities, United States, 1910-48,  
(1935-39 = 100)

Year	Farm output	Gross farm production	Product added by			Total crops and pasture: 1/	Total crops and grains: 2/	Total truck crops: 3/	Fruits and tree nuts: 4/	Vegetables except truck: 5/	Sugar crops: 5/	Feed grains and hay: 6/	Feed grains and pasture: 6/	Oil bearing crops: 7/	Cotton	Tobacco
			Meat animals and animal products:	Horses and mules:	Total crops and pasture:											
1910	79	88	76	162	87	87	82	42	60	88	76	103	117	29	89	75
1911	79	88	77	166	85	85	81	44	74	80	83	91	100	39	120	62
1912	87	95	77	169	97	98	95	48	78	101	74	111	125	54	105	74
1913	78	88	79	172	86	85	97	43	60	86	81	93	97	35	108	66
1914	86	95	81	175	95	95	115	46	87	93	74	100	106	33	123	69
1915	88	98	83	177	98	98	130	43	81	89	76	113	123	32	85	76
1916	80	91	83	178	88	88	86	45	73	75	82	103	103	39	87	80
1917	86	96	84	178	95	95	84	51	64	106	96	113	125	44	86	88
1918	86	96	84	178	95	95	121	52	69	94	98	104	110	49	91	96
1919	85	96	83	176	95	96	127	50	72	85	85	106	111	32	87	96
1920	92	101	80	170	104	105	112	58	83	97	102	116	130	39	102	101
1921	81	91	84	164	89	89	107	52	54	87	97	108	118	34	61	67
1922	89	97	89	159	96	96	114	62	89	106	75	107	112	34	74	83
1923	90	98	91	154	96	96	99	63	89	95	76	110	118	46	77	102
1924	90	97	91	149	96	95	110	69	83	95	73	100	100	74	103	83
1925	93	99	91	143	99	99	88	77	76	81	73	107	119	60	122	92
1926	95	101	93	139	101	101	107	75	101	88	69	101	108	53	136	87
1927	95	100	95	134	99	100	113	77	77	98	70	107	110	70	98	83
1928	99	102	96	128	103	104	116	78	92	108	68	108	116	61	110	93
1929	97	101	97	124	100	101	106	86	86	92	72	103	107	60	113	103
1930	95	98	99	119	96	96	115	86	84	94	83	94	95	66	106	112
1931	104	105	101	115	106	106	122	86	106	104	78	103	109	64	130	105
1932	101	102	101	111	102	102	98	86	86	104	91	113	123	59	98	68
1933	93	95	103	108	92	90	72	89	87	97	102	96	95	47	99	94
1934	79	82	97	106	76	73	69	86	82	111	84	72	62	58	73	74
1935	96	97	94	105	97	97	84	94	104	107	90	103	103	98	81	90
1936	85	87	99	103	83	81	83	93	81	90	95	77	68	74	94	80
1937	108	107	98	100	110	112	115	97	108	106	96	106	112	86	144	107
1938	105	104	101	97	105	105	120	106	97	101	114	108	109	102	91	94

Table 1.- Index numbers of farm output, gross farm production, and production by groups of commodities, United States, 1910-48 - Continued  
(1935-39 = 100).

Year	Farm output	Gross farm production	Product added by:			Total crops	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vegetables except truck	Sugar crops	Feed grains and pasture	Feed hay and crops	Oil bearing crops	Cotton	Tobacco
			Meat animals and animal products	Horses and mules	Total												
					1/	1/	2/	3/		4/	5/		6/	7/			
1939	106	105	108	95	105	105	98	110	110	96	105	106	108	140	90	129	
1940	110	108	110	93	108	109	107	111	108	102	102	111	110	165	96	99	
1941	114	111	117	90	111	111	121	112	115	103	98	116	117	182	81	85	
1942	128	123	130	87	123	123	126	118	117	108	110	129	134	287	97	96	
1943	125	120	139	84	116	116	109	114	101	131	81	122	124	300	87	96	
1944	130	124	138	79	122	123	136	122	120	110	80	124	129	255	93	133	
1945	129	123	139	75	120	121	142	125	111	111	94	124	127	274	69	136	
1946	134	126	135	70	127	129	146	141	131	128	103	128	138	265	66	159	
1947	129	121	135	63	120	122	173	128	126	108	108	109	108	281	89	149	
1948 8/	140	131	131	58	135	138	164	129	119	119	90	134	152	336	114	130	

- 1/ Includes some miscellaneous crop production not included in separate crop groups shown.
- 2/ Wheat, rye, rice, and buckwheat.
- 3/ Commercial truck crops for fresh market shipment and processing, market gardens, and farm gardens.
- 4/ Potatoes, sweet potatoes, dry edible beans, and dry peas.
- 5/ Sugar beets, sugarcane for sugar and seed, sugarcane sirup, sorgo sirup, maple sugar, and maple sirup.
- 6/ Corn, oats, barley, and grain sorghums.
- 7/ Soybeans for beans, peanuts, and flaxseed.
- 8/ Preliminary.

**Explanation of the Series.-** Farm output measures the volume of production available for eventual human use through sales from the farm or consumption in farm households. Gross production is a measure of the total product of farm land and farm labor resources each year. Gross production includes total crop production, pasture consumed by all livestock, and the product added in the conversion of feed and pasture into livestock and livestock products for human use and into farm-produced power of horses and mules. The quantity-price aggregate of farm output is calculated by subtracting from the quantity-price aggregate of gross production the quantity-price aggregate of farm-produced power (feed and pasture consumed by horses and mules plus the product added in converting this feed and pasture into animal power).

Weighted average values per unit of each commodity in 1935-39 were used as weights. Separate sets of average values were calculated for use as weights in each geographic division. The quantity data for crops are total production in the crop year. The quantity data for livestock are net liveweight production for the calendar year or the quantity of livestock products. The most important item omitted was farm forestry production. Commodities of little importance were omitted in some regions.

Production of crops and production of livestock were combined by the product-added method. This method credits feed crop production to the geographic division in which the feed was grown and credits livestock "manufacturing" production (product added) to the division in which shipped-in feed was fed. The product-added method can be illustrated for hogs. The farm price of hogs averaged about \$8.00 per cwt. in the 1935-39 period. Enterprise studies show that about three-fourths of the cost of hog production is for feed; therefore, the product added per hundred pounds of hogs is \$2.00 at average 1935-39 prices. The same factors were used each year in calculating product added by each class of livestock.

Annual quantity-price aggregates of farm output and gross production for the United States were obtained by summing the regional data for the period 1919 to date. The two indexes have been extended back to 1910 on a United States basis only.

A list of products included, price weights, and other details concerning the construction of the indexes are contained in the BAE processed report F. M. 53, "Farm Production in War and Peace."

## FARM PRODUCTION BY GEOGRAPHIC DIVISIONS

Farm output in 1948 was the greatest of record in five of the geographic divisions; in the other four divisions it was the second largest of record (table 2). Three divisions attained record levels of output in 1946 when production conditions were generally favorable. Output fell from 1946 to 1947 in all regions except the two South Central divisions and the Mountain division. The sharpest drop occurred in the North Central regions where corn heavily weights the index of output, and where production of corn in 1947 was much below the very large production of 1946.

Long-time trends in output have been upward in all geographic divisions (fig. 2). Wide fluctuations in output, owing to variations in weather conditions, have influenced the trend, especially in the West North Central and West South Central divisions. These two divisions were most severely affected by the droughts of 1934 and 1936.

Output has risen faster and more consistently in the Pacific division than in any other geographic division, although especially noteworthy increases have occurred in the South Atlantic and Mountain divisions. All divisions contributed to the rise in output during World War II. The greatest increase occurred in the West North Central division, partly as a result of a recovery from prewar drought conditions.

Increases in farm output have resulted from several forces. Advances in technology have been the chief motivating forces in each division, although favorable weather played a significant part in the rise in output during the last decade. Timeliness in doing critical operations, made possible by more and better machines and power units, has helped to increase production in all parts of the country.

Production of farm-produced animal power has become less important since about 1918 in all geographic divisions. By 1948 total production of farm-produced power in the United States had declined to 58 percent of the 1935-39 average. The greatest decrease occurred in the East North Central States where farm-produced power in 1948 amounted to only 38 percent of prewar. In the South Atlantic and East South Central States the decline was relatively small, the 1948 production of animal power amounting to around 85 percent of prewar. Since the war, production of farm-produced power has continued relatively small in the East North Central and West North Central States and relatively large in the South Atlantic and East South Central divisions.

States included in the Census geographic divisions: New England includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut; Middle Atlantic includes New York, New Jersey, and Pennsylvania; East North Central includes Ohio, Indiana, Illinois, Michigan, and Wisconsin; West North Central includes Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas; South Atlantic includes Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida; East South Central includes Kentucky, Tennessee, Alabama, and Mississippi; West South Central includes Arkansas, Louisiana, Oklahoma, and Texas; Mountain includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada; Pacific includes Washington, Oregon, and California.

# VOLUME OF FARM OUTPUT, BY GEOGRAPHIC DIVISIONS, 1919-48

INDEX NUMBERS (1935-39=100)

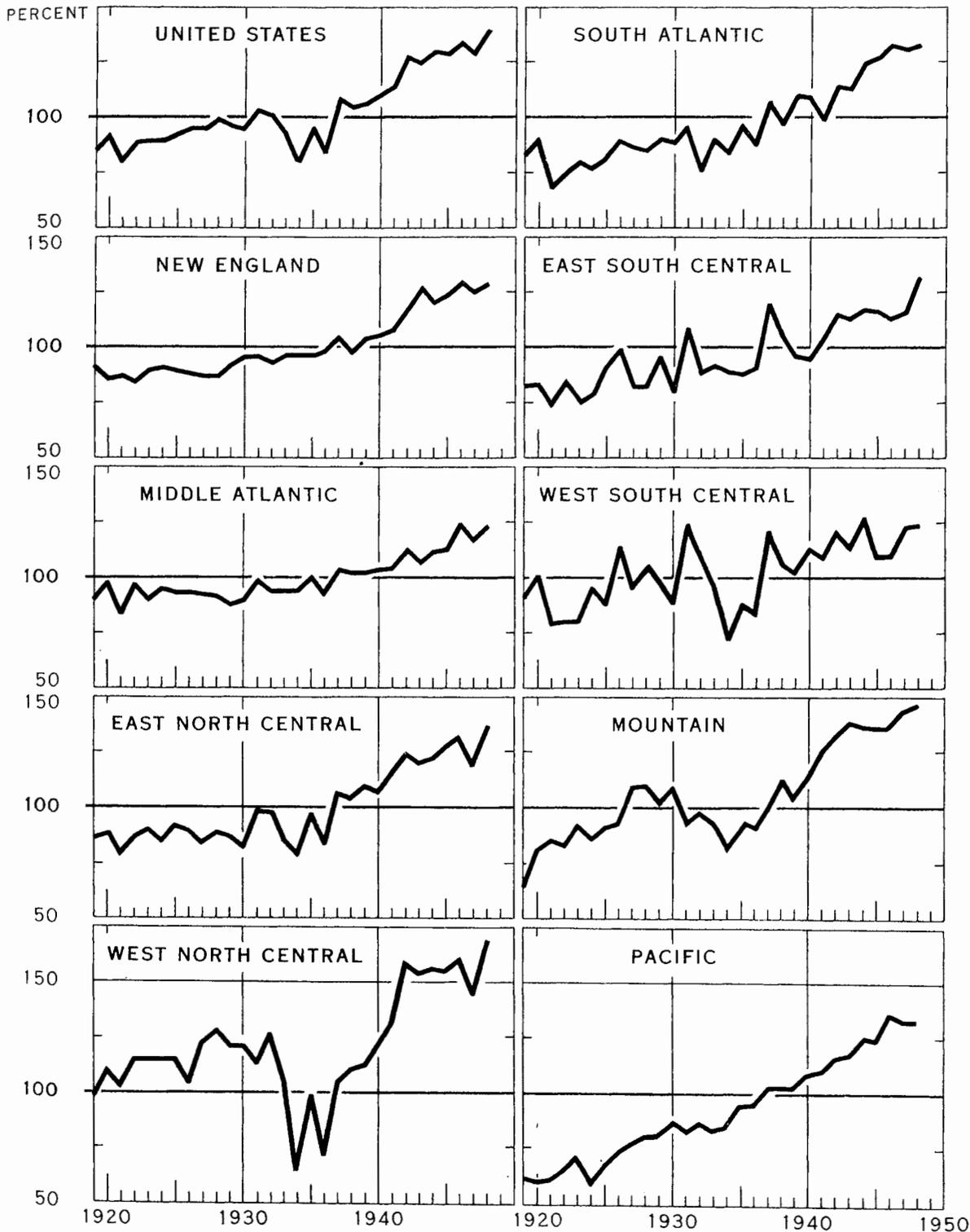


FIGURE 2

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Table 2.- Index numbers of farm output, gross farm production, and production  
by groups of commodities, by regions, 1919-48 <sup>1/</sup>  
(1935-39 = 100)

NEW ENGLAND													
Year	Farm output	Gross farm pro- duction	Product added by Meat ani- mals and animal products	Horses and mules	Total crops and pasture	Total crops	Total truck crops	Fruits and tree nuts	Vege- tables except truck	Sugar crops	Feed grains and pasture	Feed grains	Tobacco
1919	91	102	85	212	105	105	54	138	70	160	123	130	208
1920	85	96	83	206	97	96	55	111	67	150	111	126	198
1921	87	97	84	201	98	97	61	81	93	120	102	133	212
1922	84	93	86	193	92	90	50	96	65	150	114	121	144
1923	90	98	86	188	100	99	58	113	82	125	109	116	199
1924	91	99	86	180	102	102	61	114	98	150	103	114	192
1925	89	96	85	174	99	98	70	118	76	115	105	123	189
1926	88	95	84	164	97	97	70	125	87	115	101	114	146
1927	87	93	83	154	95	94	67	96	85	150	102	103	140
1928	87	92	82	147	95	95	66	91	91	110	102	96	145
1929	92	96	84	137	102	102	69	107	110	105	102	100	146
1930	96	99	87	131	104	104	64	135	107	135	100	104	164
1931	96	99	89	125	103	103	80	94	114	65	103	100	151
1932	93	96	91	120	97	97	63	139	99	100	95	108	135
1933	96	98	93	116	100	100	96	142	103	60	93	105	93
1934	96	97	91	111	100	100	91	63	135	95	94	105	74
1935	96	97	93	107	99	98	97	98	94	139	103	107	83
1936	98	98	98	104	98	98	101	78	109	79	95	101	100
1937	104	104	101	100	105	106	95	126	112	84	101	96	109
1938	98	98	102	98	96	96	99	82	94	124	100	95	83
1939	104	103	106	91	102	102	108	116	91	74	101	101	125
1940	105	104	109	86	101	101	91	86	107	95	104	95	113
1941	107	105	112	84	102	102	101	104	107	70	98	98	118
1942	117	114	122	80	111	111	96	133	109	115	114	103	103
1943	127	123	130	79	121	123	92	98	169	95	114	90	102
1944	120	116	134	78	107	107	94	87	128	85	103	96	117
1945	123	119	137	75	110	111	95	59	130	35	118	89	111
1946	129	124	124	74	127	128	97	98	133	55	113	92	126
1947	125	120	127	70	119	121	91	111	147	70	116	84	128
1948	128	122	124	64	124	126	96	104	169	60	114	83	126

<sup>1/</sup> See footnotes in table 1.

- Continued

Table 2.- Index numbers of farm output, gross farm production, and production by groups of commodities, by regions, 1919-48 1/2 - Cont'd.  
(1935-39 = 100)

MIDDLE ATLANTIC

Year	Farm output	Gross farm production	Product added by		Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vegetables except truck	Sugar crops	Feed grains hay and pasture	Feed grains	Oil bearing crops	Tobacco
			Meat animals and animal products	Horses and mules											
1919	90	102	86	190	104	104	136	53	83	104	182	119	126	-	153
1920	98	107	84	184	115	117	121	63	179	127	162	117	130	-	168
1921	83	93	86	176	92	91	119	56	66	96	95	105	122	-	157
1922	97	105	89	169	109	110	123	60	146	119	169	114	113	-	147
1923	90	98	90	164	98	98	114	61	115	106	149	102	100	-	149
1924	95	102	90	156	105	106	100	76	111	118	162	110	98	-	153
1925	93	99	90	147	101	101	109	73	103	83	128	112	119	-	161
1926	93	98	91	139	100	100	102	70	153	85	176	102	107	-	119
1927	92	96	92	132	96	96	96	76	75	89	135	107	94	-	123
1928	91	95	92	124	94	94	78	74	102	103	108	99	90	-	134
1929	88	91	94	118	88	87	84	78	81	82	81	94	82	-	134
1930	90	92	96	113	89	88	97	77	120	86	162	86	77	-	106
1931	99	100	97	109	101	102	101	79	125	111	88	102	104	-	147
1932	94	95	98	107	93	92	72	73	122	105	95	93	93	-	123
1933	94	95	98	106	93	92	84	93	95	101	88	92	88	-	57
1934	94	95	97	104	93	93	81	90	78	132	95	90	95	45	60
1935	100	101	98	104	102	103	102	92	106	104	128	105	106	45	82
1936	93	94	99	102	91	90	93	98	75	98	95	89	91	45	105
1937	103	103	100	100	105	105	113	94	121	107	95	105	100	91	90
1938	102	101	100	98	102	102	103	104	84	98	81	105	104	137	103
1939	102	101	103	96	100	100	89	112	114	93	101	96	99	182	120
1940	103	102	103	93	102	102	94	105	85	97	95	106	100	273	134
1941	104	102	107	89	100	99	86	110	88	103	74	99	104	273	153
1942	112	109	112	84	108	108	84	112	103	100	115	113	109	636	111
1943	106	103	118	79	97	96	70	104	62	102	95	102	79	591	104
1944	112	108	119	74	104	104	103	111	89	98	101	105	95	455	138
1945	113	108	121	69	103	102	100	114	34	97	34	113	100	318	121
1946	124	118	118	64	122	123	92	153	89	131	47	118	114	364	153
1947	117	111	121	58	109	108	109	124	80	109	81	107	92	273	160
1948	123	115	120	52	117	117	107	136	67	126	47	117	117	273	164

- Continued -

Table 2.- Index numbers of farm output, gross farm production, and production by groups of commodities, by regions, 1919-48 <sup>1/2</sup> - Cont'd.  
(1935-39 = 100)

EAST NORTH CENTRAL															
Year	Farm output	Gross farm production	Product added by: Meat and animal products	Horses and mules	Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vegetables except truck	Sugar crops	Feed grains and hay	Feed grains and pasture	Oil-bearing crops	Tobacco
1919	86	97	80	182	98	99	160	58	59	96	148	98	100	-	234
1920	88	98	77	175	102	103	102	59	119	125	177	105	111	1	229
1921	78	88	79	166	87	87	95	57	39	87	135	93	97	1	183
1922	87	95	85	159	95	96	109	67	105	131	83	97	94	3	171
1923	90	97	89	153	97	97	121	67	101	119	115	98	101	4	186
1924	85	91	89	146	89	89	95	76	75	120	117	91	86	5	160
1925	92	97	89	138	99	99	79	88	73	104	125	107	117	5	183
1926	90	95	91	132	95	95	103	78	117	105	101	98	101	6	135
1927	84	89	93	127	85	84	84	75	59	96	89	88	82	8	100
1928	89	93	92	122	92	92	45	81	87	123	64	101	107	10	143
1929	87	90	93	117	87	86	78	85	73	86	43	91	88	13	176
1930	82	86	94	112	80	79	85	89	64	79	74	81	81	21	187
1931	99	100	96	109	102	102	126	89	138	108	62	101	106	26	199
1932	98	99	98	106	98	99	80	71	81	123	119	105	112	24	136
1933	85	87	101	104	80	78	81	92	82	92	127	80	77	18	89
1934	78	81	95	103	74	71	89	92	72	137	115	67	62	39	75
1935	97	98	94	103	100	100	99	89	122	119	92	100	99	85	78
1936	84	86	100	103	79	77	94	92	64	92	97	76	70	60	74
1937	106	105	99	101	108	109	111	97	129	94	64	111	118	82	110
1938	104	104	101	99	105	105	104	113	63	101	124	105	104	111	111
1939	109	107	106	94	108	109	92	109	122	94	123	108	109	162	127
1940	107	105	111	90	103	103	98	107	87	82	127	104	99	123	124
1941	116	112	117	85	112	112	101	122	108	92	131	111	111	178	107
1942	124	119	127	78	118	118	60	125	99	82	151	122	123	271	103
1943	120	115	133	72	109	108	53	106	58	92	38	114	113	283	94
1944	122	116	131	66	112	112	88	117	97	74	59	111	110	278	117
1945	128	121	133	59	119	119	108	118	57	67	77	120	121	282	121
1946	132	124	130	52	125	126	90	142	96	74	91	127	134	274	128
1947	119	111	129	44	108	107	108	133	102	55	62	103	101	253	119
1948	137	127	125	38	133	135	130	121	88	71	54	135	149	291	104

- Continued -

Table 2.- Index numbers of farm output, gross farm production, and production by groups of commodities, by regions, 1919-48 1/ - Cont'd.  
(1935-39 = 100)

WEST NORTH CENTRAL																
Year	Farm output	Gross farm production	Product added by: Meat and animals; and animal products	Horses and mules	Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vegetables except truck	Sugar crops	Feed grains hay and pasture	Feed grains	Oil bearing crops	Cotton	Tobacco
1919	98	111	88	194	114	116	138	77	185	97	66	113	114	46	19	78
1920	110	120	84	187	130	134	126	88	167	132	98	136	149	73	24	78
1921	103	113	90	181	118	120	121	77	50	122	85	123	131	55	21	69
1922	115	123	102	176	127	130	146	84	278	180	72	125	131	73	45	78
1923	115	123	107	170	126	128	94	84	196	157	69	138	148	116	38	108
1924	115	122	106	164	125	127	145	92	171	156	89	120	122	217	58	88
1925	115	121	104	157	125	127	103	108	144	97	100	133	146	159	90	100
1926	104	111	108	153	109	109	108	99	194	106	100	109	116	133	66	69
1927	123	127	109	148	132	135	133	92	146	138	103	135	142	175	35	78
1928	128	130	110	143	137	140	153	98	158	177	112	135	148	132	45	100
1929	121	124	113	138	127	129	124	107	160	117	115	130	138	112	68	118
1930	121	123	117	133	124	125	148	104	81	114	129	120	127	152	47	167
1931	113	115	119	128	113	113	133	95	188	118	108	109	113	90	90	157
1932	127	127	115	122	132	134	112	98	104	134	109	141	155	86	94	147
1933	105	107	120	117	101	99	66	103	118	105	126	112	115	61	75	147
1934	65	71	105	113	55	49	52	43	79	78	72	55	42	49	72	59
1935	99	100	95	110	102	102	78	106	148	126	87	108	107	133	53	78
1936	72	76	101	105	65	61	79	71	44	61	85	60	49	45	93	59
1937	105	105	93	101	110	111	119	104	127	106	99	109	115	66	121	108
1938	111	109	100	94	113	115	126	109	67	102	129	111	114	81	101	127
1939	113	110	111	90	110	111	98	110	114	105	100	112	115	175	132	128
1940	122	117	114	87	121	122	112	116	100	126	120	120	121	259	116	127
1941	132	126	123	85	130	131	136	122	81	106	107	126	127	277	143	118
1942	158	148	140	82	156	159	158	137	85	124	118	153	161	443	126	108
1943	154	144	155	79	145	146	132	124	49	142	73	144	151	496	89	118
1944	156	145	146	74	150	154	142	118	46	103	73	153	164	341	123	147
1945	155	144	147	69	147	150	167	121	63	125	85	140	147	435	54	137
1946	160	148	144	62	155	160	170	149	74	119	107	149	164	390	93	156
1947	145	133	143	53	134	137	195	138	91	101	98	113	111	460	96	108
1948	169	153	133	47	168	176	177	169	62	120	83	160	182	600	152	118

- Continued -

Table 2.- Index numbers of farm output, gross farm production, and production  
by groups of commodities, by regions, 1919-48 1/2 - Cont'd.  
(1935-39 = 100)

## SOUTH ATLANTIC

Year	Farm output	Gross farm pro- duction	Product added by Meat ani- mals and animal products	Horses and mules	Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vege- tables except truck	Sugar crops	Feed grains hay and pasture	Feed grains	Oil bear- ing crops	Cotton	Tobacco
1919	83	92	80	147	91	90	113	51	53	105	131	102	110	48	157	59
1920	90	97	79	143	98	98	110	59	72	109	128	104	113	49	159	76
1921	68	78	80	139	74	73	88	55	41	95	103	100	109	49	93	45
1922	75	83	83	134	80	79	96	70	72	115	89	100	103	40	84	54
1923	80	86	83	129	85	84	102	70	77	98	67	96	102	49	97	72
1924	77	84	82	126	82	81	82	72	93	101	50	86	82	62	107	56
1925	81	87	83	124	85	85	87	79	70	80	41	82	87	66	129	71
1926	90	94	85	120	94	94	106	74	98	94	73	88	93	59	151	70
1927	86	90	89	116	89	89	87	78	62	114	64	93	93	71	109	84
1928	85	89	88	113	88	87	87	75	87	120	56	82	78	68	106	86
1929	90	93	88	110	93	92	88	89	79	109	70	87	88	75	119	88
1930	89	91	89	108	91	90	93	82	63	97	73	71	72	60	138	100
1931	96	97	89	105	98	98	118	77	120	108	82	94	97	91	129	80
1932	76	79	93	102	76	74	72	84	60	101	108	84	82	76	91	46
1933	90	91	94	99	90	90	82	85	84	98	116	92	92	66	103	86
1934	85	87	91	99	85	85	92	88	80	117	105	88	86	82	93	66
1935	97	97	93	99	98	98	104	95	97	110	113	101	103	89	97	94
1936	89	90	97	99	89	88	96	93	81	82	95	86	87	101	102	81
1937	107	106	100	100	107	107	105	90	108	106	99	103	102	104	135	100
1938	97	98	102	101	97	97	103	105	98	105	98	107	106	103	76	91
1939	110	109	108	101	109	110	92	117	116	97	95	103	102	103	90	134
1940	109	108	112	100	108	108	101	114	134	96	84	108	105	145	110	90
1941	99	99	122	99	95	94	104	111	135	84	91	106	103	115	65	77
1942	114	112	137	98	109	109	103	112	158	101	95	109	102	155	93	94
1943	113	111	152	97	104	104	80	110	129	107	96	111	105	157	87	91
1944	125	121	154	96	116	117	124	116	155	85	103	111	108	152	96	127
1945	127	123	162	94	117	117	97	119	163	95	108	121	116	148	71	134
1946	133	128	155	92	125	125	99	128	183	113	108	121	119	147	68	156
1947	131	125	157	89	122	122	118	108	168	97	108	123	126	169	70	152
1948	133	126	159	86	123	123	102	114	180	90	99	128	128	176	94	125

- Continued -

Table 2.- Index numbers of farm output, gross farm production, and production by groups of commodities, by regions, 1919-48 1/ - Cont'd.  
(1935-39 = 100)

EAST SOUTH CENTRAL

Year	Farm output	Gross farm production	Product added by: Meat animals and animal products	Horses and mules	Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vegetables except truck	Sugar crops	Feed grains and hay and pasture	Feed grains	Oil bearing crops	Cotton	Tobacco
1919	82	92	81	140	91	90	148	64	73	92	146	102	114	74	57	162
1920	83	92	79	136	91	91	81	76	119	93	151	110	127	79	54	135
1921	74	84	82	132	81	80	79	69	61	87	150	106	123	68	49	90
1922	85	92	82	129	91	91	77	85	157	97	112	101	111	50	64	139
1923	75	84	83	127	81	80	74	83	86	84	89	94	102	40	41	157
1924	79	87	80	124	86	85	45	91	157	68	55	88	94	60	71	129
1925	91	96	82	120	97	98	62	102	88	71	64	85	95	50	112	125
1926	99	103	86	119	105	105	91	104	136	94	78	99	112	42	111	119
1927	82	88	92	117	85	84	48	104	62	99	70	90	95	59	84	69
1928	82	88	88	113	86	85	36	94	135	97	67	80	82	56	87	99
1929	96	98	87	110	100	100	43	102	84	99	75	90	96	62	109	129
1930	80	85	87	108	83	82	46	101	72	77	66	61	58	50	96	129
1931	108	107	87	104	111	112	97	103	158	101	119	104	114	76	110	150
1932	88	90	94	101	89	88	57	106	55	124	127	92	94	72	76	105
1933	92	93	96	99	92	92	67	105	108	98	131	97	102	56	75	116
1934	89	91	94	98	89	89	82	89	107	128	150	96	99	88	73	95
1935	88	90	97	98	88	87	76	95	93	113	121	95	94	103	77	81
1936	91	92	97	99	91	91	93	94	74	77	102	88	92	116	101	75
1937	120	117	98	100	121	123	146	95	134	109	104	107	109	92	145	126
1938	105	104	102	101	105	105	117	107	80	107	90	113	113	110	96	100
1939	96	97	106	102	95	94	68	109	119	94	83	97	92	79	82	118
1940	95	96	101	103	95	95	92	115	73	80	60	105	105	118	74	117
1941	104	104	109	103	103	103	109	113	152	101	87	117	118	141	82	98
1942	115	113	127	102	111	111	90	111	104	100	84	120	120	239	102	100
1943	113	111	141	100	106	105	66	114	67	117	86	112	109	248	96	108
1944	117	113	141	98	109	109	121	113	79	93	83	104	103	200	102	155
1945	116	113	135	97	110	110	88	119	107	97	84	118	114	198	86	149
1946	113	109	136	93	106	105	72	114	83	96	90	117	113	188	69	174
1947	115	110	137	89	107	107	94	112	100	78	76	114	111	221	87	145
1948	132	124	135	85	125	126	94	114	96	71	64	130	141	283	122	142

- Continued -

Table 2.- Index numbers of farm output, gross farm production, and production  
by groups of commodities, by regions; 1919-48 1 - Cont'd.  
(1935-39 = 100)

WEST SOUTH CENTRAL																
Year	Farm output	Gross farm pro- duction	Product added by: Meat ani- mals and animal products	Horses and mules	Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vege- tables except truck	Sugar crops	Feed grains hay and pasture	Feed grains	Oil bear- ing crops	Cotton	
1919	91	100	90	165	99	99	117	49	123	92	63	119	141	43	87	
1920	101	109	88	160	111	113	101	62	44	93	78	123	150	37	120	
1921	79	89	88	157	86	85	89	50	53	94	105	120	150	39	62	
1922	80	89	87	153	87	86	64	60	81	93	92	100	110	32	86	
1923	80	90	84	151	88	87	73	58	70	79	71	89	90	28	99	
1924	95	102	85	147	103	105	90	66	87	60	57	91	96	22	133	
1925	88	96	86	147	95	96	54	73	68	70	69	72	69	26	138	
1926	114	118	87	145	123	127	123	83	92	86	35	101	119	34	161	
1927	95	100	89	138	101	102	77	79	57	103	36	105	126	58	114	
1928	105	108	90	133	111	113	106	81	88	96	52	99	113	71	136	
1929	98	102	91	129	103	104	110	87	92	84	62	91	94	64	121	
1930	89	94	92	124	92	92	95	96	59	90	58	81	77	45	107	
1931	124	123	93	119	130	134	152	90	109	123	56	112	130	62	155	
1932	110	111	99	115	113	114	94	110	84	122	64	113	128	67	124	
1933	97	99	101	111	98	97	65	89	78	105	65	91	80	75	119	
1934	72	77	93	109	72	69	79	81	89	95	69	71	57	58	67	
1935	88	91	86	107	91	91	65	100	96	120	86	105	110	92	81	
1936	84	86	96	103	83	81	73	83	64	90	97	82	75	80	87	
1937	121	118	101	101	123	125	130	100	120	101	105	101	108	94	147	
1938	105	103	105	96	103	104	119	106	95	101	110	110	110	110	94	
1939	102	102	112	93	100	99	113	111	125	88	102	102	97	124	91	
1940	113	110	111	90	111	111	114	123	129	95	65	122	123	178	99	
1941	109	106	121	87	104	103	102	112	157	116	84	120	111	178	84	
1942	121	116	139	83	113	112	139	120	143	106	95	116	107	448	96	
1943	113	109	149	80	101	100	105	126	114	134	105	109	102	301	84	
1944	127	120	150	76	116	116	187	143	139	119	95	117	117	345	87	
1945	109	104	148	71	96	95	148	136	153	118	116	105	96	352	58	
1946	109	104	138	65	98	98	174	136	150	125	100	103	100	466	57	
1947	123	114	137	58	112	115	246	117	157	91	82	93	90	423	90	
1948	124	114	133	53	114	117	187	127	142	83	84	98	95	438	104	

- Continued -

Table 2.- Index numbers of farm output, gross farm production, and production by groups of commodities, by regions, 1919-48 1/2 - Cont'd.  
(1935-39 = 100)

Year	MOUNTAIN														
	Farm output	Gross farm production	Product added by: Meat animals and animal products	Horses and mules	Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vegetables except truck	Sugar crops	Feed grains and hay and pasture	Feed grains	Oil bearing crops	Cotton
1919	64	77	78	198	71	66	64	33	105	38	67	91	83	167	19
1920	81	92	80	190	91	92	119	37	83	46	94	107	127	389	32
1921	86	95	91	187	92	91	123	36	103	57	87	107	109	250	14
1922	83	93	86	181	92	91	122	49	112	69	60	103	110	250	19
1923	92	101	93	177	100	101	118	50	120	60	85	118	164	361	34
1924	86	94	95	170	91	88	105	50	79	55	84	103	101	778	52
1925	92	100	94	163	99	98	100	74	110	71	82	111	125	333	58
1926	93	100	95	158	98	97	121	68	117	68	89	105	98	278	62
1927	109	113	95	151	117	121	170	82	112	96	99	117	135	722	51
1928	109	113	97	146	116	120	170	82	115	92	87	117	136	694	75
1929	102	106	97	140	107	108	121	94	119	89	97	111	129	556	76
1930	108	111	101	134	113	114	118	87	96	120	118	116	146	806	81
1931	93	97	104	129	94	88	77	81	104	95	97	102	101	194	68
1932	98	101	99	123	100	99	118	70	107	81	98	109	108	333	45
1933	94	97	102	119	94	91	67	80	75	98	125	105	102	83	60
1934	82	85	100	115	79	72	70	76	89	73	71	85	50	56	65
1935	93	95	95	109	95	93	85	92	101	102	85	100	100	111	67
1936	91	92	101	104	89	86	64	89	92	95	96	95	82	28	95
1937	100	100	99	99	100	101	90	104	96	107	99	97	94	28	150
1938	112	110	100	95	113	117	153	104	110	98	120	107	121	83	92
1939	104	103	105	93	103	103	108	111	101	98	100	101	103	250	96
1940	113	111	110	93	112	114	119	108	110	118	119	108	117	472	102
1941	125	122	117	91	125	128	161	110	106	114	100	126	170	472	91
1942	133	129	127	91	131	135	158	126	87	134	111	130	191	1,222	96
1943	139	134	133	90	136	142	174	147	101	178	78	128	181	1,944	75
1944	137	132	136	86	132	138	162	145	122	154	73	130	191	833	80
1945	136	130	134	82	131	137	163	159	123	147	92	126	177	722	70
1946	136	129	127	76	133	140	177	153	108	158	108	119	162	361	95
1947	144	136	125	69	142	154	216	164	125	141	135	120	174	667	120
1948	147	138	124	64	146	158	229	157	109	155	86	122	191	917	176

- Continued -

Table 2.- Index numbers of farm output, gross farm production, and production by groups of commodities, by regions, 1919-48 1/ - Cont'd.  
(1935-39 = 100)

Year	PACIFIC														
	Farm output	Gross farm production	Product added by: Meat animals and animal products	Horses and mules	Total crops and pasture	Total crops	Food grains	Total truck crops	Fruits and tree nuts	Vegetables except truck	Sugar crops	Feed grains hay and pasture	Feed grains	Oil bearing crops	Cotton
1919	62	68	64	207	66	64	94	30	64	69	39	90	94	-	10
1920	60	66	62	200	64	63	86	36	60	58	52	89	92	-	15
1921	61	66	66	188	64	62	95	32	57	60	50	93	87	-	6
1922	65	70	70	182	68	66	73	42	71	74	21	90	86	-	5
1923	72	76	72	172	75	74	103	44	82	61	27	96	92	-	12
1924	60	65	74	168	60	58	54	45	65	47	36	79	62	-	17
1925	68	72	76	161	69	67	75	51	68	60	24	93	92	-	27
1926	74	77	80	152	75	74	85	56	83	68	18	88	81	-	29
1927	78	81	85	143	79	78	110	60	84	71	23	90	76	-	20
1928	81	83	88	136	81	80	102	66	87	67	30	90	82	-	37
1929	82	84	91	128	82	81	90	76	86	64	26	90	85	-	57
1930	87	88	93	120	86	86	87	82	89	79	36	97	95	-	58
1931	83	85	94	113	82	80	82	85	86	71	50	87	64	-	39
1932	87	88	91	108	86	86	90	89	88	63	61	102	105	-	28
1933	84	85	89	104	84	83	90	79	84	81	76	93	91	-	47
1934	85	86	91	104	85	84	74	93	83	87	75	90	77	31	57
1935	95	95	93	107	95	95	93	91	103	87	68	101	109	68	52
1936	96	97	100	105	96	95	103	103	88	93	92	100	99	68	97
1937	103	103	102	101	103	104	108	100	98	115	87	98	98	74	161
1938	103	103	102	96	103	104	108	103	106	104	114	99	89	86	93
1939	103	102	103	91	103	102	88	103	105	101	139	102	105	204	97
1940	108	107	107	87	108	108	89	110	107	120	145	105	107	315	119
1941	110	109	113	84	109	109	114	107	109	116	108	108	105	358	89
1942	116	114	121	81	114	114	105	120	108	128	129	119	153	389	88
1943	117	116	126	78	114	115	102	119	108	163	67	119	137	519	75
1944	125	123	133	72	121	123	121	135	122	149	70	116	125	302	71
1945	124	121	134	67	119	120	116	138	114	145	94	116	117	210	77
1946	135	132	128	61	135	138	143	162	131	166	124	116	129	210	100
1947	133	130	129	56	132	135	124	158	124	151	166	113	123	302	166
1948	133	130	128	53	132	135	144	141	114	176	157	114	136	543	210

## PRODUCTION ON 15 TYPES OF FARMS

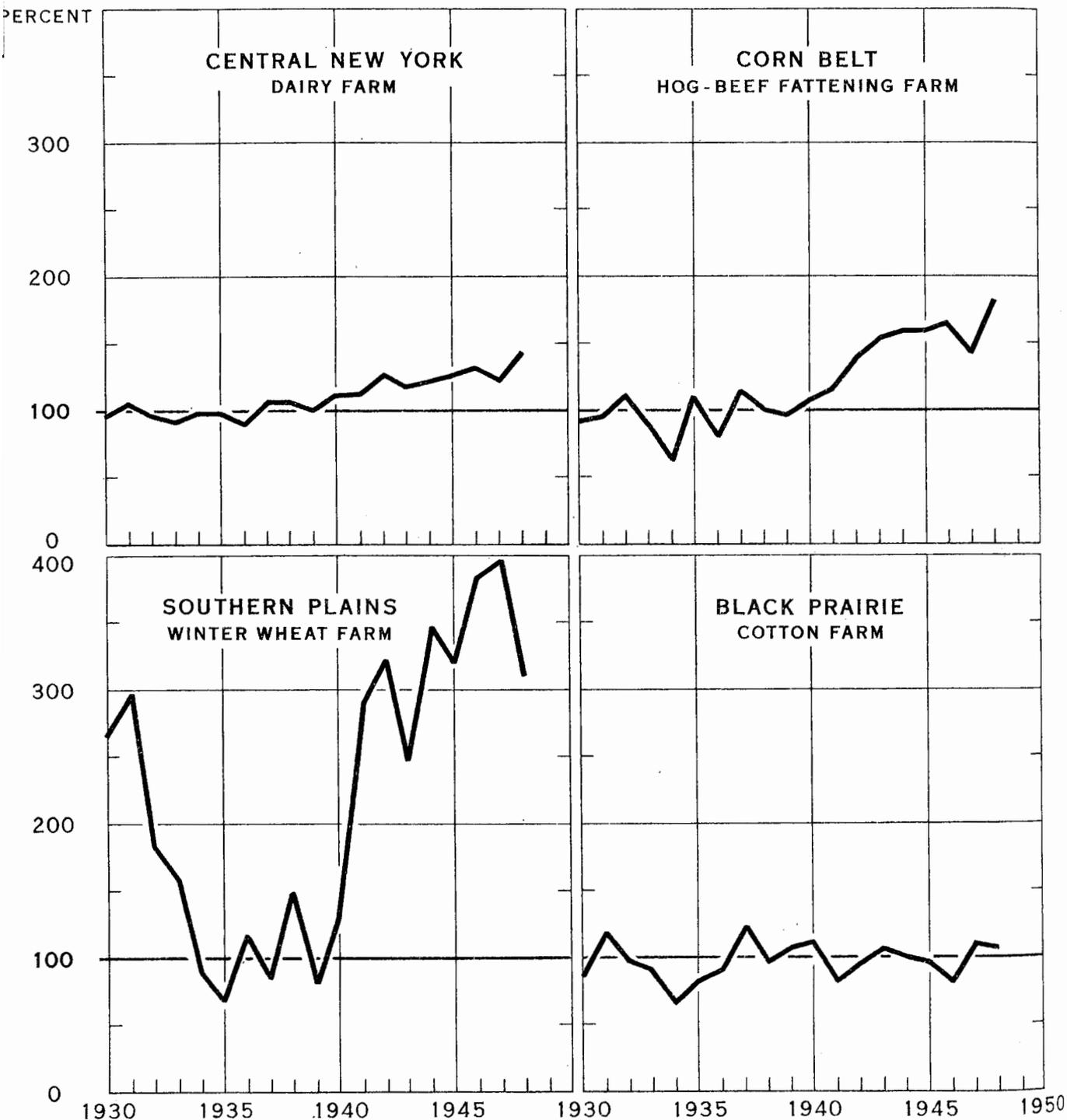
Production in 1948 on commercial family-operated farms averaged the highest on record. It was only slightly higher than in 1947 but averaged about 85 percent above the 1935-39 production and nearly 50 percent above the average production of 1930-32 (table 3).

