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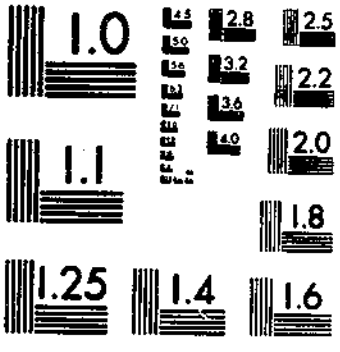

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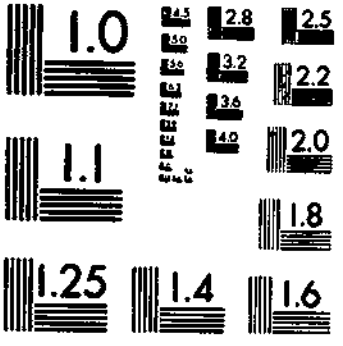

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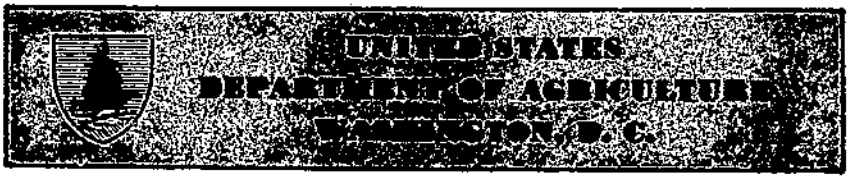

GAINS IN PRODUCTIVITY OF FARM LABOR

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Our farm workers are increasingly productive. Today a farmer on a tractor turns out twice as much product for market each hour as did his father behind a team of horses a generation ago. Science is making farm jobs more pleasant as well. Milking machines are cutting down the chore time morning and evening, and are shortening the length of workday on many farms. Mechanical pickers reduce the period of corn harvest in the fall and make this important job easier. Dairy barn cleaners, power scoops and loaders, elevators and blowers, haymaking machines and methods that keep hand pitching to a minimum, and innumerable other machines help to lessen effort and drudgery, and reduce the time demanded by farming. Farm homemakers, too, find that rural electrification and modern developments cut the number of hours and eliminate much back-breaking work within doors.

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[1] This study was developed under the general direction of Martin R. Cooper. Many other members of this Bureau and Allen D. Searl of the Bureau of Labor Statistics, U. S. Department of Labor, offered valuable suggestions.

Farm workers have matched city workers in increasing labor productivity over the last decade and a half, although, during the quarter-century before that, man-hour productivity of industrial workers rose much more rapidly than that of farm workers. Gains in productivity of both groups have been dominating influences in raising the level of living of our entire population over the last 30 years. In addition to producing a wealth of consumer goods for all, nonfarm workers have provided workers on farms with more and more tractors, trucks, and other machines, and greater and greater quantities of gasoline, oil, fertilizer, and other farm production goods. With the aid of these city-made machines and production goods, our farm people are increasingly productive in turning out a growing volume of food and fiber for domestic use and for export.

The chief technological developments behind the rise in the productivity of farm labor have been increased mechanization and a widespread adoption of improved practices that have raised crop and livestock yields. Greater use of tractors and modern machines has reduced the time element in farming operations and greater use of mechanical power has increased production for human use by displacing horses and mules which formerly consumed a large part of our feed and pasture production. More production per crop acre and per animal has meant greater productivity of labor.

The rise in man-hour productivity during the last 40 years has resulted from a sharp increase in farm output and a moderate decrease in total man-hour requirements for farm work (fig. 1).[2]

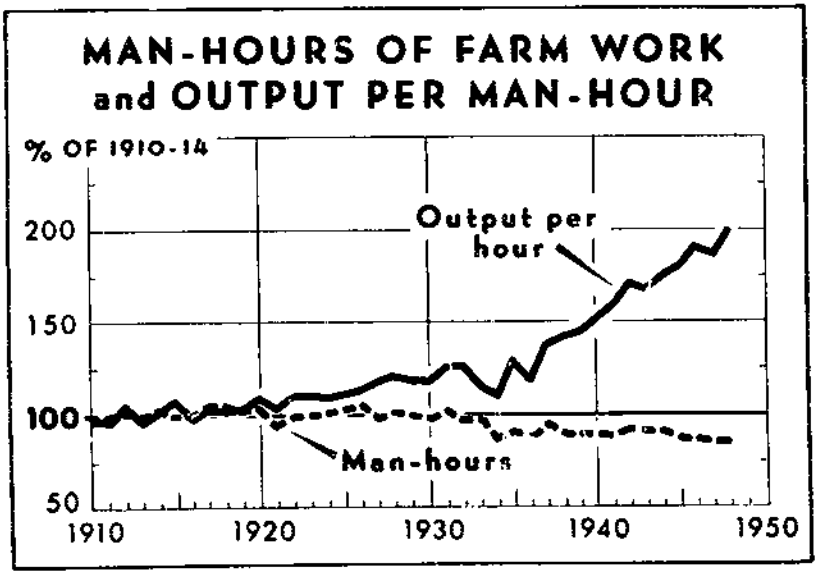

FIGURE 1.--During a little more than two decades after 1910 the rise in farm output was responsible for the increase in output per man-hour. Following this, the drop in hours spent at farm work contributed to the advance in labor productivity, but the increase in production was by far the most effective influence during all parts of the period.

[2] For an explanation of labor requirements see page 4.

This means that increases in labor productivity have been transcribed into greater production, rather than into labor displacement. But the moderate downward trend in total labor requirements has meant a decrease in the number of farm workers.

The future holds great promise for further gains in farm technology and labor productivity. Analyses of past trends in productivity of farm labor can point out some of the crop and livestock enterprises and the regions where the greatest changes are to be expected. Possibilities for an increase in labor productivity in production of milk, corn, cotton, poultry, hay, and tobacco - chief users of farm labor - will largely determine the general trend in labor productivity.

MEASURES OF FARM LABOR PRODUCTIVITY

Productivity of farm labor is usually measured by a ratio of production to labor input. The most commonly used ratio has been that of production per farm worker. As will be seen later, however, a measure of production per man-hour used in this report has several advantages.

Farm Production

To understand the meaning of production per hour it is necessary to understand the meaning of the measures of production. Two measures of total production--*farm output* and *gross farm production*--are employed.[3] Farm output is the annual production of farm products for human use. Gross farm production includes not only products for human use but also includes, as an item of total production, the farm-produced animal power of horses and mules. The index of gross farm production thus gives the farm workers credit for the animal power they produce. As a result of the long-time downward trend in numbers of farm horses and mules, the index of gross farm production rises less rapidly than the index of farm output. Both measures are useful in tracing the changes in productivity of farm labor and the causes and significance of such changes.

Index numbers of farm output, gross production, and production of specified groups of farm products, were calculated by geographic divisions, each year, beginning with 1919. Indexes are available for the United States beginning with 1910.

In constructing the indexes average 1935-39 farm prices in each geographic division are used as weights in combining annual production of individual farm products into total production. To avoid duplication of crop and livestock production, only "product added" by livestock is included. The product-added method can be illustrated for hogs. The farm price of hogs averaged about $8 per hundredweight for the United States in the 1935-39 period. Enterprise studies indicate that about three-fourths of the cost of hog production is for feed. Hence, at 1935-39 average prices, the product added per hundred pounds of hogs produced is $2.[5]

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[3] For a detailed description of these production indexes, see Farm Production in War and Peace (*1*).[4]

[4] Underscored figures in parentheses indicate literature cited.

[5] In some of the analyses pertaining to productivity of labor for individual products, it was more convenient to use bushels, pounds, etc., as units of production rather than the production indexes.

Annual production for the United States for the period beginning in 1919 is obtained by summing the quantity-price aggregates of geographic divisions.

Use of different weighting systems may result in differences in the measures of total production as the different farm products may be assigned different relative values and different absolute values. A discussion and analysis of the problems involved in choosing a set of weights is given in the appendix, beginning on page 63.

Labor Requirements

Farm labor requirements are expressed in terms of man-equivalent hours, that is, the farm time used by average adult males in performing farm operations. The man-equivalent hours for crops include the time for hauling manure, plowing and fitting the land, planting and cultivating, spraying, dusting, pruning, and for harvesting and hauling the crop to storage, local market, or processing plant. The man-hours for livestock care and production include direct labor only for such operations as feeding, caring for, and disposing of the animals and their products. Labor for growing their feed is not included. Time for farm maintenance or general overhead work is calculated separately and added to the direct labor for crops and livestock in arriving at total man-hour requirements for all farm work. Maintenance labor includes work on fences, repairs to buildings, machinery, and equipment, farm woodlands, pastures, general land maintenance, farm business, and other miscellaneous work. Available information indicates that these tasks, as a total, take about 15 percent of all farm work.

Many women, children, and older farm workers accomplish less in an hour than does an average adult male on most farm jobs. Consequently, the total of actual hours of farm work in any given year will exceed the total of estimated man-equivalent hours. Man-equivalent hours used per acre or per animal vary from year to year owing to changes in yields of crops or livestock, degree of mechanization, and other factors. Total man-equivalent hours used in farm production change over a period of time because of changes in acreages of crops and in numbers of livestock, as well as because of changes in hours used per acre or per animal.

The estimates of man-equivalent hours used in this study are new estimates. They were made for each year by geographic divisions, beginning with 1919, and for the United States, beginning with 1910. Recent bench marks for these series are the estimates of farm labor requirements, by States, for 1939 and 1944 *(6)*. The estimates of man-hour requirements for the years before 1939 are based chiefly on data in the WPA National Research Project report, "Changing Technology and Employment in Agriculture," by John A. Hopkins, on other reports in the WPA series, and on BAE estimates of crop acreages and yields, and livestock numbers and production. Reports of State experiment stations and studies of changes in farm

practices and mechanization also were utilized in making the estimates.

The use of man-hour requirements instead of employment as a measure of the input of farm labor makes possible a more thorough analysis of changes in productivity of labor. Data on man-hour requirements provide a means of comparing production per hour of individual crops or livestock or of groups of enterprises. It is impossible to make such comparisons on the basis of production per worker. Owing to the way in which farms are organized, a worker is seldom, if ever, employed consistently on a single enterprise. Consequently, a comparison of labor productivity in the production of corn and dairy products, for example, requires the use of data on man-hour inputs. In addition, a man-equivalent hour is a more uniform unit of labor than a farm worker from one year to another and among different parts of the country. Production per farm worker may rise merely because the time spent at work increases or may be higher in one region because of a greater number of hours per worker there than elsewhere. Production per man-hour is not affected by such changes and differences.

In some respects, farm employment and man-hour data supplement each other in the study of labor productivity. Variations in man-hours per worker give some clues regarding changes in the degree of underemployment of farm workers. Also, the detailed analysis afforded by man-hour data helps to explain changes in production per worker.

Neither production per man-hour nor production per worker are ideal measures of farm labor productivity. Both are ratios of total production to labor input. These ratios do not measure the actual contribution of labor or of capital or of any other factor of production. Changes in the ratios reflect the joint efforts of all factors affecting either production or labor input, as substitution of machinery for labor, the development of higher yielding and more disease-resistant hybrids and varieties of crops and animals, more effective methods of disease and insect control, and differences in the weather. Hence it is incorrect to attribute all of the changes in efficiency to farm labor *(2)*. Labor is the most important input in agricultural production, however, and changes in the ratio of total production to labor provide a useful measure of changes in efficiency of farm production. But changes in production per hour or per worker must be interpreted in the light of changes in capital inputs and the technological forces operating in farm production which affect mechanization or yields of crops and livestock.

FARM PRODUCTION AND MAN-HOUR REQUIREMENTS

About 19.5 billion man-equivalent hours of farm labor are now used in all farm work (fig. 2). This labor, combined with other production resources, resulted in a gross farm production of more than 11.8 billion 1935-39 average dollars in the record year, 1948 (fig. 3). In 1910, about 22.5 billion hours were used for a gross production of 8 billion dollars.

The milk-cow enterprise is the heaviest single user of direct man-hours of farm labor. It now requires 3 1/4 billion hours, or 16.5 percent of all farm work (table 1). The other chief farm-crop consumers of man-hours of labor are corn (10.4 percent), cotton

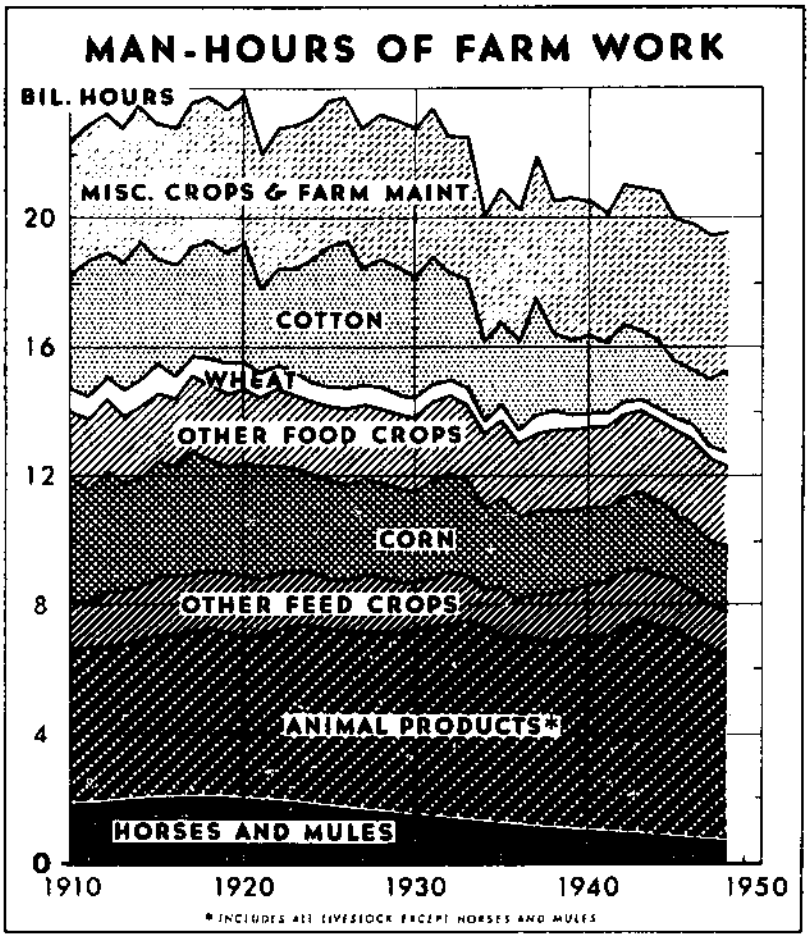

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FIGURE 2.--Total farm labor requirements have tended to decline since the first World War. This has resulted from less labor used by crops even though the requirements for livestock have gone up.

(10.3 percent), and poultry (6.0 percent). These four enterprises account for more than 40 percent of all farm work.

The milk-cow enterprise is the chief user of farm labor in five of the nine geographic divisions. Cotton leads in two of the southern divisions and tobacco in the other. Fruits and nuts take more direct labor than any other enterprise in the Pacific region. Corn ranks high on the list of labor users in six divisions, and hay in four divisions. Poultry is an important consumer of farm labor in four regions, truck crops in two, and potatoes, other cattle, and sheep and lambs in only one. Combinations of three to five of these enterprises account for more than 40 percent of all farm labor requirements in each division.

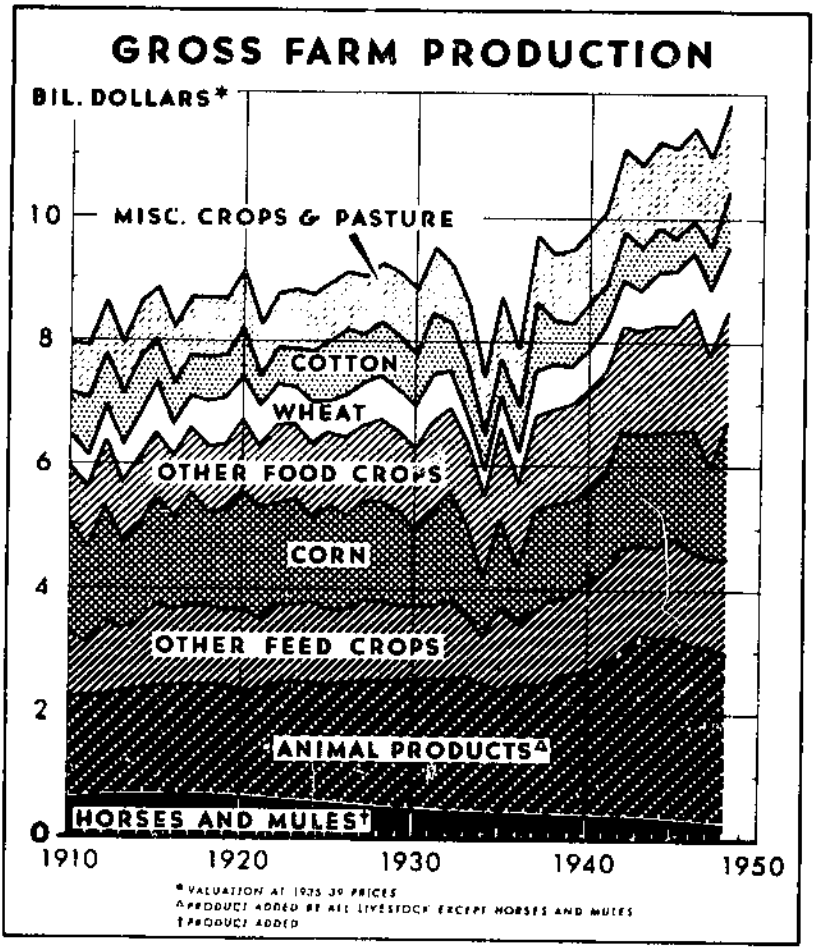

FIGURE 3.--Gross farm production increased more during and after World War II than it did during the three decades before 1939. There have been notable increases of oil-bearing crops, food grains, and truck crops. Production of livestock and products, except horses and mules, has also increased considerably.

The amount of labor used by the different crop and livestock enterprises has followed various trends through the years. The labor used in caring for horses and mules has been cut sharply owing chiefly to the decline in numbers of these animals. The increasing time devoted to other livestock reflects the rise in production of meat animals and animal products for human use. The total time now spent on the corn crop is less than 60 percent of what it was a third of a century ago; corn production during the same period increased by 15 percent. Total man-hours required for the wheat crop are little more than half what they were before World War I,

TABLE 1.--*Important labor-using enterprises in each of the geographic divisions, average 1945-48*[1]

Enterprise	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Milk cows	29.7	27.7	28.4	21.0	7.9	10.2	11.2	12.4	12.7	16.5
Other cattle	---	---	---	---	---	---	---	9.6	---	3.8
Poultry	11.1	9.6	7.1	8.5	---	---	---	---	---	6.0
Sheep, lambs, and wool	---	---	---	---	---	---	---	8.0	---	1.0
Corn	---	7.8	13.7	13.8	11.9	14.8	6.9	---	---	10.4
Cotton	---	---	---	---	11.9	24.2	27.4	---	---	10.3
Fruits and nuts	---	---	---	---	---	---	---	---	28.4	3.9
Hay and forage	8.5	6.9	---	6.0	---	---	---	11.5	---	4.9
Potatoes	6.8	---	---	---	---	---	---	---	---	1.0
Tobacco	---	---	---	---	19.6	7.4	---	---	---	4.5
Truck crops and market gardens [2]	---	8.6	---	---	---	---	---	---	8.5	3.2
Total	56.1	60.6	49.2	49.3	51.3	56.6	45.5	41.5	49.6	65.5

[1] Enterprises requiring 6 percent or more of all farm work in each of the geographic divisions.
[2] Excludes farm gardens.

although production has risen by two-thirds. Cotton now takes about half as many total hours as it did a third of a century ago, largely because of a decline in the acreage.

Individual crop and livestock enterprises account for varying proportions of total labor requirements and production (table 2). Wheat, for example, now takes 2.5 percent of the total direct labor on crops and livestock, but accounts for more than 9 percent of all gross production, exclusive of pasture. Cotton, at the other extreme, requires 12 percent of the labor, but contributes only 6 percent of the production. Production of meat animals and animal products now accounts for a little more than one-fourth of total production, but absorbs almost three-eighths of the direct labor.

In the early part of the period under consideration, the proportion of the direct man-hours of farm labor required by livestock more nearly matched their contribution to gross farm production than it does today. The difference in this regard between 1910-14 and 1945-48 was due to the fact that livestock production per hour did not rise so fast as did crop production per hour. The proportion of total hours used by wheat and corn, on the other hand, fell relative to the production contributed by these crops over the period as a whole. Shifts in importance of the various enterprises have decided effects on the changes in total farm production per hour over a period of years. These shifts are considered in more detail in later sections of this publication.

LABOR PRODUCTIVITY IN THE PRODUCTION OF CROPS

In 1948, farmers in this country raised about 90 percent more total crops per hour of labor than they did in 1910. They raised more than 3 1/3 times as much wheat, about 2 1/4 times as much corn, more than 100 percent more fruit, more than 75 percent more cotton, and 30 percent more hay. Even more pronounced climbs in labor productivity have been made by certain crops in particular areas. For crops as a whole, the West North Central Division stands at the head of the list, with an increase of 113 percent in production per hour of labor from 1919 to 1948. This area is followed by the Mountain and East North Central Divisions, each with increases exceeding 100 percent.

These increases have occurred because of changes in many factors. These influences may be placed into two groups; those that chiefly influence acre yields and those that mainly affect labor requirements per acre. This is not a clear-cut distinction, however, as crop yields and labor requirements are themselves interrelated. Before World War I, for example, it took about 35 hours to grow and harvest an acre of corn yielding 26 bushels (table 3). Since then, the man-hours per acre have fallen to less than 24 hours and the drop would have been greater if the yield had not increased. The average yield is now about 35 bushels. The combined effect of fewer hours and more bushels per acre has been to halve the labor requirement per bushel. This trend to fewer man-hours per unit of production has occurred on other crops but on some of them it has resulted from a different combination of changes in labor requirements and yields. The man-hours per acre of potatoes, for example, have actually gone up but the yield has also increased greatly, and again the labor requirements per bushel have been almost cut in two.

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TABLE 2.--*Proportion of direct labor requirements and of gross farm production contributed by various enterprises, United States, indicated periods, 1910-48* [1]

Enterprise	1910-14		1920-24		1935-39		1945-48	
	Labor requirements	Gross farm production	Labor requirements	Gross farm production	Labor requirements	Gross farm production	Labor requirements	Gross farm production
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Horses and mules	9.5	8.3	9.8	7.3	6.2	4.5	4.4	2.3
Meat animals and animal products	24.8	21.5	27.0	22.5	32.9	25.1	36.1	26.7
Corn	18.2	21.1	17.0	20.7	14.6	16.9	12.2	17.4
Other feed grains and hay	8.4	13.9	9.1	15.3	8.1	14.3	8.8	14.2
Wheat	3.9	7.7	3.8	8.1	2.8	7.2	2.5	9.2
Other food crops	11.1	11.9	11.8	13.3	13.7	16.6	15.2	17.0
Cotton	20.2	11.0	16.7	7.9	15.5	9.2	12.1	6.1
Other crops	3.9	4.6	4.8	4.9	6.2	6.2	8.7	7.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Man-hour requirements for farm maintenance and production from pasture were excluded from the totals in computing percentages.