Although production in 1948 averaged the highest on record, it varied considerably among types of commercial family-operated farms. About half of the farms had higher production in 1948 than in 1947, whereas about three-fourths had higher production in 1948 than in 1946.

Although the general trend in production on commercial family-operated farms had been upward, it has varied considerably among types of farms (fig. 3). Year-to-year fluctuations in production also have been large. Livestock farms, particularly dairy farms and cattle ranches, have shown less variation in production than have crop farms, but they also have had less gain in total production during the last two decades. There are three important reasons for this: (1) Vagaries in weather more directly affect production on crop farms; weather conditions were generally favorable to crop production during the last decade. (2) Livestock farming is a comparatively long-time venture and operators can less afford to shift about to take advantage of year-to-year price and demand situations. It takes time and money to build up a good breeding herd. (3) Improved mechanical power and equipment and other labor-saving devices plus results of technological developments have been more readily available to crop farmers than to livestock farmers. As a result, most crop farmers have been in a better position than livestock farmers to increase the output per unit and at the same time to increase the total number of units operated.

Compare winter wheat farmers with dairy farmers and cattle ranchers. Winter wheat farms are among the more highly mechanized farms. The physical size of these farms in 1948 was about 20 percent larger than in 1930 and physical production was more than double the production in 1930. Dairy farmers, on the other hand, milked a few more cows in 1948 than in 1930, and total physical production per farm was 30 to 40 percent higher. In 1948 cattle ranchers had about the same size breeding herds as in 1930. Production in 1948 also was about the same as in 1930.

**PRODUCTION PER FARM**  
**COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48**  
**INDEX NUMBERS (1935-39 = 100)**



**FIGURE 3**

Table 3.- Total production, commercial family-operated farms, by type, 1930-48

Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	95	101	67	92	96	94	149	150	198	265	210	65	86	59	112
1931	105	86	80	95	110	99	120	63	142	296	340	105	119	89	96
1932	96	99	98	110	117	104	131	138	237	183	143	135	97	62	120
1933	91	89	66	89	99	87	70	90	90	159	79	113	91	66	118
1934	98	82	50	62	61	77	58	38	77	88	95	42	67	67	116
1935	98	103	95	110	112	96	105	117	134	68	66	93	83	70	89
1936	90	89	66	80	62	84	43	30	30	117	78	68	91	101	120
1937	106	104	120	114	116	104	92	127	106	85	107	150	123	137	94
1938	106	105	109	100	107	106	118	123	99	149	129	105	96	94	96
1939	100	99	110	96	103	110	142	103	131	81	120	84	107	98	102
1940	111	117	102	107	119	114	128	129	151	131	155	110	111	83	93
1941	112	110	116	116	120	113	169	203	209	290	265	149	82	95	99
1942	126	131	132	138	143	126	218	234	291	322	379	154	95	113	113
1943	117	129	133	154	135	131	165	227	229	247	246	136	106	107	124
1944	121	134	131	159	143	124	204	232	272	347	440	152	100	113	113
1945	125	138	138	159	165	143	210	250	308	320	279	96	96	115	116
1946	131	126	151	165	168	151	184	199	276	384	294	99	82	106	106
1947	122	136	108	142	116	130	198	225	285	396	448	139	109	108	100
1948 1/	143	188	157	181	176	149	197	212	284	310	380	119	106	149	98

1/ Preliminary.

Total production is the quantity of crops, livestock and livestock products sold during the calendar year, consumed on farms where grown plus net change in inventory of crops, livestock and livestock products. The quantity of feeder livestock bought is deducted from sales or inventories. Also it does not include farm-produced power. Therefore, it is the net quantity of farm products produced and sold or consumed or available for sale or for consumption in the farm household during the calendar year.

Each unit of product (bushels of corn, cwt. of hogs, tons of hay) is weighted by its respective average base price (1935-39) to reduce all items to a common denominator. The formula for index of production is:  $\frac{\sum q_1 P_0}{\sum q_1 P_1}$  where  $q_1$  and  $p_1$  are current-year quantities and prices and  $P_0$  is weighted average prices in the base years, 1935-39.

## ACREAGES OF CROPS USED FOR DIFFERENT PURPOSES

One of the chief accomplishments of farm mechanization in the United States has been the release of land and other resources from production of feed for horses and mules to the production of food, fiber, and tobacco for human use (table 4). From 1918 to 1948, 63 million crop acres were so released. The decline in numbers of farm horses and mules accounted for 53 million acres, and the rapid decrease in nonfarm horses and mules for 10 million acres. The sharp drop in numbers of farm horses and mules since 1939 has resulted in the release of 17 million acres. Feed from large acreages of pasture land also has been diverted from maintenance of horses and mules to production of livestock products for human use.

After allowing for acreages used to grow products for export and lend lease, and feed for horses and mules, the acreages for producing products for domestic consumption have averaged consistently around 2 acres per capita during the last third of a century. Increases in per capita consumption of farm products have been made possible by higher production per acre.

Comparisons of the two 5-year periods 1918-22 and 1940-44 - both periods of high farm and industrial activity - show the sources of increased production to feed and clothe our increasing population. During 1940-44 total population in the United States averaged 26 percent larger than during 1918-22, and on an average each person in the later period consumed nearly 10 percent more farm products than in the earlier period. During the same time harvested acreages for all uses decreased about 3 percent.

Three noteworthy reasons why our increased population has been fed and clothed better from less land are: (1) Crop yields were considerably higher in 1940-44 than in 1918-22; (2) fewer acres were needed to grow feed for horses and mules; (3) fewer acres were needed to produce our export and lend-lease products in the years 1940-44 compared with the period 1918-22. More than 50 percent of the increased production used by our larger population has come from larger crop and livestock yields, about 30 percent from a decrease in crop acreages required for feeding farm and off-farm horses and mules, and about 20 percent from decreased acreages required for producing products for export and lend lease.

Table 4.- Acreages of harvested crops used for specified purposes, United States, 1910-48

Crop year beginning	Crops harvested 1/	Acreages used for producing		Acreages used for producing			Total population July 1 5/
		products 2/	export 3/	Feed for horses and mules	Food, fiber, and tobacco	for domestic consumption 4/	
	Million acres	Million acres	Million acres	Million acres	Million acres	Acres	Million
1910	325	36	70	16	203	2.21	92
1911	330	40	72	15	203	2.16	94
1912	329	41	73	15	200	2.11	95
1913	333	42	74	15	202	2.08	97
1914	334	55	76	14	189	1.91	99
1915	340	47	77	14	202	2.00	101
1916	340	51	77	13	199	1.95	102
1917	349	42	78	12	217	2.11	103
1918	362	60	79	11	212	2.02	105
1919	364	54	79	10	221	2.10	105
1920	360	58	77	10	215	2.03	106
1921	359	64	77	8	210	1.93	109
1922	355	48	76	7	224	2.04	110
1923	354	46	76	6	226	2.02	112
1924	355	52	74	5	224	1.96	114
1925	360	43	72	4	241	2.08	116
1926	359	52	70	4	233	1.99	117
1927	358	48	68	3	239	2.01	119
1928	361	48	66	2	245	2.02	121
1929	365	42	64	2	257	2.11	122
1930	369	38	61	2	268	2.18	123
1931	365	35	60	1	269	2.17	124
1932	371	34	58	1	278	2.22	125
1933	340	27	56	1	256	2.03	126
1934	304	19	55	1	229	1.83	125
1935	345	20	53	1	271	2.13	127
1936	323	18	51	1	253	1.98	128
1937	347	28	50	1	268	2.08	129
1938	349	21	46	1	281	2.16	130
1939	330	23	43	1	263	2.01	131
1940	339	15	41	1	282	2.14	132
1941	342	15	39	1	287	2.17	133
1942	346	22	38	1	285	2.12	135
1943	356	37	37	1	281	2.06	136
1944	361	33	35	1	292	2.09	138
1945	355	35	34	1	285	2.04	140
1946	353	7/	31	1	7/	7/	141
1947	357	7/	28	1	7/	7/	144
1948 6/	359	7/	26	1	7/	7/	147

1/ Area in 52 principal crops harvested or estimated equivalent plus acreages in fruits, tree nuts, and farm and market gardens.

2/ Crop exports from 1910 to 1939 are based on yields of specified year applied to gross exports for year beginning July 1, or month representing beginning of crop season. Acreages for livestock exports from 1910 to 1939 are based on average crop yields for 1935-39, and are for the year beginning July 1. Acreages for exports and lend lease from 1940 to 1945 for both crops and livestock are based on 1940-43 average crop yields.

3/ Feed computations for horses and mules are based on United States average yields of corn, oats, and all hays. From 1910 to 1919 the calculations allow 800 pounds of oats, 1,600 pounds of shelled corn, and 1.8 tons of hay per head for farm horses and mules 3 years old and over, and animal-unit equivalents for younger animals. Beginning with 1920, it was assumed that the rate of feeding corn declined 10 pounds per head annually and the rate of feeding hay increased 20 pounds. For nonfarm horses and mules the quantity of grain and hay fed per head annually was estimated to average about one-third more than for farm horses and mules.

4/ Includes products used by our military forces in this country and abroad, and by our domestic civilian population.

5/ Includes persons in our military forces in this country and abroad.

6/ Preliminary.

7/ Data not available.

## TOTAL CROPLAND, AND CROP PRODUCTION PER ACRE

Crop production per acre in the United States in 1948 was the greatest of record (table 5). The sharp rise in production per acre during and since World War II has been a major factor in the record levels of farm output during this period. Total acreage of cropland has changed very little since World War I (fig. 4). Record levels of production per acre were reached in four geographic divisions in 1948; in three of the other five regions production per acre was the second largest of record. New highs were attained in 1948 in the two North Central divisions which heavily weight the United States average.

The increase in crop production per acre has been due to a number of factors. Weather was more favorable during the war and postwar years than in the prewar period 1935-39, when weather conditions throughout the country probably were slightly less favorable than the long-time average. Farmers are using more than two and a half times as much fertilizer as in prewar years. There has been a fourfold increase in use of lime. Among the more noteworthy developments in crop production has been the widespread adoption of hybrid corn seed which now adds an average of about 400 million bushels to our annual crop. Increased use of improved varieties of other crops and of soil-improvement practices, greater timeliness in farm operations, and other factors also have contributed to the rise in production of crops per acre.

Changes in acreage of cropland and in production per acre have not been uniform among the geographic divisions of the United States. Over the last quarter century, the acreage of cropland has increased in the regions west of the Mississippi River and decreased in the eastern part of the country (table 6). The net result has been a relative stability in acreage of cropland for the United States as a whole.

The most consistent upward trend in production of crops per acre has occurred in the Pacific region (table 7). Since World War I, the index of crop production per acre has doubled in this region. In part this was because of the increased importance of intensive crops, such as truck crops and fruits. The greatest increase in crop production per acre during World War II occurred in the West North Central region. Part of this rise was due to a recovery from the relatively unfavorable growing conditions during the 1935-39 period.

Production per acre has been rather variable in the West South Central region, where growing conditions have fluctuated widely. In neither the West South Central nor the West North Central divisions has there been a definite, sustained upward trend in production per acre since World War I. The long-time movements in production per acre among the other geographic divisions have varied. All regions, however, experienced a rise during World War II.

Following the good year of 1946, crop production per acre dropped sharply in 1947, chiefly because of the decrease in corn yields because of a late, wet spring, and droughty conditions during the latter part of the season. The severe drops in production per acre during 1934 and 1936 indicate the extent to which generally adverse weather conditions can affect production of crops in any one year.

### Methods Used in Constructing Series

The total cropland series is made up of three components--acreage of harvested cropland (land from which one or more crops were harvested), crop failure, and summer fallow. Idle cropland is not included, as the series is intended to measure changes in the land area in crops or being prepared for crops the following year.

Reports of the United States Census of Agriculture and the Bureau of Agricultural Economics series on principal crops harvested were used in building up the series on harvested cropland. Census reports of harvested cropland were used for census years, and interpolations for intervening years were based on the Bureau of Agricultural Economics series on principal crops harvested.

A similar procedure was followed in estimating the acreage of crop failure. Census reports of acreage of crop failure were used for census years, and interpolations for intervening years were based largely on differences between planted and harvested acreages of principal crops as estimated by the Bureau of Agricultural Economics.

Estimates of acreage of summer fallow were made only for the geographic divisions that lie west of the Mississippi River. Since 1944, estimates of fallow have been based on data contained in the annual "Report of Conditions in the Great Plains," by the Great Plains Council. Estimates for earlier years were built up from fragmentary data available in the Bureau of Agricultural Economics.

Index numbers of total crop production were constructed for each geographic division by weighting annual total production of each crop by its average 1935-39 farm price in that division. The index of crop production was divided by the index of total cropland to derive the index of crop production per acre.

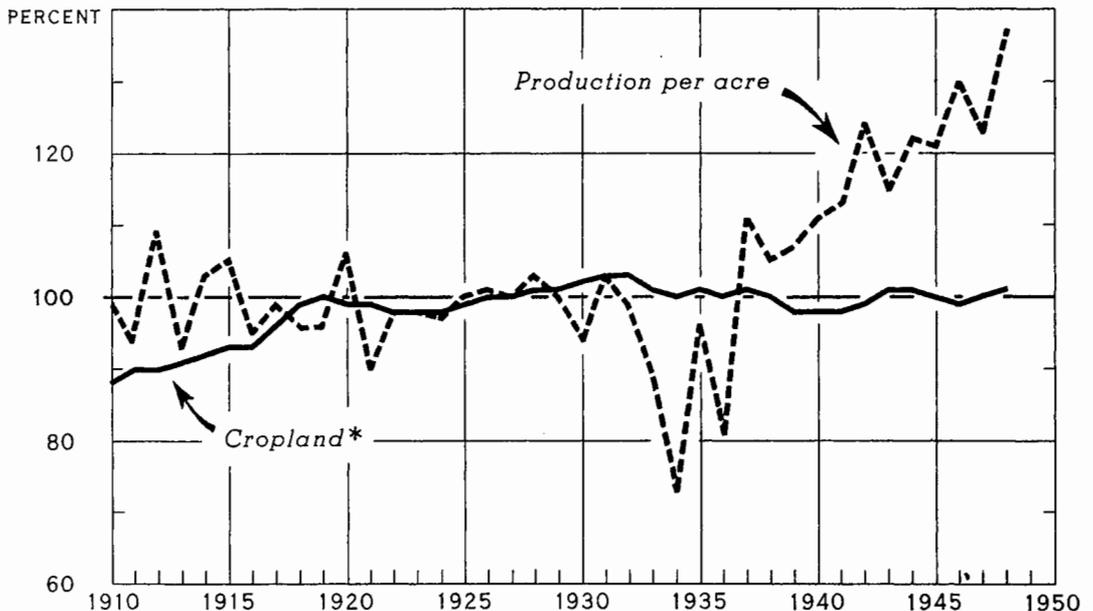
The index of crop production per acre is different from the crop-yield index of 28 crops published by the Bureau of Agricultural Economics. The latter index is computed from yields of 18 field crops per acre harvested and yields of 10 fruits per acre of bearing age, combined in proportion to the relative values of the crops during the 1923-32 period. Whereas the yield index of 28 crops is computed on a basis of harvested acreage, the index of crop production per acre is computed on a total cropland basis. The crop-yield index uses constant-value weights for each of the 28 crops throughout the period covered by the index. In contrast, the index of crop production per acre gives a variable weight to individual crops in each year according to the relative production importance (as measured in average 1935-39 prices) of the crops in the particular year.

Table 5.- Index numbers of total cropland and crop production per acre, United States, 1910-48 (1935-39=100)

Year	Total cropland	Crop production per acre	Year	Total cropland	Crop production per acre
1910	88	99	1929	101	100
1911	90	94	1930	102	94
1912	90	109	1931	103	103
1913	91	93	1932	103	99
1914	92	103	1933	101	89
1915	93	105	1934	100	73
1916	93	95	1935	101	96
1917	96	99	1936	100	81
1918	99	96	1937	101	111
			1938	100	105
1919	100	96	1939	98	107
1920	99	106	1940	98	111
1921	99	90	1941	98	113
1922	98	98	1942	99	124
1923	98	98	1943	101	115
1924	98	97	1944	101	122
1925	99	100	1945	100	121
1926	100	101	1946	99	130
1927	100	100	1947	100	122
1928	101	103	1948 <sup>1/</sup>	101	137

<sup>1/</sup> Preliminary.

TOTAL CROPLAND, AND CROP PRODUCTION PER ACRE, UNITED STATES, 1910-48 INDEX NUMBERS (1935-39=100)



\*TOTAL CROPLAND IS THE SUM OF THE ACREAGE OF LAND FROM WHICH ONE OR MORE CROPS WERE HARVESTED PLUS ACREAGES OF CROP FAILURE AND SUMMER FALLOW DATA FOR 1947 AND 1948 ARE PRELIMINARY

FIGURE 4

Table 6.- Index numbers of total cropland, by geographic divisions, 1919-48

(1935-39 = 100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	U.S.
1919	121	127	113	99	111	104	88	78	97	100
1920	119	125	111	97	106	99	88	85	94	99
1921	117	123	110	98	102	98	87	86	92	99
1922	116	122	109	98	99	99	85	86	92	98
1923	113	120	109	98	96	96	88	90	91	98
1924	111	119	106	98	95	94	93	87	92	98
1925	110	117	105	99	98	97	94	91	93	99
1926	108	113	103	101	98	98	96	95	93	100
1927	107	110	100	102	96	94	99	100	93	100
1928	105	105	99	103	95	95	101	102	95	101
1929	103	102	98	104	95	97	102	105	98	101
1930	102	101	99	106	96	97	103	105	97	102
1931	101	101	102	103	99	104	104	104	97	103
1932	101	100	100	105	99	103	103	103	99	103
1933	102	101	99	102	100	95	105	103	98	101
1934	104	103	99	100	97	98	104	102	95	100
1935	103	103	101	101	100	99	102	101	100	101
1936	101	101	101	101	98	98	101	103	100	100
1937	101	101	103	101	103	104	101	99	102	101
1938	97	99	99	100	100	99	100	98	100	100
1939	98	96	96	97	99	100	96	99	98	98
1940	92	98	97	98	98	100	99	99	98	98
1941	94	97	98	99	96	98	97	100	97	98
1942	96	98	100	99	97	99	97	101	101	99
1943	103	99	102	104	98	97	93	109	102	101
1944	107	103	106	105	95	91	92	110	101	101
1945	106	101	105	104	93	89	88	112	101	100
1946	105	100	104	102	90	86	88	112	101	99
1947	103	96	103	103	92	87	90	117	102	100
1948 <u>1/</u>	103	98	106	105	90	87	92	120	105	101

1/ Preliminary.

Table 7 .- Index numbers of crop production per acre of cropland, by geographic divisions, 1919-48

(1935-39 = 100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	U.S.
1919	87	82	88	117	81	87	112	85	66	96
1920	81	94	93	138	92	92	128	108	67	106
1921	83	74	79	122	72	82	98	106	67	90
1922	78	90	88	133	80	92	101	106	72	98
1923	88	82	89	131	88	83	99	112	81	98
1924	92	89	84	130	85	90	113	101	63	97
1925	89	86	94	128	87	101	102	108	72	100
1926	90	88	92	108	96	107	132	102	80	101
1927	88	87	84	132	93	89	103	121	84	100
1928	90	90	93	136	92	89	112	118	84	103
1929	99	85	88	124	97	103	102	103	83	100
1930	102	87	80	118	94	85	89	109	89	94
1931	102	101	100	110	99	108	129	85	82	103
1932	96	92	99	128	75	85	111	96	87	99
1933	98	91	79	97	90	97	92	88	85	89
1934	96	90	72	49	88	91	66	71	88	73
1935	95	100	99	101	98	88	89	92	95	96
1936	97	89	76	60	90	93	80	83	95	81
1937	105	104	106	110	104	119	124	102	102	111
1938	99	103	106	115	97	106	104	119	104	105
1939	104	104	113	114	111	94	103	104	104	107
1940	110	104	106	124	110	95	112	115	110	111
1941	109	102	114	132	98	105	106	128	112	113
1942	116	110	118	161	112	112	115	134	113	124
1943	119	97	106	140	106	108	108	130	113	115
1944	100	101	106	147	123	120	126	125	122	122
1945	105	101	113	144	126	124	108	122	119	121
1946	122	123	121	157	139	122	111	125	137	130
1947	117	112	104	133	133	123	128	132	132	122
1948 <u>1/</u>	122	119	127	168	137	145	127	132	129	137

1/ Preliminary.

## CROP YIELDS ON 15 TYPES OF FARMS

Crop yields on commercial family-operated farms have varied considerably among types of farms and over the years on the same type of farm (fig. 5). On the whole yields have varied more over the years on the same type of farm than among types of farms.

The least variation in yields has been on the cattle ranches and cotton farms and the largest variation has been on wheat farms (table 8). Hay is by far the most important crop on cattle ranches. Much of this is grown under irrigation which largely accounts for the relatively small year-to-year variations in yields. Wheat farms are located in the Great Plains where both total precipitation and its annual distribution vary widely from year to year. This accounts for the extreme variation in yields on wheat farms.

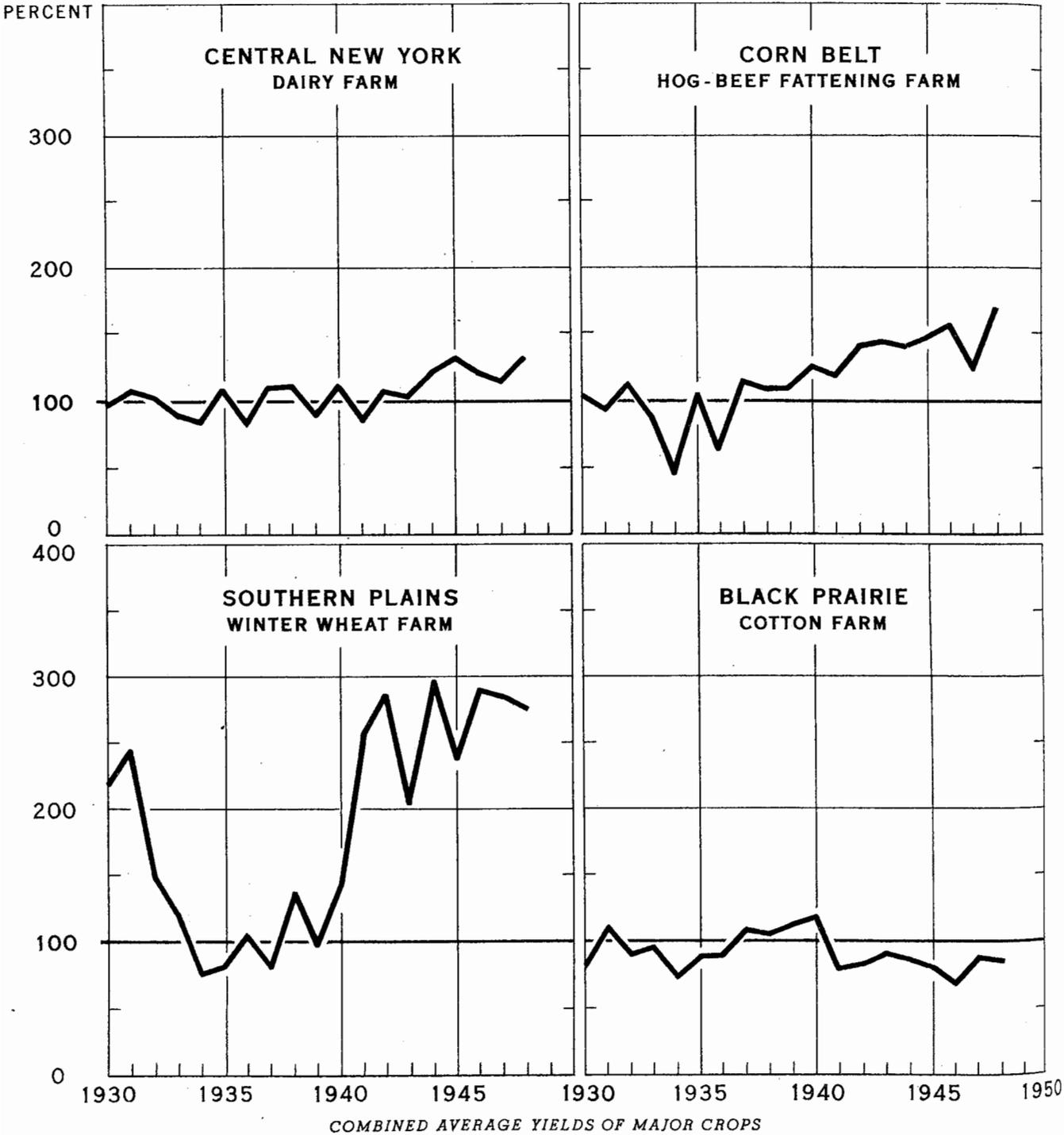
Increased use of hybrid seed corn and improved and higher yielding varieties of other crops has meant an almost constant increase in crop yields on Corn Belt farms. Except for the droughts in the early thirties and the late, wet spring of 1947 which reduced yields in these years, crop yields on Corn Belt farms have risen quite steadily. Yields on Corn Belt farms in 1948 were the highest on record, averaging well over 50 percent higher than in prewar years.

Crop yields for these 15 types of commercial family-operated farms averaged the highest on record in 1942, with 1948 a close second. Since 1940 crop yields have averaged nearly 50 percent above the 1935-39 prewar average. The lowest average yields were harvested in 1934 with 1936 as a close second. These were two years of wide-spread drought.

The information given on crop yields for these 15 types of farms cannot be accepted as representing crop yields over the years on other types and sizes of farms. In the areas in which these 15 types of farms are located are farms of other types and sizes. Crop yields on the other types and on the small-scale and large-scale farms may differ more or less than on these 15 types of commercial family-operated farms.

For further explanation and details of these commercial family-operated farms see the final section of this report.

**CROP YIELDS PER HARVESTED ACRE**  
**COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48**  
**INDEX NUMBERS (1935-39=100)**



**FIGURE 5**

BAE 47220

Table 8.- Crop yield per harvested acre, commercial family-operated farms, by type, 1930-48

Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog- dairy	Wheat- corn livestock	Wheat- small grain livestock	Wheat- roughage livestock	Wheat	Wheat- grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region 1/
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	98	113	87	102	96	97	145	132	210	219	157	64	82	49	97
1931	107	87	96	94	104	93	104	74	135	244	239	108	110	82	84
1932	101	105	112	112	113	100	134	109	240	147	117	128	91	59	98
1933	91	94	73	91	87	80	75	88	88	120	87	129	96	79	93
1934	85	75	55	49	44	67	92	55	44	76	86	43	73	81	86
1935	108	112	96	104	106	103	101	114	146	81	83	108	89	76	97
1936	83	82	69	66	55	81	45	42	30	103	87	73	89	97	101
1937	109	98	115	114	121	105	84	120	70	81	99	132	107	118	104
1938	110	112	109	108	114	104	126	110	93	136	121	103	104	106	105
1939	90	96	110	108	104	107	144	114	161	99	110	84	112	103	95
1940	110	125	112	125	127	117	133	122	172	141	137	107	118	93	101
1941	86	112	121	118	122	114	168	168	266	256	204	154	79	104	111
1942	106	131	128	140	141	125	212	208	353	286	269	144	82	120	105
1943	103	125	116	143	133	115	150	195	266	204	157	109	90	108	102
1944	121	125	112	140	129	105	175	178	275	294	265	137	86	113	102
1945	131	145	121	147	147	124	186	198	292	237	172	89	81	119	100
1946	121	128	130	157	166	147	159	158	313	289	189	92	68	100	106
1947	115	132	97	123	112	124	154	171	269	284	264	113	88	112	110
1948 2/	131	133	137	168	181	152	163	178	264	274	216	93	85	152	109

1/ Hay yield index.

2/ Preliminary.

Crop yield per harvested acre is a composite index of yield of all crops grown on the farm. It is computed in two steps. First, an index of yield is computed for each of the major crops (the 1937-41 average yield=100). These several indexes are combined by giving the respective index of each crop a weight in proportion to the acreage of that crop harvested each year. This all crop index is converted to 1935-39=100 by dividing the index for each year by the average for 1935-39.

## FERTILIZER AND LIME CONSUMED

Consumption of fertilizer has risen to about two and a half times the average of the prewar years of 1935-39 (table 9). An upward trend in consumption was noticeable following the early twenties, but it was interrupted during the period of low farm income of the 1930's. The long-time upward trend was then accelerated during the war years (fig. 6). There has been a considerable increase in areas and on crops heretofore receiving little or no application. Most of the increase has been on the cash crops although an increasing proportion is applied on hay and pasture. To the extent that more fertilizer, particularly phosphate, is used to benefit hay and pasture crops, it becomes increasingly an investment from which returns are received over a period of years.

The annual use of agricultural lime has increased to more than four times the average during the period of 1935-39 (fig. 7). Special impetus was given to consumption of lime in 1936 when it was included as a conservation material in the program of the Agricultural Adjustment Administration.

Table 9.- Application of fertilizer and lime in the continental United States, 1910-48

Year	Fertilizer 1/		Liming materials 2/					
	Thousand tons	Index (1935-39=100)	Year	Thousand tons	Index (1935-39=100)	Year	Thousand tons	Index (1935-39=100)
1910	844	61	1929	1,404	101	1929	3,808	56
1911	926	67	1930	1,452	105	1930	3,588	52
1912	887	64	1931	1,128	81	1931	2,611	38
1913	975	70	1932	763	55	1932	1,811	26
1914	1,100	79	1933	872	63	1933	1,548	23
1915	788	57	1934	1,003	72	1934	2,748	40
1916	715	51	1935	1,153	83	1935	3,505	51
1917	825	59	1936	1,305	94	1936	6,566	96
1918	873	63	1937	1,546	111	1937	7,199	105
1919	931	67	1938	1,447	104	1938	7,859	115
1920	1,127	81	1939	1,520	109	1939	9,066	133
1921	771	56	1940	1,679	121	1940	14,406	211
1922	914	66	1941	1,835	132	1941	15,916	233
1923	1,036	75	1942	2,021	146	1942	19,838	290
1924	1,112	80	1943	2,331	168	1943	18,935	277
1925	1,210	87	1944	2,612	187	1944	24,569	359
1926	1,230	89	1945	2,717	195	1945	23,030	337
1927	1,163	84	1946	2,995	216	1946	28,932	423
1928	1,397	101	1947	3,288	237	1947	5/29,600	433
:	:	:	1948	3/ 4/ 3,718	268	1948	6/ --	:

1/ In terms of Nitrogen (N), Phosphoric acid (P<sub>2</sub>O<sub>5</sub>) and Potash (K<sub>2</sub>O). Data from BFISAE.

2/ In terms of ground limestone equivalent. Based on surveys made by State Agricultural College agronomists. Includes data from county surveys of producers and from county extension agents and AAA offices. No data available prior to 1929.

3/ Preliminary.

4/ Estimated supplies for year ending June 30, 1948 (as given in PMA mimeographed report of October 1948) from which has been deducted an estimated consumption of 90,000 tons for Hawaii and Puerto Rico. This figure is therefore subject to change.

5/ Reported distribution under ACP of 29,285,677 tons plus an estimated small additional quantity used outside this program.

6/ No estimate released but consumption reduced because of reduced appropriations for ACP.

FERTILIZER CONSUMPTION IN TERMS OF NITROGEN, PHOSPHORIC ACID, AND POTASH, CONTINENTAL UNITED STATES, 1910-48

INDEX NUMBERS (1935-39=100)

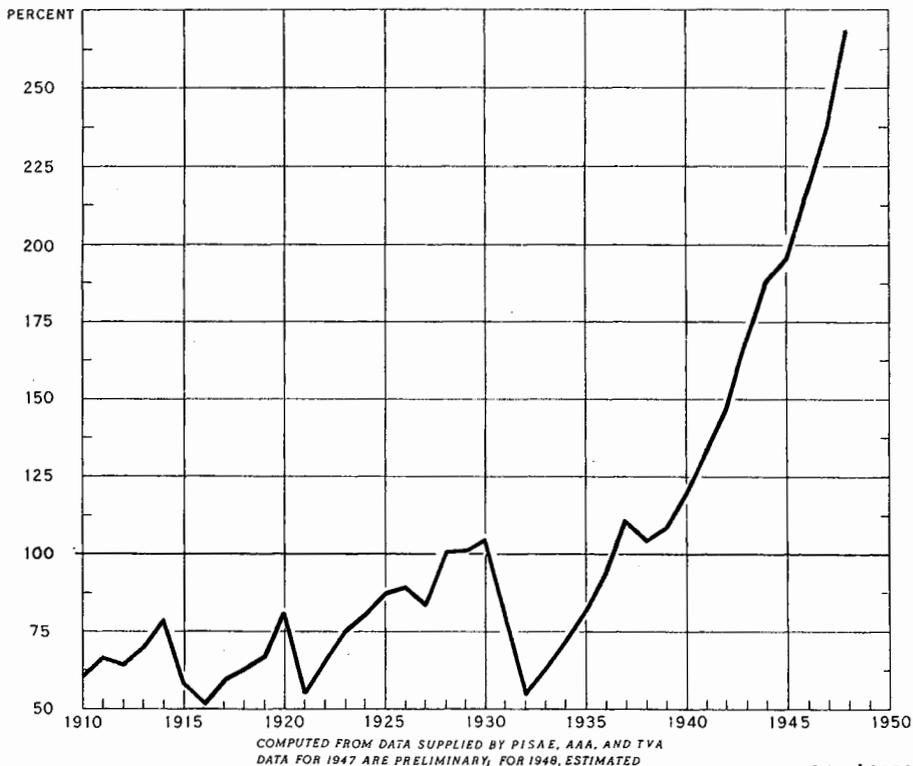


FIGURE 6

BAE 43920

LIME CONSUMPTION IN THE UNITED STATES, 1929-47\*

INDEX NUMBERS (1935-39=100)

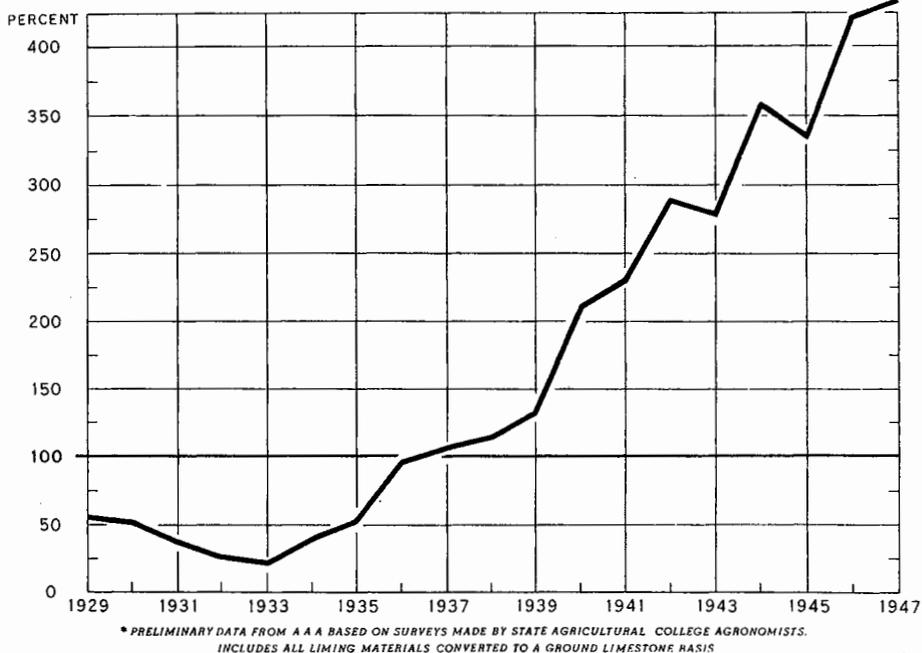


FIGURE 7

BAE 45940

## ANIMAL UNITS OF BREEDING LIVESTOCK AND LIVESTOCK PRODUCTION PER BREEDING UNIT

At 114 percent of the 1935-39 average, production of livestock per breeding unit in 1948 was the greatest of record (table 10). The decline in total number of animal units of breeding livestock, under way since 1944, appears to have been halted. The short corn crop of 1947 contributed to a sharp decrease in number of breeding units from 1947 to 1948, but the record 1948 production of feed grains helped prevent a further drop from 1948 to 1949.

Production of livestock per animal unit of breeding stock has risen by more than 40 percent since World War I (fig. 8). In contrast with crop production per acre, livestock production per breeding unit did not rise sharply during the World War II period. The number of breeding units of livestock increased substantially during most of the war period, however, whereas acreage of cropland changed very little.

Heavier feeding of better-balanced rations, improved strains of livestock, increased sanitation and disease control, reduced death losses, and better care have all contributed to the long-time rise in production per breeding unit. Variations in weather also indirectly affect livestock production per breeding unit via changes in feed supplies.

### Method Used in Constructing Series

The index of animal units of breeding livestock is based on numbers of milk cows, beef cows, ewes, and hens and pullets on January 1, the number of sows farrowing in the spring of the given year and in the fall of the preceding year, the total number of turkeys on January 1, and the number of goats clipped. The numbers of the various types of breeding units were combined into a total by weighting according to the contribution of each unit to gross livestock production in the 1935-39 period. For example, a milk cow produced about \$80 of gross production in 1935-39 and a hen or pullet \$2.50. These value weights were applied to numbers of milk cows, and hens and pullets, respectively, in calculating the index of animal units of breeding livestock each year.

The index of livestock production was built up from net annual live-weight production of cattle and calves, sheep and lambs, and hogs, and annual production of dairy products, chickens raised, broilers, turkeys, eggs, wool, and mohair. Average 1935-39 farm prices in each geographic division were used as weights in constructing indexes. Quantity-price aggregates of the geographic divisions were summed to obtain United States totals each year.

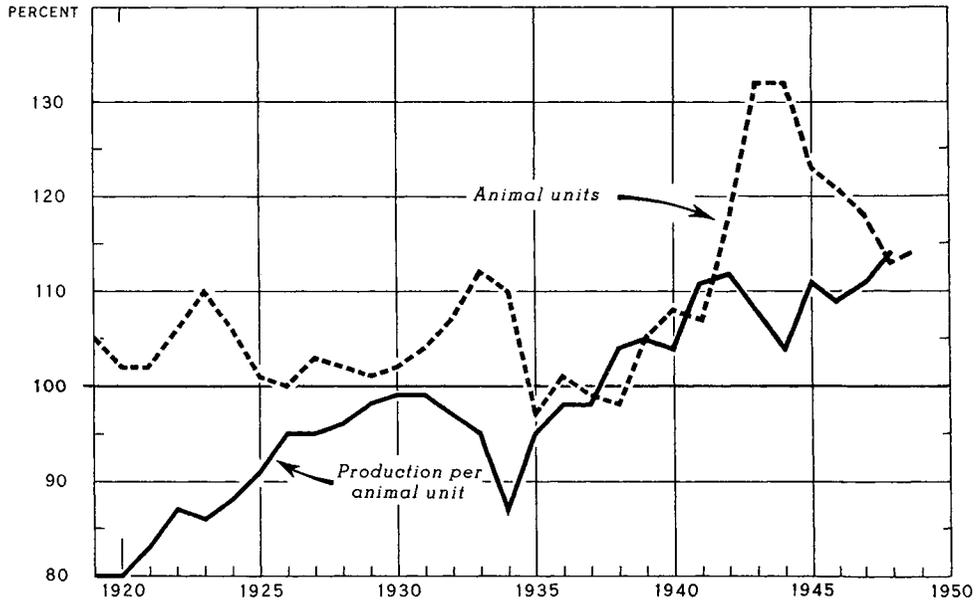
The index of livestock production was divided by the index of animal units of breeding livestock to obtain production per unit.

Table 10.- Index numbers of animal units of breeding livestock and livestock production per breeding unit, United States, 1919-49 <sup>1/</sup> (1935-39=100)

Year	Animal units of breeding livestock	Livestock production per breeding unit	Year	Animal units of breeding livestock	Livestock production per breeding unit
1919	105	80	1935	97	95
1920	102	80	1936	101	98
1921	102	83	1937	99	98
1922	106	87	1938	98	104
1923	110	86	1939	105	105
1924	106	88			
1925	101	91	1940	108	104
1926	100	95	1941	107	111
1927	103	95	1942	118	112
1928	102	96	1943	132	108
1929	101	98	1944	132	104
1930	102	99	1945	123	111
1931	104	99	1946	121	109
1932	107	97	1947	118	111
1933	112	95	1948 <sup>2/</sup>	113	114
1934	110	87	1949 <sup>2/</sup>	114	

<sup>1/</sup> Animal units and production exclude horses and mules.  
<sup>2/</sup> Preliminary.

ANIMAL UNITS OF BREEDING LIVESTOCK AND LIVESTOCK PRODUCTION PER BREEDING UNIT, 1919-49\*  
 INDEX NUMBERS (1935-39=100)



\*INCLUDES ALL BREEDING LIVESTOCK EXCEPT HORSES AND ALL LIVESTOCK PRODUCTION EXCEPT FARM-PRODUCED POWER OF HORSES AND MULES  
 DATA FOR 1948 AND 1949 ARE PRELIMINARY

FIGURE 8

BAR 45814

## ROUGHAGE-CONSUMING LIVESTOCK

Over the last 40 years the number of roughage-consuming livestock on farms in the United States has varied from about 77-79 million units at the top of the cycles in 1918-19, 1933-34, and 1943-44 to 67 or 68 million units at the bottom of the cattle cycles in 1911-12, 1927-28 and 1938-39. Numbers of livestock have been decreasing rapidly since 1944 and roughage-consuming livestock are down to nearly 68 million units in 1948-49. We are thus about as low in total roughage-consuming livestock as at previous low points in the cycle since 1910.

A major change in the kinds of livestock in the last three decades has been the decrease in numbers of horses and mules due to the increased use of tractors, automobiles, and other mechanical power on farms (fig. 9). Horses and mules use only a third as much hay and pasture as they did 30 years ago. This feed, which formerly produced farm power, has been used to increase the number of dairy and beef cattle, and until the war, of sheep. Hence it has resulted in increased quantities of milk, beef, and lamb. During the war and since, the number of sheep dropped off sharply and their place has been largely taken by beef cattle. It is likely that the downward trend in horses and mules will continue for several years and thus make way for still more cattle.

Changes in numbers of roughage-consuming livestock in the different regions are given in table 11. Data are given for seven selected years since 1919. The year 1919-20 is the first year that data on numbers by States are available. The peak of the cattle cycle occurred just a couple of years before 1920. The succeeding low point occurred in 1927-28 and the next high point just before the great drought of 1934. Roughage-consuming livestock declined after the droughts of 1934 and 1936, reaching a low point in 1938-39; and then increased, reaching a peak during the war in 1943-44. They have since decreased until they are now about as low as at previous low points of the last 40 years.

Figures for horses and mules are not given in the tables as they have decreased in all regions. This decrease of horses and mules since 1919-20 was offset by increases in cattle or sheep from the standpoint of roughage consumption in most parts of the United States except in the Northeastern States. Here there has been an actual decrease in total roughage-consuming livestock measuring from the high points reached in the last three decades. The lower Northeastern States have more dairy cattle than they had in the early twenties but the increase has not been enough to offset the decrease in horses and mules. In New England the number of dairy cattle has not increased and the number of roughage-consuming livestock is less than four-fifths of the number in 1919-20. In most other regions the number of dairy cattle had increased substantially in 1943-44 as compared with 1919-20. In the Lake States the increase

amounted to 38 percent, in the Corn Belt 30 percent, in the Appalachian States 40 percent, and on the Pacific Coast 64 percent. Since 1943-44 there has been a decrease in dairy cattle for the country as a whole of 11 percent, while horses and mules have decreased 35 percent. The greatest decrease in dairy cattle was in the Plains States. In the lower Northeastern States there was a small increase in dairy cattle.

In the Southern Plains there were almost two and a half times as many animal units of sheep and goats in 1943-44 as in 1919-20 while the number of beef cattle had increased 12 percent. From 1919-20 to 1943-44, total roughage-consuming units increased 21 percent in the Southern Plains, 14 percent on the Pacific Coast, 4 percent in the Northern Plains and 1 percent in the Northern Mountain States. In the Southwest they had decreased 27 percent. For all of the States east of the Plains States taken together, the increase was 3 percent. Thus, in 1919-20, 52 percent of the roughage-consuming livestock of the United States were east of the Plains States and in 1943-44 this percentage was 51 percent of the total. In 1933-34, just before the drought, 50 percent were in the eastern half of the country and in 1938-39 this percentage was 53 percent. In 1948-49, 51 percent of the roughage-consuming livestock were east of the Plains States.

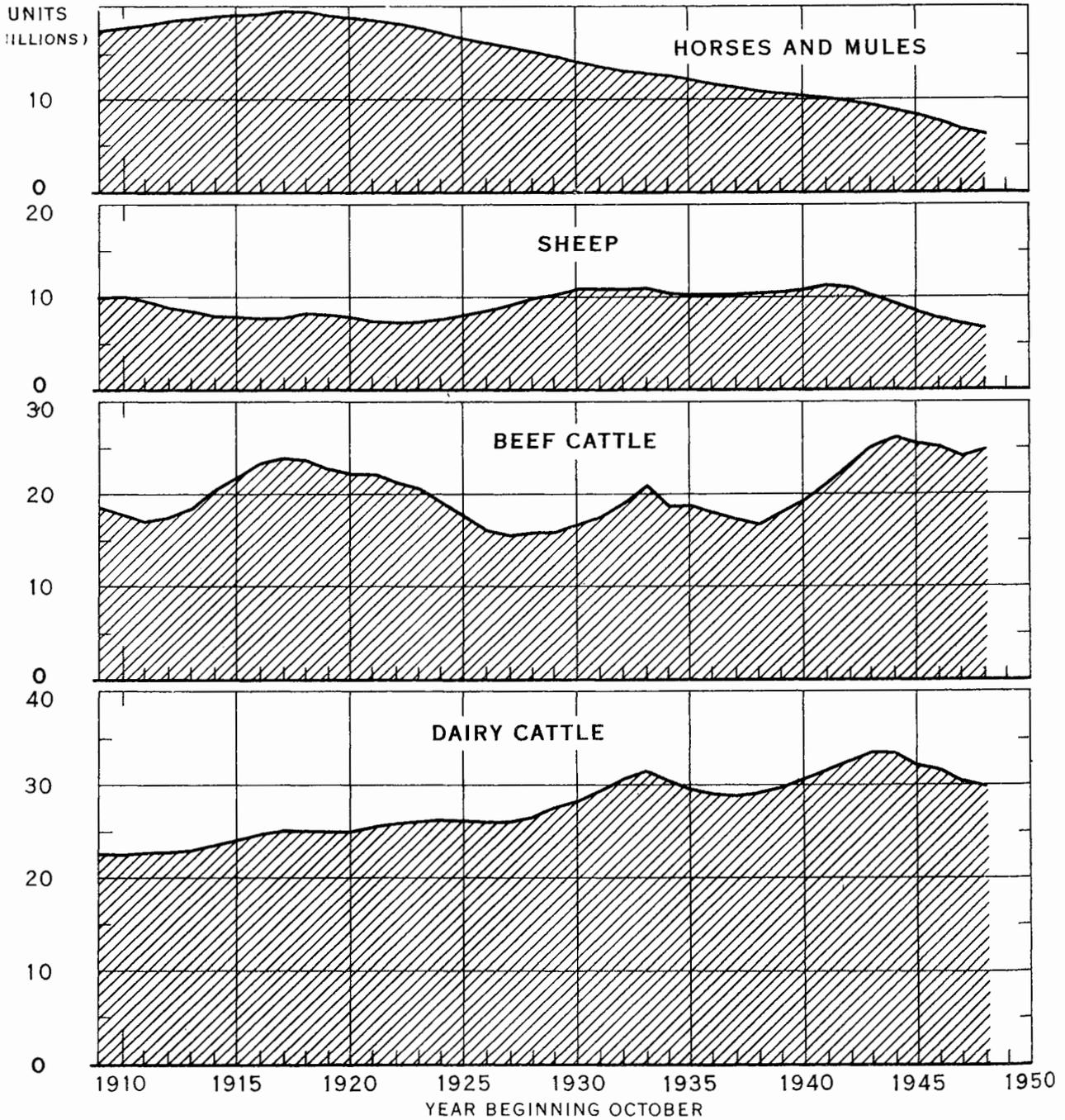
There were more animal units of beef cattle in nearly all parts of the country at the top of the cattle cycle in 1943-44 than in 1919-20. The greatest increase was in the Northern Plains, but there was a decrease in the Southwest.

Since 1943-44 animal units of beef cattle have decreased 1 percent. This has been mostly due to a decrease in the Southwest, the Southern Plains States, and the Pacific Coast as in most other areas they have held their own or increased. Sheep, on the other hand, have decreased about 35 percent since 1943-44. The decrease has not been as great as this in the Southern Plains, but in most other parts of the West it was more than this.

Most of the decrease in total numbers of cattle since the war time peak has been in dairy cattle. Farmers have been culling their dairy herds and disposing of them while meat prices were favorable. There has also been a shift from sheep to cattle in much of the West. Although total numbers of roughage-consuming livestock are about as low as they have been any time in the last 40 years the number of beef cattle is only slightly less than at the war time peak and above the peak reached in World War I. It is apparent, therefore, that beef cattle are in a position to increase to record numbers. Some people have estimated that at the peak of the next cycle we may have 95 million head of cattle in this country or about 20 percent more than now. This would mean about 85 million roughage-consuming animal units or about 5 million more than the peak of 80 million reached in 1943-44.

# UNITS OF PRINCIPAL KINDS OF ROUGHAGE-CONSUMING LIVESTOCK FED, UNITED STATES, 1909-48

(HAY, PASTURE AND OTHER ROUGHAGE CONSUMED BY ONE MILK COW IN A YEAR EQUALS ONE UNIT)



**FIGURE 9**

BAE 46549A

Table 11.- Changes in animal units of roughage-consuming livestock fed annually, by State groups, specified years, 1919-48, year beginning October 1

Region and class of livestock 1/	1919-20	1927-28	1933-34	1938-39	1943-44	1947-48	1948-49 2/
	Thousands						
<b>Northeast</b>							
<b>New England</b>							
Dairy cattle	1,113	967	1,056	1,040	1,067	995	995
All livestock	1,478	1,234	1,277	1,231	1,255	1,154	1,147
<b>Lower Northeast</b>							
Dairy cattle	3,395	3,060	3,379	3,389	3,637	3,714	3,765
All livestock	5,040	4,256	4,460	4,392	4,576	4,456	4,464
<b>Corn Belt</b>							
Dairy cattle	5,179	5,414	6,565	6,036	6,731	6,039	5,860
Beef cattle	3,807	2,274	2,879	2,751	4,127	3,456	3,734
All livestock	14,853	12,507	13,957	12,828	14,525	11,926	11,828
<b>Lake States</b>							
Dairy cattle	5,314	5,500	6,508	6,306	7,310	6,709	6,602
All livestock	8,323	7,937	9,045	8,702	9,796	8,451	8,251
<b>Northern Plains</b>							
Dairy cattle	2,448	2,845	3,622	2,685	3,247	2,453	2,362
Beef cattle	4,358	3,054	4,723	2,983	5,348	5,312	5,593
All livestock	10,444	9,100	11,178	7,750	10,846	9,105	9,178
<b>Appalachian</b>							
Dairy cattle	1,769	1,799	2,198	2,099	2,482	2,347	2,357
Beef cattle	856	541	690	664	992	1,024	1,012
All livestock	4,727	4,252	4,626	4,480	5,140	4,816	4,730
<b>Southeast</b>							
Dairy cattle	983	845	1,074	963	1,111	1,087	1,051
Beef cattle	799	485	628	589	891	970	935
All livestock	2,595	2,002	2,316	2,165	2,593	2,571	2,476
<b>Mississippi Delta</b>							
Dairy cattle	987	884	1,216	1,182	1,334	1,168	1,129
Beef cattle	633	404	609	601	891	887	900
All livestock	2,637	2,186	2,778	2,652	3,088	2,760	2,693
<b>Southern Plains</b>							
Dairy cattle	1,417	1,635	2,271	2,094	2,438	2,043	1,909
Beef cattle	4,396	3,029	4,457	3,081	4,934	4,770	4,651
Sheep and goats	1,060	1,635	2,293	2,590	2,795	2,132	1,951
All livestock	9,281	8,449	10,758	9,123	11,269	9,681	9,163
<b>Mountain</b>							
<b>Northern Mountain</b>							
Dairy cattle	880	1,124	1,332	1,115	1,326	1,141	1,122
Beef cattle	3,344	2,507	3,414	2,534	3,872	3,962	4,148
Sheep	2,565	2,884	3,180	2,775	2,551	1,769	1,663
All livestock	8,488	7,923	9,063	7,296	8,602	7,498	7,517
<b>Southwestern</b>							
Dairy cattle	135	147	190	184	200	166	165
Beef cattle	2,091	1,238	1,571	1,337	1,453	1,243	1,247
Sheep	774	769	817	678	600	391	383
All livestock	3,327	2,423	2,799	2,396	2,434	1,953	1,940
<b>Pacific</b>							
Dairy cattle	1,533	1,812	2,050	2,143	2,514	2,448	2,455
Beef cattle	1,419	1,168	1,262	1,383	1,947	1,671	1,709
Sheep	1,117	1,225	1,183	1,123	903	584	568
All livestock	5,098	4,968	5,099	5,176	5,820	5,053	5,057
<b>United States</b>							
Horses and mules	19,066	15,490	12,918	10,829	9,318	6,733	6,093
Dairy cattle	25,153	26,032	31,461	29,236	33,397	30,310	29,772
Beef cattle	22,877	15,390	21,081	16,752	25,566	24,252	24,910
Sheep	8,143	9,141	10,739	10,296	10,053	6,940	6,472
All livestock	76,291	67,237	77,356	68,191	79,944	69,424	68,444

1/ New England includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut; Lower Northeast includes New York, New Jersey, Pennsylvania, Delaware, and Maryland; Corn Belt includes Ohio, Indiana, Illinois, Iowa, and Missouri; Lake States include Michigan, Wisconsin, and Minnesota; Northern Plains include North Dakota, South Dakota, Nebraska, and Kansas; Appalachian includes Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; Southeast includes South Carolina, Georgia, Florida, and Alabama; Mississippi Delta includes Mississippi, Arkansas, and Louisiana; Southern Plains include Oklahoma and Texas; Northern Mountain includes Montana, Idaho, Wyoming, Colorado, Utah, and Nevada; Southwestern includes New Mexico and Arizona; Pacific includes Washington, Oregon, and California.

The totals for all livestock for each region and the United States include some livestock not shown separately.

2/ Preliminary.

## GRAIN-CONSUMING LIVESTOCK

The grain-consuming livestock of which hogs and poultry make up more than half, fluctuate with the grain supply. They increased from about 132 million units on farms in 1909-10 to 158 million units in 1918-19. In the early twenties, as a result of large corn crops, they increased to 163 million units, then leveled off at 149 to 153 million units for several years, but increased to about 160 million units in 1932-33 because of a large corn crop. The great drought of 1934 cut grain-consuming livestock down to 131 million units and it was 1939-40 before they reached 156 million units again. During the war, as a result of large feed-grain crops and large quantities of wheat fed, the number of grain-consuming livestock was pushed to 193 million units. Since then it has decreased sharply and in 1947-48 stood at about 156 million units or a little above the 1925-29 level. Because of a good corn crop in 1948, the number of grain-consuming livestock increased to about 160 million units in 1948-49 (table 12).

From the long-time viewpoint the chief change has been the reduction in numbers of horses and mules and city livestock and the increase in numbers of hogs, poultry, and dairy cattle (fig. 10). The decrease of one horse or mule permitted the increase of 20 hens, 2 hogs, or  $1\frac{1}{2}$  dairy cows in the use of grain. The country today has about the same number of grain-consuming units as in World War I, but probably 18 million fewer units of horses and mules. The number of cattle has increased by 4 million units, hogs by 9 million, and poultry by 14 million. Thus, poultry and hogs have been the principal recipient of the grain saved by the shift to mechanical power.

This year - 1948-49 - the number of grain-consuming units stands at about 17 percent below the peak numbers of grain-consuming animal units reached in 1943-44. This is about 3 percent above last year and about as large as was reached in the year of big feed crops in the 1920's and 1930's. Horses and mules, and hogs were reduced more than other livestock compared with 1943-44 and beef cattle increased. From figure 10 it will be seen that hogs and poultry change more from one year to the next than do other kinds of livestock. It takes several years to raise a milk cow but only 6 months to raise a pullet, and 10 to 12 months to raise and fatten a pig from the time the sow is bred.

The effect of the big corn crops of the early twenties is shown by the increase in hogs in the Corn Belt and Northern Plains from 1919 to 1922 and the effect of the droughts of the 1930's is shown by the reduction in hogs in the same areas between 1932 and 1937. The great increase in the years from 1941-42 to 1943-44, because of the war, is shown by the increase in poultry in the Northeast and in hogs and poultry in the North Central States and the South. Since the war the decrease in hogs and poultry has been general. The decrease in poultry has been widespread. However, this year poultry may exceed the wartime peak in

parts of the Northeast and South. If production of corn remains fairly high the number of hogs fed will probably increase somewhat from present levels. From 165 to 170 million grain-consuming units of livestock in 2 to 3 years would seem to be in line with our rapidly increasing population.

#### Method Used in Constructing Series

The new series of animal units of livestock fed annually are designed to take account of all livestock and poultry fed on farms in a year, instead of only those that appear in the January 1 inventory. It is possible to make more accurate approximations of potential feed requirements from the new series of animal units than from the old. The old series did not allow for hogs and poultry fed during the year that are born after January 1. These animals are included in the new series. The new series are computed, by States, for the feeding year beginning October 1. Details on construction of the new series are given in the processed report, F. M. 64, "Animal Units of Livestock Fed Annually 1919-20 to 1946-47," Bureau of Agricultural Economics, November 1947.

The weighting factors for combining the different classes of livestock into aggregate numbers of "animal units" are based on estimates of average feed consumption per head for each class of livestock in a year. The average feed consumption of the average milk cow in the United States is taken as 1.00, and the feed consumption of each kind of livestock for each State, is expressed in proportionate ratios.

Animal units are computed by States for grain-consuming livestock by multiplying the number of livestock and poultry on farms January 1 and the number raised during the year by factors based on the average consumption of grain and other concentrates per head per year compared with that of the average U. S. milk cow as 1.0 unit. These units reflect changes in numbers of livestock and poultry but not changes in weight or in production per head. Similarly the units of hay and pasture-consuming livestock are computed by multiplying the number of livestock by factors based on the average quantity of feed nutrients obtained per head per year from hay, pasture, and other rough feeds compared with the average U. S. milk cow as 1.0 unit.

## UNITS OF PRINCIPAL KINDS OF GRAIN-CONSUMING LIVESTOCK FED, UNITED STATES, 1909-48

(GRAIN AND OTHER CONCENTRATES CONSUMED BY ONE MILK COW IN A YEAR EQUALS ONE UNIT)

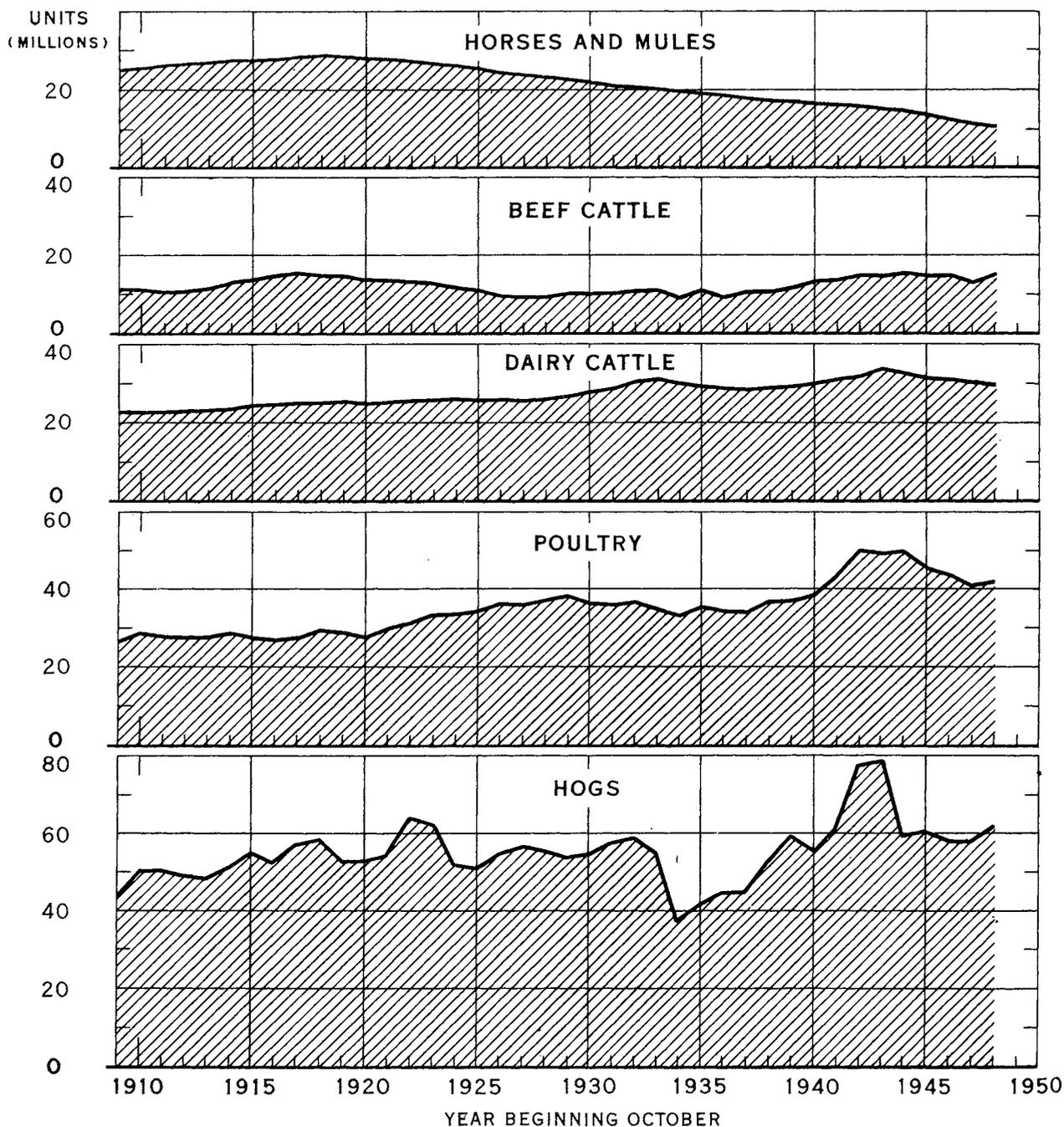


FIGURE 10

BAE 46548A

Table 12.- Changes in animal units of grain-consuming livestock fed annually, by State groups, specified years, 1919-48, year beginning October 1

Region and class of livestock 1/	1919-20	1922-23	1927-28	1932-33	1937-38	1941-42	1943-44	1947-48	1948-49 2/
	Thousands								
Northeast									
New England									
Dairy cattle	1,171	1,159	1,024	1,115	1,094	1,080	1,131	1,052	1,052
Poultry	794	867	910	1,101	1,246	1,702	2,126	1,811	1,875
All livestock	2,822	2,708	2,526	2,737	2,830	3,198	3,818	3,262	3,316
Lower Northeast									
Dairy cattle	4,114	4,051	3,710	4,062	4,005	4,229	4,367	4,458	4,514
Hogs	2,074	1,588	1,180	941	1,166	1,232	1,980	1,366	1,382
Poultry	3,118	3,399	3,976	4,098	4,305	5,618	6,593	6,330	6,616
All livestock	11,790	11,284	10,632	10,658	10,998	12,393	14,160	13,114	13,387
Corn Belt									
Dairy cattle	6,198	6,243	6,499	7,548	7,124	7,677	9,005	7,164	6,941
Beef cattle	6,705	6,003	3,877	4,885	5,367	6,762	7,036	5,871	6,838
Hogs	23,762	30,021	26,061	28,635	21,820	29,969	37,276	30,398	32,689
Poultry	9,220	10,051	10,677	10,571	9,362	11,235	12,318	10,020	9,979
All livestock	52,999	59,124	52,857	56,673	48,017	59,411	69,091	55,678	58,382
Lake States									
Dairy cattle	4,461	4,641	4,604	5,295	5,195	5,776	6,131	5,659	5,571
Hogs	5,796	7,836	6,926	6,503	5,847	8,633	9,700	6,843	7,290
Poultry	3,052	3,328	3,862	4,376	4,036	5,198	6,033	4,921	4,890
All livestock	16,988	19,125	18,227	19,092	17,971	22,459	24,537	19,437	19,779
Northern Plains									
Dairy cattle	1,961	2,122	2,278	2,730	2,136	2,437	2,579	1,949	1,877
Beef cattle	3,507	3,336	2,516	2,906	1,732	2,677	3,061	2,947	3,507
Hogs	6,363	11,833	11,093	10,834	4,173	7,277	10,255	6,392	6,617
Poultry	3,290	3,586	4,280	4,486	3,248	4,622	5,023	3,690	3,598
All livestock	18,800	24,592	23,405	23,718	13,154	18,815	22,652	16,114	16,621
Appalachian									
Dairy cattle	1,870	1,933	1,901	2,269	2,182	2,411	2,625	2,485	2,493
Hogs	4,613	3,890	3,609	3,479	3,529	4,108	5,767	4,358	4,481
Poultry	2,949	3,216	3,410	3,374	3,299	4,029	4,604	4,009	4,109
All livestock	12,946	12,479	11,952	11,798	11,603	13,207	15,672	13,278	13,386
Southeast									
Dairy cattle	1,266	1,193	1,099	1,348	1,247	1,338	1,442	1,425	1,380
Hogs	2,736	2,337	1,996	2,155	2,427	2,664	3,784	3,083	3,066
Poultry	1,139	1,242	1,400	1,359	1,346	1,838	2,189	2,040	2,113
All livestock	8,121	7,484	6,937	7,137	7,300	8,056	9,626	8,567	8,478
Mississippi Delta									
Dairy cattle	1,036	963	911	1,233	1,190	1,280	1,373	1,197	1,162
Hogs	1,372	1,356	1,187	1,357	1,515	1,493	2,089	1,421	1,416
Poultry	859	935	1,106	1,109	1,193	1,519	1,639	1,478	1,595
All livestock	6,132	5,616	5,412	5,888	6,035	6,532	7,377	6,076	6,082
Southern Plains									
Dairy cattle	1,474	1,555	1,704	2,205	2,149	2,381	2,525	2,109	1,977
Beef cattle	1,188	1,187	803	869	873	1,037	1,062	998	1,042
Hogs	2,978	2,726	2,307	2,762	1,998	2,803	4,043	2,280	2,381
Poultry	1,912	2,085	2,695	2,829	2,581	3,418	3,787	2,818	2,854
All livestock	11,592	11,604	11,224	11,795	10,126	11,707	13,291	9,467	9,365
Mountain									
Northern Mountain									
All livestock	3,594	4,024	4,002	4,058	3,473	4,477	5,141	3,723	3,823
Southwestern									
All livestock	627	612	535	609	582	637	680	542	549
Pacific									
Dairy cattle	1,138	1,256	1,329	1,498	1,544	1,733	1,818	1,768	1,762
Hogs	1,166	1,037	1,000	963	1,138	1,310	1,501	903	964
Poultry	1,539	1,678	2,531	2,247	2,416	2,917	3,287	3,074	3,398
All livestock	4,383	4,474	5,313	5,132	5,589	6,451	7,115	6,230	6,629
United States									
Horses and mules	28,262	27,443	23,908	20,682	17,839	16,141	15,239	11,468	10,453
Dairy cattle	25,254	25,733	25,760	30,105	28,562	31,122	33,826	29,970	29,423
Beef cattle	14,727	13,329	9,274	11,126	10,789	13,653	14,591	13,262	15,028
Hogs	52,642	64,147	56,773	58,951	44,719	61,061	78,614	58,180	61,519
Poultry	28,687	31,232	35,891	36,714	34,052	43,450	49,130	41,398	42,280
All livestock	150,794	163,126	153,022	159,295	137,678	167,343	193,160	155,503	159,797

1/ See table 11.