TABLE 3.--*Man-hours per acre, yield, and man-hours per unit of production for designated crops, United States, 1910-14 and 1945-48* [1]

Crop	Man-hours per acre [2]		Yield			Man-hours per unit of product		
	1910-14	1945-48	Unit	1910-14	1945-48	Unit	1910-14	1945-48
	Hours	*Hours*						
Corn	35.2	23.7	Bushels	26.0	35.2	100 bushels	135	67
Oats	15.7	8.1	Bushels	29.4	35.0	100 bushels	53	23
Hay	11.9	11.6	Tons	1.15	1.37	Tons	10.3	8.5
Wheat	15.2	6.1	Bushels	14.4	17.7	100 bushels	106	34
Rice	55.0	26.1	Bushels	35.8	46.4	100 bushels	154	56
Potatoes	76.0	80.1	Bushels	99.7	182.3	100 bushels	76	44
Sweetpotatoes	132	118	Bushels	94.9	96.3	100 bushels	140	123
Drybeans	47.2	20.8	Pounds	778	988	Cwt.	6.1	2.1
Sugar beets	128	90	Tons	10.6	13.2	Tons	12.1	6.8
Cotton	116	102	Pounds	200.6	268.6	Bale	277	182
Tobacco	356	495	Pounds	816	1,164	Cwt.	44	43
Soybeans [3]	15.9	9.5	Bushels	12.6	19.0	100 bushels	126	52

[1] For comparable data for the intervening period see appendix table 26.
[2] Per acre harvested; includes preharvest work on abandoned acreage.
[3] Average shown for 1925-29 rather than 1910-14; soybean production in 1910-14 was relatively insignificant.

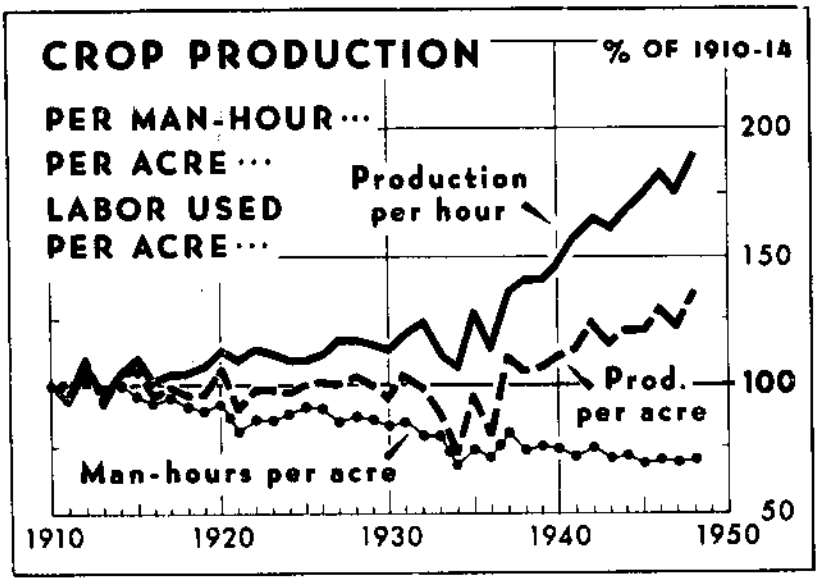

FIGURE 4.--For the first two decades after 1910 the rise in crop production per man-hour resulted from a decrease in man-hours per acre as crop production per acre showed a flat trend. During World War II and the postwar years, decreasing man-hours per acre owing to the surge in farm mechanization, and increasing crop yields, formed the basis for a record rise in crop production per man-hour.

In addition to the fact that crop yields and labor requirements are interrelated, their relative influences have changed considerably during the course of 40 years. Total crop production per hour of labor exhibited only a moderate upward trend from 1910 to about 1930 (fig. 4), but after the drought and depression of the 1930's a strong upward trend started and continued through and after World War II. Before 1930, the reduction in man-hours per acre of cropland[6] was wholly responsible for the climb in crop-labor efficiency, as there was no appreciable change in yields. But since 1937, sharp increases in crop production per acre of cropland have joined with the continuing reduction in man-hours to push crop production per man-hour to an unprecedented level.

The absolute data upon which figure 4 is based are presented in table 4 for a few key years. In 1910-12 about 38 man-hours were spent on the average acre of cropland yielding $16 worth of crops at average 1935-39 prices. During World War I crop yields went down. This by itself would have lowered crop production per hour but there was a sufficiently greater drop in man-hours per acre to overcome the effect of lower yields and to raise crop production per hour about 10 percent.

It should be remembered that the number of man-hours per acre depends to some extent on the size of crop yields. During this

[6] Cropland is the sum of the estimated acreage from which one or more crops were harvested, plus acreage of crop failure and summer fallow.

TABLE 4.--*Average crop production per man-hour, and average man-hours and crop production per acre of cropland, United States, by indicated periods, 1910-46* [1]

Item	Unit	1910-12	1919-21	1937-39	1944-46
Man-hours per acre	Hours	38.3	33.6	29.5	26.9
Crop production per acre	Dollars [2]	16.05	15.50	17.16	19.76
Crop production per man-hour	Dollars [2]	.42	.46	.58	.73

[1] Three-year averages were used to add stability. The intervening years represent, in a general way, the World War I, the interwar, and the World War II periods. See footnote 6, page 12 for definition of cropland.
[2] Based on 1935-39 geographic division prices of farm products.

period, for example, labor requirements per acre would not have gone down quite so rapidly if there had not been a lowering of crop yields.

The reduction in man-hours per acre was not quite so rapid from 1919-21 to 1937-39 as it had been during the first World War but the rate of decrease was about the same during both World Wars. Increased mechanization, including change in practices in many instances, was chiefly responsible for the reduction in man-hours per acre. Even before the advent of tractors, the increased use of labor-saving machines in crop production was an acknowledged fact. The more recent development and widespread adoption of tractors and associated equipment, of motortrucks, automobiles, and other forms of mechanical power, is likewise well known.

The extent of replacement of horses and mules by tractors tells the story--there were slightly more than 24 million horses and mules on farms in 1910 and they increased to almost 27 million head in 1918. Then the horse and mule population decreased rapidly and there were less than a third of the 1918 peak numbers left on farms at the end of 1948. During this same 39-year period the number of tractors on farms rose from a thousand to 3.5 million. Automobiles and motortrucks have also aided in the replacement of horses and mules and in reducing the time required per acre in hauling jobs on the farm, and more particularly in transporting supplies to the farm and products to market.

The increased use of mechanical power on farms and other developments have helped in reducing the labor requirements per acre on crops. Tractors were first adopted in areas composed of big farms having large fields. Tractors, particularly the early models, are best adapted to large fields and their use for this purpose results in the greatest decrease in man-hours per acre. Despite the recent development of smaller tractors, the increased use of tractors has hastened the enlargement of fields. In New England, for instance, farmers go to considerable expense to eliminate old stone walls between small fields to facilitate the use of mechanical power and associated equipment.

If it were necessary to use the automobiles and trucks on roads like those prevailing at the time of World War I, the reduction in man-hours per acre of crops would not have been so great. The development of hard-surfaced highways and improved farm-to-market roads has helped decidedly in reducing man-hours per acre of crops.

If the indirect labor on crops were added to the direct labor, the reduction in farm man-hours per acre resulting from the replacement of horses and mules by tractors would be greater than is indicated in table 4. Considerably less time is spent on the farm per crop acre to service and maintain tractors and automobiles than was required to produce and care for horses and mules and to raise feed for them. It is true, however, that a major part of this indirect farm labor for crops has been transferred to the cities. Urban people now manufacture the tractors and automobiles, produce fuel for them, and do many of the major repair jobs. In the years before tractors, farmers produced the farm power in the form of horses and mules, and produced their fuel in the form of oats, hay, corn, and pasture. Thus, if indirect labor on crops, urban as well as farm, is added to direct labor, the reduction during the last 40 years in total labor used per acre exceeds the decrease in man-hours of direct labor per acre; if indirect farm labor only is added the reduction greatly exceeds the drop in direct labor per acre.

As a general rule, year-to-year fluctuations in crop production per acre come about largely through the weather. It has been demonstrated that weather can be very influential in changing crop yields over a period of a few years. But it can hardly be said that weather by itself has either raised or lowered yields substantially over a long period of time. Other factors--as use of new hybrids and varieties of crops, increased application of fertilizers and lime, adoption of soil- and moisture-conserving practices, more effective control of pests and diseases, and irrigation and drainage of larger areas--have been more influential than weather in the long run, in increasing the yields of crops.

Improved hybrids and varieties of crops, of which hybrid seed corn is an outstanding example, have made notable contributions to increased yields, particularly in recent years. Almost four times as much fertilizer was used by farmers in the United States in 1947 as in 1910. The quantity of lime now applied is six to eight times greater than in 1929, the first year for which data are available.

When the changes in man-hours and crop production per acre are converted to average annual rates of change, their effect on changes in crop production per hour is more clearly seen (table 5). The decrease of 1.4 percent per year in labor requirements per acre was responsible for the increase in crop production per hour from 1910-12 to 1919-21 as crop yields also went down. But during the interwar period fewer man-hours and more crop production per acre were about equally effective in raising crop production per man-hour 1.3 percent a year. Crop yields increased greatly during World War II, and were more influential in raising crop production per hour at the high rate of 3.4 percent per year than was the reduction of 1.3 percent per year in man-hours per acre. Thus during the three subperiods changes in yields were, chronologically, less effective, equally effective, and more effective, than were decreases in labor requirements in raising crop production per hour.

Although a more detailed discussion is presented later, it seems well to mention, at this point, two influences that operate on crop production per man-hour. The crop pattern in an area does not remain the same. There may be shifts in importance of crop enterprises from year to year, or over a period of several years.

As there are marked differences in production per man-hour among crop enterprises, these shifts in importance affect total crop production per man-hour. Similarly, there may be shifts in importance of a crop among regions. From 1919-21 to 1944-46 such shifts within regions tended to reduce total crop production per man-hour for the United States as a whole, whereas shifts in importance of individual crops among regions tended to increase total crop production per hour. The net effect of these two influences on change in crop production per hour during the entire 25-year period was small. During parts of the period, however, shifts in importance of crops within and among regions affected total crop production per hour significantly.

Regional Changes in Crop Production Per Hour

Changes of real import in labor productivity in crop production have seldom had a uniform effect in all parts of the country. One part may have resisted mechanization while others may have taken readily to machine methods. Higher yielding varieties and hybrids have usually not been adapted to the whole country. About the only mark of similarity among the geographic divisions with respect to the changes in production of all crops per man-hour of direct labor is the definite upward trend exhibited in each region (fig. 5). There are wide differences in the magnitude of the increases and in the year-to-year fluctuations around the trend.

The most consistent increase in crop production per man-hour occurred in the Pacific States. During only 7 of the 29 years was the production per hour lower than it had been the year before, and most of these drops were slight. This is in sharp contrast to the West South Central Division where declines were recorded in almost half of the years. The dependence on irrigation in the Pacific States and the more variable weather conditions in the West South Central area are influential factors in this difference.

By far the greatest annual increases in crop production per hour came during World War II. In many instances greater additions to production per hour were made in a few years than during the previous several years. The outstanding example is found in the West North Central States where the gain in crop production per man-hour during the 7 years from 1937-39 to 1944-46 was more than double that of the previous 18 years. The Middle Atlantic is the only area in which the annual increase was greater during the years before 1937-39.