2/ Preliminary.

## NUMBERS OF SPECIFIED MACHINES ON FARMS

The estimated number of motor vehicles, grain combines, mechanical corn pickers, and milking machines on farms January 1, 1949, was the highest of record (table 13). Farm numbers of most of these machines increased substantially over a year ago, continuing the postwar surge in farm mechanization.

Except for automobiles, farmers added greatly to their inventories of these machines during World War II. The number of grain combines on farms and the number of farms reporting milking machines doubled from 1940 to 1945. During the same period, numbers of tractors, motortrucks, and mechanical corn pickers increased by half. The number of automobiles on farms was about the same in 1945 as in 1940. Since 1945, however, numbers of farm automobiles have risen by more than a fourth.

Table 13.— Number of tractors and other specified machines on farms, United States, January 1, 1910-49 <sup>1/</sup>

Year	Tractor	Motor- trucks	Auto- mobiles	Grain combines	Corn pickers	Milking machines <sup>2/</sup>
	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands
1910	1	0	50	1	---	12
1920	246	139	2,146	4	10	55
1930	920	900	4,135	61	50	100
1940	1,545	1,047	4,144	190	110	175
1941	1,675	1,095	4,330	225	120	210
1942	1,885	1,160	4,670	275	130	255
1943	2,100	1,280	4,350	320	138	275
1944	2,215	1,385	4,185	345	146	300
1945	2,422	1,490	4,152	375	168	365
1946	2,585	1,550	4,150	415	200	465
1947	2,800	1,730	4,520	450	225	580
1948 <sup>3/</sup>	3,150	1,920	4,930	520	300	640
1949 <sup>3/</sup>	3,500	2,000	5,250	590	365	685

<sup>1/</sup> The estimates of number of machines on farms are based upon information from several sources, including reports of the Agricultural Census, Department of Commerce data on purchases of machinery by farmers, data on motor vehicle registrations, and data from enumerative surveys and other information available in the Bureau of Agricultural Economics.

<sup>2/</sup> Number of farms reporting milking machines.

<sup>3/</sup> Preliminary.

## NUMBERS OF HORSES AND MULES AND TRACTORS ON FARMS

Farmers bought more new tractors during 1948 than in any previous year. Numbers of horses and mules continued their sharp postwar drop during the year.

The rapid mechanization of farms since World War I has been keynoted by the steady decline in numbers of horses and mules and the rise in numbers of farm tractors (fig. 11). The 3,500,000 tractors on farms January 1, 1949, was the highest of record. Horse and mule numbers on the same date were less than a third of the peak of 26.7 million head reached in 1918 (table 14).

The first large increase in tractor numbers came after World War I when agricultural and industrial production were at high levels. Development of the general-purpose type of tractor and its widespread adoption by farmers was chiefly responsible for the maintenance of the rapid upward trend in tractor numbers in the late twenties. Introduction and adoption of rubber-tired general-purpose tractors was an impetus to the climb in numbers of tractors on farms in the late thirties.

Record farm incomes, relatively high farm wage rates, and high prices of feed for horses and mules all contributed to the rapid increase in tractor numbers and the sharp decline in numbers of farm horses and mules during and following World War II.

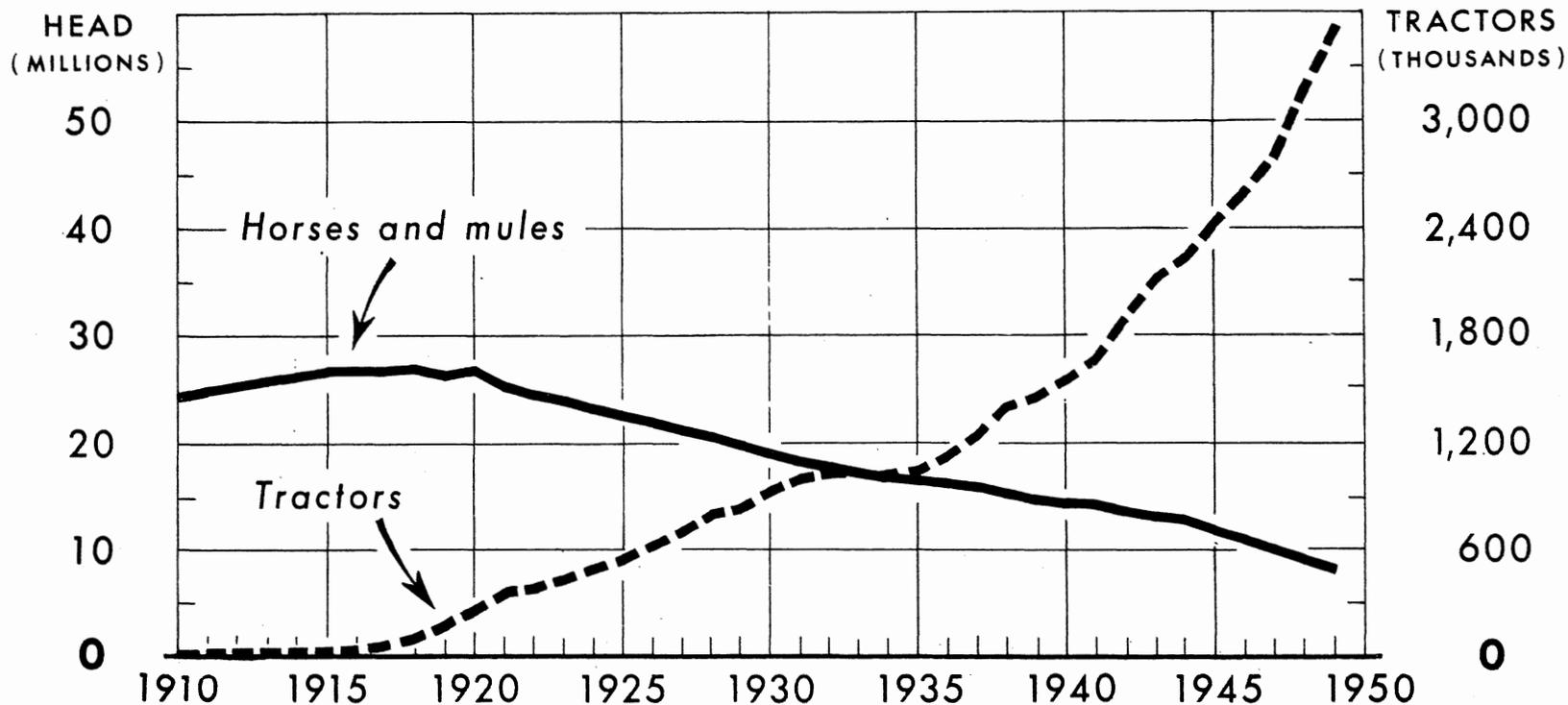
Horses and mules of work age will probably continue to disappear rapidly from farms, unless the downward trend in the annual colt crop is halted.

Table 14.- Horses and mules, and tractors on farms, United States, 1910-49

Year	Horses and mules	Tractors	Year	Horses and mules	Tractors
	Thousands	Thousands		Thousands	Thousands
1910	24,211	1	1929	19,744	827
1911	24,847	4	1930	19,124	920
1912	25,277	8	1931	18,468	997
1913	25,691	14	1932	17,812	1,022
1914	26,178	17	1933	17,337	1,019
1915	26,493	25	1934	16,997	1,016
1916	26,534	37	1935	16,683	1,048
1917	26,659	51	1936	16,226	1,125
1918	26,723	85	1937	15,802	1,230
			1938	15,245	1,370
1919	26,490	158	1939	14,792	1,445
1920	25,742	246	1940	14,478	1,545
1921	25,137	343	1941	14,104	1,675
1922	24,588	372	1942	13,655	1,885
1923	24,018	428	1943	13,231	2,100
1924	23,285	496	1944	12,613	2,215
1925	22,569	549	1945	11,950	2,422
1926	21,986	621	1946	11,063	2,585
1927	21,192	693	1947	10,021	2,800
1928	20,448	782	1948 <sup>1/</sup>	9,130	3,150
			1949 <sup>1/</sup>	8,274	3,500

<sup>1/</sup> Preliminary.

# HORSES AND MULES, AND TRACTORS ON FARMS, JANUARY 1, UNITED STATES, 1910-49



1945 TRACTOR NUMBERS FROM PRELIMINARY CENSUS REPORT; 1941-44 DATA ARE REVISED ESTIMATES OF BAE ADJUSTED TO PRELIMINARY CENSUS NUMBERS; DATA FOR 1948 AND 1949 ARE PRELIMINARY.

**FIGURE 11**

**BAE 38745-1**

## QUANTITY OF POWER AND MACHINERY ON FARMS

The inventory volume of all farm power and machinery, measured in terms of 1935-39 dollars, is now the highest of record (fig. 12). Measured in this way, the volume has been rising since 1935, and on January 1, 1949, was two-thirds greater than in 1935-39. During the war and postwar years numbers of tractors and tractor labor-saving machines, and motortrucks on farms have increased tremendously. This explains in large measure how farmers have been able to do a greatly expanded production job.

The total volume of farm power and machinery rose as cropland area increased following 1910. Beginning with World War I, when a sharp rise in volume took place, outstanding changes occurred in the composition of the farm power and machinery inventory. Numbers of horses and mules began their sharp downward trend. The steady increase in numbers of tractors and motortrucks compensated for the decrease in numbers of horses and mules. The rise in inventory volume of all farm motor vehicles - tractors, trucks, and automobiles - more than matched the decrease in inventory volume of farm horses and mules (table 15).

Major changes in composition of other farm machinery have occurred also. Tractor equipment has steadily replaced horse-drawn equipment during the last quarter century. The rapid increase in numbers of tractor machines was the chief factor in the rapid rise in volume of other farm machinery during the last decade.

Changes in volume of power and machinery on farms are associated with fluctuations in the farmers' financial position during periods of war and depression. Volume rose right after World War I. Purchases of machinery by farmers and inventory volume declined during the depression of the 1930's. Record farm incomes in World War II and the postwar years have contributed greatly to the present record volume of farm power and machinery.

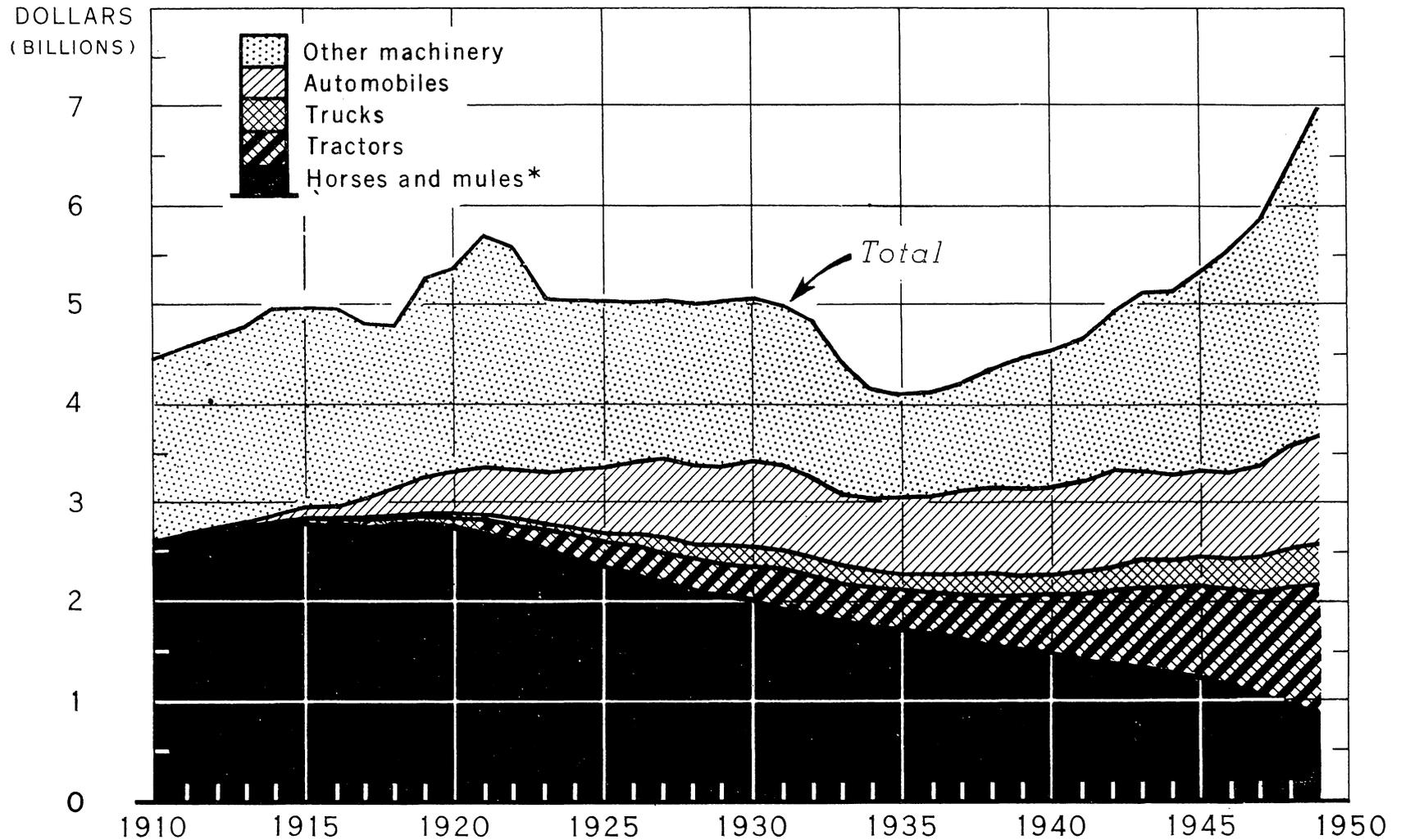
### Method Used in Constructing Series

The inventory volume in terms of 1935-39 dollars, of tractors, motortrucks, and automobiles was calculated by weighting the annual numbers of each of these motor vehicles by the average 1935-39 farm value per machine. Inventory values of farm horses and mules were calculated in the same way. Current-dollar inventory value of "Other farm machinery" was reduced to a comparable basis by deflating by an index of machinery prices.

These data on inventory volume should not be used as a basis for calculating an "index of farm mechanization," as they do not adequately reflect the increase in horsepower or potential work capacity over the last quarter century. The full horsepower potential of motor vehicles is not used on many farm jobs, however, and as a result there is a "surplus" capacity of power on farms.

# VOLUME OF FARM POWER AND MACHINERY, JANUARY 1, 1910-49

(VOLUME MEASURED IN 1935-39 AVERAGE DOLLARS)



\* INCLUDES HARNESS

DATA FOR 1948 AND 1949 ARE PRELIMINARY

FIGURE 12

BAE 46397

Table 15.- Volume of farm power and machinery, United States, January 1, 1910-49

(Volume measured in 1935-39 dollars)

Year	Horses and mules 1/	Tractors	Motor- trucks	Auto- mobiles	Other farm machinery	Total	Index of total
	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Percent
1910	2,564	0	0	10	1,876	4,450	105
1911	2,631	1	0	21	1,911	4,564	107
1912	2,679	3	1	37	1,945	4,665	110
1913	2,719	5	2	54	2,012	4,792	113
1914	2,787	6	3	72	2,074	4,942	116
1915	2,813	9	5	99	2,025	4,951	116
1916	2,787	14	8	144	1,989	4,942	116
1917	2,782	19	12	203	1,780	4,796	113
1918	2,788	31	18	315	1,630	4,782	112
1919	2,797	58	22	370	2,049	5,296	124
1920	2,748	91	28	451	2,055	5,373	126
1921	2,689	127	41	500	2,308	5,665	133
1922	2,618	138	53	509	2,234	5,552	130
1923	2,542	158	63	550	1,723	5,036	118
1924	2,470	184	73	631	1,663	5,021	118
1925	2,386	203	92	689	1,647	5,017	118
1926	2,315	230	112	757	1,596	5,010	118
1927	2,228	256	132	802	1,601	5,019	118
1928	2,147	289	151	802	1,612	5,001	118
1929	2,079	306	168	834	1,621	5,008	118
1930	2,019	340	180	868	1,634	5,041	118
1931	1,953	369	184	856	1,631	4,993	117
1932	1,873	378	182	798	1,590	4,821	113
1933	1,807	377	173	714	1,357	4,428	104
1934	1,756	376	175	714	1,123	4,144	97
1935	1,728	388	178	765	1,043	4,102	96
1936	1,680	416	185	784	1,044	4,109	97
1937	1,636	455	198	832	1,096	4,217	99
1938	1,579	507	208	863	1,214	4,371	103
1939	1,536	535	204	846	1,353	4,474	105
1940	1,503	572	209	870	1,364	4,518	106
1941	1,464	620	219	909	1,449	4,661	110
1942	1,417	697	232	981	1,609	4,936	116
1943	1,378	777	256	914	1,798	5,123	120
1944	1,319	820	277	879	1,844	5,139	121
1945	1,257	896	298	872	2,014	5,337	125
1946	1,166	956	310	872	2,230	5,534	130
1947	1,062	1,036	346	949	2,477	5,870	138
1948 <sup>2/</sup>	968	1,166	384	1,035	2,852	6,405	151
1949 <sup>2/</sup>	877	1,295	400	1,102	3,300	6,974	164

<sup>1/</sup> Includes harness and saddlery.<sup>2/</sup> Preliminary.

## QUANTITY OF POWER AND MACHINERY ON 15 TYPES OF FARMS

The quantity of power and machinery on commercial family-operated farms in 1948 was the highest on record (table 16). With current rates of purchasing machinery and equipment, the amount on farms is expected to be higher still in 1949. Operators of commercial family-operated farms had approximately 50 percent more power and machinery in 1948 than in the prewar period, 1935-39, and about 25 percent more than in 1930-32 (fig. 13).

During the depression and droughts in the early and middle thirties, because of reduced production, lower incomes, and generally unfavorable business conditions and price relationships, farmers did not replace their machinery as fast as it wore out. As a result, the physical amount of power and machinery on these farms declined for a few years. It was not until after 1940 that some farmers had replaced their worn-out equipment and were up to their 1930-31 levels of power and equipment. Some farmers had difficulty in obtaining equipment during the war despite relatively higher prices for farm products and higher incomes compared with prices of machinery and power items.

Cash grain farms (corn, wheat, and small grains) are the most highly mechanized and cotton the least mechanized. Winter wheat farms have about two and a half times as much power and machinery and cash grain farms in the Corn Belt twice as much as the average of all 15 types of commercial family-operated farms. Cotton farms had much less than the average amount of machinery compared with other types of farms. Delta cotton farms have about a third and Black Prairie cotton farms have about four-fifths of the average of all types of farms. Mississippi Delta cotton farms are family-operated units and are not representative of the plantation and larger units that are fairly common in the Delta area.

Large-scale units in the West and Midwest and plantations in the South probably have mechanized more rapidly than have the family-sized farms represented in this study. Likewise, there are other types of farms in the same areas in which these family-operated farms are located. These types of farms may be more highly or less highly mechanized than are the types of farms covered in these analyses. Operators of many of the small-scale units, particularly the small-scale cotton, peanut, and tobacco farms in the South and the poultry, fruit, and general farms in the West and Midwest, have not had the opportunities open to them to mechanize as have operators of the larger farms. Until recently many items of equipment suitable for small-scale units were not readily available.

The results obtained on these 15 types of commercial family-operated farms, therefore, cannot be accepted as representing farms of all types and sizes throughout the country. The last section of this publication shows the location of the 15 types of farms and gives additional information on them.

QUANTITY OF POWER AND MACHINERY USED, AND  
ACRES OF CROPLAND HARVESTED PER FARM  
COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48  
INDEX NUMBERS (1935-39=100)

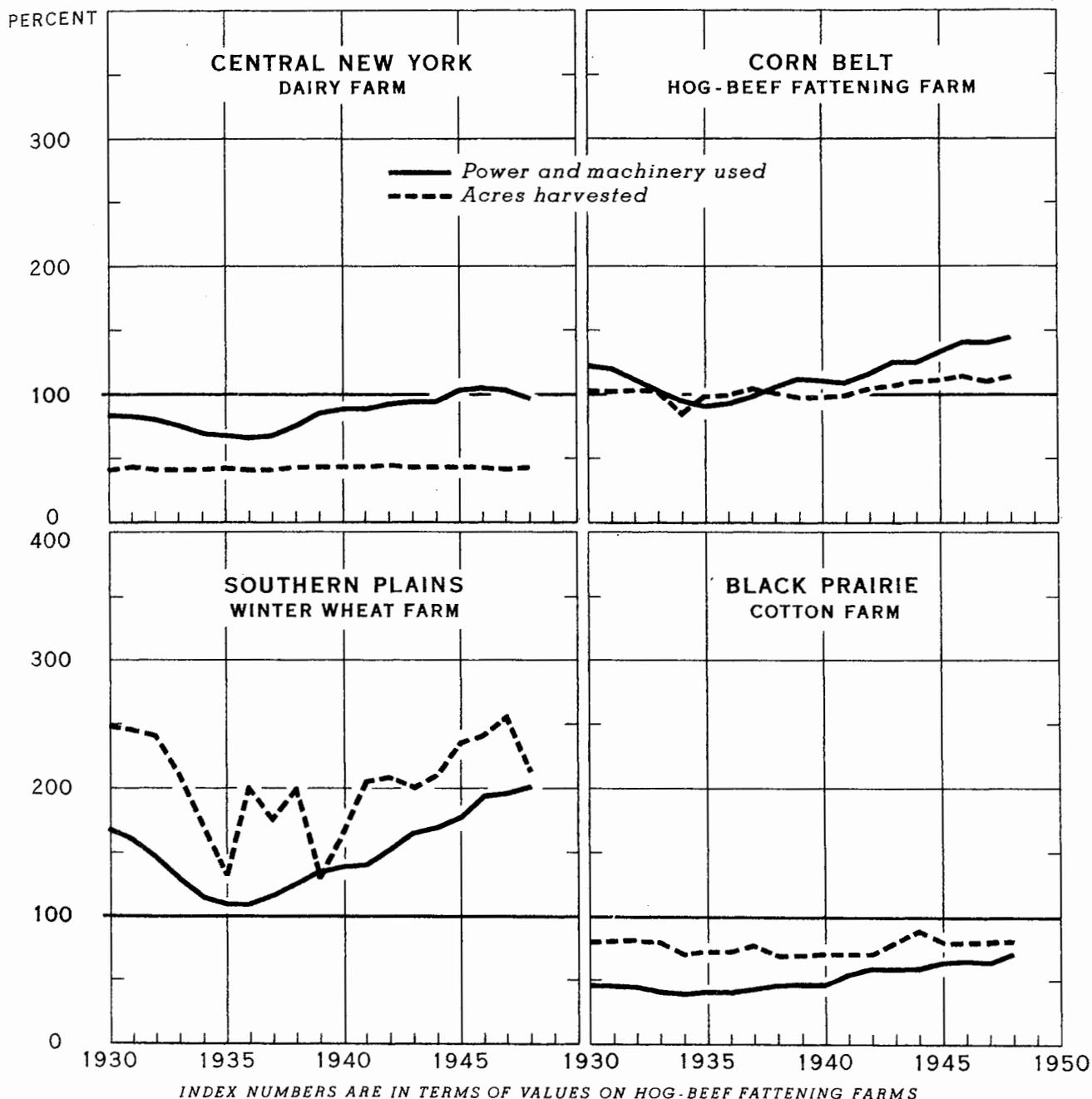


FIGURE 13

BAE 47221

Table 16.- Quantity of power and machinery used, commercial family-operated farms, by type, 1930-48

Index numbers (average of all types 1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	104	109	164	150	94	109	144	162	140	205	215	76	56	32	97
1931	101	107	159	145	91	105	138	151	133	196	205	74	55	32	98
1932	98	102	151	137	85	99	127	137	122	179	189	67	53	31	88
1933	91	95	138	126	78	92	114	127	112	158	150	63	50	30	88
1934	85	89	127	116	72	86	104	117	103	140	149	60	48	29	94
1935	82	88	122	112	70	83	97	112	97	134	140	74	50	30	93
1936	81	88	124	114	69	83	100	117	94	134	138	78	51	31	98
1937	82	95	132	120	72	89	102	117	95	142	145	86	53	31	101
1938	92	108	146	130	82	103	107	121	96	154	157	89	55	33	96
1939	104	121	154	137	91	115	112	126	97	165	172	92	56	34	112
1940	107	121	151	136	90	117	115	132	96	170	177	89	56	34	122
1941	108	119	150	133	89	113	128	138	101	171	182	93	66	34	135
1942	113	124	160	142	97	118	138	145	108	187	197	97	72	35	107
1943	115	124	170	151	104	123	138	145	109	202	210	102	73	36	105
1944	116	123	176	152	106	122	141	144	117	208	215	99	73	36	113
1945	126	134	197	165	115	133	140	144	121	217	227	109	78	37	119
1946	129	140	204	173	124	142	144	143	121	236	247	112	79	37	123
1947	126	139	203	172	123	140	151	146	123	239	252	112	79	37	130
1948 1/	129	144	205	175	124	141	165	158	132	246	260	114	87	36	131

1/ Preliminary.

The index of quantity of power and machinery used represents the combined amount of machinery and equipment, tractors, trucks, horses and mules and farm share of automobile available on the respective group of commercial family-operated farms. The number of workstock on the farm is converted into a tractor equivalent—the rate of conversion varies depending on the most common size of tractor in the area. The numbers of tractors, trucks, mits, combines, et cetera, in the inventory each year were multiplied by their respective prices in 1930 to convert them to a common unit. These aggregate values for each farm type were then divided by the 1935-39 average values for all types. The index thus computed is a measure of the quantity of power and machinery available on commercial family-operated farms, each measured in terms of the average for all types.

## MECHANIZATION OF SOME MAJOR CROPS

The basic operations in preparing seedbeds are now done mainly with the use of tractor power. More than 80 percent of the heavy operations of land-breaking and disking was performed with tractor equipment in 1946. Tractor power was used less extensively for the lighter work of harrowing. The proportion of cropland broken and disked with tractor equipment increased by half between 1939 and 1946; use of tractors in harrowing rose by 80 percent.

Preparation of seedbeds is most highly mechanized in the Northern Plains. The Pacific, Corn Belt, and Lake States regions rank close to the Northern Plains in the use of tractor power in seedbed preparation (table 17). Animal-drawn equipment still predominates in the Mississippi Delta, the Southeast, and the Appalachian regions. However, the greatest percentage increase in use of tractors in seedbed preparation occurred in these southern areas during the period from 1939 to 1946.

A greater degree of mechanization prevails in production of small grain crops than of any other major crop group. Acreages of small grains are concentrated in the Western and North Central areas of the country where the use of tractor power is dominant. About 90 percent of the drilling of small grains in 1946 was done with tractor power in the Northern Plains, Southern Plains, and Pacific areas (table 18). Tractor machines were used to harvest practically all the small grain in the Northern Plains region in 1946, and the average for the entire United States was 90 percent. Use of animal-drawn machines was still important in the harvest of the limited acreage of small grains in the Appalachian, Southeastern and Mississippi Delta States in 1946, although more than half the acreage was harvested with tractor power. Progress in mechanization of small grains from 1939 to 1946 was generally greatest in these three Southern areas. The use of cradles was still important in some areas of the South in 1939 but had practically disappeared as a practice by 1946.

More than half the acreage of corn in the United States was still planted with animal-drawn planters in 1946 (table 19). Use of tractor planters increased from 13 percent of the acreage in 1939 to 41 percent in 1946. During the same period, use of tractor planters increased fivefold in the Corn Belt States which had more than a third of the corn acreage of the country. About two-thirds of the cultivating of corn was done with tractors in 1946 - more than double the proportion in 1939. Tractor cultivators are now used most extensively in the Corn Belt, the Lake States, and the Northern Plains.

In 1946 mechanical field pickers were used to harvest more than 60 percent of the acreage of corn for grain in the Corn Belt and Lake States. For the country as a whole, more than 40 percent of the acreage of corn for grain was machine-picked; this was about three and a half times the proportion handled in this way in 1938 (table 20). Husking or snapping by hand from the standing stalk or shock was the method used to harvest practically all of the corn for grain in the South in both 1943 and 1946. Use of husker shredders is most prevalent in the Lake States.

Production of cotton is less mechanized than that of small grains and corn. Use of tractor machines for planting and cultivating cotton doubled between 1939 and 1946 (table 21). Despite this rapid advance, however, less than 50 percent of the acreage of cotton was planted and cultivated with tractor power in 1946. Mechanization of the planting and cultivating operations was farthest advanced in the Oklahoma-Texas and Western areas where tractor power was used for 75 to 90 percent of the work. Although machine strippers and mechanical cotton pickers have been in the developmental stage for two decades or more, only .4 of 1 percent of the 1946 cotton crop was harvested by machine methods.

Mechanization of the hay harvest has progressed rapidly since 1939. The proportion of the hay acreage cut with tractor mowers rose from 15 percent in 1939 to more than 40 percent in 1944 (table 22). Use of mechanical power in hauling at haying time increased threefold during the same period. By 1944, nearly a third of the hay acreage was raked with tractor power. The greatest percentage increase in mechanization of hay production occurred in the use of windrow pick-up balers.

Windrow pick-up balers were used to about the same extent as stationary balers in 1944 when more than a fourth of the hay crop was baled.

#### Method Used in Constructing Series

The data relative to mechanization and practices used on selected crops were developed from information supplied by the voluntary crop reporters of the United States Department of Agriculture. In most years around 20,000 reports for the United States as a whole were received; the number of reports pertaining to particular crops varied depending upon the importance and geographical distribution of the crop.

Crop reporters were asked to supply information as to mechanization of crop production and crop practices in their localities rather than on their own farms only. An exception to this was the study of corn harvesting in 1943 when crop reporters supplied information for their own farms.

The replies to each question were edited and simple averages of the locality estimates were calculated for each crop-reporting district. State averages of mechanization or practice items were then obtained by applying appropriate weights to the averages of each crop-reporting district. The weights used varied with the type of item. For land breaking, total cropland harvested plus crop failure minus all hay except sorghum hay; that is an approximation of the total land area broken in each crop-reporting district, was used as weights. In the case of specific crops, planted or harvested acres were used as weights depending on the type of operation and the availability of data for weighting purposes from the census or the Bureau of Agricultural Economics. In the case of some items, production data were used as weights. State averages as thus calculated were checked against available related data; in most instances the averages for particular States were reviewed by people acquainted with conditions in the particular States. This checking and review formed the basis for some adjustments in the State averages.

State average estimates were combined into averages for State groups and estimates for the United States by applying appropriate acreage, production, etc., weights to the respective State averages.

Development of data on the corn crop of 1943 represented a departure from the above-described general procedure. All reports for individual farms for a given State were sorted into groups according to acreage of corn grown per farm. Simple averages of items were calculated for each size of corn acreage group. Weights were developed from frequency distributions of corn acreage in the 1940 Census of Agriculture, and these were used in calculating State averages. Acreage weights were used in arriving at averages for State groups and the United States.

Table 17.- Use of tractor power for breaking, disking and harrowing land for all crops, by State groups, 1939 and 1946 <sup>1/</sup>

State group	Land breaking done with tractors <sup>3/</sup>		Disking done with tractors		Harrowing done with tractors	
	1939	1946	1939	1946	1939	1946
<u>2/</u>	Percent	Percent	Percent	Percent	Percent	Percent
Northeast	46	79	60	85	46	77
Corn Belt	69	92	69	92	52	86
Lake States	62	92	59	91	44	85
Northern Plains	80	96	76	96	65	93
Appalachian	13	41	26	53	10	31
Southeast	11	36	21	52	8	31
Mississippi Delta	11	35	19	48	9	29
Southern Plains	49	82	50	86	41	79
Mountain	67	91	62	88	47	80
Pacific	76	94	79	95	64	92
United States	55	82	57	85	43	77

<sup>1/</sup> For similar information for individual States, see the BAE processed report F.M. 69, "Use of Tractor Power, Animal Power, and Hand Methods in Crop Production," July 1948.

<sup>2/</sup> Northeast includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland; Corn Belt includes Ohio, Indiana, Illinois, Iowa, and Missouri; Lake States include Michigan, Wisconsin, and Minnesota; Northern Plains include North Dakota, South Dakota, Nebraska, and Kansas; Appalachian includes Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; Southeast includes South Carolina, Georgia, Florida, and Alabama; Mississippi Delta includes Mississippi, Arkansas, and Louisiana; Southern Plains include Oklahoma and Texas; Mountain includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada; Pacific includes Washington, Oregon, and California.

<sup>3/</sup> Includes plowing with moldboard and disk plows, listing, middle busting and bedding.

Table 18.- Use of tractor power in drilling small grains, and acreage of small grain crops harvested with tractor machines, animal-drawn machines, and by hand methods, by State groups, 1939 and 1946 <sup>1/</sup>

State group <sup>2/</sup>	: Drilling of		: Acreage harvested with -					
	: seed done with		: Tractor		: Animal-drawn		: Cradles	
	: tractors		: machines		: machines		: 1939	: 1946
	: 1939	: 1946	: 1939	: 1946	: 1939	: 1946	: 1939	: 1946
	: Percent	: Percent	: Percent	: Percent	: Percent	: Percent	: Percent	: Percent
Northeast	: 10	: 45	: 44	: 79	: 55	: 21	: 1	: -
Corn Belt	: 30	: 70	: 71	: 91	: 29	: 9	: -	: -
Lake States	: 23	: 64	: 56	: 87	: 44	: 13	: -	: -
Northern Plains	: 67	: 92	: 78	: 97	: 22	: 3	: -	: -
Appalachian	: 5	: 27	: 35	: 59	: 51	: 38	: 14	: 3
Southeast	: 8	: 42	: 25	: 60	: 47	: 36	: 28	: 4
Mississippi Delta	: 23	: 38	: 35	: 54	: 61	: 45	: 4	: 1
Southern Plains	: 71	: 89	: 80	: 90	: 19	: 10	: 1	: -
Mountain	: 56	: 81	: 63	: 89	: 36	: 11	: 1	: -
Pacific	: 69	: 89	: 80	: 91	: 20	: 9	: -	: -
United States	: 49	: 79	: 69	: 90	: 30	: 10	: 1	: <sup>3/</sup>

<sup>1/</sup> For similar information for individual States, see the BAE processed report F.M. 69, "Use of Tractor Power, Animal Power, and Hand Methods in Crop Production," July 1948.

<sup>2/</sup> Northeast includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland; Corn Belt includes Ohio, Indiana, Illinois, Iowa, and Missouri; Lake States include Michigan, Wisconsin, and Minnesota; Northern Plains include North Dakota, South Dakota, Nebraska, and Kansas; Appalachian includes Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; Southeast includes South Carolina, Georgia, Florida, and Alabama; Mississippi Delta includes Mississippi, Arkansas, and Louisiana; Southern Plains include Oklahoma and Texas; Mountain includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada; Pacific includes Washington, Oregon, and California.

<sup>3/</sup> Less than .5 of one percent.

Table 19.- Corn acreage planted by specified methods and use of tractors for cultivating corn, by State groups, 1939 and 1946 <sup>1/</sup>

State group	Acreage planted -						Cultivating	
	By hand		With animal-drawn planters		With tractor planters		done with tractors	
	1939	1946	1939	1946	1939	1946	1939	1946
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Northeast	10	7	84	59	6	34	15	54
Corn Belt	1	-	90	56	9	44	47	82
Lake States	9	3	85	63	6	34	32	79
Northern Plains	-	-	59	30	41	70	51	87
Appalachian	13	8	86	85	1	7	4	13
Southeast	13	7	85	79	2	14	3	11
Mississippi Delta	12	5	84	83	4	12	5	16
Southern Plains	4	2	73	38	23	60	22	65
Mountain	5	4	51	26	44	70	41	76
Pacific	31	13	48	19	21	68	26	75
United States	6	3	81	56	13	41	30	64

<sup>1/</sup> For similar information for individual States, see the BAE processed report F.M. 69, "Use of Tractor Power, Animal Power, and Hand Methods in Crop Production," July 1948.

<sup>2/</sup> Northeast includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland; Corn Belt includes Ohio, Indiana, Illinois, Iowa, and Missouri; Lake States include Michigan, Wisconsin, and Minnesota; Northern Plains include North Dakota, South Dakota, Nebraska, and Kansas; Appalachian includes Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; Southeast includes South Carolina, Georgia, Florida, and Alabama; Mississippi Delta includes Mississippi, Arkansas, and Louisiana; Southern Plains include Oklahoma and Texas; Mountain includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada; Pacific includes Washington, Oregon, and California.

Table 20.-Corn for grain: Acreage harvested by specified methods, by State groups, 1938, 1943 and 1946 <sup>1/</sup>

State group	Harvested with mechanical corn picker			Husked or snapped : by hand from : standing stalk : or shock :		Husker with husker shredder	
	1938	1943	1946	1943	1946	1943	1946
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Northeast	2	9	26	85	68	6	6
Corn Belt	28	51	64	45	33	4	3
Lake States	22	49	62	33	23	18	15
Northern Plains	6	25	49	75	50	3/	1
Appalachian	1	1	6	96	92	3	2
Southeast	-	3/	1	100	99	-	-
Mississippi Delta	-	3/	1	100	99	-	-
Southern Plains	-	1	6	99	94	-	-
Mountain	3	10	23	89	76	1	1
Pacific	-	13	30	87	70	-	-
United States	12	27	41	70	56	3	3

<sup>1/</sup> For similar information for individual States, see the BAE processed report F.M. 69, "Use of Tractor Power, Animal Power, and Hand Methods in Crop Production," July 1948.

<sup>2/</sup> Northeast includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland; Corn Belt includes Ohio, Indiana, Illinois, Iowa, and Missouri; Lake States include Michigan, Wisconsin, and Minnesota; Northern Plains include North Dakota, South Dakota, Nebraska, and Kansas; Appalachian includes Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; Southeast includes South Carolina, Georgia, Florida, and Alabama; Mississippi Delta includes Mississippi, Arkansas, and Louisiana; Southern Plains include Oklahoma and Texas; Mountain includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada; Pacific includes Washington, Oregon, and California.

<sup>3/</sup> Less than .5 of one percent.

Table 21.- Use of tractor power for planting and cultivating cotton, 1939 and 1946, and proportion of 1946 crop harvested by specified methods, by State groups 1/

State group	: Planting		: Cultivating		: Proportion of 1946		
	: done with		: done with		: crop harvested		
<u>2/</u>	: tractors		: tractors		: by <u>3/</u>		
	: 1939	: 1946	: 1939	: 1946	: Hand	: Hand	: Machine
	:	:	:	:	: pick-	: snap-	: methods
	:	:	:	:	: ing	: ping	: <u>4/</u>
	: Percent	: Percent	: Percent	: Percent	: Percent	: Percent	: Percent
Southeast	: 2	: 13	: 2	: 11	: 99.4	: 0.6	: <u>5/</u>
Mid-South	: 4	: 16	: 6	: 18	: 90.9	: 9.1	: <u>5/</u>
Oklahoma-Texas	: 42	: 78	: 40	: 82	: 49.3	: 48.7	: 2.0
Mountain and Pacific	: 64	: 81	: 69	: 87	: 87.6	: 11.9	: 0.5
United States	: 21	: 43	: 21	: 45	: 83.9	: 15.7	: 0.4

1/ For similar information for individual States, see the BAE processed report F.M. 69, "Use of Tractor Power, Animal Power, and Hand Methods in Crop Production," July 1948.

2/ Southeast includes Virginia, North Carolina, South Carolina, Georgia, Florida and Alabama; Mid-South includes Mississippi, Louisiana, Arkansas, Tennessee and Missouri; Mountain and Pacific include New Mexico, Arizona and California.

3/ Adapted from table 17 in "Charges for Ginning Cotton," Production and Marketing Administration, U.S.D.A., September 1947 (Processed).

4/ Includes machine-picking and machine-stripping.

5/ Less than 0.05 percent.

Table 22.--Use of mechanical power in hay production, by State groups, 1939 and 1944 <sup>1/</sup>

State group <sup>2/</sup>	Mowing done with tractors		Raking done with tractors		Hauling at haying time done with mechanical power <sup>3/</sup>		Hay production baled with -		
	1939	1944	1944	1939	1944	1939	1944	1939	1944
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Northeast	17	36	30	22	45	6	8	<u>4/</u>	8
Corn Belt	12	42	35	14	47	8	12	2	25
Lake States	11	30	25	14	40	3	5	<u>4/</u>	8
Northern Plains	23	50	26	12	49	7	7	1	8
Appalachian	5	15	7	4	15	24	26	1	6
Southeast	8	22	9	3	16	46	42	1	3
Mississippi Delta	9	21	11	6	21	35	38	2	8
Southern Plains	22	68	51	19	66	48	42	5	26
Mountain	19	54	29	12	45	6	7	2	12
Pacific	28	66	51	30	68	22	22	14	22
United States	15	42	30	15	45	12	13	2	14

<sup>1/</sup> For similar information by States see the BAE processed report F.M. 57, "Harvesting the Hay Crop," April 1946.

<sup>2/</sup> Northeast includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland; Corn Belt includes Ohio, Indiana, Illinois, Iowa, and Missouri; Lake States include Michigan, Wisconsin, and Minnesota; Northern Plains include North Dakota, South Dakota, Nebraska, and Kansas; Appalachian includes Virginia, West Virginia, North Carolina, Kentucky, and Tennessee; Southeast includes South Carolina, Georgia, Florida, and Alabama; Mississippi Delta includes Mississippi, Arkansas, and Louisiana; Southern Plains include Oklahoma and Texas; Mountain includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada; Pacific includes Washington, Oregon, and California.

<sup>3/</sup> Motor trucks, tractors, auto or tractor buckrakes, etc.

<sup>4/</sup> Less than 0.5 of one percent.

## PRODUCTION PER WORKER IN AGRICULTURE AND INDUSTRY

The rise in gross production per farm worker over the last two decades has been about the same as the increase in production per worker in manufacturing and mining (fig. 14). In 1945, the last year of World War II, production per worker in both agriculture and industry was more than a third greater than in the prewar period of 1935-39.

Production per worker in industry rose two and a half times as much as gross production per farm worker in the 20 years following 1910. Worker productivity in agriculture increased much faster than in industry during the 1910-20 decade, but farm workers' productivity showed little change during the 1920's when productivity of manufacturing and mining employees rose rapidly.

Production per industrial worker in 1948 was 195 percent of that in 1910, compared with 180 percent of 1910 for gross production per farm worker (table 23). In terms of output of farm products for human use, the rise in worker productivity in agriculture exceeded that in industry for the 1910-48 period.

The greater rise in output compared to the rise in gross production per farm worker reflects the shifting of some farm jobs to nonfarm workers. Since World War I, farmers have bought an increasing proportion of their power needs in the form of tractors, other motor vehicles, gasoline, oil, etc. At the same time, numbers of horses and mules on farms have declined steadily and more and more feed and other resources have been diverted from production of animal power to output of products for the market. Thus the shift from animal to mechanical power on farms has directly raised the output of products for human use per farm worker.

Technological progress has been the dominating influence behind the long-time increase in worker productivity in both industry and agriculture. Worker productivity in agriculture showed its greatest rise during and following World War II when technological developments progressed rapidly and technical "know how," accumulated over a long period, was applied with full force.

### PRODUCTION PER WORKER IN AGRICULTURE AND INDUSTRY, UNITED STATES, 1910-48 INDEX NUMBERS (1935-39=100)

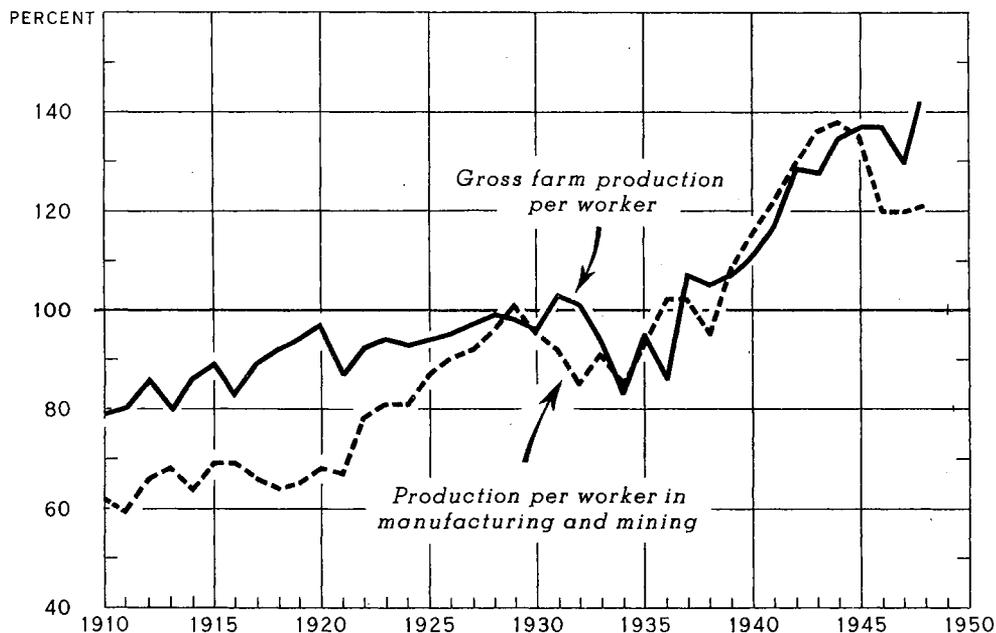


FIGURE 14

BAE 46417

Table 23.- Index numbers of gross production per farm worker and production per worker in manufacturing and mining, United States, 1910-48 <sup>1/</sup>

(1935-39 = 100)

Year	Gross production per farm worker	Production per worker in manufacturing and mining	Year	Gross production per farm worker	Production per worker in manufacturing and mining
1910	79	62	1929	98	101
1911	80	59	1930	96	95
1912	86	66	1931	103	92
1913	80	68	1932	101	85
1914	86	64	1933	94	91
1915	89	69	1934	83	85
1916	83	69	1935	95	93
1917	89	66	1936	86	102
1918	92	64	1937	107	102
			1938	105	95
1919	94	65			
1920	97	68	1939	107	108
1921	87	67	1940	111	115
1922	92	78	1941	117	122
1923	94	81	1942	129	129
1924	93	81	1943	128	136
1925	94	87	1944	135	138
1926	95	90	1945	137	135
1927	97	92	1946	137	120
1928	99	96	1947	130	120
			1948 <sup>2/</sup>	142	121

<sup>1/</sup> The index of production per farm worker was calculated by dividing the index of gross farm production by the index of farm employment. A detailed explanation of the index of gross production was given in an earlier section of this report.

Gross farm production includes output of farm products for human use plus farm-produced power of horses and mules. This measure of production gives farm workers credit for the animal power they have produced. A large portion of farm labor and farm land resources was formerly devoted to raising and maintaining horses and mules and to the growing of their feed. When the number of farm horses and mules was at a peak during World War I, more than 15 percent of all farm labor requirements was used directly or indirectly in the production of animal power. This proportion has now been reduced to around 5 percent, owing to the sharp decline in horse and mule numbers. Owing to the important shift from animal power to mechanical power on farms, the index of gross production is superior in many respects to the farm output index in measuring changes in productivity of farm workers.

The index of farm employment was calculated from farm employment data published by the Bureau of Agricultural Economics since 1936 as an extension of the series in "Trends in Employment in Agriculture, 1909-36," by Eldon E. Shaw and John A. Hopkins, WPA National Research Project, Report No. A-8. The index was calculated from average annual employment estimates which are simple averages of estimates of employment each month. Farm operators, unpaid family workers, and hired workers doing 2 or more days of farm work during the reporting week were counted as employed. The Bureau of Agricultural Economics has recently revised its definition of farm employment and revised its estimates for recent years accordingly (see "Farm Labor," BAE processed publication, January 1949). The old, unrevised series of employment were used throughout the period 1910-48 in calculating production per farm worker.

The index of production per industrial worker is based on the Federal Reserve Board index of production in mining and manufacturing, and the Bureau of Labor Statistics reports on employment in mining and manufacturing.

<sup>2/</sup> Preliminary

## PRODUCTION PER FARM WORKER BY GEOGRAPHIC DIVISIONS

There has been a long-time rise in production per farm worker in all geographic divisions of the United States (fig. 15). Over the last quarter century the increase in gross production per worker in the South Atlantic and Pacific divisions has been far greater than the average increase for the United States as a whole. Production per farm worker increased least of all in the Middle Atlantic and West South Central divisions.

The most consistent long-time rise in farm worker productivity also has occurred in the Pacific and South Atlantic divisions. In most of the other geographic divisions the bulk of the gain in production per farm worker took place during and immediately following World War II. In this period rapid mechanization of farm operations took place and crop yields rose markedly; these developments contributed greatly to the increase in production per farm worker. The reduction in underemployment of farm workers as the armed forces, war industry, and other industry drew manpower from the farms and workers remaining on farms were more fully employed, also was important in raising productivity of farm workers. The sharpest wartime rise in gross production per farm worker occurred in the West North Central division. The rapid increase in this division was due partly to a recovery from the serious drought conditions of the 1930's.

The rise in farm output per worker has been much greater than the increase in gross production per farm worker over the last quarter century (table 24). This is because of the shift from producing animal power on the farm to producing products for human use. There is less difference between the long-time rise in output and gross production per worker in the Pacific division than in the other geographic divisions. Farm-produced power has always represented a smaller proportion of total gross production in this division than in any other; as a result, the decline in production of animal power has influenced relatively little the output of farm products for human use.

Next to the Pacific States, the South Atlantic and East South Central divisions show the smallest difference between the long-time percentage increases in gross production and farm output per worker. In contrast to the Pacific area, farm-produced power has been an important item of production in these Southern divisions. However, the shift from animal to mechanical power has been less rapid in the South Atlantic and East South Central divisions than in other regions.

The greatest differences between the long-time increases in gross production and farm output per worker are in the West North Central and Mountain divisions. Mechanical power has rapidly replaced animal power on farms in these divisions.

### Method Used in Constructing Series

The indexes of gross farm production and farm output were explained on page 7. These indexes were divided by an index of farm employment in calculating the indexes of gross production per farm worker and farm output per farm worker. Gross farm production includes output of farm products for human use, plus farm-produced power. Thus it gives farm workers credit for the animal power they produce. The index of farm output is a measure of changes in production of farm products for human use and hence does not include farm-produced power as an item of production.

The indexes of farm employment were based on official estimates of the Bureau of Agricultural Economics for the period beginning in 1925. Estimates of farm employment by geographic divisions for the period 1919-24 were based on data in the WPA National Research Project Report, "Changing Technology and Employment in Agriculture," by John A. Hopkins.

The annual employment data are simple averages of monthly employment estimates. Farm operators, unpaid family workers, and hired workers doing 2 or more days of farm work during the reporting week were counted as employed. The Bureau of Agricultural Economics has recently revised its definition of farm employment and its estimates for recent years. See "Farm Labor," Bureau of Agricultural Economics, January 1949. Processed. The old, unrevised series of employment data were used in calculating worker productivity.

# GROSS PRODUCTION PER FARM WORKER, BY GEOGRAPHIC DIVISIONS, 1919-48

INDEX NUMBERS (1935-39=100)

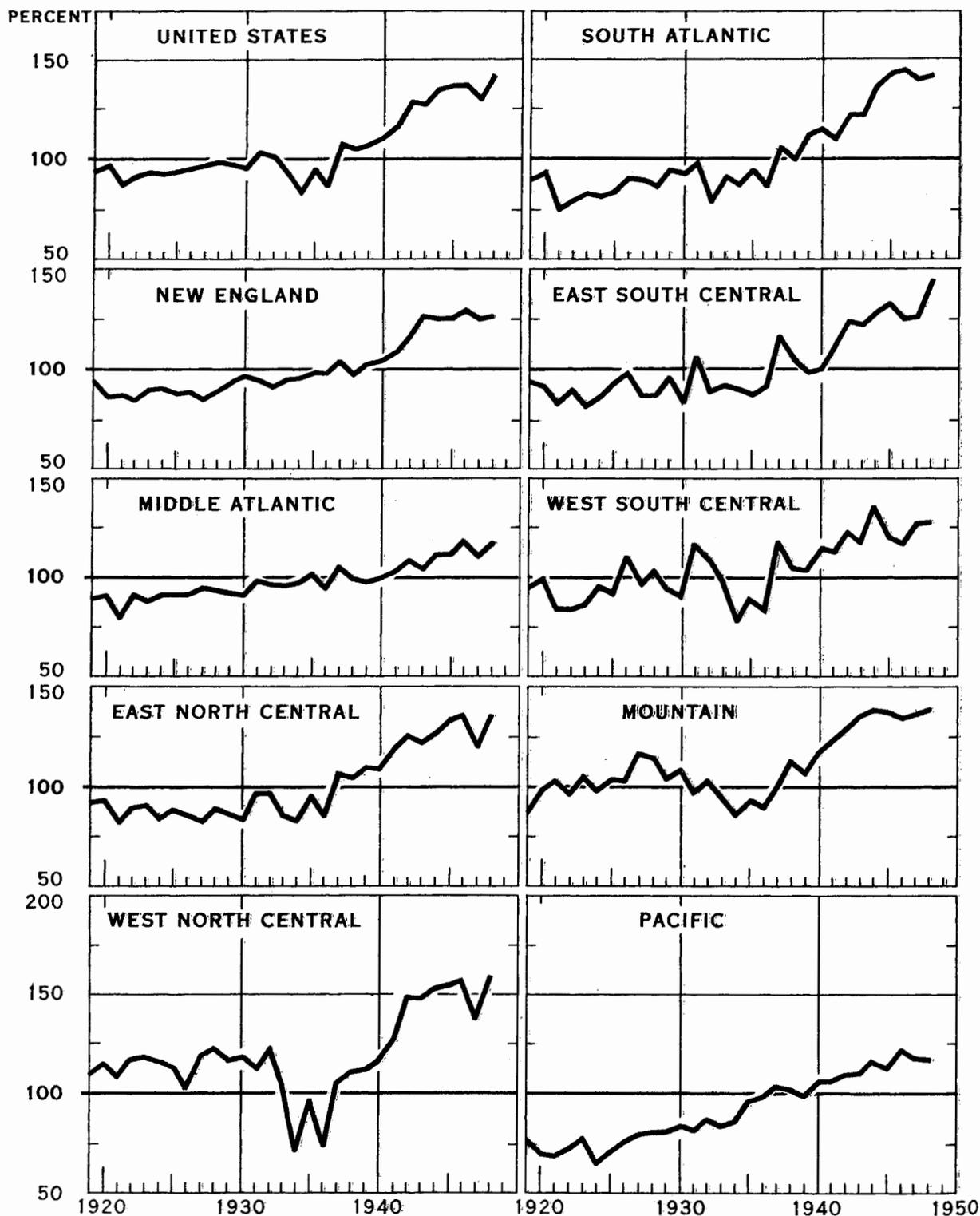


FIGURE 15

BAE 47216

Table 24.—Index numbers of gross production and farm output per worker by geographic divisions, 1919-48

(1935-39 = 100)

Year	New England		Middle Atlantic		East North Central		West North Central		South Atlantic		East South Central		West South Central		Mountain		Pacific		United States		
	Production per worker		Production per worker		Production per worker		Production per worker		Production per worker		Production per worker		Production per worker		Production per worker		Production per worker		Production per worker		
	Gross	pro- : Farm	Gross																		
1919	94	84	89	79	92	82	109	96	90	81	94	84	96	88	87	72	76	69	94	83	
1920	86	76	91	83	93	84	115	106	94	87	92	84	100	93	98	86	70	64	97	88	
1921	87	78	80	72	82	73	108	98	75	65	83	73	84	75	102	91	69	64	87	77	
1922	85	76	91	84	90	82	117	110	79	71	90	83	84	75	96	86	72	67	92	85	
1923	90	83	88	80	91	84	118	111	83	77	82	74	86	76	105	96	78	73	94	87	
1924	91	83	91	85	84	79	116	110	82	75	86	78	96	90	98	90	65	60	93	87	
1925	88	82	91	85	88	84	113	107	84	79	93	88	92	85	103	95	71	67	94	89	
1926	89	82	91	86	86	82	102	98	91	87	99	95	110	107	102	95	76	73	95	90	
1927	85	80	95	91	83	79	119	115	90	86	87	81	97	92	116	112	80	77	97	92	
1928	89	84	94	90	89	85	123	121	87	83	87	81	103	99	114	110	81	79	99	96	
1929	94	90	92	89	86	83	117	114	95	92	96	94	94	90	103	99	81	79	98	94	
1930	97	94	91	89	83	79	118	116	93	91	84	79	90	85	108	105	84	83	96	93	
1931	95	92	99	98	97	96	112	110	99	98	106	107	116	117	97	93	82	80	103	102	
1932	92	89	97	96	97	96	123	123	79	76	89	87	109	108	102	99	87	86	101	100	
1933	95	93	96	95	85	83	104	102	92	91	92	91	98	96	95	92	84	83	94	92	
1934	96	95	97	96	83	80	71	65	88	86	90	88	78	73	85	82	86	85	83	80	
1935	99	98	101	100	96	95	97	96	95	95	87	85	89	86	93	91	97	97	95	94	
1936	98	98	95	94	85	83	74	70	87	86	92	91	84	82	89	88	99	98	86	84	
1937	103	103	105	105	106	107	106	106	106	107	117	120	118	121	100	100	103	103	107	108	
1938	98	98	100	101	104	104	111	113	100	99	105	106	105	107	112	114	102	102	105	106	
1939	102	103	99	100	109	111	112	115	112	113	99	98	104	104	106	107	99	100	107	108	
1940	104	105	100	101	108	110	117	122	115	116	100	99	115	118	117	119	106	107	111	113	
1941	108	110	103	105	119	123	127	133	110	110	112	112	113	116	123	126	106	107	117	120	
1942	115	118	108	111	125	131	149	160	122	124	124	126	123	129	129	133	109	110	129	135	
1943	126	130	104	107	122	128	148	159	122	124	122	124	118	123	135	140	110	111	128	133	
1944	125	129	111	115	126	133	153	164	136	140	128	133	135	143	138	143	116	118	135	141	
1945	125	129	111	116	133	141	155	167	143	148	133	136	120	125	137	143	113	116	137	143	
1946	129	134	118	124	135	143	157	170	145	151	125	130	117	122	134	142	122	125	137	146	
1947	125	130	111	117	119	128	137	149	140	147	126	132	127	137	136	144	118	121	130	139	
1948 1/2	126	132	117	124	135	146	159	176	142	149	144	153	128	139	138	147	117	120	142	152	

1/ Preliminary.

## PRODUCTION PER HOUR OF MAN LABOR ON 15 TYPES OF FARMS

Production per hour of man labor is closely associated with crop and livestock yields and production per farm, and with power and machinery (labor-saving devices). As generally calculated, labor productivity reflects changes in output resulting from higher yields obtained from favorable weather and improved cropping varieties, and from use of labor-saving equipment. As a result, production per hour of man labor and production per man in 1948 were the highest on record. Productivity was more than 70 percent higher than the prewar (1935-39) average and nearly 4 percent higher than in 1947, the previous record high (table 25).

Not all the increase in production per man in recent years can be credited to favorable weather and to labor-saving devices. Substantial changes have been made in production methods and in other management practices which have reduced the amount of labor used per unit of product. Many farmers have learned to do things in better ways and to economize on labor. They use improved production practices which increase total output and thus production per man. Note the increase in production per hour of man labor from 1930 to 1948 (fig. 16).

Livestock producers, although they have not had the direct advantages that crop farmers have had from favorable weather or as great opportunities to make effective utilization of labor-saving equipment, have nevertheless increased production per man substantially. They have higher producing cows, larger litters per sow, higher producing hens, and less death loss in livestock than formerly. Also they have learned to cut corners on labor.

In 1948 production per hour of man labor on livestock farms averaged about 20 percent higher than a decade or so ago. Combination crop and livestock farms (hog, beef, and wheat-corn-livestock) have made still larger increases. Production per man has increased most on crop farms, except for cotton farms where hand labor is still the chief type of labor.

In the areas in which these 15 types of farms are located are farms of other types and sizes not included in the results presented here.

Production per man, size of farm, and related details of farm organization and operation may have differed more or less over the years on these other types and sizes of farms as they have among these 15 types of commercial family-operated farms. The final section of this publication shows the location of these 15 types of commercial family-operated farms and presents additional information concerning them.

# PRODUCTION PER HOUR OF MAN LABOR, AND COST PER UNIT OF PRODUCT, EXCLUDING PRICE CHANGE

COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48

INDEX NUMBERS (1935-39=100)

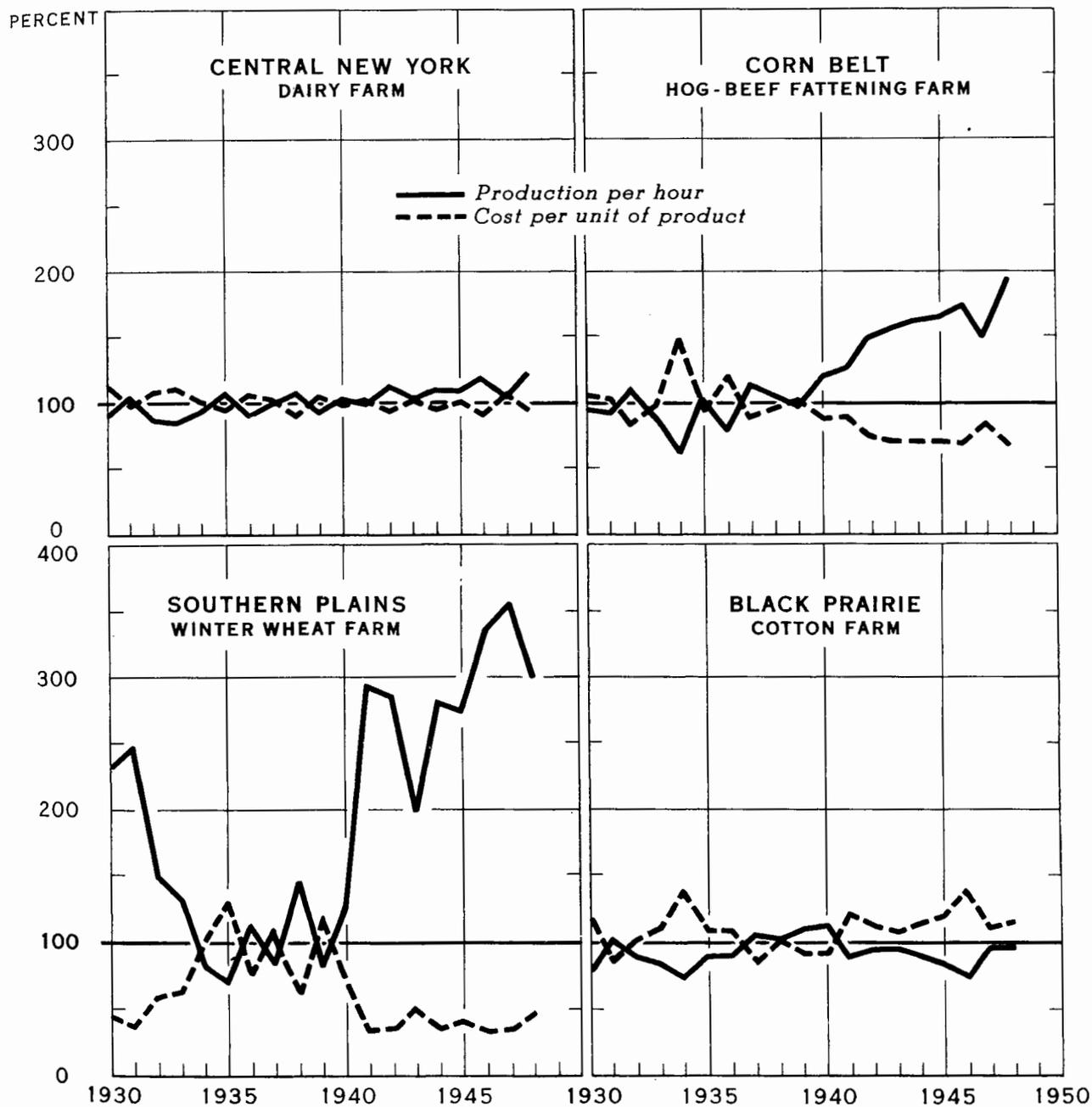


FIGURE 16

BAE 47222

Table 25.- Production per hour of man labor, commercial family-operated farms, by type, 1930-48  
Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	90	104	68	96	91	97	124	129	157	230	187	68	78	86	96
1931	104	88	79	93	104	100	101	65	117	246	295	96	102	98	88
1932	87	101	94	111	110	104	115	114	172	148	130	112	89	85	97
1933	85	90	64	91	93	88	72	84	84	132	78	93	84	85	97
1934	94	82	54	62	63	83	68	48	76	82	92	51	74	94	94
1935	107	104	95	103	113	99	106	114	114	71	68	102	90	92	84
1936	92	88	66	80	64	85	52	41	54	115	84	78	91	100	111
1937	100	104	119	113	117	105	96	122	101	85	104	134	106	106	97
1938	108	105	109	106	106	104	114	120	102	146	126	102	103	102	103
1939	93	99	111	98	100	107	132	103	129	83	118	84	110	100	105
1940	103	108	106	121	120	106	119	124	137	126	144	101	113	98	108
1941	100	102	121	127	118	104	146	179	179	294	245	133	90	105	111
1942	113	117	132	148	137	113	177	194	223	286	321	130	95	111	123
1943	105	109	128	157	126	114	126	178	165	200	191	106	96	107	129
1944	110	112	129	163	130	107	160	172	189	281	343	137	91	112	122
1945	109	114	139	165	147	122	169	191	214	275	223	101	85	116	128
1946	120	110	152	173	156	136	158	172	204	335	246	107	74	111	127
1947	105	115	113	151	108	115	170	201	219	354	381	140	97	107	120
1948 1/	122	115	167	195	163	133	182	206	230	300	305	122	97	131	119

1/ Preliminary.

Production per hour of man labor represents the total physical output accomplished per hour of man labor used on the farm. It is obtained by dividing the index of total physical production (table 3) by the index of total hours of man labor (operator, family and hired) used in production, both index numbers based on 1935-39=100. As such it illustrates the changes in production efficiency of man labor over time on groups of similar farms.

## RATIO OF PRODUCERS TO CONSUMERS OF FARM PRODUCTS

The proportion of our population needed to produce food and fiber is an excellent measure of long-time economic progress in the United States. In 1820 our country was chiefly a rural nation; one farm person produced food and fiber for himself (or herself) and only a little more than a fourth of the amount consumed by another person. A century later, in 1920, one farm person produced enough for himself and nearly two and a half other persons (table 26). By 1947 one farm person was producing enough for five and a third persons in all. The 1947 figure was about one-half person under the peak reached in 1945, the last year of World War II. This was partly because of the increase in farm population between the two dates. By 1947, farm employment had also risen from the wartime low of 1945.

Consumers of farm products per farm worker also have increased greatly over the last century and a quarter. Variation in the ratio of farm employment to farm population has accounted for the differences in the trend of numbers of consumers per farm person and per farm worker.

Farmer's participation in the over-all job of supplying consumers with food and fiber during the last 125 years has changed. During this period many jobs were transferred, in total or in part, from the farm to the city. This has been true of work in the farmhouse and on the farm. It is also highly probable that the average level of consumption today is greater than in early years when diets and clothing were simple if not meager. Consumption of farm products per person in the United States increased especially during World War II and immediately thereafter.

## EFFICIENCY IN FARM PRODUCTION

Efficiency of farm production has made remarkable gains since World War I. A unit of farm output is now produced with a fourth less inputs of all kinds than a generation ago, that is, less labor, equipment, supplies, etc. These gains in efficiency have resulted from greater production per worker, per acre, per animal, and per unit of power and machinery.

Total volume of production inputs showed a flat trend in the period between the two World Wars (fig. 17). Total inputs have risen by about 15 percent since the start of World War II (table 27). The downward trend in inputs per unit of farm output since World War I has resulted from a relatively stable volume of inputs and a steady upward trend in farm output. Thus, increases in physical efficiency in agriculture have been brought about by increasing production per unit of input rather than by decreasing total inputs. The technological developments that resulted in increased production efficiency also resulted in greater total volume of farm output.

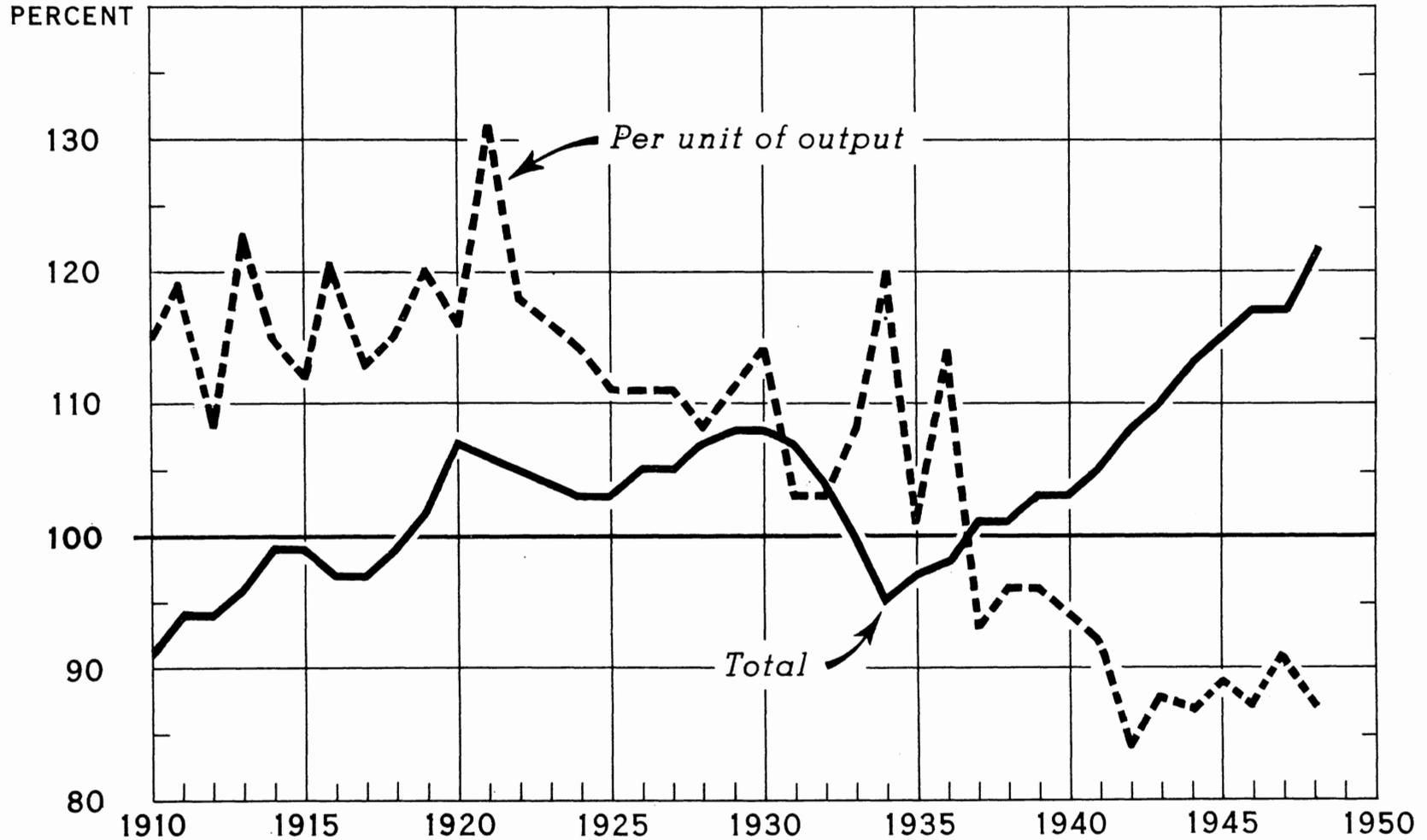
Total inputs of farm labor, power, and machinery, which account for about two-thirds of the volume of all physical inputs, have not changed greatly in the last quarter century. But mechanical power and equipment have displaced both animal and human power on farms. This has been a dominating force behind the increase in over-all production efficiency on our farms.

Although the upward trend in efficiency of farm production is definite and long-time, some cyclical movements appear to have been conditioned by war and depression and the accompanying variations in economic conditions. Total production inputs rose somewhat during and following World War I when farmers were beginning the transition from animal power to mechanical power and equipment. During the depression and drought period of the 1930's total inputs declined. Over the interwar period as a whole, however, total production inputs changed very little, while volume of farm output generally rose.

During World War II output rose at an unprecedented rate. Total inputs also increased as farmers added greatly to their inventory of power and machinery, doubled their use of fertilizer, and generally increased the use of production goods necessary to our modern way of farming. The long-time downward trend in inputs per unit of output continued during the early part of the war. Since 1942, however, total production inputs have continued to climb chiefly because of increased mechanization, while volume of farm output has not generally increased as fast. As a result, the decline in inputs per unit of farm output has been temporarily halted.