The big differences among the geographic divisions in the increase in crop-labor productivity are the more remarkable when

TABLE 5.--*Average annual rate of change in crop production per man-hour, and man-hours and crop production per acre of cropland, United States, indicated periods, 1910-46*

Item	1910-12 to 1919-21	1919-21 to 1937-39	1937-39 to 1944-46	1910-12 to 1944-46
	Percent	*Percent*	*Percent*	*Percent*
Man-hours per acre	-1.4	-0.7	-1.3	-1.0
Crop production per acre	- .4	.6	2.0	.6
Crop production per man-hour	1.0	1.3	3.4	1.7

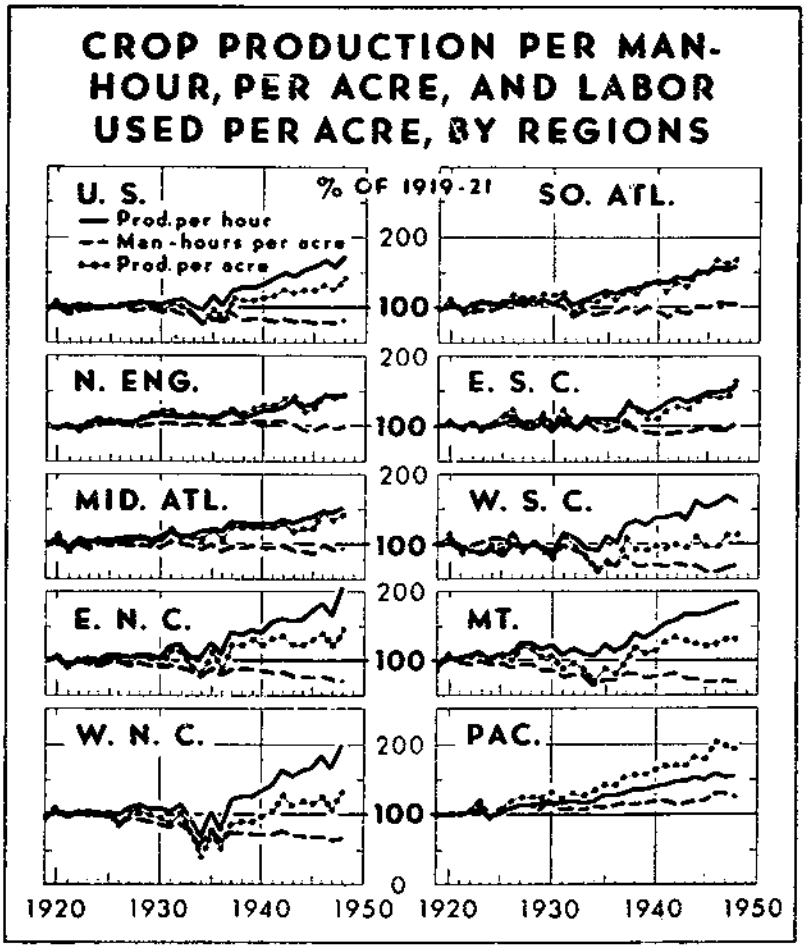

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FIGURE 5.--Man-hours per crop acre have decreased most since World War I in the North Central, Mountain, and West South Central States, where mechanization has generally progressed most rapidly. The greatest rise in man-hours per acre occurred in the Pacific States where increasing yields and growing emphasis on labor-intensive crops offset the decrease in hours that resulted from advancing mechanization. Rising yields, farm mechanization, and other factors that reduced man-hours per acre all contributed to the increase in crop production per hour, although the relative importance of each factor varied among regions.

the different amounts of crop production per man-hour in 1919-21 are considered. Even with horses and mules as power, crops in the different parts of the country took greatly different expenditures of labor (table 6). The extensive type of crop production is reflected in the fewer than 20 hours of labor used per acre in midwestern areas. The 70 and more hours of labor used per acre in the two southeastern areas reflect the many hours of hand work on cotton and tobacco.

TABLE 6.--*Crop production per man-hour, and man-hours and crop production per acre of cropland, by geographic division, averages of indicated periods, 1919-46* [1]

Geographic division	1919-21			1937-39			1944-46		
	Man-hours per acre	Crop production per acre	Crop production per man-hour	Man-hours per acre	Crop production per acre	Crop production per man-hour	Man-hours per acre	Crop production per acre	Crop production per man-hour
	Hours	*Dollars*	*Dollars*	*Hours*	*Dollars*	*Dollars*	*Hours*	*Dollars*	*Dollars*
New England	34.8	28.61	0.82	37.0	35.10	0.95	33.7	37.26	1.11
Middle Atlantic	35.1	21.92	.62	33.7	27.28	.81	31.6	27.97	.89
East North Central	24.9	16.09	.65	22.1	20.09	.91	18.9	20.97	1.11
West North Central	15.4	11.02	.72	11.3	9.91	.88	10.6	13.13	1.24
South Atlantic	78.4	24.11	.31	77.6	30.68	.40	80.9	38.15	.47
East South Central	70.8	19.98	.28	69.0	24.41	.35	67.6	28.09	.42
West South Central	51.7	15.22	.29	38.9	14.89	.38	33.2	15.52	.47
Mountain	19.4	11.38	.59	15.9	12.36	.78	14.1	14.12	1.00
Pacific	34.1	21.09	.62	39.5	32.66	.83	41.7	39.74	.95
United States	33.6	15.50	.46	29.5	17.16	.58	26.9	19.76	.73

[1] See footnote 2, table 4, p. 13.

Similar forces were behind the changes in crop production per hour in all parts of the country but their relative importance varied widely among regions. Since just after World War I, the reduction in man-hours per acre have been more influential than greater yields in raising crop production per hour in the West North Central, Mountain, and West South Central Divisions where labor requirements dropped 4.8, 5.3, and 18.5 hours per acre, respectively. The large farms and level fields in these areas aided the change to machine methods of crop production and this change to mechanization is one of the chief reasons for the big drops in man-hours per acre. In addition, in the West South Central States, a considerable reduction in the high labor-consuming cotton acreage and a large increase in the low labor-consuming wheat acreage lowered the average number of man-hours per acre. This shift to wheat had the additional effect of holding down the increase in crop production per acre, as the value of cotton production per acre is greater than that for wheat.

The increase in crop production per man-hour in the Pacific area during the last quarter-century is unique in at least two respects. First, the increase in crop production per acre was higher than in any other area. Second, it is the only group of States in which the average man-hours per acre of total crops have increased significantly. While yields of individual crops have increased during this period, a shift to crops of higher value has contributed a lot to the increase in average production per acre of all crops. Man-hours per acre for most crops have decreased, but the average for all crops has increased. The man-hours required per acre of wheat, for example, decreased by almost 50 percent from 1919-21 to 1944-46 despite a decidedly higher yield. The big increase in crop production per acre (88.5 percent) and the shift to truck crops and cotton, which have above-average labor requirements per acre, were influential causal factors in the upward trend in man-hours per acre.

Aside from the Pacific area, the South Atlantic States had the largest increase in crop production per acre. Greater yields of individual crops helped, but a shift from cotton to tobacco was also effective in raising average crop production per acre. The rise in crop production per hour was below average despite the very definite increase in production per acre, because of the slight increase in man-hours per acre. Mechanization has been slow in this area, and the shift to the labor-intensive tobacco enterprise has raised the average man-hours per acre.

There are above-average numbers of tractors in relation to cropland in the New England and Middle Atlantic States, but the reductions in man-hours per acre since 1919-21 are less than average. Small fields, uneven topography, and the kind of crops, limit the opportunities for great labor savings on crops. Hay, for example, is a prevailing crop in these areas and mechanical methods of putting up hay were adopted slowly. A large part of the corn crop is cut by hand and shocked or ensiled with a stationary ensilage cutter, just as it was 25 years ago. Considerably greater yields, however, have resulted in about average increases in production per hour.

The effect of changes in yields and man-hours per acre on crop production per hour is more readily seen when they are presented as average annual rates of change. Farmers in the East and West North Central and Mountain Divisions raised their crop production

TABLE 7.--*Average annual rate of change in crop production per man-hour, and in manhours and crop production per acre of cropland, by geographic division, indicated periods, 1919-46*

Geographic division	1919-21 to 1937-39			1937-39 to 1944-46			1919-21 to 1944-46		
	Man-hours per acre	Crop production per acre	Crop production per man-hour	Man-hours per acre	Crop production per acre	Crop production per man-hour	Man-hours per acre	Crop production per acre	Crop production per man-hour
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England-------	0.3	1.1	0.8	-1.3	0.8	2.2	-0.1	1.1	1.2
Middle Atlantic---	- .2	1.2	1.4	- .9	.4	1.3	- .4	1.0	1.4
East North Central	- .7	1.2	2.0	-2.2	.6	2.8	-1.1	1.1	2.2
West North Central	-1.7	- .5	1.2	- .9	4.1	4.9	-1.5	.7	2.2
South Atlantic----	- .1	1.3	1.4	.6	3.2	2.5	.1	1.8	1.7
East South Central	- .1	1.1	1.3	- .3	2.0	2.3	- .2	1.4	1.6
West South Central	-1.6	- .1	1.5	-2.2	.7	2.8	-1.8	.1	1.9
Mountain----------	-1.1	.5	1.6	-1.8	1.9	3.8	-1.3	.9	2.2
Pacific-----------	.8	2.5	1.6	.8	2.8	2.0	.8	2.6	1.7
United States---	- .7	.6	1.3	-1.3	2.0	3.4	- .9	1.0	1.9

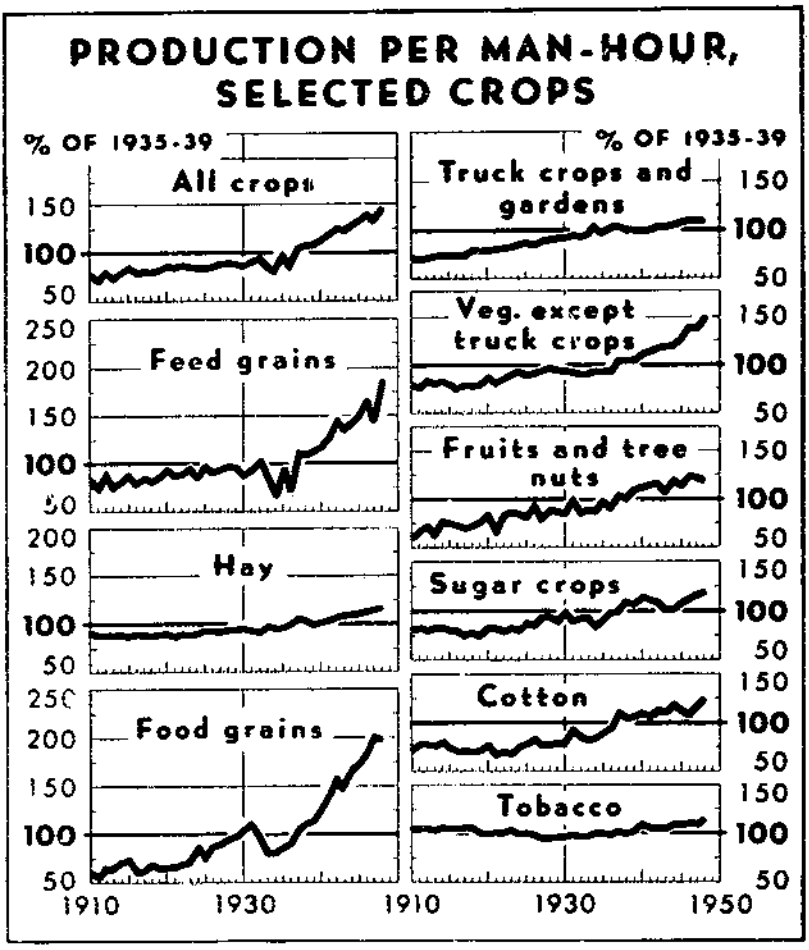

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FIGURE 6.--The trend in production of almost all groups of crops per man-hour has been upward since 1910. The greatest gain was made on food grains because of their early suitability for mechanization. Greater yields also contributed to labor efficiency, particularly during and after World War II. The next most rapid rise was made on feed grains. While mechanization of cotton production has lagged, a significant increase in production per man-hour has occurred, owing chiefly to greater yields.

per hour relatively more than those in other areas, from 1919-21 to 1944-46 (table 7). Lower labor requirements and higher crop yields were about equally effective in raising crop production per hour in the East North Central Division, but in the other two divisions the reduction in man-hours was more influential, particularly during the interwar period. The drought of the early thirties had a greater adverse effect on crop yields in these areas and the general use of higher yielding hybrids and varieties of crops came later than in the East North Central States.