# PRODUCTION INPUTS: TOTAL AND PER UNIT OF FARM OUTPUT, UNITED STATES, 1910-48

INDEX NUMBERS (1935-39=100)



INPUTS ARE PHYSICAL QUANTITIES OF ALL FARM LABOR, LAND, MACHINERY, POWER, FERTILIZER, AND OTHER MATERIALS AND RESOURCES USED IN FARM PRODUCTION (WEIGHTED BY AVERAGE 1935-39 PRICES)

FIGURE 17

Table 26.- Total farm population and farm employment, and average number of consumers per farm person and per farm worker, United States, 1820-1947

Year	Total farm population Jan. 1 1/	Total farm employment 2/	Consumers per person on farms of the United States 3/		Consumers at home and abroad per farm worker of the United States 6/
	Millions	Millions	Number 4/	Number 5/	Number
1820	7.7	2.2	1.20	1.28	4.52
1830	9.8	2.9	1.27	1.35	4.51
1840	12.3	3.9	1.33	1.41	4.49
1850	15.8	5.1	1.44	1.51	4.68
1860	20.1	6.6	1.47	1.65	5.07
1870	22.4	7.2	1.60	1.78	5.60
1880	27.1	9.0	1.66	2.08	6.42
1890	29.4	10.4	1.84	2.26	6.59
1900	31.2	11.4	2.15	2.86	8.05
1910	32.1	12.1	2.54	2.97	7.99
1920	31.6	11.4	2.87	3.47	9.94
1930	30.2	11.2	3.61	4.01	10.96
1940	30.3	10.6	3.78	3.93	11.31
1941	30.0	10.4	3.93	4.28	12.54
1942	29.0	10.4	4.25	4.63	13.02
1943	26.7	10.3	4.67	5.23	13.76
1944	25.5	10.0	5.01	5.51	14.10
1945	25.2	9.8	5.07	5.78	14.96
1946 7/	26.8	10.0	4.72	5.43	14.73
1947 7/	27.6	10.2	4.76	5.33	14.61

1/ Data for 1910-47 are official estimates of the Bureau of Agricultural Economics, rounded to nearest 100 thousand. Data for 1820-1900 are approximations based largely on total population and numbers of persons engaged in agricultural pursuits (see Sixteenth Census of the United States: 1940 Series, P-9, No. 11).

2/ Data from 1910-47 taken from releases on farm employment issued by Bureau of Agricultural Economics, rounded to nearest 100 thousand. The Bureau of Agricultural Economics has recently revised its definition of farm employment and revised its estimates for recent years accordingly (see "Farm Labor," BAE processed publication, January 1949). The old, unrevised series of employment has been used throughout the period 1910-47. Data for 1820-1900 are estimates based largely on the size of the labor force engaged in agricultural pursuits.

3/ The first step in measuring the ratio of consumers to persons on farms and to farm workers in the United States is to determine the level of products available for consumption per capita. The total amount available for consumption in the United States at any given date is the value of farm production in the United States minus the value of agricultural export plus the value of agricultural imports; this value divided by total United States population gives the per capita level of agricultural products available at any given date.

The value of United States farm production minus the value of agricultural exports equals the value of agricultural products available to the United States population from United States farm production. This value divided by the per capita level of agricultural products available gives the number of persons in the United States who could be supplied at this level with agricultural products from U. S. farm production. The value of agricultural exports divided by the per capita level of agricultural products available in the United States gives the number of persons abroad who could be supplied at this same level with agricultural products from U. S. farm production.

4/ The numbers of persons in the United States supplied with agricultural products at the specified level from U. S. farms divided by the number of persons on farms in the United States.

5/ The number of persons in the United States and abroad supplied with agricultural products at the specified level from U. S. farms divided by the number of persons on farms in the United States.

6/ The number of persons in the United States and abroad supplied with agricultural products at the specified level from U. S. farms divided by the average annual farm employment in the United States.

7/ Preliminary.

Table 27.- Index numbers of total production inputs and input per unit of farm output, United States, 1910-48 <sup>1/</sup>  
(1935-39 = 100)

Year	Total production inputs	Inputs per unit of farm output	Year	Total production inputs	Inputs per unit of farm output
1910	91	115	1929	108	111
1911	94	119	1930	108	114
1912	94	108	1931	107	103
1913	96	123	1932	104	103
1914	99	115	1933	100	108
1915	99	112	1934	95	120
1916	97	121	1935	97	101
1917	97	113	1936	98	114
1918	99	115	1937	101	93
			1938	101	96
1919	102	120			
1920	107	116	1939	103	96
1921	106	131	1940	103	94
1922	105	118	1941	105	92
1923	104	116	1942	108	84
1924	103	114	1943	110	88
1925	103	111	1944	113	87
1926	105	111	1945	115	89
1927	105	111	1946	117	87
1928	107	108	1947	117	91
			1948 <sup>2/</sup>	122	87

<sup>1/</sup> Methods used in constructing the index of farm output for human use were described on page

All inputs in agricultural production were combined by using constant-dollar costs. This was done by multiplying physical quantities by average 1935-39 cost rates, or by deflating current dollar costs by indices of prices. The cash and noncash items included account for over 95 percent of total inputs. Several estimates and calculations were made to avoid duplication of input items.

In calculating total physical inputs in agricultural production, estimates were made of the constant-dollar costs of all farm labor; net land rent; maintenance and depreciation of buildings, motor vehicles, machinery, and equipment; operation of motor vehicles; interest on investment in motor vehicles, machinery, livestock including horses and mules, and crops; taxes on farm real estate and personal property; fertilizer and lime; and miscellaneous operating expenses.

Constant-dollar costs of all farm labor were obtained by multiplying total man-hours by estimated 1935-39 average wage rates per hour. Several steps were involved in the calculation of constant-dollar costs of farm land. The BAE estimates the dollar value of net land rent paid on rented farm real estate each year. The rent estimates are net in that landlords' expenses on real estate, such as taxes, building depreciation, etc., are excluded from the rent estimates. The items deducted from gross rent are included in the estimates of total agricultural production expenses for taxes, depreciation, etc.

Estimates of the cost of total net rent on all farm real estate each year were made by dividing the total of net rent on rented real estate by the percentage that the value of rented real estate was of the value of all real estate. From this was obtained the average 1935-39 net rent per acre of farm land; this rental per acre was multiplied by total acres of land in farms each year in deriving constant-dollar costs of land. "Land" here includes cropland, pasture land, other land, and buildings. Estimates of costs of pasture or range land not in farms but used in farm production are included in miscellaneous operating expenses.

Constant-dollar costs of most of the other input items were calculated by deflating estimates of costs in current dollars by appropriate indices of price changes.

<sup>2/</sup> Preliminary.

OPERATIONS, COSTS, AND RETURNS ON COMMERCIAL  
FAMILY-OPERATED FARMS BY TYPE

Data presented in the section which follow stem from a Nation-wide project. The project is designed specifically to study farm organization, size of farm, land use, production, farm practices, mechanization, production methods, production efficiencies and use of labor, prices, costs, and returns year by year by type and size of farm in the major farming regions in the United States.

Summary statistics given apply specifically to 15 important types of commercial family-operated farms and ranches in 7 major production areas. (See figure 18 for location of types of farms studied.) The data for each of the 15 types of farms are averages obtained from detailed analyses of groups of similar types of farms ranging in size from the smallest commercial family-operated unit to the largest of such units of the specified type in the respective area.

In each of the areas in which these 15 types of farms are found are many farms which differ both in size and in type. Farm sizes considered in the size range of commercial family-operated farms include farm operating units which, among certain other physical and economic characteristics, have produced a total value of products ranging from \$1,200 to \$20,000 based on 1944 prices. <sup>1/</sup> Probably with the exception of the cotton farms in the Mississippi Delta area, from 70 to 95 percent of the farm sizes in each type studied are in the range of commercial family-size units.

Farm type includes farms with certain specified physical characteristics, from which 50 percent or more of the value of sales is from a given enterprise or combination of stipulated enterprises. In each area covered, the type of farm studied is the most common one and the most important economically. With a few minor exceptions, the type of farm studied generally includes well over half of the classified farms in the area. In some instances it includes as many as 95 percent of all bona fide farming units.

The summary statistics given for the 15 types of farms, therefore, do not necessarily represent results from other types of farms. Nor do they necessarily apply to small-scale or large-scale farming units.

Studies are under way in additional areas and preliminary results from some of these soon will be available. In addition to the present series on commercial family-operated farms and ranches, sizes

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<sup>1/</sup> For more details on classification of farms by size, see "Appraisal of the Economic Classification of Farms." Bachman, K. L., Ellickson, J. C., Goodsell, W. D., and Hurley, Ray. Jour. Farm Econ., V. 30, No. 4, November 1948.

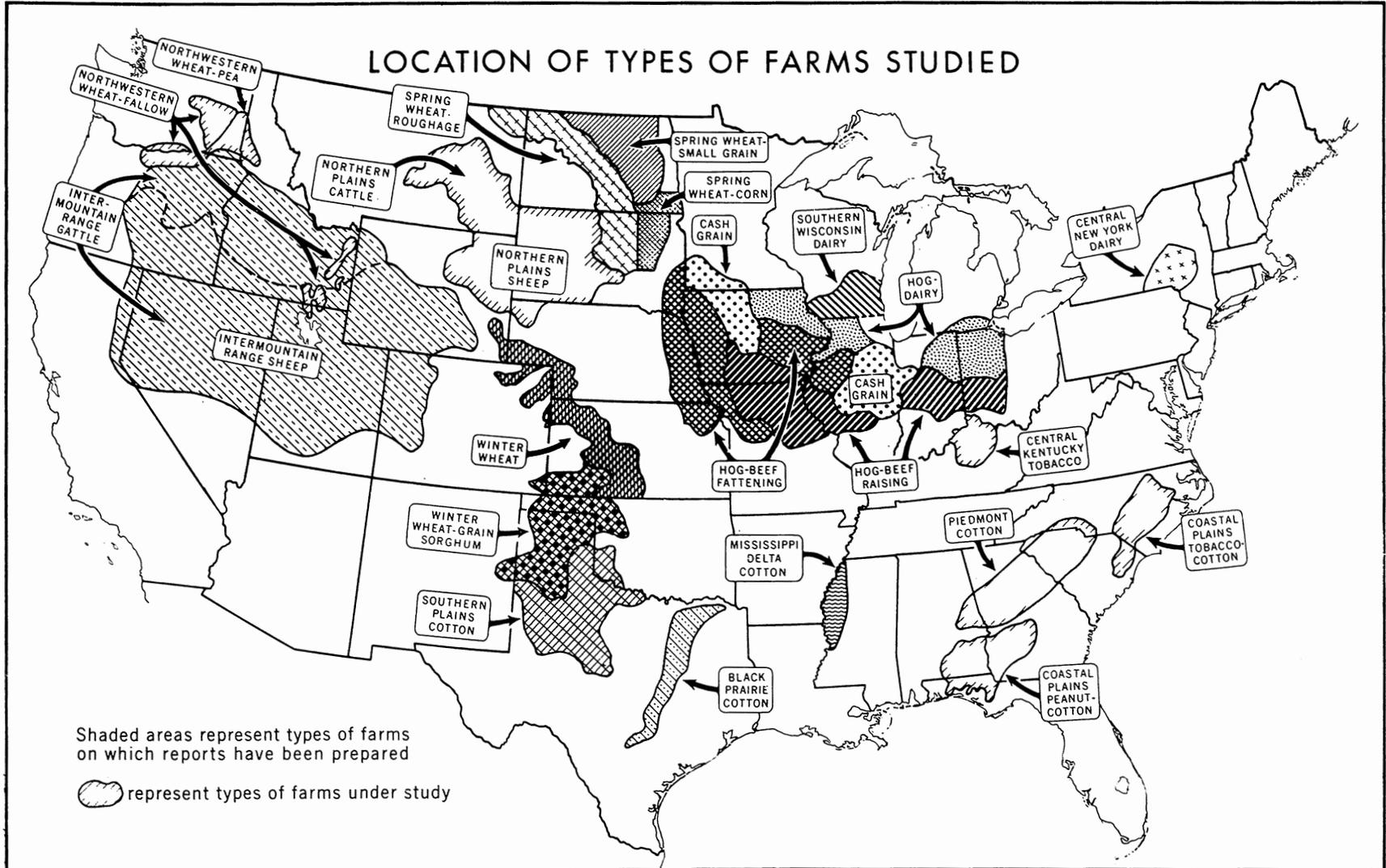


FIGURE 18

BAE 45773

of farms within the size range of the commercial family-operated units are being analyzed. Plans have been made also for studying farms smaller than commercial family-operated units and farms larger than family-operated units in areas in which these sizes of farms and ranches are a large proportion of the total number. Results from these will not be available for some time.

The general objectives for the studies are the same for all areas. Methodology, and procedures and terms used, so far as practicable, also are uniform throughout. As a result, comparisons may be made of results from one type of farm to another and overtime through droughts, depressions, war and postwar on the same type of farm. It is expected that the analyses will be kept current thus providing a valuable historical series on each group of farms.

A general rise in the price level in recent years was an important factor in generally raising farm incomes and expenses above prewar levels on most farms. The extent of the increase, however, differed widely from farm type to farm type (table 28 and fig. 19).

Prices received for farm products rose faster than prices paid for goods and services used in production. As a result, operators of all types of farms for which data are available had larger margins of profits during the war and postwar years than in the prewar period (fig. 20). Margins of profits generally were higher during 1946-48 than in any other period since 1930.

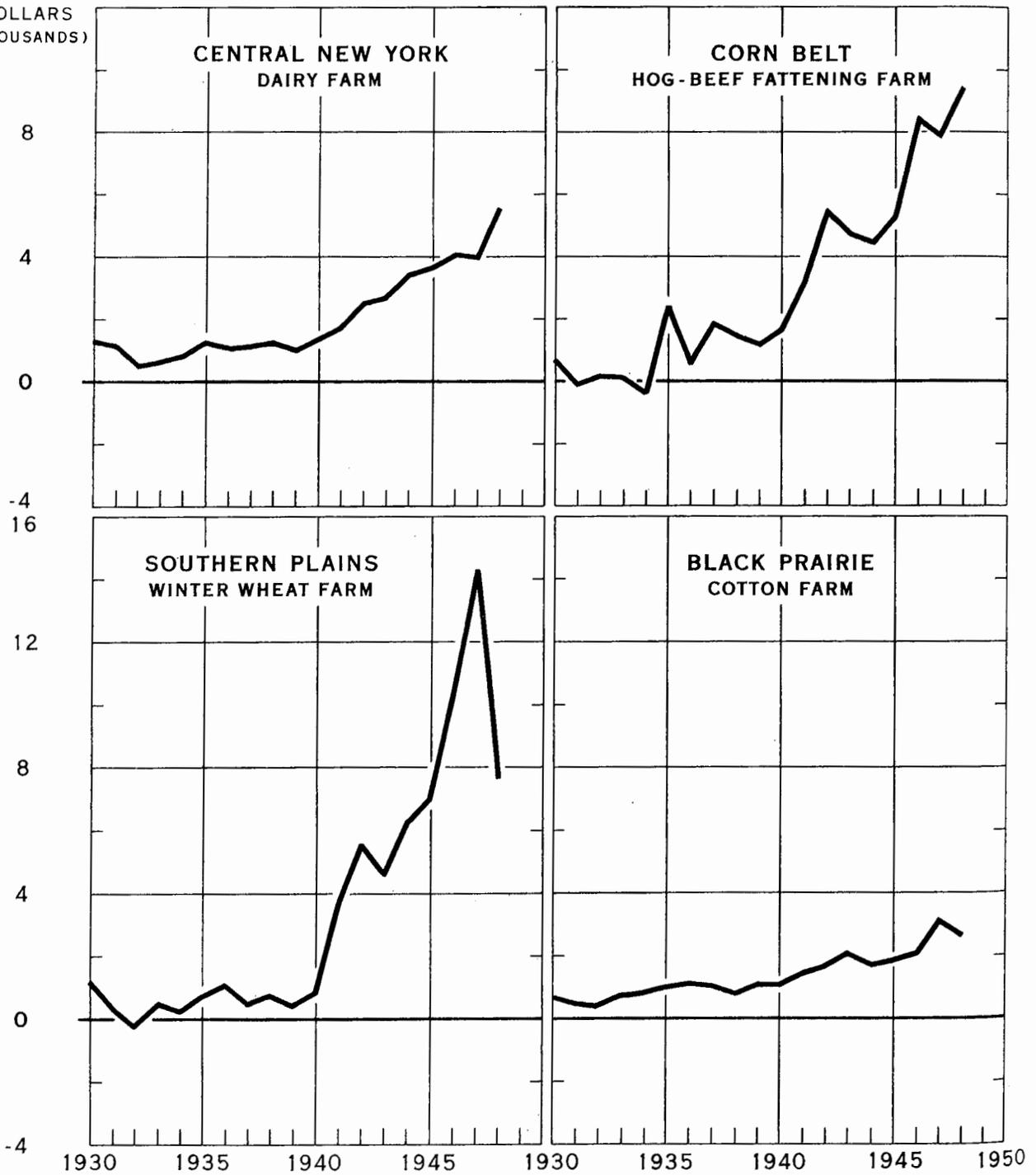
Greater production also boosted incomes, particularly on wheat farms in the Great Plains. As a result of the combination of increasing prices of farm products and higher production gross incomes rose year after year on most of the farms. In 1947 gross farm income was the highest in nearly two decades on all types of farms except hog-beef fattening farms. Gross incomes in 1948 were lower than in 1947 on 8 of the 15 types of farms (tables 28 and 29).

Higher than average production plus increased efficiency in production have been important in holding down unit costs. Greater physical volume of output per farm distributes fixed costs over more units of product and thereby tends to hold down unit costs of production.

Prices paid for materials and services used in production have nearly doubled since the prewar period of 1935-39. Therefore, despite increased efficiencies unit production costs have risen when measured in terms of current prices. When costs are adjusted for changes in price level, however, unit costs of production have gone down on most types of farms. These costs have gone up slightly in recent years on cattle ranches and Black Prairie cotton farms and have remained about the same on dairy farms (figs. 20 and 21, and tables 32 and 33).

**OPERATOR'S NET FARM INCOME**  
**COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48**

DOLLARS  
 (THOUSANDS)



**FIGURE 19**

BAE 47223

**PRICES RECEIVED, AND PRICES AND WAGES PAID**  
**COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48**  
**INDEX NUMBERS (1935-39=100)**

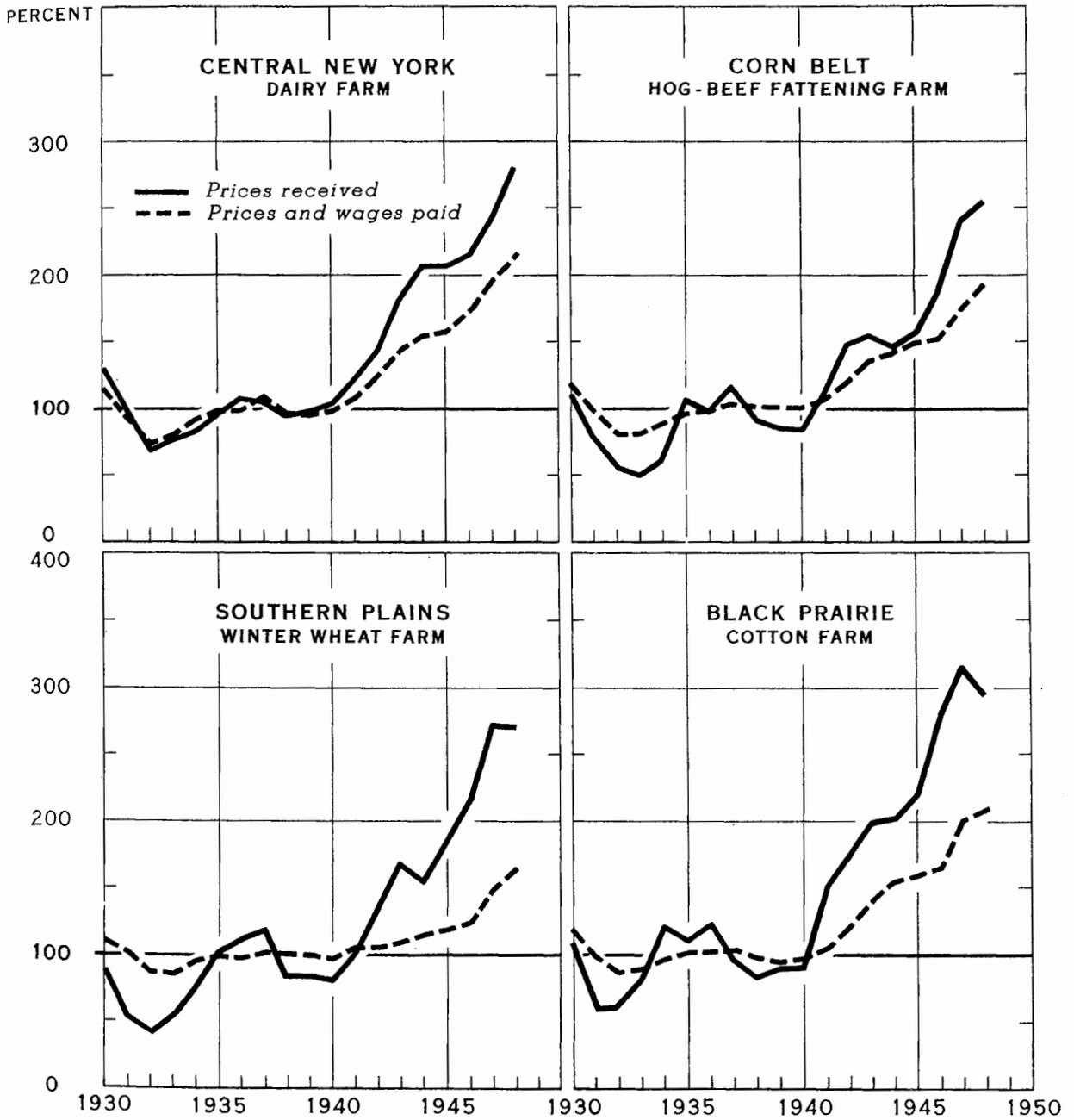


FIGURE 20

BAE 47226

# TOTAL PRODUCTION, AND COST PER UNIT OF PRODUCT, EXCLUDING PRICE CHANGE

COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48  
INDEX NUMBERS (1935-39=100)

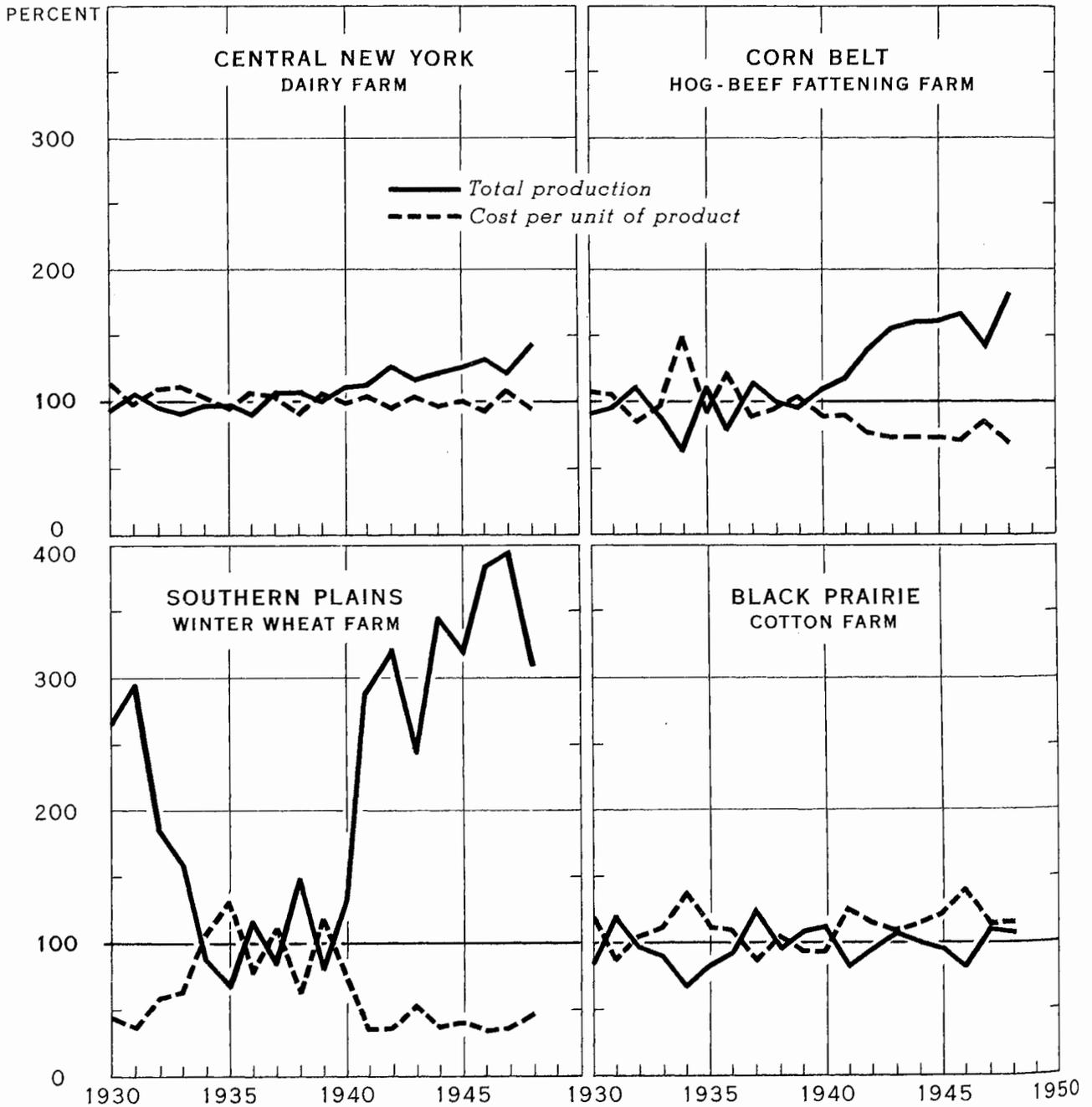
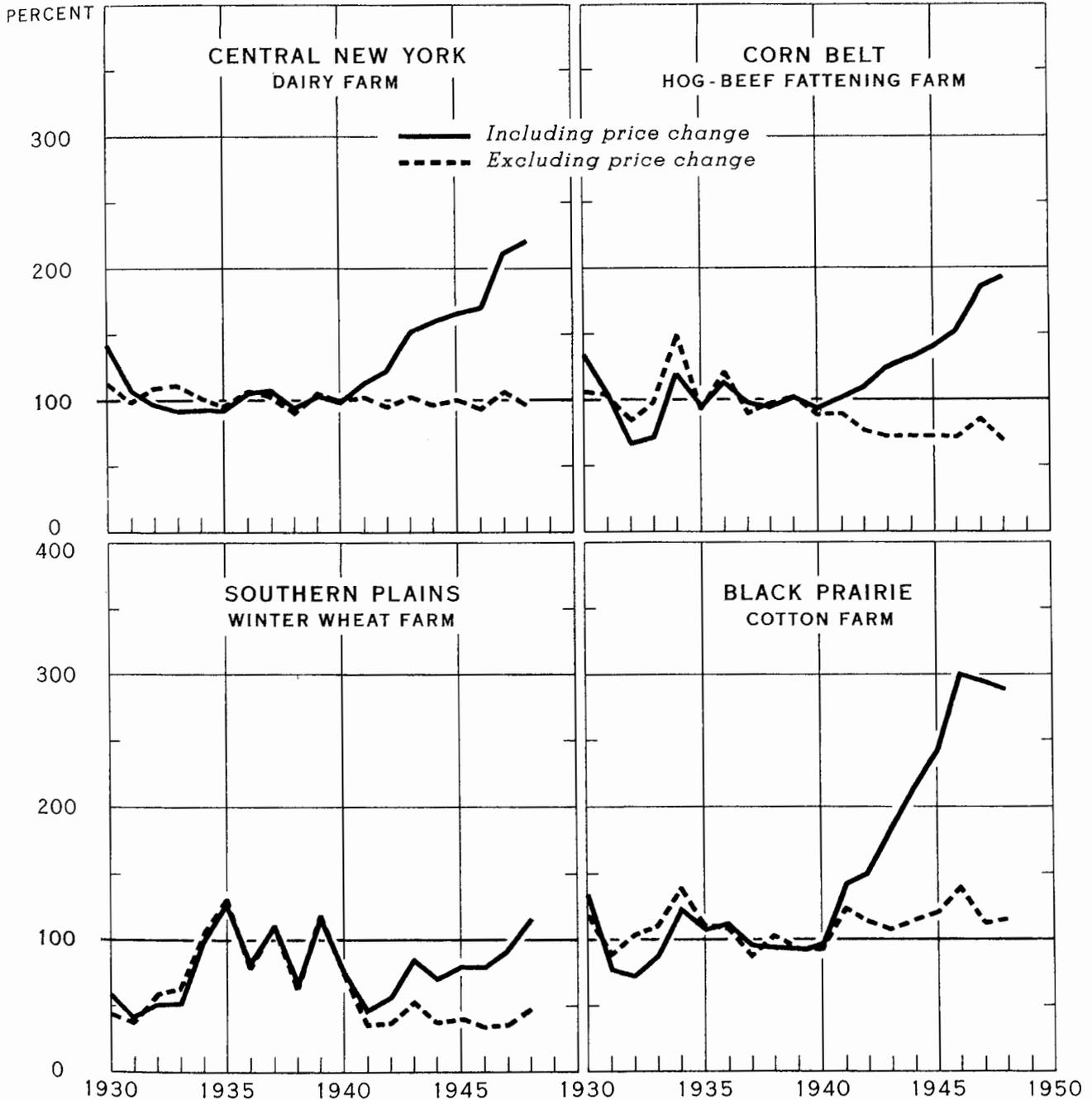


FIGURE 21

BAE 47225

**COST PER UNIT OF PRODUCT, INCLUDING  
AND EXCLUDING PRICE CHANGE**  
COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES, 1930-48  
INDEX NUMBERS (1935-39 = 100)



**FIGURE 22**

BAE 47224

### Central New York Dairy Farms

In 1948 income was a record high for dairy farmers in central New York (fig. 19). It was a third higher than the previous high in 1946 and nearly five times as high as the prewar average 1935-39. The income in 1948 from the sale of milk alone amounted to \$6,500.

The year 1948 was a good all-round year for these farmers. They milked slightly more cows than in any previous year. Production per cow was slightly under the record high set in 1947 but higher than in any previous year. As a result, quantity of milk sold in 1948 was nearly 7 percent higher than in 1947 and more than 40 percent higher than in 1935-39. The price received by producers for milk sold in 1948 was more than 2.8 times as high as in the prewar period. Income from milk in 1948 was almost 25 percent higher than in 1947 and four times as high as in the 1935-39 period.

About 85 percent of the cash receipts on these farms is from the dairy enterprise; 10 percent is from poultry; and the remaining 5 percent comes from specialized crops and miscellaneous products. Therefore, any substantial change in the dairy enterprise on these farms materially affects the economic returns. However, production of both poultry and crops reached a record high in 1948. Number of layers per farm was slightly lower in 1948 than in recent years, but production of eggs per hen was high and total production of eggs was exceeded only by that of 1944.

Hay, corn for silage, and oats are the important crops on these farms and acreages of these crops were near record high in 1948. Yields of corn silage and oats were the highest on record and hay yields were exceeded only by those in 1945. As a result, the combined production of crops in 1948 was the highest on record.

Prices received for products sold have risen steadily since 1937 on these farms but not so spectacularly as on most other types of farms (table 34). Prices and wages paid also have risen. During the last few years they rose faster on these farms relative to prices received than on any other type of farm except the cotton farms in the Mississippi Delta.

Expenditures for feed and labor are the main expenditures on these dairy farms. In 1948, despite record feed crops on these farms, expenditures for feed amounted to nearly \$3,000; nearly 3.5 times the amount spent for feed in 1935-39. Expenditures for hired labor were almost five times as high in 1948 as in the prewar period. Wage rates were nearly three times as high in 1948.

### Southern Wisconsin Dairy Farms

Production on southern Wisconsin dairy farms in 1948 was slightly under the record high production obtained in 1945, but approximately 35 percent higher than in the prewar years 1935-39. Production on these farms all during the war and postwar years has been more than 30 percent higher than in any consecutive 5-year period before World War II (table 3).

About 60 percent of the income on these farms is from the dairy enterprise. Any significant increase in production of dairy products and prices of milk would increase substantially incomes on these farms. Numbers of cows milked increased almost steadily from 1930 to 1945. During the war and postwar years the milking herd averaged about 17.5 cows. With both production per cow and the price of milk at a record high in 1948, income alone from the sale of milk exceeded \$4,500. Cash receipts from the sale of veal calves and cull cows contributed another \$1,300. The price of milk averaged \$4.15 per 100 pounds in 1948 compared with \$1.40 in 1935-39. Production of milk in 1948 was almost 40 percent higher than prewar production.

In 1948 production of pork averaged about 9,200 pounds. This was slightly less than the production in 1943, but higher than in any other year. The average price received for hogs in 1948 was \$23.10 per 100 pounds, about \$1.10 less than in 1947. As a result of the high production in 1948 with near record prices for hogs, income from hogs was the highest on record and averaged nearly \$1,900 per farm. About 20 percent of cash receipts was from the hog enterprise.

The average laying flock was about 125 birds. Production per layer has been stepped up and was the highest on record in 1948, almost 45 percent higher than in 1935-39. Income from sales of eggs in 1948 was nearly four times as high as in 1935-39.

Southern Wisconsin dairy farmers buy little feed. Crop yields in 1948, though not a record high, were far above average. They were a third higher than in 1935-39 and about 8 percent below the previous record high in 1945. Despite higher prices of feeds, farmers' expenditures for feeds in 1948 were very little greater than in recent years.

The index of prices received by these dairy farmers in 1948 was almost three times the 1935-39 average and nearly 13 percent higher than in 1947, the previous high. The index of prices and wages paid in 1948 was 216 based on 1935-39 = 100 (tables 34 and 35). As a result of relatively higher prices and near record production in 1948, operators of southern Wisconsin dairy farms received net incomes of nearly \$5,700. This was the highest income on record for these farmers.

### Cash-Grain Farms

The bumper crop of 1948, together with the highest prices on record, gave cash-grain farmers in the Corn Belt the highest incomes on record. Net farm income averaged slightly more than \$12,000 (table 30). This is slightly higher than in 1947 and well over four times the prewar average. Around 65 percent of total cash receipts on the cash-grain farms is from the sale of crops. About 40 percent is from the sale of corn alone.

In 1948 yields of corn on these farms averaged about 60 bushels and the acreage harvested was second to the highest on record; just short of 100 acres. The price received for corn was the highest in more than two decades. Cash sales of corn amounted to nearly \$6,000 and inventories at the end of the year were the highest on record. Inventories of corn were nearly double those in the prewar years.

Although the harvested acreage of soybeans in 1948 was the lowest since 1939, per acre yields of soybeans were higher than average and the price was the highest on record. As a result, cash sales of soybeans in 1948 amounted to nearly \$2,000, and were slightly higher than in 1946 and the highest on record. Except for 1947 the quantity sold in 1948 was the lowest since 1941.

Acreages in small grains in 1948 were higher than in recent years. Total cropland harvested on these farms was near record high. The average of all yields in 1948 was almost 40 percent above the 1935-39 average and more than 5 percent above the previous record high in 1946.

About 35 percent of the cash receipts on cash-grain farms come from the livestock enterprises. More than half of this comes from the hog enterprise. Both the quantity of hogs sold and the price received for hogs were lower in 1948 than in 1947. The number of hogs sold in 1948 was the lowest since 1941.

Cash-grain farmers normally milk around 4 or 5 cows and keep between 100 and 125 laying hens. Also, about 5 or 6 head of cattle are sold each year. Sales from these miscellaneous and supplementary enterprises make up around 15 percent of the total cash receipts. In 1948 cash sales of butterfat, eggs, and poultry amounted to almost \$1,300. In 1935-39 sales of these products amounted to a little more than \$375 each year. Butterfat sold for 76 cents a pound and eggs for nearly 42 cents a dozen in 1948, compared with 28.4 cents and 18.4 cents, respectively, in 1935-39.

Cash-grain farms are the most highly mechanized farms in the Corn Belt (table 16). About a third of the cash expenditures is for the operation and replacement of power and machinery. This labor-saving equipment has permitted these farm operators to handle more land than before. Total land in farms in 1948 was almost 20 percent higher than in 1930.

During the years 1946-48 about 3,900 hours of man labor were required to operate the average cash-grain farm. In 1930-32 about 4,600 hours were required. In 1946-48 size of farm averaged about 16 percent larger and output about 70 percent higher than in 1930-32. Production per hour of man labor used in 1946-48 averaged almost 80 percent higher than in the earlier period.

In 1948 total cost per unit of product, adjusted for price change, was a little less than 70 percent as high as in 1930-32. Operating expense per dollar of gross farm income was 24 cents in 1948, compared with an average of 74 cents in 1930-32.

### Hog-Beef Fattening Farms

Total production and operator's returns in 1948 were relatively higher on hog-beef fattening farms than on most other Corn Belt farms (table 3). Operator's net farm income in 1948 exceeded \$9,000 on hog-beef fattening farms; some \$2,000 higher than on cash-grain farms, the next highest group of Corn Belt farms.

Because of their diversity of enterprises and to some extent their advantage in location, operators of hog-beef fattening farms have been in a better position than most other Corn Belt farmers to weather economic stresses and drought. Crop yields have been maintained as well and total production has varied less on hog-beef fattening farms than on most other types of farms.

About 80 percent of the cash receipts on hog-beef fattening farms is from the livestock enterprises. This has been divided equally between hogs and cattle. In recent years, because of increased production of crops on these farms, about 20 percent of the cash receipts have come from the sale of grains.

Corn is by far the most important crop and accounts for half the total harvested acreage. Yields of corn on these farms now are about 75 percent higher than they were in 1930-32. Acreage in corn has been increased by about 15 percent since that time. As a result production of corn has been nearly doubled. Very few soybeans are grown on these farms. Acreages in small grains and hays average about 40 acres each.

During the years 1946-48 cash receipts from the sale of crops averaged a little over \$2,200. Most of this was from the sale of corn. Before 1942 these farmers received very little income from the sale of crops. Total crop sales did not reach \$500 until 1943. Of course, only the excess crops above feeding requirements for livestock are sold on these farms.

Production of livestock has been stepped up on hog-beef fattening farms. From 1930-32 to 1946-48 production of hogs was increased by almost 30 percent and production of cattle was increased by almost 25 percent. On these farms livestock are fattened before they are sold,

and most of the cattle are bred, raised, and fattened on the farms. Sales of livestock have averaged more than \$9,000 a year during the last 3 years. Prices of both cattle and hogs averaged about \$22 per 100 pounds during these 3 years.

During 1946-48 the index of prices received for products sold by operators of hog-beef fattening farms averaged almost 230 percent of the 1935-39 average price, and over 275 percent of the 1930-32 average (table 34). Cost rates and wage rates also increased but not so rapidly. In 1948 prices and wage rates paid were the highest on record. They were 92 percent higher than in 1935-39. From 1947 to 1948 prices received rose slightly less than 6 percent, compared with a little more than 10 percent for prices and wage rates paid.

Although these farmers now sell feed grains they also buy some feeds such as tankage and high-protein feeds. About 10 percent of the cash expenditures go for purchase of these feeds.

Next to the cash-grain farms, hog-beef fattening farms are the most highly mechanized of the Corn Belt farms (see table 16). The relatively large acreage of crops and particularly intertilled crops makes it advantageous for the operators of these farms to mechanize. About a third of the total cash expenditures are for repair, operation, and replacement of power and machinery.

Production per hour of man labor was a record high in 1948 (table 25). It has been relatively higher during the last 10 years on hog-beef fattening farms than on other types of Corn Belt farms studied. Returns per hour of labor on hog-beef fattening farms average \$1.57 in 1948. This was the highest on record. Operating expense per dollar of gross farm income in 1948 was only 22 cents and the lowest on record (fig. 23 and table 37).

### Hog-Beef Raising Farms

Hog-beef raising farms are located mostly in the rolling terrain of the drift hills and flats along the southern border of the Corn Belt proper. They are situated in the silty lands of west-central Ohio, and central Indiana, and in the loess flats and drift hills of southern Iowa and northeastern Missouri, and extend into central Illinois. They are in the more hazardous and less productive areas in the Corn Belt and have neither offered the farm operators the opportunity for their labor and capital nor yielded the returns that have many other types of Corn Belt farms.

Until 1948 operators' net returns were higher on each of the three other major types of Corn Belt farms than on hog-beef raising farms. In 1948, the combination of high yields, diversity of enterprises with high production and high prices, gave operators of hog-beef raising farms their record income, and for the second time a higher return than

operators of hog-dairy farms received. Operators of hog-beef raising farms received a slightly higher return in 1940 than did hog-dairy farmers.

Returns per hour to all labor used on hog-beef raising farms have increased each year since 1939 and in 1948 they averaged about \$1.20 (table 39). The average return per hour of labor for the 10-year period 1930-39 was less than 11 cents. Operating expense per dollar of gross farm income in 1948 was 20 cents. This was the lowest for any of the four major types of Corn Belt farms (table 37). In 1948 operators' returns on the hog-beef raising farms averaged nearly \$6,200, compared with an average of about \$925 in the prewar 1935-39 period.

Operators of hog-beef raising farms for the most part have been able to hold the line on cost of production. The index 1935-39 = 100 of total cost per unit of product when adjusted for price change has varied between 75 and 97 (table 32). This, however, is exclusive of four drought years during the last two decades. It has not varied much more than 10 to 15 points.

Generally, there is no real dominant enterprise on hog-beef raising farms. In prewar years receipts were divided almost evenly among: hogs, cattle, crops, and poultry and livestock products. The livestock enterprises have been expanded very little during the last two decades on these farms. In 1946-48 total production of livestock and livestock products averaged a little more than 4 percent higher than in 1930-32. Production of livestock decreased a little but production of livestock products increased by about 50 percent. Livestock products, however, make up less than 23 percent of the combined production of livestock and livestock products. The biggest single factor contributing to the increase in production of livestock products was the increase in eggs per layer and butterfat per cow. From 1930-32 to 1946-48 production of eggs increased by 45 percent and production per cow increased by about 10 percent.

Production of crops has been expanded considerably on these farms in recent years, largely because of higher yields. During 1930-32 total cropland per farm averaged about 88 acres compared with about 96 acres in 1946-48, an increase of 9 percent. Total crop production, however, increased by about 56 percent during the same period. Production of corn alone increased from an average of a little more than 1,200 bushels in 1930-32 to more than 2,100 bushels in 1946-48, an increase of 75 percent. The average yield of corn was 29.8 bushels in 1930-32 compared with 49.6 bushels in 1946-48. The yield of corn in 1947 because of the drought was only 31.8 bushels, but in 1948 it averaged more than 61 bushels and was the highest on record.

# OPERATING EXPENSE PER DOLLAR OF GROSS FARM INCOME, 1935-39 AVERAGE AND 1948

COMMERCIAL FAMILY-OPERATED FARMS, SELECTED TYPES

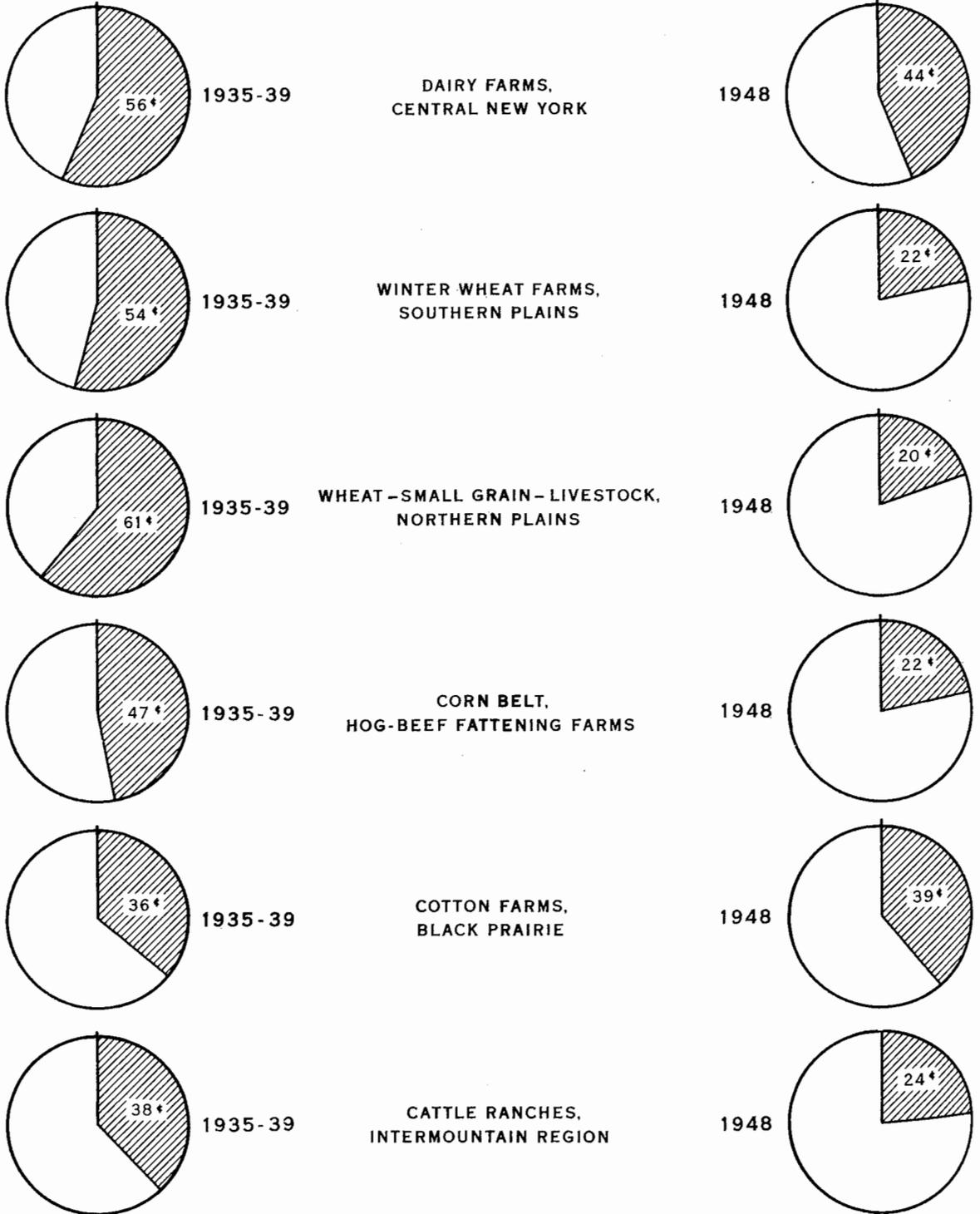


FIGURE 23

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### Hog-Dairy Farms

Net farm income on hog-dairy farms in 1948 was about 8 percent higher than in 1947 but about the same as in 1946 (table 30). Low crop yields in 1947 kept incomes slightly lower in that year. However, after the farm operator had paid his 1948 rental and interest he had less for himself and his family and for his farm investment than in 1946 and about the same as in 1947. Return per hour to all labor in 1948 was 92 cents, compared with \$1.10 in 1946 and \$1.01 in 1947. In 1948 annual returns to all labor used on these farms were about \$1,000 less than in 1946 and about \$500 less than in 1947 (table 31).

Yields and production of crops on these farms were the highest on record in 1948, but production of livestock and livestock products was down from the preceding 3 years. As a result, total production of crops and livestock in 1948 was slightly under the record high of 1946. It was nearly 50 percent above either the average production in the prewar years 1935-39 or 1930-32.

Prices received in 1948 averaged considerably higher than in any previous year. Hogs sold for slightly more than \$23 per 100 pounds, and butterfat 77 cents per pound compared with \$8.54 for hogs and 28.4 cents for butterfat in 1935-39.

Prices and wage rates paid also were high in 1948 and had risen more rapidly from 1947 to 1948 than had prices received for farm products (tables 34 and 35). In 1948 prices received, however, were nearly 2.8 times as high as in 1935-39, whereas prices and wages paid were slightly more than double prewar. Expenditures for power and machinery amount to about a third of the total cash expenditures on these farms. Expenditures for these items in 1948 were more than double expenditures in 1935-39 and were considerably higher than in any previous year. Machinery prices in 1948 were nearly 17 percent higher than a year earlier and 60 percent higher than in 1935-39.

Operating expense per unit of production in 1948 remained about the same as in 1947 mostly because production was higher in 1948 (table 36). Total cost per unit of production in 1948 was 241 percent of the 1935-39 average and 10 percent higher than in 1947. Total cost per unit of product excluding price change was 10 percent lower in 1948 than in 1947 (table 32). It was the lowest on record in 1946, next lowest in 1945, and third lowest in 1948.

In 1948, 32 cents of each dollar of gross farm income were required to pay operating expenses (table 37). This is considerably lower than in prewar and near the lowest (26 cents) reached in 1946. It is slightly higher than the average in 1948 for all types of farms represented.

### Spring Wheat-Corn-Livestock Farms

Spring wheat-corn-livestock farms are located in the Black Prairie lands of northeastern South Dakota and southeastern North Dakota. Because they lie in a transition area between the Corn Belt on the south and southeast and the wheat area on the north and northwest, they naturally are a combination of wheat and corn farms. Their operations and their returns have been much more varied than have those of their neighbors in the Corn Belt, but less varied than those of their neighbors in the spring wheat area.

In 1948 operators of wheat-corn-livestock farms received a net return of more than \$7,600. This was about \$1,300 less than the return a year earlier, but far above that of earlier years. From 1930-40, inclusive, operators' net returns on these farms never reached \$1,500. They ranged between a loss of more than \$200 to about \$1,300 in the black. The average for the entire 11-year period was only about \$525 per year.

Wheat is the most important of a fairly large variety of crops on these farms. About a fourth of the income is from the sale of wheat. During the last 3 years more than 100 acres of wheat have been harvested each year. This is considerably larger than in prewar years. Yields of wheat have varied from a low of 4 bushels per harvested acre in 1936 to a high of nearly 21 bushels in 1942. Over the last 19 years they have averaged 11.7 bushels. During the 1940's, however, they averaged nearly 15 bushels. These relatively high yields, with the large acreages and high prices during the 1940's, have increased greatly the returns to these farmers.

During the last 3 years (1946-48) receipts from wheat averaged nearly \$3,000, compared with a little more than \$250 in the prewar period 1935-39. The price received for wheat in 1946-48 averaged more than \$2.25 per bushel, compared with 80 cents in 1935-39.

Both the price of flaxseed and the acreage of flaxseed harvested increased substantially on these farms during the war years. In 1935-39 the average acreage of flaxseed harvested was less than 6 acres per farm and the price received averaged \$1.55 per bushel. During 1946-48 the acreage harvested averaged 27 acres and the price averaged nearly \$5.25 per bushel.

Income from the sale of all crops jumped from an average of about \$450 in 1935-39 to an average of almost \$6,500 in 1946-48. Crop sales in 1948 amounted to more than \$7,200. Receipts from sales of livestock and livestock products increased from an average of about \$725 in 1935-39 to slightly more than \$3,600 in 1946-48. In recent years 60 to 70 percent of cash receipts has been for the sale of crops. In prewar years around 40 percent was from the sale of crops, but about 15 percent of the cash income was from Government payments.

These farms, although they are not generally thought of as highly mechanized, are the most highly mechanized of the spring-wheat farms in the Northern Plains. Winter wheat, cash-grain, and hog-beef fattening farms are the only types of farms studied that are more highly mechanized than the spring wheat-corn-livestock farms. On the latter group of farms more than half of the cash expenditures are for power and operation of machinery replacement.

In 1948 the index of production per hour of man labor (1935-39 = 100) was 182, the highest on record for the last 5 years (table 25). Operating expense per dollar of gross farm income has remained below 25 cents. During 1935-39 it averaged about 50 cents (table 37). In 1948 returns per hour to all labor averaged \$1.68, almost 35 cents below those in 1947, but well above those in any previous year.

### Spring Wheat-Small Grain-Livestock Farms

Operators' returns in 1948 on these farms in North Dakota averaged a little more than \$6,900. This was almost \$2,000 lower than the returns in 1947, but about the same as in 1946 (table 28). These lower returns in 1948, compared with those of a year earlier, are mostly because of lower production. In 1948 the index of total production based on 1935-39 was 212 compared with 225 for 1947. Except for 1946, it was the lowest in 6 years. Crop yields, on the average, were about 4 percent higher in 1948 than in 1947, but less acreage was harvested in 1948. Prices received were about the same in 1948 as in 1947, but prices and wage rates paid in 1948 were a little over 6 percent higher than in 1947.

Wheat is the chief single enterprise on these farms, and usually occupies more than half of the crop acreage. More than 40 percent of the income is derived from the wheat enterprise. During the war and postwar years more than 150 acres of wheat have been harvested annually on these farms. Crop yields and prices have been considerably higher than average. As a result, receipts from sales of wheat were unusually high compared with prewar years. During 1942-48 receipts from wheat averaged nearly \$4,000 a year compared with \$500 a year for the prewar period. During 1946-48 receipts from wheat alone averaged nearly \$5,000 per year. The price averaged nearly \$2.25 per bushel.

Other small grains occupied nearly 40 percent of the harvested acreage. These grains, plus flaxseed, contribute 25 to 30 percent of the income. Some corn is grown, but this is fed to the livestock from which 25 to 30 percent of the income is generally derived.

Flax, although not important in total acreage particularly before the war, has increased considerably in importance and in 1948 was second only to wheat in cash receipts.

The flax enterprise has added much to the returns on these wheat farms. Larger than usual acreages and higher yields per acre, together with higher prices, have made the flax enterprise a relatively high-paying one. During the war and postwar years the acreage in flax averaged nearly 24 acres compared with about 5 acres in prewar years. Yields per acre were more than double prewar yields, and the price was nearly 2.5 times the prewar average. Cash receipts from sales of flaxseed in recent years have been many times greater than in prewar years. In 1948 more than \$1,500 was received from the sale of flaxseed. The price was the second largest on record and both acreage harvested and yield per acre were the highest on record.

The livestock enterprises on these farms consist of about 20 head of cattle of which 7 or 8 are milked, a small flock of sheep, 50-60 laying hens and 2 to 4 sows. The size of the livestock enterprise has not changed substantially. Prices received for livestock and livestock products have advanced less rapidly than those for crops during the last 15 years. In 1947-48 the combined average of prices received for crops was about 3.8 times as high as in 1935-39, whereas prices for livestock were slightly more than three times as high.

In 1948 production was a little more than 2.8 times the average production for the prewar period (table 3). Prices received were about 3.5 times prewar, and net farm income and returns per hour to all labor were both a little more than 10 times as high (tables 30 and 38). Prices and wage rates paid were 1.8 times as high and total farm expenditures were almost 2.4 times as high as in 1935-39.

#### Spring Wheat-Roughage-Livestock Farms

Operators of spring wheat-roughage-livestock farms in the Northern Plains, like operators of other spring wheat farms and many other types of farms, had their best year in 1947; that is, returns were higher in 1947 than in any other year. Operators' net farm income in 1947 was about \$8,600. This was \$1,000 more than returns in 1948 and almost \$2,000 more than in any previous year.

Returns per hour to all labor used on these farms in 1948 averaged \$1.67. This was approximately 23 cents less than was received in 1947, but much higher than that received in any previous year and nearly 14 times higher than the average received in 1935-39 (table 39). The 1948 returns on wheat-roughage-livestock farms were approximately the same as those received on other spring wheat farms and were exceeded only by the returns on winter wheat farms.

Total production in 1948 was about the same as in 1947, but higher than in any other year except 1945 and 1942. It was about 185 percent higher than in 1935-39 and 130 percent higher than the 10-year average 1930-39. Combined average crop yields in 1948 were slightly lower than in 1947, but cropland harvested in 1948 was the highest on

record (table 8). Crop yields in 1948 were nearly 165 percent higher than those in 1935-39 and higher than in any year from 1930 to 1940.

Wheat is the chief single enterprise on these farms. During the last 5 years nearly 150 acres of wheat were harvested each year. This is about 58 percent of the total harvested acreage. The prewar average was about 50 percent. From 40 to 50 percent of cash receipts are normally from the sale of wheat. During 1946-48 sales of wheat alone amounted to more than \$4,000 a year. The average price was \$2.20 a bushel and average sales amounted to about 1,900 bushels.

Before the war operators of wheat-roughage-livestock farms faced some difficult financial and production problems. These farms are located on the fringe between the Northern Plains wheat and range livestock areas. Precipitation is light and varied. During the 10-year period 1930-39 production of wheat averaged less than 600 bushels a year. Production of wheat was reasonably good in 1930, 1931, and 1932, but from 1933 to 1938 it was almost a complete failure.

The price situation during the period 1930-39 differed little from that of production. The price of wheat (the important crop on these farms) averaged 70 cents per bushel during this 10-year period. In 1936 and 1937 the price reached \$1.00 a bushel, but farmers had little wheat to sell in those years. During the period 1930-39 the combined average price received for all crops, livestock, and livestock products, averaged less than 45 percent of the war and postwar price. During the war and postwar period about 65 percent of the cash receipts was from the sale of crops. This was far different from 1930-39 when droughts and low prices reduced cash receipts from crop sales to 21 percent of the total. From 1933, when the Government farm program began, to 1939 inclusive, about 25 percent of the cash income on these farms was from Government payments.

Because of the droughts and the low crop production, and to some extent the general economic conditions during the 1930's, operators of these farms were forced to liquidate their livestock. Cattle numbers were reduced by 50 percent, sheep and even the small farm flocks of poultry were reduced by about 40 percent. The hog enterprise was almost completely liquidated. Numbers of cows milked were reduced only slightly.

Although harvests were small or almost complete failures during the 1930's, many expenses continued. Operating expenses during the 1930's were only half those in the war and postwar years. Incomes were much higher in the war and postwar years and, as a result, less than 25 cents out of each dollar of gross income went to pay operating expenses in those years, compared with nearly 85 cents in the 1930's (table 37). In 1948, 19 cents out of each dollar of gross farm income went to pay operating expenses. This was only 2 cents more than in 1947, the lowest on record for these farms.

### Winter Wheat Farms

Net returns in 1948 to operators of winter wheat farms averaged about \$8,800 (table 28). This was much lower than returns in 1946 and 1947 but considerably higher than the 1935-39 prewar average. The lower returns in 1948, compared with 1946 and 1947, are accounted for mainly by lower production. Prices received in 1948, however, were lower than in 1947.

Production in 1948 was the lowest since prewar, except for 1943 (fig. 21). Acreage harvested was about 14 percent lower than in 1947 and the lowest since 1944. Crop yields were about 4 percent lower than in 1947 and except for 1943 and 1945 were the lowest since 1941 (table 8).

Wheat is the main enterprise on these farms. In 1947 and 1948 sales of wheat alone grossed more than \$10,500. About 75 percent of the cash income came from the sale of wheat. Normally about 60 percent of the income is from the sale of wheat. During the war and postwar years the acreage seeded to wheat ranged from 174 in 1943 to 287 in 1947, and averaged about 225 acres per year during the 7-year period. Except for 1944, abandonment was light during this period and did not exceed 9 percent in any year. Yields were higher than usual and as a result production was relatively high. From 1942 to 1948, inclusive, production of wheat averaged around 4,200 bushels a year compared with about 1,500 bushels for the 10-year period 1930-39.

Wartime demands for food and fiber brought about a substantial increase in the price of wheat. During the years 1942-48 operators of these farms received an average of \$1.61 per bushel for their wheat compared with about 68 cents in 1930-39, an increase of about 135 percent. The index of prices received for all products sold on these farms advanced by about the same amount.

Grain sorghum is the only other cash crop produced on these farms. Some corn, oats, barley, hay, and forage are grown, but are fed. The harvested acreage of grain sorghums has not changed significantly over the years on these farms. Yields and prices, however, have more than doubled. The 10-year (1930-39) average yield was about 10 bushels an acre and the price was about 60 cents a bushel compared with about 21 bushels and \$1.25 during the war and postwar years. During the war and postwar years an average of about \$475 per year was received from the sale of grain sorghums. The highest (\$930) was received in 1944 when production reached nearly 1,100 bushels.

Individually, the livestock enterprises are not important on these farms. They normally consist of a couple of brood sows, a milking herd of about 5 milk-and-beef cows, 4 or 5 additional breeding cows, and a laying flock of about 100 birds. Around 20 percent of the cash receipts are from the sale of livestock and livestock products. During 1946-48 average cash receipts from the cattle enterprise exceeded \$2,100 a year. Cash receipts from all livestock enterprises averaged about \$3,000 a year during these years. This is nearly seven times the amount received during the period 1935-39.

Large-scale methods of production and a high degree of mechanization characterize these farms. Because they are comparatively large and level in topography and have a high proportion of grain crops, they encourage the use of mechanical power and equipment. These farms average about 600 acres in size. About 70 percent of the farm land is cultivated and the remainder is in open pasture. More than 70 percent of the total expenditures is for operation and replacement of power and machinery. Expenditures for these items have increased substantially during the last 7 years. In 1948 they amounted to more than \$2,000, more than double the net farm income in the prewar period. In 1948 these costs also exceeded gross cash receipts in the prewar period.

Size of farm, total output, and output per man, however, have been significantly increased on these farms through the use of mechanical power and equipment. During the 5-year period 1944-48 total production was almost 140 percent greater than during the 5-year period 1937-41, and yields were about 90 percent higher. Production per hour of man labor was about 115 percent higher in 1944-48 than in 1937-41 (table 25). Cropland harvested increased by one-third.

During 1944-48 returns per hour of labor averaged about \$2.70 compared with 37 cents in 1937-41. Returns in 1948 averaged about \$2.75 but were lower than in 1947 and 1946. Operating expense per dollar of gross income in 1944-48 averaged about 17 cents compared with around 50 cents for the period 1937-41. Total cost per unit of product was about 6 percent higher in 1944-48 than in 1937-41, but prices and wage rates paid were 33 percent higher (tables 33 and 35). From 1947 to 1948 the index of prices and wage rates paid increased by 12 percent whereas the index of prices received decreased slightly.

#### Winter Wheat-Grain Sorghum Farms

These farms cover some 30,000 square miles of level to rolling terrain in the Canadian-Cimarron High Plains of southwestern Kansas and the Panhandles of Oklahoma and Texas. Wheat-grain sorghum farms found here are among the larger and more mechanized of the farms studied. Although by 1930 all of these farms had tractors and considerable mechanical equipment, many new items have been added and new and improved tractors and equipment have replaced the older models. As a result, the size of farm and the output per man have been increasing. During the 19-year period 1930-48, the size of farm increased from 600 to 700 acres and output per hour of man labor (although it varied considerably because of the droughts and economic conditions during the 1930's) almost doubled.

From 1930-34 to 1944-48 crop yields increased by 61 percent, production per farm more than doubled, and prices of farm products sold on these farms increased by nearly 250 percent. Prices and wage rates paid, however, increased by less than 45 percent.

Although operators' returns have been comparatively high for several years the crest appears to have been reached. Operators' returns on these farms in 1948, although considerably higher than in prewar years, were down almost 30 percent from 1947. They averaged more than \$10,000 in 1948. Except for 1947 this was the highest on record and was higher than for operators of other types of farms studied (tables 28 and 31).

In 1948 return per hour to all labor used averaged \$3.00. This was 30 percent lower than in 1947, but well above that for any other year or for any other group of farms studied. The lower return in 1948 compared with 1947 is due to lower production and higher costs in 1948. Production was about 22 percent lower in 1948 than in 1947. Prices received were about the same in 1947 and 1948 but prices and wage rates paid in 1948 were about 10 percent higher than in 1947.

Cash receipts and net cash income were higher in 1948 than in 1947, but this was caused mainly by sales from inventories as production was lower and prices were about the same in 1948 as in 1947. Cash receipts from sales of wheat alone amounted to about \$11,500 in 1948. Sales of grain sorghums contributed almost \$3,400. These are the two principal enterprises and they account for about 80 percent of the income on these farms. In recent years wheat alone has accounted for more than 60 percent of the cash receipts.

Other crops grown are fed to livestock which consist of a cattle enterprise of about 4 milk-and-beef cows plus 10 or 12 additional breeding cattle, a couple of brood sows, and a laying flock of from 100 to 140 birds. During the last 3 years (1946-48) cash receipts from the cattle enterprise have averaged about \$1,900 a year, a little more than 10 percent of the total.

Because the wheat enterprise is so dominant on these farms anything that happens to the wheat enterprise mainly determines the financial outcome for the entire farm. From 1930 to 1939 acres seeded to wheat ranged from a low of about 220 in 1939 to about 310 in 1931, and averaged about 275 acres. Acreage planted was significantly increased during the war and postwar years and from 1944 to 1948 it averaged about 340 acres per year. Abandonment averaged less than 10 percent during the war and postwar years compared with almost 40 percent during the 10-year period 1930-39. In addition, wheat yields averaged 8.5 bushels per acre during the 1930's compared with almost 16 bushels during the war and postwar years. As a result, production was 170 percent higher in the latter period. This compares with 155 percent for total production of all crops and livestock on these farms.

Operators of these farms responded to the increased demand for food and fiber during the war and postwar years and increased their acreage of grain sorghums by 44 percent. Yields of grain sorghums increased by about the same amount as wheat yields and from 1930-39 to 1942-48 production was tripled.

Prices of wheat and grain sorghums increased from an average of 77 cents a bushel for wheat and 41 cents a bushel for grain sorghums in the 5 years immediately preceding the war to \$1.65 for wheat and \$1.10 for grain sorghums during the war and postwar years.

In 1948 the price of grain sorghum averaged about \$1.65 a bushel and wheat averaged about \$2.20. The price of wheat was slightly below that received in 1947, but the price for grain sorghum was the highest on record. Production of wheat in 1948 was about 32 percent below that of 1947. The yield and the acreage seeded and harvested also were lower in 1948. The acreage of grain sorghums harvested was more than 40 percent higher than in 1947 and was next to the highest on record. The yield per acre was a little more than 5 percent higher than in 1947 and considerably above the long-time average.

These are the most highly mechanized of all the farms studied (table 16). From 70 to 75 percent of total cash expenditures is for operation and replacement of power and machinery. During the last 3 years expenditures for these items have averaged about \$2,000. Total cash receipts exceeded this amount only in the 4 years 1930-39.

#### Southern Plains Cotton Farms

Operators' returns on Southern Plains cotton farms were about 23 percent lower in 1948 than in 1947 (table 31). Total production was about 15 percent lower and prices of farm products were about 5 percent lower in 1948 than in 1947. In 1948 crop yields averaged about 18 percent lower than in 1947 and about 7 percent lower than in prewar.

Cotton farms were the only farms studied on which prices averaged lower in 1948 than in 1947. Prices were lower in 1948 for lint, cottonseed, and hogs. About 60 percent of the cash receipts on these farms was from the cotton enterprise. Any significant change in production or price of cotton affects the return to these farm operators.

In 1948 operators of cotton farms in the Southern Plains harvested an average of almost 39,000 pounds of seed cotton. This was about 10,000 pounds less than was harvested in 1947, but 6,000 pounds or about 17 percent more than was harvested during the prewar years 1935-39. It was also higher than the average for the war and postwar years 1942-47. Production in 1947 was the third highest on record for operators of these farms. It was exceeded by production in 1937 and 1932 when harvested acreages and yields were record or near record highs.

Slightly more acreage was planted to cotton in 1948 than in 1947 but failure was higher in 1948 so that acreage harvested was the same in both years. Yields of cotton in 1948, however, were about 75 percent as high as in 1947. They were about 97 percent as high as in 1935-39, and about 80 percent as high as in the war and postwar years.

In 1948 the price of lint averaged about 28 cents a pound, about 3 cents lower than in 1947, but otherwise the highest on record. It was about 17 cents higher than the 1935-39 average. Prices of cottonseed averaged about \$75 per ton in 1948 compared with \$92 in 1947 and \$26 in 1935-39.

Sorghums, mostly grain sorghums, are the only other crops sold on these farms. During the last two decades the acreage planted to sorghums has increased year after year. In recent years the acreage planted to sorghums has exceeded that planted to cotton. During the war and postwar years (1942-48) acreage planted to sorghums averaged about 77 acres per year, whereas acreage planted to cotton averaged about 58 acres a year. The reverse was true in the 1930's. From 1930-34 acreage seeded to cotton averaged about 65 acres a year, about 12 percent higher than during the war and postwar years, whereas acreage seeded to sorghums averaged about 46 acres a year, about 60 percent of the acreage during the war and postwar years.

The price of grain sorghums averaged about \$1.45 per 100 pounds during the war and postwar years compared with about 90 cents in 1930-34. It was not until 1937 that sales of grain sorghums became important. From 1942 to 1948 inclusive, receipts from grain sorghums averaged about \$460 a year compared with about \$340 from the cattle enterprise, the next most important enterprise from the standpoint of gross receipts.

From 25 to 30 percent of the cash receipts on these farms are received from the livestock enterprises. Approximately 85 acres of the farm are in pasture, hay and forage. Another 15 acres are in feed grains, exclusive of grain sorghums. A cattle enterprise is, therefore, advantageous on these farms. A breeding herd of 10 to 12 animals is normally kept. From 4 to 6 of the cows are milked. A couple of brood sows and a laying flock of 100 to 150 birds are also kept. During the last few years, in addition to supplying the farm household with livestock products, more than \$1,500 cash receipts have been received each year from the sale of livestock and livestock products.

Cotton farms in the Southern Plains, although they are not highly mechanized compared with other groups of farms, are mechanized to a greater degree than other cotton farms studied. The number of farms with tractors has increased rapidly in recent years; practically all now have tractors. Despite this, substantial reductions have not been made in the hours of labor used on these farms. Production of cotton, and particularly harvesting, still is done largely by hand labor on these farms.

Cash expenditures for operation and upkeep of power and machinery on these farms make up the largest single item; they usually amount to around 45 percent of the total. Expenditures for hired labor are next in importance and usually average around 25 percent of the total. During the last 5 years cash expenditures for power and machinery operation and replacement amounted to more than \$875 per year. This is about 20

percent more than the average return received by operators of these farms during the 10-year period immediately preceding World War II. Expenditures for labor added another \$560 per year, making a total annual expenditure of about \$1,435 for power, machinery, and labor.

Prices and wage rates paid by operators of cotton farms in the Southern Plains have risen each year (except for 1945) since 1939, and in 1948 they were double prewar. From 1947 to 1948 they rose about 5 percent, whereas prices received for products sold declined by about 5 percent.

In 1948 operating expense per dollar of gross farm income was about 33 cents. This is slightly higher than during the previous 2 years, and about average for the last 10 years. In 1948 return per hour to all labor used averaged about \$1.08. This was about 30 cents less than the return in 1947 but about 40 cents higher than the average for the last 10 years. It was about 20 cents higher than the average for the war and postwar years, and about 40 cents more than was received in 1948 by operators of Black Prairie and Mississippi Delta cotton farms. It was also slightly higher than the return on hog-dairy farms, but about the same as for cattle ranches and lower than for the other types of farms.

#### Black Prairie Cotton Farms

Operators' net farm return in 1948 on Black Prairie cotton farms averaged slightly more than \$2,600. This was approximately \$425 or about 14 percent less than they received in 1947, but still nearly three times their average annual returns from 1935-39 (table 28). The lower net return in 1948 was the result of lower prices received for products sold, particularly cottonseed and corn, and lower crop yields and production.

In 1948 prices received for products sold averaged about 7 percent lower than in 1947 and crop yields and production both averaged about 3 percent lower. Cash receipts in 1948 from sale of both crops and livestock averaged about 10 percent less than in 1947. Cash expenditures in 1948 were about 5 percent less than in 1947, but prices and wage rates paid were about 5 percent higher.

Production in 1948 was about the same as the average for the last two decades. Unlike the upward trend in production on most other types of farms, the level of production on Black Prairie cotton farms has not noticeably changed (figs. 3 and 21, and table 3). Cropland harvested during the last 5 years averaged 13 percent higher than in 1935-39, but crop yields were down about 19 percent. Production of livestock in 1948 was about 40 percent higher than in 1935-39, but was the lowest since 1941.

The highest acreage since 1933 (62.5 acres) was planted to cotton in 1948. This was almost 30 percent higher than the average for 1935-39. Only a small part of it was abandoned. As a result, acreage harvested was slightly under the record high in 1930. But a yield of 152 pounds of lint in 1948 compared with an average of 176 in 1935-39 produced a total crop in 1948 about 11 percent higher than that of the 1935-39 period. The average price received by these farm operators in 1948 for lint cotton was 30.2 cents a pound compared with 9.9 cents in 1935-39.

About 70 percent of the cash receipts on these farms in 1948 was from the cotton enterprise, compared with 62 percent during 1935-39. Prices received for cotton and cottonseed have gone up relatively more than have prices received for other products of these farms. Also, in 1935-39 a larger part of the cash receipts were from Government payments. Prices received by these farmers went up steadily from 1939 to 1947 when they averaged three times as high as in the prewar years 1935-39. In 1947 they were more than four times as high as in 1930-32, but they declined in 1948 and averaged about 7 percent lower in 1948 than in 1947. The price of cotton lint in 1948 was about a cent per pound lower than in 1947. The price of cottonseed, however, was 27 percent lower, and corn was 30 percent lower.

#### Mississippi Delta Cotton Farms

Record production combined with high prices made 1948 a record year for operators of family-sized farms in the Mississippi Delta. Acreage of cotton harvested was the largest since 1937 and the yield was the largest on record. Acreages and yields of other crops were also at record highs. Operator's net farm income in 1948 exceeded \$3,000. This was an increase of \$500 over 1947 and nearly four times as large as the average for the years 1935-39.

Production of cotton is by far the most important enterprise on these farms. In 1948, 88 percent of the cash receipts came from sales of cotton and cottonseed. The 16.8 acres of cotton harvested in 1948 was 10 percent higher than the 1947 acreage. A record yield in 1948 of 520 pounds of lint per acre was 30 percent higher than the 1947 yield of 398 pounds, and 8 percent higher than the next highest yield on record, 481 pounds in 1942.

In 1948 the prices these farmers received for their products were 7 percent lower than in 1947. This was the first general decline in prices received since 1937. In 1948 cotton was down nearly 3 cents a pound and cottonseed was \$27 a ton lower than in 1947. These were offset in part by higher prices received for livestock and livestock products. Prices and wage rates paid continued the upward trend of the last 10 years. They were about 22 percent higher in 1948 than in 1947. The greatest increase was in wages paid for cotton picking, which was up 25 percent from 1947.