TABLE 8.--*Changes in production of selected crops per man-hour, United States, indicated periods, 1910-46*

Crop	Annual rate of change				Total change
	1910-12 to 1919-21	1919-21 to 1937-39	1937-39 to 1944-46	1910-12 to 1944-46	1910-12 to 1944-46
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Feed grains	1.1	1.2	4.6	1.9	87.3
Hay	-.1	.8	1.0	.6	24.9
Food grains	1.0	2.8	7.0	3.2	191.0
Truck crops and gardens	1.0	1.4	.8	1.2	49.9
Vegetables, except truck crops	.3	1.3	2.9	1.4	58.1
Fruits and tree nuts	1.3	1.9	1.8	1.7	79.1
Sugar crops	-.3	1.6	.4	.8	33.2
Cotton	-.6	2.3	.7	1.2	48.2
Tobacco	-.4	.1	1.3	.2	6.5
All crops	1.0	1.3	3.4	1.7	75.4

In all other regions, except the West South Central, increased yields during the last quarter-century were more effective than the reduction in man-hours per acre in raising the productivity of the labor spent on crops. In the West South Central States the large reduction in man-hours per acre was accompanied by a small increase in crop production per acre, and resulted in an average annual rate of increase of 1.9 percent in crop production per hour, which is the same as the average increase for the entire United States.

Changes in Production Per Hour, by Groups of Crops

During the last 40 years the changes in production per man-hour of the different crops have been markedly dissimilar (fig. 6). The steepest rise in labor productivity was made by food grains. The rise was particularly rapid after the drought of the 1930's and during World War II when production of food grains increased rapidly and the scarcity of farm labor made farmers apply every practicable device to reduce the man-hours of labor used. The production of food grains per hour increased at the rate of 3.2 percent per year from 1910-12 to 1944-46, and at a rate of more than double this after 1937-39 (table 8). Wheat is the major food grain and is the crop on which the greatest gains in labor productivity have been made. During World War I and the interwar period, decreases in man-hours per acre brought about by rapid strides in mechanization were chiefly responsible for the rise in labor productivity. During the inter-war period the change over from harvesting wheat with binders and headers to the much less time-consuming combine-harvester-thresher was particularly rapid. Significant increases in yields during World War II joined the continuing reduction in labor requirements per acre to push production per hour upward at the high average rate of 7.0 percent per year.

Next to food grains, feed grains have exhibited the greatest increase in production per man-hour. Corn is the dominant crop in this group, and the big increase in corn yield in recent years has contributed much to the increase in labor productivity. The average annual rate of increase in labor productivity in feed grains was 4.6 percent during the recent war period and was almost 2 percent

per year for the entire period since 1910-12. It may be noted that the droughts of the early 1930's had more effect on the production of feed grains per hour of labor than for any other crop or group of crops. Production per hour of labor used on food grains dropped drastically during the early 1930's, the low point coming in 1933; but for feed grains the output per hour of work was lowest in 1934 and 1936, when droughts were most severe. In the western Corn Belt and in the Great Plains, precipitation is often the limiting factor in crop production. But wheat is mostly harvested before the dryer months of July and August, whereas these are the critical months in the development of the corn crop, and are sometimes very dry, as in 1934 and 1936.

Among the crops having a higher than average gain in labor productivity, fruits, berries, and tree nuts had the most consistent rise during the last 40 years. But this group is characterized also by large and consistent year-to-year changes. The tendency of many fruits to alternate between high and low yields is partly responsible for the usual large year-to-year change.

At the other extreme is the hay crop, which is almost devoid of yearly fluctuations in output per hour of labor, although there has been a small but consistent increase in hourly output since the early 1920's. Yields of hay, particularly perennial hays, are less subject to fluctuations than are yields of most crops, and methods of putting up hay have not changed materially until recent years.

Cotton production per hour of labor decreased during the early part of the 40-year period. The boll weevil was advancing over the Cotton Belt and its ravages severely reduced cotton yields and more labor was needed to fight the scourge. Since about 1921, however, production of cotton per man-hour has increased almost as much as the average for all crops, and during the interwar period it advanced at a rate of 2.3 percent a year, which was more than the average increase for any other group of crops except food grains. But this increase was from a relatively low level.

Tobacco production involves considerable hand work and the time required for the major harvest jobs is about proportional to the production. But higher yields during World War II resulted in more production per hour of labor. The annual rate of increase in production per hour was 1.3 percent during the war, compared with only 0.2 percent during the entire third of a century.

Production of Individual Crops per Hour

As is well known, reduction in man-hours per acre and greater yields of crops have been largely responsible for the increases in crop production per hour of labor. This is true for an individual crop as well as for crops as a whole. The importance of each of these factors varies, however, from crop to crop, from area to area, and during different parts of the period. The changes in production per hour associated with changes in yield per acre and mechanization and other factors for three outstanding crops are outlined below.

Corn.--Farmers in every part of the country grow corn. It is harvested from more acres, requires more labor, and has a greater value than any other single crop. Because of its importance the increase in the productivity of the labor spent on corn has contributed much to the greater production per hour of all farm work.

The bushels of corn produced per hour of labor in 1919-21 varied considerably among different parts of the country. Corn production in the two North Central Divisions is characterized by relatively high yields and the use of few man-hours per acre. This was true in 1919-21 but is even more strikingly true today. This means that farmers in these areas not only produced more corn per hour of labor in 1919-21, but also have increased the production per hour more than those in other parts of the country (appendix table 27). More than 2 bushels are now produced for each hour of labor in these areas, or about double that received just after World War I. In some other areas the productivity of the labor spent on corn was low at that time and little progress has been made since then.

Yields of corn per acre went down from 1919-21 to 1937-39 in all geographic divisions except the East North Central and Pacific. By itself, this reduction in yields lowered the production of corn per hour of labor, but the considerable progress in mechanizing the production of corn made during this period had the opposite effect. And, in most instances, the effect of increased mechanization more than offset the lowering effect of the decreased yield. In the West South Central and Mountain States, however, the yield went down almost 20 and 30 percent, respectively; and although additional mechanization resulted in some labor efficiency, it was not enough to overcome the effect of these substantial decreases in yield. Consequently, there were net decreases in bushels of corn produced per hour of labor in these two areas during this period.

As much or more gain in corn production per man-hour was made during World War II as had been made during the previous two decades. The rate of mechanization was stepped up and man-hours per acre decreased rapidly. More of each operation was done with tractors and machines (appendix table 28). Much of the corn that had been harvested by cutting and shocking, much by hand, was picked from the standing stalk, and more was harvested with the mechanical picker. In addition, increased yields in most areas also contributed to the greater labor productivity. The increase in production per hour associated with higher yields was particularly great in the West North Central and Mountain Divisions. These areas had not fully recovered from the drought in 1937-39 so more favorable weather in 1944-46 had a decided effect in increasing the yields. The acceptance and use of hybrid seed corn made a great difference in all areas.

Cotton.-- In contrast to corn, a greater part of the increase in production of cotton per hour of labor during the last third of a century was associated with higher yields. There has been a rather slow but steady increase in mechanization of cotton production which has helped to increase the productivity of the labor spent on cotton. But from 1919-21 to 1944-46, the effect of greater yields was almost double or more that of increased mechanization in all geographic divisions, except the West South Central (appendix table 29). The increase in yield was less in this area than in any other geographic division and it is among the areas in which the most progress has been made in mechanizing the production of cotton.

Greater yields are the result of several factors, the most influential of which include greater use of fertilizers and green manure crops, producing on the more productive land on farms, more effective control of insects and diseases, and greater use of

higher yielding varieties of seed. Fertilizer is now not only applied to a greater proportion of the cotton acreage but is also applied in greater quantities per acre treated.

In all areas except the South Atlantic most of the increase in cotton yield and in labor productivity associated with changes in yield during the 25 years prior to 1944-46, came before 1937-39. In fact, from 1937-39 to 1944-46 the yield decreased in the three geographic divisions west of the Mississippi River where cotton is extensively grown, and increased substantially only in the South Atlantic States. The decrease in acreage was greater in this area than in any other geographic division and this provided a greater opportunity for the selection of the more productive land. There was also a substantial increase in application of fertilizer in this as in most of the other areas.

The annual increase in pounds of cotton produced per hour that is associated with mechanization, is about the same in each geographic division during both the interwar and World War II periods. Before tractors were commonly used, additional mechanization consisted chiefly of changing from half-row to one-row and larger equipment. More recently, in addition to the continuing substitution of larger horse and mule equipment, the noteworthy change has been to tractors (appendix table 30). In 1946, three-fifths of the land planted to cotton in the United States was broken with tractor-drawn implements as against half that percentage 7 years earlier. The proportion of the cotton planting and cultivating done with tractors likewise more than doubled during these 7 years. In 1939, the Mountain and Pacific regions were far ahead of the others in the extent to which tractors were used for these operations, but the West North Central and West South Central States made the most gain from 1939 to 1946.

Although considerable progress has been made in mechanizing these operations on cotton, much less progress has been made on the time-consuming job of picking. Considerable effort has been made, over many years, to develop a machine that would harvest cotton successfully. Two types of machines--the stripper which removes the entire boll from the stalk and the mechanical picker which removes the seed cotton and leaves the empty boll on the stalk--have been developed and are being used to a limited extent. Use of these machines results in a big reduction in labor requirements and thus in an increase in labor productivity. But such machines were used on less than 1 percent of the crop in 1946, so their effect on labor productivity was not marked. If they are widely adopted in the future their effect on productivity of farm labor in the Cotton Belt will be very significant.

Wheat.--The change in productivity of the labor spent in raising wheat is characterized by the tremendous gains brought by the advancements in mechanization. During the last quarter-century the increase in bushels of wheat produced per hour of labor that was associated with mechanization was much greater than that resulting from higher yields in most areas; it ranged up to over 50 times greater in the West South Central States (appendix table 31).

In 1919-21, the bushels of wheat produced per 100 hours of labor varied considerably by geographic divisions. Through combinations of man-hour reductions and high yields per acre, farmers in the four western groups of States produced more than a bushel of wheat per hour of labor, and the figures ranged up to 162 bushels

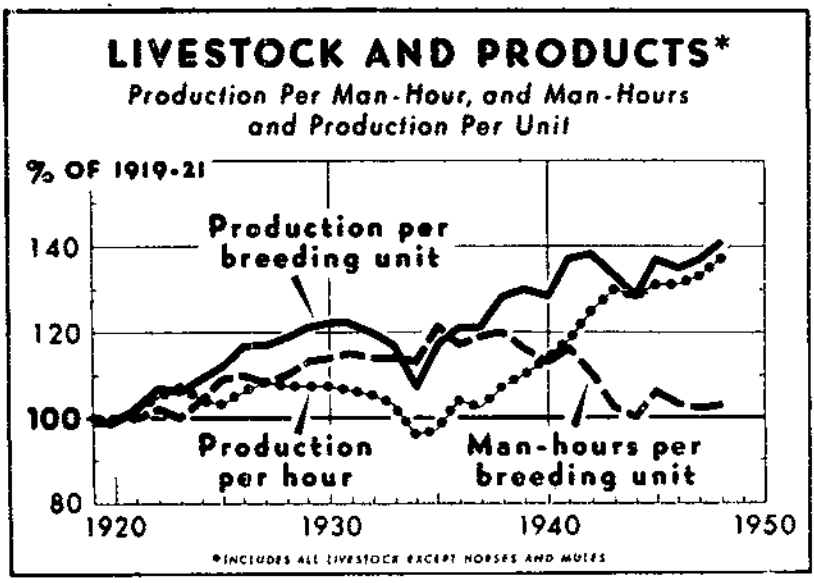

FIGURE 7.--Changes in production of milk per cow, of eggs per hen, and of livestock production per breeding unit, in general, have effective influence on labor efficiency in livestock production. Over the interwar period as a whole, production per breeding unit rose at a faster rate than man-hours per breeding unit; hence labor productivity increased. The rapid rise in livestock production per man-hour during World War II resulted from an increase in production per breeding unit and a decrease in man-hours per breeding unit. Greater use of milking machines contributed to the decline in hours per breeding unit.

per 100 hours in the Pacific States. Farmers in these areas also increased the production of wheat per hour more than those in other areas, from 1919-21 to 1944-46.

In most areas the increase in productivity that was associated with higher yields was greater during the few years from 1937-39 to 1944-46 than it had been during the previous two decades. In fact, lower yields in 1937-39 than in 1919-21, in these areas, resulted in a reduction in number of bushels produced per hour that was associated with this factor. Distinctly more favorable weather was chiefly responsible for the higher yields in 1944-46.

Although the use of mechanical power and associated equipment has lowered the man-hour requirements for practically all operations in wheat production, the adoption of the combine-harvester-thresher has been the most influential. Although the first United States patent for a combine had been granted almost a century earlier, combines were used to harvest less than 5 percent of the crop in 1920. But about half of the wheat crop was harvested with them in 1938 and more than three-fourths in 1945 (appendix table 32). The increase in use of combines goes hand in hand with the increase in labor productivity that is associated with mechanization. From 1920 to 1938 the increase in both was greatest in the West South Central and Pacific Divisions, the West North Central

and Mountain Divisions were next, with the East North Central States ranked fifth. The same ranks for these factors also existed for the entire quarter-century, from 1920 to 1945.

LABOR PRODUCTIVITY IN THE PRODUCTION OF LIVESTOCK

There has been a noteworthy increase in the proportion of the farmers' time that is spent in direct work on livestock during the last 40 years. The increase is even more noticeable if horses and mules are excluded; farmers increased other kinds of livestock to utilize the pasture and other feed set free. It is probable that the part of the farmers' workday given to livestock will continue to increase. It is well to know, therefore, what the changes have been in the productivity of direct labor spent on livestock.

The annual rate of increase in production per man-hour of labor spent on livestock has lagged behind the rate of increase in production of crops. But there has not been so much difference during the last few years as there was in earlier periods. This lagging results chiefly from the fact that mechanization, while causing a great reduction in man-hours per acre of crops, has not brought in a corresponding decrease in time required for livestock production. The increase in production per breeding unit of livestock, however, has exceeded the increase in crop production per acre.[7]

Livestock production per breeding unit rose rapidly from 1919 to the early 1930's (fig. 7). There was more milk per cow, eggs per hen, pork per sow farrowing, etc. Such elements as reduction in the death losses, feeding meat animals to heavier weights, raising a higher percentage of the calf and lamb crops, and raising more chickens and turkeys in relation to the number of adult birds on farms also helped to raise livestock production per breeding unit. Man-hours per breeding unit went up, but less rapidly than production per breeding unit, because it requires less than a proportional increase in time to handle more milk per cow or eggs per hen. These changes brought a moderate upward trend in livestock production per hour of labor.

The productivity of the labor spent on livestock fell below the 1919-21 level, in 1934 and 1935, because of a drastic drop in production per breeding unit and a slight lowering in man-hours per breeding unit. Following the drought and during and after World War II the labor requirements per cow, sow, ewe, and hen, went down rapidly despite a continued increase in production per unit. The great increase in use of milking machines, the wide acceptance of labor-saving methods of doing livestock chores, the rapid step-up in number of farms using electricity and its attendant savings in

[7] Production per breeding unit of livestock (exclusive of horses and mules) measures essentially the same thing for livestock as does crop production per acre for cropland. A breeding unit is a cow, a sow, a hen, etc. The numbers of the types of breeding units were combined into a total by weighting according to the relative contribution of each unit to gross livestock production in 1935-39. For example, a milk cow produced about $80 of gross production 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. This calculation is satisfactory for the United States but it is not feasible on a geographic-division basis because of interregional shipments. For example, a beef animal may be produced in one division and shipped as a stocker or feeder to another division and there fattened. The latter area would then show an unrealistically large beef production relative to number of beef cows on farms.

time for many jobs, and the omission and slighting of some tasks because of severe labor scarcities were instrumental in reducing the man-hours required per unit of breeding livestock. This reduction was at the average rate of 2.0 percent per year, from 1937-39 to 1944-46 (appendix table 33).

During this period, production per breeding unit went up at the rate of 0.8 percent a year. This increase helped, but the reduction in man-hours had considerably more influence in causing livestock production per hour to increase at the average annual rate of 2.9 percent. During the interwar period, however, and for the quarter-century from 1919-21 to 1944-46, the increase in production per breeding unit was wholly responsible for the increase in livestock production per hour of labor. In 1944-46, the man-hours per unit of breeding livestock were approximately at the 1919-21 level, after the significant upswing which reached high points in 1935 and 1938.

As seen later, changes in importance of the various livestock enterprises within regions has helped to raise livestock production per hour of labor. The shift to more poultry and meat animals has increased livestock production per man-hour of labor. Shifts in importance of livestock enterprises among regions, however, have been a minor influence in slowing down the increase in livestock production per hour of labor during the last quarter-century.

Regional Changes in Livestock Production per Hour

Changes in the quantity of livestock products obtained from a given amount of human effort has not been the same in all parts of the country. Different kinds of livestock prevail in the various geographic divisions and the changes in production per hour have varied widely among the different kinds. In some instances, shifts from production of one kind of livestock to another have also had decided bearing on the changes in labor productivity.

The greatest and most consistent increase in production of meat animals and animal products per hour of direct labor during the last 30 years took place in the New England States (fig. 8). In most geographic divisions the trend in productivity of the labor spent on livestock was moderately upward during the decade of the twenties, dropped during the early thirties, and climbed steeply upward during the late thirties and through and after World War II. But the upward movement during the twenties was very small in some areas, as the West South Central States, and the drop during the early thirties was accentuated in some divisions, as the West North Central States. The upward climb that started during the late thirties reached an average annual rate of 3.9 percent in the New England Division (appendix table 34). It was almost 3 percent or more in four additional groups of States. In all geographic divisions the annual rate of increase from 1937-39 to 1944-46 was much greater than it had been during the interwar period. In the West North Central States, for example, it rose at the average annual rate of 3.6 percent compared with a slight decrease from 1919-21 to 1937-39.

During the quarter-century the average rate of increase was 2 percent a year in the New England States, 1 percent or more a year in five additional groups of States and ranged down to 0.6 a year in the other three areas. There were several reasons for these wide differences. Although milk cows require the most labor in all parts of the country the importance of the various kinds of animals, from

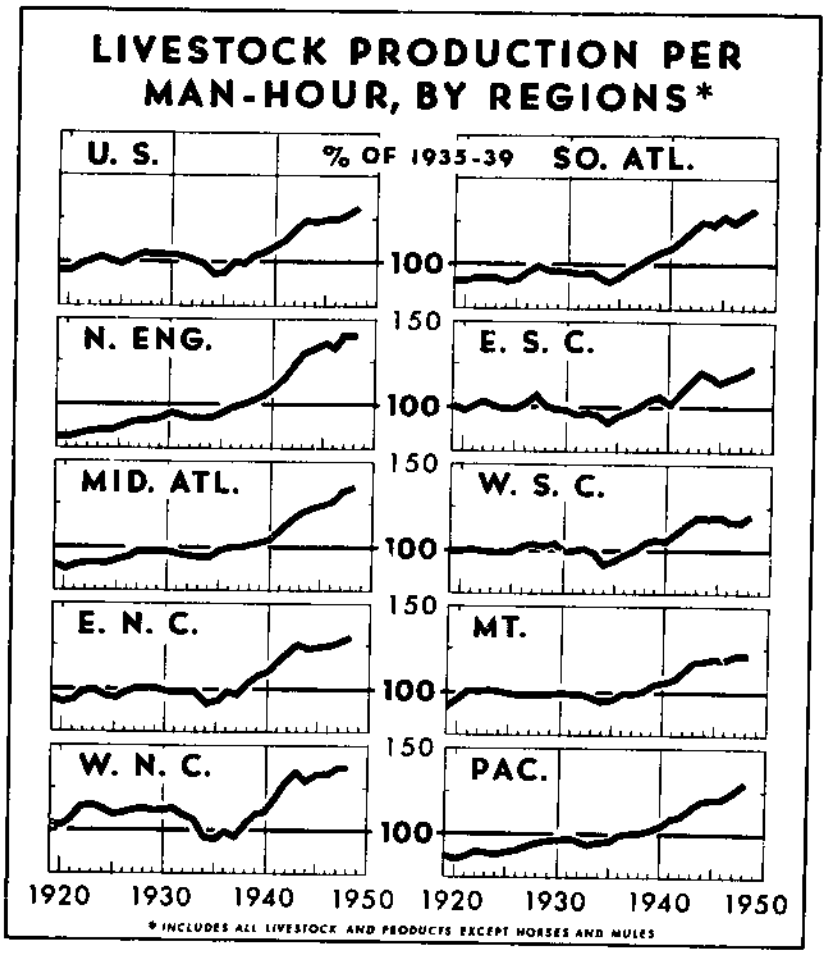

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FIGURE 8.--The importance of the different kinds of livestock in an area should be kept in mind in interpreting the differences among areas in changes in production of livestock per hour of direct labor, because the increase in production per hour has been greater among some kinds of livestock than in others. As meat animals have tended to lag in this respect, increases have been smaller in areas where they prevail.

the labor standpoint, varies widely, and there have been considerable differences in the changes in production per hour for the different kinds. Meat animals have lagged behind milk cows and poultry in this respect, which means that areas in which meat animals are particularly numerous are below average in the increase in productivity of the labor spent on livestock. For example, the Mountain region where meat animals are of greatest importance, is among the regions having the lowest rate of increase in production of all livestock per hour of labor.