Despite record production in 1948, total costs per unit of product were the highest in two decades (tables 3 and 33). In one respect, at least, the large cotton crop was a factor in pushing up cost rates. The strong demand for labor during the cotton-picking season and the high price of cotton were among the factors that tended to increase picking rates. The increase in labor costs was one of the major causes of higher unit costs in 1948. Operating expenses per unit of production in 1948 were the same as in 1947, but were almost double the 1935-39 average.

After deducting interest on investment from net farm income, the return to all labor was more than \$2,900 in 1948. This is 78 cents an hour compared with 68 cents an hour in 1947 and an average of 21 cents an hour during 1935-39.

### Cattle Ranches

Operators of cattle ranches received a net return of about \$7,900 in 1948. This was about \$500 below the record high return in 1947, but more than three times the prewar average (table 28). Cash receipts in 1948 were also the highest on record for these ranches. Prices received were about 25 percent higher than the previous high reached in 1947, but total production was about 3 percent below the previous high reached in 1947.

Cattle ranches are the most specialized of the groups of farms studied. Almost 100 percent of the income on cattle ranches is from the livestock enterprises. The beef-cattle enterprise is the chief enterprise. It usually consists of a few more than 200 head. A few cows are milked, but the number varies considerably depending upon the needs of the ranch households and time available to care for the cows. Other livestock enterprises are 2 or 3 hogs, a small poultry flock of 30 to 40 layers, and a sizable horse enterprise. Very little cash is received from the sale of livestock products. No hogs are sold.

About 15 head of horses are kept on these ranches. Most of the animals are saddle and pack horses and although more are kept than are required to perform the work under standards set on some types of farms, they are part of the Western scene. Grazing and public range are available so feed is not a limiting factor. Other costs also are insignificant.

Because the cattle enterprise is dominant on these ranches, any change in price or production of cattle significantly affects the income of the rancher. There is a close relationship between range condition and cattle condition and output (fig. 24). From 1930 to 1935 the cattle enterprise averaged about 220 head. This was about 20 head more than in 1948. Drought, depression, and Government purchase programs during the middle thirties reduced the average number per ranch by more than 30

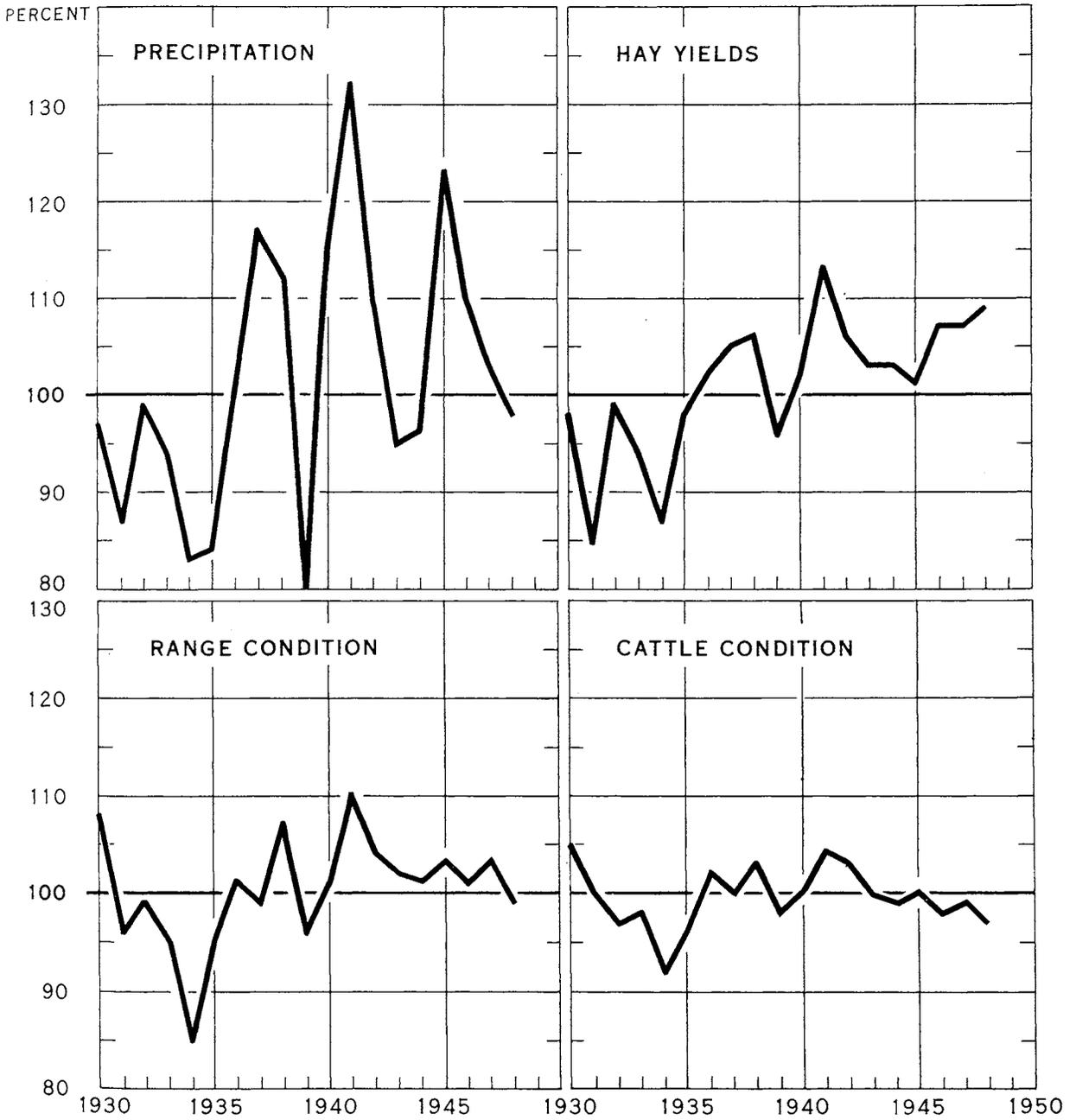
head. In 1938 the average number of cattle per ranch was about 188 head compared with about 222 head in 1932. From 1930-39 the price received by ranchers for these cattle averaged less than \$5.50 per 100 pounds. In 1933 it averaged about \$3.45.

After 1933 the price began slowly to rise and by 1940 it had exceeded \$7.00 per 100 pounds. Fortunately, the size of breeding herds began to increase after 1938. By the time wartime demands for meat animals were so pronounced it was well on the increase. From 1930-34 to 1942 net ranch income increased from an average of about \$1,300 to more than \$5,200. In 1948, it was almost \$8,400.

The price of cattle continued to increase after the war and by 1948 it exceeded \$22.00 per 100 pounds for cattle and almost \$25.00 for calves. This is about 18 percent higher than in 1947 for cattle and almost 27 percent higher for calves. In 1948 cash receipts from cattle alone exceeded \$10,000; around 3.5 times the prewar average. Returns per hour to all labor averaged about \$1.08 in 1948. This is about 20 cents below the 1947 average for cattle ranches, and approximately 35 cents less than the average return on other types of farms studied.

In 1948 the ranch operators received a return for their labor and management of about \$40.00 for each animal unit of cattle handled. This was the return after paying all expenses and allowing a return of about 5 percent on current investment in the ranch. From 1930 to 1935 they lost money. From 1944 to 1948 gross receipts per animal unit averaged about \$57, between two and a half and three times the prewar average. In 1948 gross receipts per animal unit averaged about \$72.

**PHYSICAL PRODUCTION FACTORS, 1930-48**  
(FAMILY-OPERATED CATTLE RANCHES, INTERMOUNTAIN REGION)  
INDEX NUMBERS (1930-44=100)



**FIGURE 24**

BAE 46980



Table 29 -- Gross farm income, commercial family-operated farms, by type, 1930-48

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	3,361	2,946	2,984	2,991	1,602	2,485	2,385	1,945	1,841	3,040	2,589	1,192	1,507	634	4,366
1931	2,758	1,638	1,776	1,949	1,099	1,688	1,273	708	887	1,917	2,387	1,165	1,225	622	2,836
1932	1,897	1,516	1,436	1,704	922	1,284	1,039	891	1,166	1,087	967	1,306	965	423	2,551
1933	2,023	1,486	2,264	1,514	1,035	1,284	966	1,412	968	1,696	1,469	1,802	1,387	631	2,257
1934	2,375	1,636	2,184	1,294	764	1,570	809	681	674	1,419	1,748	796	1,444	884	1,409
1935	2,731	2,801	3,647	4,718	2,458	2,894	2,050	2,007	1,733	1,907	1,883	1,975	1,676	880	2,780
1936	2,685	2,486	3,743	2,429	1,197	2,379	907	643	344	2,425	2,227	1,420	1,909	1,401	3,139
1937	3,152	3,050	4,264	4,203	2,177	2,882	1,916	2,468	1,516	1,724	2,500	2,666	2,011	1,368	3,568
1938	2,865	2,653	3,538	3,292	1,942	2,547	2,026	1,749	1,327	2,136	2,179	1,993	1,547	1,055	3,694
1939	2,747	2,379	4,111	3,104	1,834	2,419	2,521	2,036	1,713	1,706	2,662	1,855	1,879	1,165	3,701
1940	3,288	2,958	4,196	3,627	2,262	2,726	2,372	2,248	1,947	2,215	2,782	2,331	1,949	1,050	4,234
1941	3,984	3,961	6,432	5,427	3,277	3,930	4,439	4,355	3,545	5,514	5,554	4,211	2,345	1,860	6,274
1942	5,282	5,488	8,779	8,283	4,719	5,357	6,418	5,876	5,217	7,711	9,202	4,834	2,817	2,378	7,069
1943	5,808	6,289	9,692	8,268	4,545	5,887	5,739	7,326	5,046	6,900	8,133	4,664	3,544	2,426	7,479
1944	7,043	6,949	9,162	8,329	4,524	5,572	7,013	7,637	6,302	8,987	13,726	5,436	3,291	2,520	7,074
1945	7,379	7,430	10,264	9,273	5,971	7,140	8,190	8,775	7,529	9,704	9,580	3,581	3,523	2,700	8,188
1946	7,966	8,446	13,462	12,879	7,531	9,427	9,480	10,160	9,456	13,747	12,140	4,602	3,820	2,868	9,068
1947	8,647	9,557	14,888	12,569	7,566	9,232	12,612	13,356	11,438	17,145	20,590	7,498	5,595	3,515	11,630
1948 1/	11,053	10,499	15,912	15,618	9,362	10,213	11,594	11,860	10,622	12,799	15,973	6,056	5,060	4,421	11,362

1/ Preliminary.

Gross farm income includes cash receipts from the sale of crops, livestock and livestock products, government payments, value of produce consumed in farm household and value of net change in inventory of crops and livestock. The value of feeder livestock bought is deducted from gross sales or inventory on farms where bought in deriving gross farm income. Increases in income or losses incurred solely because of price change are disallowed on inventories by revaluing beginning-year working assets at year end prices. Produce intended for sale (wheat, hogs, etc. generally sold currently) and held in inventory are valued at prevailing prices when inventory is taken. Changes in fixed assets do not affect gross farm income.

Table 30 -- Net farm income, commercial family-operated farms, by type, 1930-48

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Gattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	1,419	1,514	1,305	1,278	639	1,202	1,004	491	565	1,574	1,055	528	793	343	2,889
1931	1,230	482	322	399	293	568	139	- 331	- 105	599	971	503	548	379	1,506
1932	597	524	212	518	270	392	116	- 126	260	- 27	- 156	673	433	255	1,229
1933	742	539	1,177	453	427	477	267	577	303	699	509	1,135	843	441	976
1934	927	604	1,117	- 84	23	651	- 147	- 74	- 149	470	774	269	960	711	20
1935	1,388	1,666	2,448	2,882	1,609	2,007	1,243	1,113	985	941	880	1,330	1,144	692	1,655
1936	1,204	1,280	2,458	965	479	1,384	165	- 89	- 255	1,393	1,214	815	1,298	1,128	1,963
1937	1,245	1,713	2,825	2,436	1,357	1,704	1,024	1,475	534	662	1,393	1,659	1,207	998	2,369
1938	1,341	1,357	2,109	1,851	1,150	1,387	1,062	738	564	1,028	1,028	1,261	935	807	2,303
1939	1,101	1,089	2,652	1,622	1,044	1,246	1,562	1,088	938	611	1,506	1,148	1,237	911	2,139
1940	1,480	1,589	2,755	2,208	1,462	1,490	1,384	1,232	1,123	1,100	1,561	1,473	1,251	829	2,775
1941	1,908	2,444	4,851	3,807	2,368	2,548	3,302	3,154	2,582	4,226	4,162	3,054	1,634	1,581	4,627
1942	2,759	3,679	6,934	6,347	3,651	3,696	5,072	4,398	3,969	6,274	7,586	3,384	1,881	2,001	5,237
1943	3,014	4,150	7,552	5,874	3,287	3,839	4,152	5,566	3,582	5,293	6,332	3,177	2,406	2,028	5,417
1944	3,804	4,621	6,926	5,766	3,128	3,291	5,403	5,793	4,524	7,245	10,768	3,772	2,034	2,065	4,910
1945	4,097	4,824	7,950	6,620	4,493	4,643	6,441	6,892	5,663	7,961	7,549	2,312	2,197	2,240	5,882
1946	4,538	5,832	11,089	10,042	6,058	6,941	7,718	8,450	7,677	11,847	9,960	3,249	2,458	2,426	6,722
1947	4,478	6,361	11,586	9,459	5,859	6,427	10,520	11,291	9,623	14,805	17,946	5,294	3,659	2,956	8,869
1948 1/	6,194	6,945	12,107	12,148	7,458	6,969	9,388	9,387	8,614	10,237	13,054	4,038	3,109	3,649	8,376

1/ Preliminary.

Net farm income is the annual return including change in inventory and estimated value of perquisites to the operator for his labor and management to the unpaid members of the household for services rendered on the farm during the calendar year, and to the total farm investment regardless of ownership. It is computed by subtracting cash expenditures excluding interest paid on borrowed capital from the sum of cash receipts, government payments, perquisites, and net change in inventory.

Table 31.- Operators net farm income, commercial family-operated farms, by type, 1930-48

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	1,280	1,194	598	666	404	950	686	253	391	1,114	549	412	638	297	2,326
1931	1,092	284	- 145	- 72	102	381	17	- 273	- 172	287	508	395	458	334	877
1932	492	326	- 112	127	129	258	- 8	- 165	151	- 253	- 349	520	356	228	631
1933	628	357	843	110	293	335	162	446	229	458	281	863	685	381	431
1934	801	430	745	- 384	- 74	474	- 210	- 75	- 155	209	474	106	775	604	- 521
1935	1,226	1,342	1,530	2,339	1,361	1,716	1,006	902	837	689	643	1,079	949	607	1,213
1936	1,059	1,019	1,808	557	347	1,143	81	- 21	- 268	1,069	853	631	1,076	961	1,555
1937	1,099	1,386	1,564	1,830	1,086	1,393	805	1,090	505	432	1,042	1,337	989	844	1,960
1938	1,184	1,067	1,366	1,429	985	1,175	863	554	540	733	728	1,022	795	677	1,891
1939	967	858	1,723	1,132	863	995	1,277	855	841	382	1,139	972	1,051	765	1,716
1940	1,309	1,271	1,841	1,632	1,235	1,208	1,108	942	1,011	825	1,121	1,168	1,050	695	2,361
1941	1,693	1,998	3,540	3,160	2,113	2,224	2,855	2,498	2,337	3,680	3,278	2,478	1,404	1,341	4,246
1942	2,446	3,012	5,146	5,399	3,260	3,280	4,365	3,438	3,554	5,512	5,922	2,840	1,640	1,704	4,849
1943	2,653	3,389	5,494	4,678	2,848	3,290	3,443	4,274	3,140	4,584	4,967	2,537	2,040	1,712	5,025
1944	3,369	3,738	4,720	4,421	2,629	2,720	4,430	4,354	4,001	6,230	8,447	3,042	1,697	1,750	4,452
1945	3,627	3,952	5,583	5,245	3,913	3,960	5,476	5,349	5,067	6,978	6,021	1,938	1,857	1,919	5,414
1946	4,028	4,764	8,049	8,334	5,309	6,096	6,594	6,745	6,880	10,373	7,975	2,698	2,054	2,034	6,263
1947	3,989	5,215	8,849	7,879	5,264	5,637	8,909	8,782	8,643	13,024	14,282	4,366	3,044	2,498	8,438
1948 1/	5,523	5,677	7,267	9,369	6,183	5,643	7,627	6,967	7,627	8,848	10,156	3,355	2,622	3,017	7,890

1/ Preliminary.

Operator's net farm income is the annual return including change in inventory and estimated value of perquisites to the farm operator and his family for their labor and management and for return on operator's investment in the farm. It is also net farm income less net rent and interest paid. Net rent is the value of the landlord's share of the farm produce plus cash rent received by the landlord less his share of current expenditures for crops, livestock, buildings, taxes, etc., on the farm.

Table J2.- Total input per unit of production, commercial family-operated farms, by type, 1930-48

Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	113	100	146	106	108	108	72	62	54	44	54	135	118	146	104
1931	99	116	119	104	90	100	84	132	70	37	33	91	88	96	105
1932	109	96	95	84	81	92	72	62	42	59	73	74	103	127	99
1933	111	106	138	98	93	107	119	88	93	63	120	86	110	119	108
1934	102	115	178	149	146	117	132	181	104	105	98	195	138	117	107
1935	95	93	97	93	79	98	78	64	60	130	137	93	110	124	107
1936	106	110	143	120	151	115	188	234	224	78	115	128	108	96	81
1937	103	97	80	89	81	95	92	62	77	110	89	71	87	80	95
1938	91	97	90	96	92	97	77	65	78	64	76	94	102	101	107
1939	105	103	90	102	97	95	65	75	61	118	83	114	93	99	111
1940	99	90	97	88	85	93	74	63	56	75	67	94	93	112	108
1941	102	97	86	89	87	97	59	43	44	35	42	73	123	102	111
1942	95	86	80	76	77	91	51	44	37	36	32	73	113	92	105
1943	102	91	83	72	87	90	72	48	51	52	54	83	107	103	99
1944	97	90	84	72	86	101	58	48	46	37	30	74	114	101	107
1945	100	91	81	72	75	85	56	43	40	40	47	106	120	86	107
1946	93	99	77	71	78	81	64	53	45	34	46	102	138	92	107
1947	106	86	115	85	114	98	63	47	48	35	31	83	112	95	131
1948 1/	96	101	83	69	77	89	66	54	49	48	44	93	115	73	114

1/ Preliminary.

Total input per unit of production is a measure of the labor and capital used per unit of output. Total input is the sum of: (1) the value of operator and family labor at a rate equal to the average return which this labor earned in the 1935-39 period, (2) total acres multiplied by the average net rent to land in the base period, (3) the current investment in working assets times the interest rate these assets earned in the base period, (4) depreciation and repairs on buildings, machinery and equipment at base period prices, and (5) other expenditures for labor, feed, seed, supplies, etc., at 1935-39 average prices. (See statement at bottom of table 3, for definition of total physical production). Algebraically, total input per unit of production is the sum of all items used in production, each multiplied by its respective base price, divided by the sum of all items or units produced, each multiplied by its respective base price; the base price in both numerator and denominator is 1935-39 average prices. As such total input per unit of production is total cost (excluding changes in price) of producing each unit of product.

Table 33.- Total cost per unit of production, commercial family-operated farms, by type, 1930-48

Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	142	131	163	133	132	129	99	86	74	58	72	145	133	155	103
1931	106	127	106	105	92	98	90	119	75	41	38	79	77	81	84
1932	96	89	65	66	62	68	64	52	38	51	62	56	72	79	68
1933	91	89	87	71	66	73	91	76	79	52	96	76	87	91	59
1934	92	102	121	120	119	96	126	149	92	100	89	167	122	106	38
1935	91	89	94	94	86	91	80	67	63	126	127	96	107	103	94
1936	105	108	127	113	135	110	164	194	208	82	117	120	111	105	81
1937	107	102	97	97	92	106	100	80	83	109	93	82	95	90	111
1938	94	98	88	94	91	97	82	72	79	67	77	95	94	101	110
1939	103	103	94	102	96	96	74	87	67	116	86	107	93	101	104
1940	98	89	102	93	87	97	83	75	63	76	72	102	95	112	122
1941	113	108	111	101	101	114	81	69	59	46	55	106	142	136	166
1942	122	109	124	108	108	124	88	86	62	56	56	121	150	147	166
1943	151	133	148	125	141	151	140	115	100	84	95	162	183	179	164
1944	159	142	159	132	148	174	131	125	99	70	73	182	214	165	166
1945	165	152	161	140	144	169	140	124	96	80	98	211	242	168	187
1946	169	175	172	152	165	174	167	156	115	79	109	238	300	200	216
1947	211	189	260	185	237	218	194	175	126	92	99	226	296	230	305
1948 1/2	199	211	250	193	220	241	206	189	132	116	124	244	288	251	296

1/ Preliminary.

Total cost per unit of production is the total aggregate costs at current prices of producing each unit of product in a given year. It is obtained by dividing the index of current aggregate production costs by the index of total production. See statement at bottom of table 3 for an explanation of total production. Current production expenditures is the sum of (1) current expenditures for hired labor, feed, seed, fertilizer, supplies, etc., (2) depreciation and repairs on machinery, buildings and equipment, (3) a return on working assets equal to current interest on loans for similar purposes, (4) a net return on land equal to that which operators on the average could receive if they rented out their land, and (5) the value of operator and family labor and management at current wage rates for hired labor.

Table 34.- Prices received, commercial family-operated farms, by type, 1930-48

Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	131	118	115	111	112	113	103	98	99	89	93	108	108	98	118
1931	97	81	73	79	77	78	69	70	70	52	52	65	61	60	85
1932	70	60	45	56	52	53	51	49	50	42	44	59	62	64	66
1933	77	62	56	50	54	54	61	71	61	54	65	82	82	84	56
1934	83	71	75	61	61	65	62	75	60	76	76	94	122	124	60
1935	96	97	102	106	101	102	99	100	99	102	104	113	111	109	93
1936	107	109	112	99	105	110	106	107	104	111	115	114	123	127	92
1937	105	112	116	116	112	113	119	123	114	118	115	89	94	87	109
1938	94	95	84	92	94	93	89	84	95	85	81	91	83	88	98
1939	98	87	86	87	88	82	87	86	88	84	85	93	89	89	108
1940	104	92	92	85	90	85	88	92	95	82	82	97	90	94	114
1941	123	124	121	113	120	114	121	122	121	100	103	145	151	167	136
1942	143	153	149	146	154	148	149	142	139	134	129	172	173	188	162
1943	182	183	173	154	174	172	182	179	173	168	172	201	198	197	177
1944	207	194	180	146	174	171	184	195	182	156	171	204	202	200	176
1945	207	203	187	157	186	191	199	204	192	186	189	205	218	215	193
1946	214	232	221	187	220	213	250	265	252	216	229	256	282	292	230
1947	242	265	290	240	286	267	333	348	315	273	276	312	315	305	276
1948 1/	280	299	317	254	302	278	344	352	326	270	281	296	294	283	346

1/ Preliminary.

Prices received for products sold is a summary measure of the changes in prices received by producers on the respective commercial family-operated farms for products sold during the calendar year. It is the sum of actual prices received for each item sold in the current calendar year weighted by the respective quantity of the product sold in the same year on the respective group of farms divided by the sum of the weighted base year (1935-39) prices received for each item sold weighted by the respective quantity of the product sold in the current year. The formula is  $\frac{\sum q_1 P_1}{\sum q_1 P_0}$  where  $q_1$  and  $P_1$  are quantities and prices in the current year and  $P_0$  represents weighted average prices in the base period, 1935-39.

Table 35.- Prices and wages paid, commercial family-operated farms, by type, 1930-48  
Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	115	119	123	119	121	123	123	125	122	110	114	115	119	111	102
1931	93	98	109	98	107	106	109	108	106	102	105	92	99	94	97
1932	73	85	94	81	91	87	95	92	92	87	93	76	87	86	90
1933	79	82	86	82	84	81	87	88	85	85	90	89	90	93	79
1934	91	89	91	88	91	88	95	96	104	95	96	92	97	97	91
1935	97	96	95	96	95	93	96	97	95	99	99	99	101	100	93
1936	99	98	99	98	99	98	98	98	97	98	99	99	102	103	98
1937	110	105	103	103	104	104	103	102	108	102	101	104	104	107	103
1938	98	102	102	102	102	103	103	103	100	101	101	99	98	95	102
1939	96	99	101	101	100	102	100	100	100	100	100	99	95	95	103
1940	98	100	100	100	99	102	99	101	102	97	98	101	96	96	102
1941	107	110	105	107	104	110	104	105	104	104	103	114	105	110	102
1942	123	125	114	119	115	124	114	112	134	106	108	131	122	131	106
1943	142	143	126	136	130	145	128	127	131	110	118	152	139	145	116
1944	154	150	129	141	135	153	132	139	148	116	127	155	153	152	122
1945	157	160	134	149	140	162	140	147	158	120	129	143	159	165	127
1946	173	168	136	152	140	165	143	139	157	124	131	156	164	166	134
1947	195	196	167	174	163	189	168	169	170	147	155	193	198	191	142
1948 1/	212	216	187	192	177	209	177	179	175	165	171	201	209	233	178

1/ Preliminary.

Prices paid including wages to hired labor refers to the weighted aggregates of actual prices paid during the calendar year by operators of the respective types of commercial family-operated farms for all goods and services used in production and maintenance. It is the sum of current-year prices and wages paid each weighted by the quantity of the respective commodity or service bought or obtained in the same year divided by the sum of the base year (1935-39) prices paid for each item purchased and weighted by the amount of goods and services bought in the current year. The formula is  $\frac{\sum q_1 p_1}{\sum q_1 p_0}$  where  $q_1$  and  $p_1$  are current year quantities and prices respectively and  $p_0$  represents weighted averages of prices paid in the base period, 1935-39.

Table 36.- Operating expense per unit of production, commercial family-operated farms, by type, 1930-48

Index numbers (1935-39=100)

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1930	129	113	178	115	121	126	94	84	67	49	64	134	130	184	111
1931	92	108	129	101	89	104	95	143	72	39	36	53	89	102	103
1932	86	80	89	67	67	80	71	64	39	54	69	61	85	102	91
1933	89	85	118	75	74	86	101	81	76	56	106	78	93	108	88
1934	94	101	153	139	148	110	168	174	110	96	90	164	114	97	98
1935	87	88	89	103	92	85	78	66	57	125	133	92	100	101	100
1936	104	108	138	114	140	110	173	214	206	78	114	116	105	101	80
1937	114	102	85	97	86	104	98	68	96	111	90	89	102	102	98
1938	91	98	94	89	89	102	83	72	80	66	78	92	100	99	108
1939	104	104	94	97	93	99	68	80	61	120	85	111	93	97	114
1940	103	93	101	83	82	100	78	68	57	75	69	103	98	100	109
1941	117	110	97	87	92	114	68	52	48	39	46	102	135	110	113
1942	121	110	99	87	90	122	63	55	45	39	37	124	154	125	112
1943	151	132	114	96	112	145	97	68	66	58	65	145	167	140	118
1944	158	138	122	100	118	171	80	69	68	45	42	144	197	151	133
1945	166	151	119	107	109	162	84	65	62	48	63	173	215	150	137
1946	166	168	111	107	106	153	95	74	65	44	65	208	261	156	145
1947	216	188	217	136	179	200	109	80	69	52	51	210	279	195	188
1948	216	210	171	119	131	202	113	89	72	73	73	223	289	195	203

1/ Preliminary.

Operating expense per unit of production is intended to be and is to a large extent a measure of the variable costs of producing each unit of product in a given year. Operating expense fails to be a measure of variable costs in that taxes are included and family and operator labor (part of which vary with output) are excluded. Algebraically, operating expense per unit of production is "current cash expenditures" plus net depreciation on service buildings (excluding dwelling) and working assets divided by current production. Charges for land and buildings and working capital (except for depreciation on service buildings and working capital) and operator and family labor are not included. These charges do not vary with output and in general constitute a return rather than a cost.

Table 37.- Operating expense per dollar of gross farm income, commercial family-operated farms, by type, 1930-48

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	.58	.48	.56	.57	.60	.52	.58	.75	.69	.48	.59	.56	.48	.46	.34
1931	.55	.71	.82	.80	.74	.66	.89	1.47	1.12	.69	.59	.57	.55	.39	.47
1932	.69	.65	.85	.70	.71	.70	.89	1.14	.78	1.02	1.16	.48	.55	.40	.52
1933	.63	.64	.48	.70	.59	.63	.72	.59	.69	.59	.65	.37	.39	.30	.57
1934	.61	.63	.49	1.06	.97	.59	1.18	1.11	1.22	.67	.56	.66	.33	.20	.99
1935	.49	.40	.33	.39	.35	.31	.39	.45	.43	.51	.53	.33	.32	.21	.40
1936	.55	.48	.34	.60	.60	.42	.82	1.14	1.74	.43	.45	.43	.32	.19	.37
1937	.61	.44	.34	.42	.38	.41	.47	.40	.65	.62	.44	.38	.40	.27	.34
1938	.53	.49	.40	.44	.41	.46	.48	.58	.57	.52	.53	.37	.40	.24	.38
1939	.60	.54	.35	.48	.43	.48	.38	.47	.45	.64	.43	.38	.34	.22	.42
1940	.55	.46	.34	.39	.35	.45	.41	.45	.42	.50	.44	.37	.36	.21	.34
1941	.52	.38	.25	.30	.28	.35	.26	.28	.27	.23	.25	.27	.30	.15	.26
1942	.48	.33	.21	.23	.23	.31	.21	.25	.24	.19	.18	.30	.33	.16	.26
1943	.48	.34	.22	.29	.28	.35	.28	.24	.29	.23	.22	.32	.32	.16	.28
1944	.46	.33	.24	.31	.31	.41	.23	.24	.28	.20	.15	.31	.38	.18	.31
1945	.44	.35	.23	.29	.25	.35	.21	.21	.25	.18	.21	.35	.38	.17	.28
1946	.43	.32	.18	.22	.20	.26	.18	.17	.19	.14	.18	.29	.36	.15	.26
1947	.48	.33	.22	.25	.23	.30	.17	.15	.17	.14	.15	.29	.35	.16	.24
1948 1/	.44	.34	.24	.22	.20	.32	.19	.19	.19	.20	.18	.33	.39	.17	.24

1/ Preliminary.

Operating expense per dollar of gross farm income is obtained by dividing current cash expenditures plus net depreciation on farm buildings (excluding dwelling) and working assets by gross farm income in the same year. (See statements at bottom of tables 36 and 29 for an explanation of operating expense and gross farm income.) Operating expense per dollar of gross farm income therefore is a general measure of the operating efficiency of farm operators on similar types of farms. It gives the amount of each dollar of income produced on the respective farm that goes to pay operating expense.

Table 35.- Annual return to all labor, commercial family-operated farms, by type, 1930-48

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	997	747	357	383	191	839	435	148	232	607	200	374	701	288	706
1931	797	- 226	- 253	- 238	- 32	342	- 70	- 232	- 232	- 40	255	384	562	344	- 244
1932	197	- 78	- 128	47	76	276	- 89	- 142	97	- 437	- 505	550	423	227	- 312
1933	386	35	837	87	262	259	119	398	169	341	186	945	720	365	- 257
1934	587	124	657	- 445	- 117	423	- 233	- 88	- 166	- 22	348	43	724	545	- 1,131
1935	999	1,169	1,187	2,093	1,168	1,538	898	824	799	472	490	1,025	872	556	331
1936	833	839	1,556	394	228	1,035	- 5	- 90	- 321	841	689	579	1,024	902	602
1937	928	1,267	1,038	1,546	840	1,211	677	883	481	263	880	1,432	1,017	850	922
1938	1,040	907	1,042	1,262	816	1,113	720	430	489	516	532	964	743	622	866
1939	819	652	1,300	926	674	890	1,068	684	731	191	918	932	972	709	795
1940	1,195	1,250	1,414	1,296	992	1,152	873	771	888	615	910	1,159	962	629	1,329
1941	1,678	2,176	2,919	2,788	1,830	2,171	2,546	2,138	2,122	3,246	3,025	2,523	1,304	1,240	3,002
1942	2,570	3,448	4,277	4,846	2,841	3,211	3,814	2,783	3,234	4,801	5,574	3,062	1,639	1,612	3,420
1943	2,795	3,964	4,533	4,026	2,387	3,279	2,930	3,433	2,782	3,842	4,534	2,733	2,046	1,610	3,482
1944	3,959	4,438	3,671	3,689	2,148	2,813	3,782	3,407	3,707	5,187	7,818	3,396	1,848	1,715	3,055
1945	3,981	4,642	4,429	4,517	3,344	4,022	4,581	4,379	4,744	5,937	5,439	1,972	1,939	1,865	3,866
1946	4,364	5,569	6,439	7,259	4,414	5,837	5,480	5,482	6,194	9,058	7,332	2,698	2,079	1,933	4,344
1947	4,201	6,068	7,183	6,716	4,428	5,379	7,323	7,014	7,548	11,455	13,136	4,588	3,130	2,407	5,961
1948 1/	5,980	6,559	4,831	7,200	4,600	4,845	5,734	5,036	6,302	7,264	8,945	3,488	2,739	2,933	5,105

1/ Preliminary.

Total return to all labor is the remuneration for all labor and management used in production on the farm with due allowance for return to capital invested and all production expenses exclusive of labor and management. It is obtained by adding expenditures for hired labor to the return to operator and family labor.

Table 39.- Return per hour to all labor used, commercial family-operated farms, by type, 1930-48

Calendar year	Dairy farms		Corn Belt farms				Spring wheat farms (Northern Plains)			Winter wheat farms (Southern Plains)		Cotton farms			Cattle ranches
	Central New York	Southern Wisconsin	Cash grain	Hog-beef fattening	Hog-beef raising	Hog-dairy	Wheat-corn livestock	Wheat-small grain livestock	Wheat-roughage livestock	Wheat	Wheat-grain sorghum	Southern Plains	Black Prairie	Delta of Mississippi	Intermountain region
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1930	0.21	0.16	0.08	0.07	0.05	0.17	0.10	0.04	0.05	0.20	0.06	0.09	0.14	0.10	0.13
1931	.17	-.05	-.05	-.05	-.01	.07	-.02	-.06	-.05	-.01	.08	.09	.11	.10	-.04
1932	.04	-.02	-.03	.01	.02	.05	-.02	-.04	.02	-.13	-.17	.12	.09	.08	-.05
1933	.08	.01	.18	.02	.06	.07	.03	.10	.04	.10	.06	.21	.15	.12	-.05
1934	.13	.03	.15	-.09	-.03	.09	-.07	-.03	-.05	-.01	.12	.01	.18	.20	-.20
1935	.22	.25	.28	.43	.31	.31	.25	.24	.19	.17	.18	.29	.22	.19	.06
1936	.18	.18	.37	.08	.06	.20	.0	-.03	-.11	.31	.27	.17	.24	.25	.12
1937	.20	.27	.25	.31	.22	.24	.20	.26	.15	.10	.32	.36	.21	.20	.19
1938	.21	.19	.25	.25	.21	.22	.20	.13	.15	.19	.20	.26	.19	.19	.18
1939	.16	.14	.32	.18	.17	.17	.30	.21	.22	.07	.35	.25	.24	.21	.16
1940	.24	.25	.36	.28	.27	.22	.24	.23	.24	.22	.33	.30	.24	.20	.28
1941	.34	.43	.74	.60	.49	.41	.67	.61	.57	1.28	1.08	.66	.34	.38	.60
1942	.51	.66	1.04	1.01	.74	.59	.96	.76	.79	1.67	1.82	.76	.41	.45	.67
1943	.56	.73	1.07	.81	.61	.59	.70	.89	.63	1.22	1.38	.64	.46	.46	.67
1944	.76	.80	.89	.75	.54	.50	.93	.88	.82	1.65	2.35	.92	.43	.49	.60
1945	.76	.85	1.10	.93	.83	.71	1.16	1.16	1.06	2.00	1.69	.61	.44	.54	.77
1946	.86	1.06	1.60	1.53	1.15	1.10	1.48	1.58	1.47	3.10	2.38	.88	.50	.58	.90
1947	.85	1.13	1.87	1.45	1.17	1.01	2.02	2.10	1.90	4.02	4.31	1.40	.73	.68	1.27
1948 1/	1.16	1.24	1.16	1.57	1.21	.92	1.68	1.64	1.67	2.76	3.01	1.08	.66	.78	1.08

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Return per hour to all labor used is the amount of money and money equivalent available (includes perquisites and credits in inventory) for the payment for all hired labor, unpaid family and operator labor and management used in production on the farm after production expenditures other than labor have been met and after appropriate credit has been given for the use of capital (land, buildings, equipment, livestock, feeds and supplies) employed in the farm business. It is obtained directly by dividing returns to all labor by total hours of labor used.