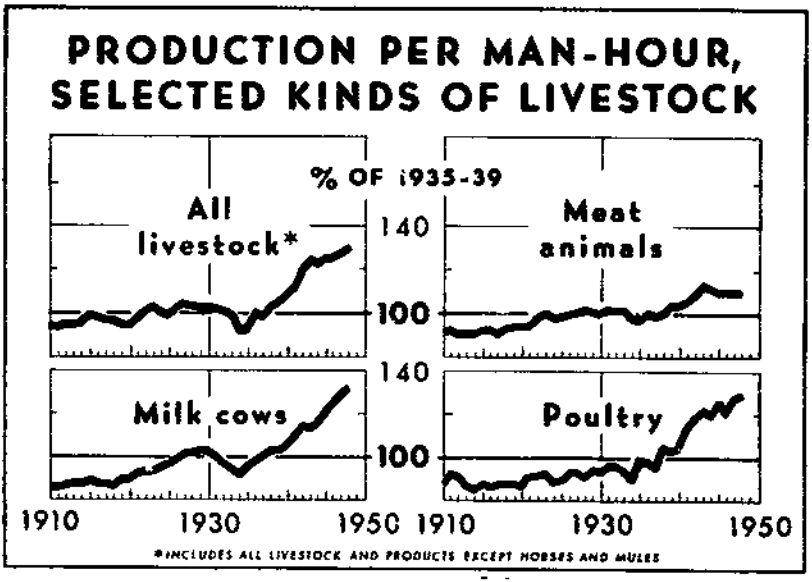

FIGURE 9.--Increased use of milking machines, more milk per cow, larger herds, and other factors contributed to a greater rise in milk production per hour during the last decade than had occurred during the previous quarter-century. The gain in production of meat animals and poultry per hour also was accelerated during World War II.

On the other hand, milk cows and poultry are of greatest importance in the New England States which partly accounts for the high rate of increase there. But, in addition, and as seen in more detail later, relatively more time is now spent on poultry than was true 25 years ago in this region and more poultry products are obtained per hour of labor, compared with other kinds of livestock. In other words, the change in labor emphasis away from milk cows and meat animals to poultry has helped to increase livestock production per man-hour.

Contributing to the low rate of increase in the West South Central Division was the shift from meat animals to milk cows and poultry. The change in production, in this instance, slowed the increase in production of meat animals and animal products per hour of labor. In some areas the rate of increase is high or low merely because the rate for each kind of livestock was in that direction.

Changes in Production per Hour, by Kinds of Livestock

Just as among the groups of crops, the different kinds of livestock show considerable variation in the advancements made in production per man-hour of farm labor. Poultry production per man-hour exhibits both the most frequent and the greatest year-to-year fluctuations (fig. 9). Aside from a short period in the early 1930's, the dairyman has had the most consistent increase in production for each hour of labor. Before and during the first World

War the trend in production of all meat animals and animal products per hour was upward, at an average annual rate of 0.2 percent per year (appendix table 35). This was caused by increases for milk cows and meat animals as the trend for poultry was downward.

The trend for all kinds of livestock was upward during the interwar period and was sharply upward during World War II. The acceleration in the average annual rate of increase in labor productivity that came with World War II was approximately the same for each kind of livestock. It was about four times greater during this period than it was between the wars.

The factors behind the changes in labor productivity are identical for each kind of livestock but their effectiveness varies. Poultry is now a substantial enterprise on many farms where formerly it was merely a sideline. There have been great improvements in poultry buildings and equipment, rations, sanitation practices, feeding and marketing methods, and disease control, and there has been a widespread adoption of improved strains developed through selection and breeding. For the production of hens and eggs these facts have been translated to a greater extent into greater egg production than into reduction in hours of labor per hen. Nevertheless, from 1919-21 to 1944-46, there was a reduction of 6 percent in man-hours per hen which, together with the increase of 30 percent in eggs per hen, has meant about 40 percent more production per hour of labor. About half of the increase in eggs per hen and most of the reduction in labor requirements has occurred since 1937-39, which accounts for the high annual rate of increase in labor productivity in recent years, compared with previous periods.[8]

Although poultry has headed the list since 1919-21, it is only an example of what has happened all along the line in production of meat animals and animal products per hour of labor. A large increase in production per beef cow, sow, and ewe, has been the dominant influence in greater production per hour for these kinds of livestock. For some kinds of livestock there was a decrease in man-hours per head and there would have been a similar decrease in man-hours per breeding unit if the production per breeding unit had not increased. In other words, from 1919-21 to 1944-46 there would have been a decrease in man-hours per breeding unit rather than a 3-percent increase had it not been for the 33-percent increase in production per breeding unit.

Dairying is the only livestock enterprise in which farm mechanization has had a decided influence in reducing the man-hours of direct labor per breeding unit and thus increasing the production per hour. The outstanding part of mechanizing the work on dairy herds has been the adoption of milking machines. There were about 380 thousand milking machine installations on farms in 1945. This was more than double the number 7 years earlier and there were only about 55 thousand in 1920. From 1919-21 to 1937-39 the influence of the use of more milking machines in reducing hours per cow was more than erased by other factors. In 1937-39 farmers marketed more of the milk as whole and market milk, rather than as cream or butter. This change, with the accompanying higher

[8] For man-hours per hen or pullet, rate of lay, and man-hours per 100 eggs by 5-year periods since 1910 see appendix table 36. Comparable data for milk cows and production of milk are also shown along with man-hours per cwt. of production of hogs.

sanitary standards and more frequent marketings, undoubtedly increased the hours per cow. The production of more pounds of milk per cow was also influential in increasing labor requirements.

Production per cow rose in each area during this period. Man-hours per cow would have decreased slightly with no change in yield of milk, but greater production per cow was chiefly responsible for the increase in milk production per hour of labor. In the country as a whole the increase in labor productivity amounted to 12.5 percent or 337 pounds of milk per 100 man-hours (appendix table 37). By geographic divisions the additional milk varied from 190 to 659 pounds per 100 hours or, on a percentage basis, from 7 to 31 percent.

During World War II, the increase in farm labor productivity in milk production was greater than it had been during the previous 20 years in the entire country and in six of the nine geographic divisions. It ranged up to 2 1/2 times greater and more in the two northeast divisions and the disparity was even greater on an annual basis. Milking machines had been increasing during the interwar period but their influence was much greater during World War II. In the Middle Atlantic Division an increase of more than 4 pounds of milk per hour was due to the greater use of milking machines, and the increase was more than 1 1/2 pounds of milk in the country as a whole (appendix table 38).

Other phases of mechanization helped to lower the man-hours of direct labor per milk cow and to increase the production of milk per hour. Higher farm income and the labor scarcities that came with World War II gave an impetus to the use of devices and practices for saving labor. These devices included installation and use in dairy barns of such things as feed and litter carriers or trucks, barn cleaners, and drinking cups at the stanchions. The commercialization of dairy farming continued although at a higher rate, and many jobs that were formerly done on the farm are now done in urban factories. Even less butter and cheese are made and less market milk is bottled on the farm than before the war. The effect of this step-up in mechanization and transference of dairying jobs to urban centers on pounds of milk per hour is shown under "miscellaneous factors" (appendix table 38). The notable effect of size of herd is also included under this heading. According to the census, the number of cows milked all or any part of the year, per farm reporting, rose from 1939 to 1944 in all parts of the country, except the West South Central, with a United States average increase of 8.5 percent. This constituted approximately an additional cow for each two farms reporting. As additional cows can be added to the herd with less than a proportional increase in time required, the addition is an important factor in reducing the man-hours per cow and increasing the quantity of milk produced per man-hour.

The increase in milk production per cow from 1937-39 to 1944-46 was responsible for 45 to 190 additional pounds of milk per 100 man-hours in eight of the geographic divisions. In the West South Central Division, however, milk production per cow went down 161 pounds; a reduction of 77 pounds of milk per 100 man-hours was the result.

In the whole country, between the wars, the entire increase in production of milk per 100 man-hours was due to the production of more milk per cow, as time spent per cow also rose. But, during World War II, the effect of fewer man-hours per cow joined the

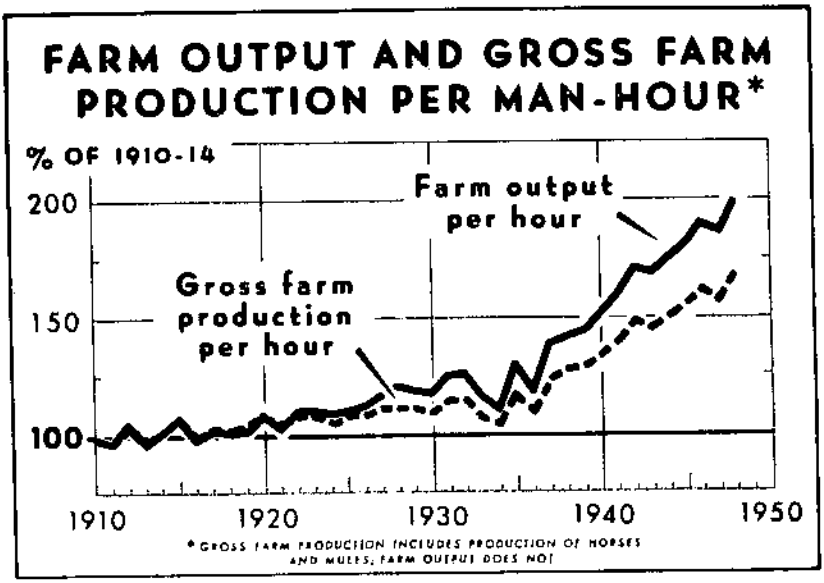

FIGURE 10.--The indexes of both farm output and gross farm production per hour of labor have increased more since 1910 than the indexes of total output and gross farm production because of the lowering of labor needs in farming. Replacement of farm-raised work animals by purchased tractors and motor fuels brought greater farm production for market and accounts for the greater increase per hour in farm output for human use.

influence of greater production per cow to push production per man-hour sharply upward. Labor productivity in milk production rose almost a third from 1919-21 to 1944-46.

LABOR PRODUCTIVITY IN TOTAL FARM PRODUCTION

For each hour of work, in 1948, farmers in the United States obtained over two-thirds more gross production than in 1910-14. The increased output of farm products for human use was even greater - it doubled during this third of a century. This increase has not come gradually since 1910. A moderate upward trend occurred from 1910 to the early 1930's when it was temporarily interrupted by the severe droughts and depression (fig. 10). Following this the rate of increase accelerated and it has continued to the present time.

Although there has been a long-time downward trend in total labor requirements, the increase in farm output and gross farm production has had a larger part in the upward surge in labor productivity. In fact, from 1910-12 until just after World War I the increase in farm production was wholly responsible for gains in production per hour because total labor requirements also rose (table 9). But after this, total labor requirements decreased. This, coupled with increased production, resulted in a rapid increase in production per man-hour. This was particularly true during World War II, when the decrease in the labor used and the increase in

TABLE 9.—*Change in farm labor requirements, production and farm labor productivity, United States, indicated periods, 1910 to 1946*

Item	Annual rate of change				Total change 1910-12 to 1944-46
	1910-12 to 1919-21 (1)	1919-21 to 1937-39	1937-39 to 1944-46	1910-12 to 1944-46	
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Man-hours for all farm work	0.1	-0.5	-0.6	-0.4	-11.3
Farm output	.6	1.1	3.0	1.4	59.8
Farm output per man-hour	.5	1.7	3.6	1.7	80.3
Gross farm production	.7	.5	2.4	.9	37.6
Gross farm production per man-hour	.6	1.0	3.0	1.3	55.1

[1] The increase in gross farm production exceeded that for farm output because the increase in production of horses and mules for farm power was greater than the increase in other farm production.

production, brought an average annual increase of 3.0 percent and 3.6 percent in gross farm production and farm output per hour of labor, respectively.

The increase in gross farm production per man-hour has been less than the gain in farm output for human use per hour. Part of the rise in output per man-hour of all farm labor is due to the fact that since World War I less and less of the total farm work has been spent on horses and mules, which are excluded from farm output. More and more of the farm power--in the form of tractors, automobiles, fuel, and so on--has been produced by urban people. During recent years about one-twentieth of the farm worker's time has been spent on the production and maintenance of horses and mules whereas about one-sixth of their time was devoted to these jobs during World War I. If the farm man-hours used on horses and mules were excluded, the increase in labor productivity would be less. Farm output per man-hour, however, does indicate the greatly increased quantity of farm goods for human consumption made available per man-hour of farm labor.

The same forces that have caused big increases in the productivity of the labor spent on crops and livestock have also been responsible for the comparable increase in total farm production per man-hour. Many of these factors have a bearing on both man-hours of labor used and production. There is evidence that farm mechanization, for example, has added to both quantity and quality of farm products, but it was more important in reducing labor requirements. In addition to the fewer hours required for road and field jobs when automobiles, trucks, and tractors are used, less farm labor is needed to service and maintain these machines than was given to the horses and mules that the machines replaced. Milking machines have been responsible for the greatest decrease in the labor used for livestock production.

Farms in the United States and the enterprises on them have increased in size. This tendency, coupled with no increase in total land in farms, has lowered total labor used because acres and animals can be added to a farm unit with less than a proportional increase in the labor needed. Additional knowledge and the applica-

tion of established principles have reduced the labor needed on farms. Education regarding work-simplification methods has helped. "Quick milking" shortens time spent. Time required for operations on other enterprises has been reduced and in some instances operations have been eliminated.

On the production side, increased yields per acre and per animal were chiefly responsible for the notable step-up. These higher yields in turn had other causes including application of greater quantities of fertilizer and lime, more favorable weather, feeding of better rations, less crop failure, more productive pastures, development and adoption of higher yielding hybrids and varieties of crops and animals, and more effective control of insects and diseases of plants and animals.

These two groups of factors have both been translated into more total farm production per man-hour of labor. As seen in more detail later, farm production has become relatively more important in areas where a greater quantity of products are produced per hour of labor. Although not a major factor, this shift has helped some in obtaining greater productivity of labor. On the other hand, the trend toward more labor-intensive enterprises--as tobacco, truck crops, and most kinds of livestock--has slowed the increase in farm production per hour of labor.

Regional Changes in Total Farm Production per Hour

The increase in total farm production per hour of labor during the last 25 years exhibits less variation among geographic divisions than that for either crops or livestock. There was a tendency for the areas in which the increase in crop production per hour was above average to be below average for livestock, and vice versa. The New England and Middle Atlantic Divisions, for example, had the greatest increase in livestock production per hour but they had the smallest increase for crops. On the other hand, the two North Central areas had big increases in crop production per hour and about average or below for livestock.

Although the increase in total production per hour over the 25 years has a relatively narrow range among areas, the year-to-year changes are widely different (fig. 11). The most consistent increase occurred in the Pacific States, with the two northeastern groups of States following in this respect. Rather violent year-to-year fluctuations are exhibited in the other areas. The yearly changes are largely a function of changes in crop production per hour, with livestock production per hour serving as a tempering element. Thus regions that have large year-to-year changes in crop production per hour also have big annual changes in farm output and gross production per hour.

The spread between the over-all increase in output and gross production per man-hour is explained chiefly by the rate at which horses and mules were replaced by tractors. Where the displacement of animal power has lagged, as in the South Atlantic and East South Central Divisions, the difference between the increase in output and gross production per hour is not large. But in areas where use of mechanical power has advanced rapidly the difference is great.

When the rise in output and gross production per hour are expressed in average annual rates of change there is some similarity

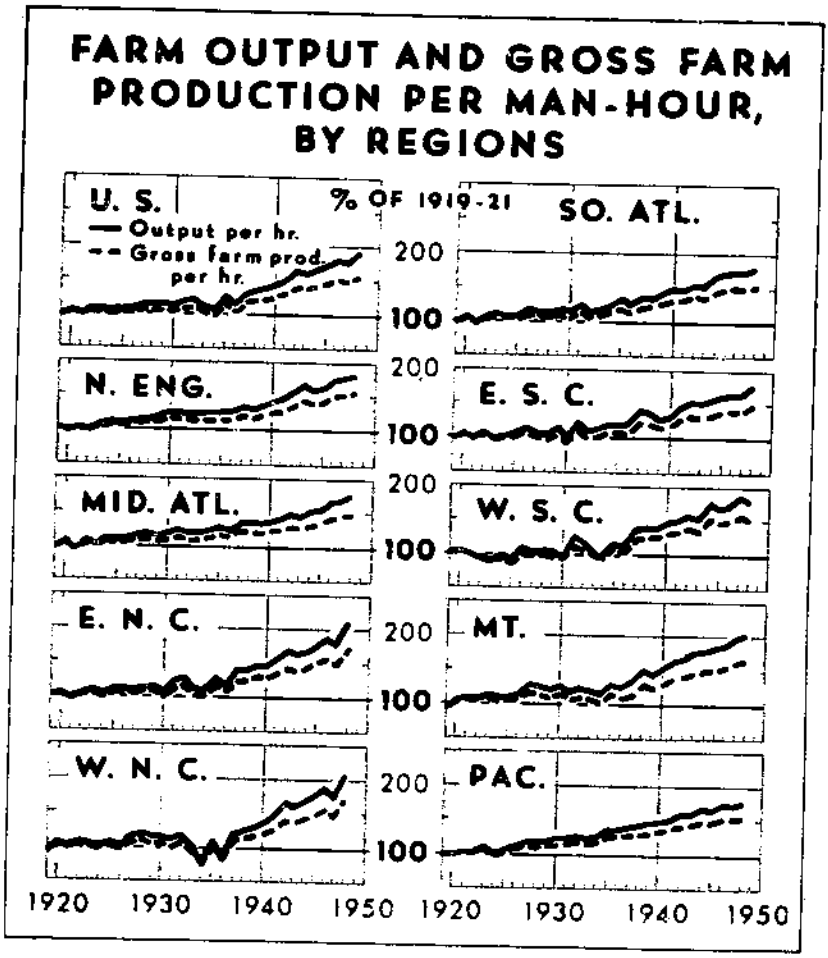

FIGURE 11.--Greater differences among areas of the country have occurred in the increase in farm output per hour than in gross production per hour because of the regional variation in the rate of farm mechanization and the displacement of horses and mules. Either measure indicates a definite upward trend in farm labor productivity since 1910, in every area. The rise was especially rapid during World War II.

in the statistics for the geographic divisions during each subperiod and more particularly, during the entire 25 years (table 10). There are, however, some appreciable differences. In the West North Central States the rate of increase in gross production per hour during World War II was more than 1 percent higher than in any other area. A greater difference in farm output per hour occurred because of the rapid change-over to mechanical power in this area. The remarkable step-up in the rate of increase from the interwar to the World War II period is common to all areas.

TABLE 10.--*Change in farm output and gross farm production per man-hour, by geographic division, indicated periods, 1919-46*

Geographic division	Annual rate of change						Total change 1919-21 to 1944-46	
	1919-21 to 1937-39		1937-39 to 1944-46		1919-21 to 1944-46			
	Farm output	Gross farm production	Farm output	Gross farm production	Farm output	Gross farm production	Farm output	Gross farm production
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	1.6	0.9	3.1	2.7	2.0	1.4	64.5	41.7
Middle Atlantic	1.7	1.1	2.3	1.7	1.9	1.2	58.9	36.6
East North Central	2.0	1.3	3.2	2.5	2.3	1.6	77.1	50.1
West North Central	1.3	.6	5.0	4.1	2.3	1.6	77.2	48.3
South Atlantic	1.8	1.2	3.0	2.4	2.1	1.6	70.0	47.7
East South Central	1.7	1.0	2.5	2.2	1.9	1.3	59.9	37.5
West South Central	1.8	1.2	3.4	2.7	2.2	1.6	72.4	48.5
Mountain	2.0	1.1	3.6	3.1	2.4	1.6	81.4	50.8
Pacific	2.0	1.1	2.1	2.2	2.1	1.6	67.8	49.5

Effects of Changes in Importance of Enterprises on Labor Productivity

Differences in production per hour of work devoted to different crop and livestock enterprises, and to the same enterprises in different areas, frequently are very great. Consequently, changes in the relative importance of the various enterprises within a given area, or changes in their importance from area to area, have a decided effect on production per hour of labor when enterprises are combined into all crops, all livestock, and gross farm production.[9]

Changes in the proportion of the total time spent on the various enterprises or changes in the "pattern" of man-hours affect average production per hour, as some enterprises return more or less product per man-hour than the average of all enterprises. The pattern of man-hours can be changed in several ways. Changes in the composition of production within an area may affect the pattern of man-hours and average production per hour. For example, the great expansion in soybean production in the Corn Belt during the war increased average production per hour for the area because more soybeans were produced per hour of labor than the crops they displaced. Similarly, there may be a shift in the importance of an individual enterprise among areas. Average production of corn per

[9] The effects of changes in relative importance of enterprises on average production per hour within and among regions were analyzed for crops, livestock, and gross farm production, separately. The relative importance of enterprises at any time was measured by the proportion of total man-hours devoted to them, for each of the periods, 1919-21, 1937-39, and 1944-46, and for each geographic division and the United States. The data on production per hour for the groups of enterprises were reweighted into all crops, all livestock, and gross farm production, by holding constant the proportion of man-hour requirements devoted to each group of enterprises, as feed grains, food grains, etc. The resulting data on production per hour gave the same relative importance to each enterprise group in each of the periods. Changes in production per hour based on the reweighted data were compared with changes based on the originally calculated data to measure the effects of shifts in importance of enterprises.

man-hour in the United States will be raised, for example, if production in the Corn Belt increases more than production in other regions.

Decided changes in mechanization and other labor-saving factors in production for a given enterprise can change the pattern of man-hours, and thus affect average production per hour indirectly as well as directly. The wheat crop provides a good example. The direct effect of the rapid mechanization of the production of wheat was to raise the average production of all crops per hour of direct labor. But as the mechanization progressed a smaller proportion of total man-hours was devoted to wheat, and as this crop returns a relatively high product per man-hour, the indirect effect was a lowering of average production of all crops per hour. The direct effect of mechanization, of course, was much more important than the indirect effect.

During World War II, labor was scarce and production demands were high. Agriculture helped to meet this challenge by devoting relatively more labor to the crops and kinds of livestock of which greater quantities of products were produced per man-hour. This was accomplished chiefly by spending relatively more time on the more labor-extensive livestock enterprises, and more of the crop labor in the more labor-extensive areas. Although these changes accounted for only about 3 percentage points of the 23 percent rise in gross farm production per hour during the war, they were timely and significant.

Increases in the production of oil crops, feed grains, and vegetables other than truck crops, in the regions that are most suitable for them contributed substantially to the wartime gains in the productivity of labor. In most regions during the war relatively greater production of meat animals and poultry increased the production per man-hour of direct labor spent on livestock. Moreover, a greater proportion of farm man-hours was devoted to livestock production than before the war. This tended in most regions to hold down the increase in labor productivity, as crop production generally yielded more product per hour of work than did production of livestock.

Although there were some notable exceptions, the general tendency at the end of the period between the wars was to devote a greater proportion of farm labor to the more labor-intensive crop and livestock enterprises than at the beginning of the period. This means, chiefly, that relatively more time was devoted in 1937-39 than in 1919-21 to producing dairy products, truck crops, fruits, and tobacco, and less to producing meat animals and food and feed grains. These interwar changes in the importance of various crop and livestock enterprises held down the increase in gross farm production per man-hour. Without these changes production per man-hour would have increased 27 percent instead of the 20 percent actually recorded.

It must be recognized that labor productivity is only one of many factors that farmers must consider when making adjustments among enterprises. A certain combination of enterprises may result in maximum production per man-hour but other combinations may result in higher net returns, or in a more complete utilization of the farm labor force, etc. In 1937-39 almost a billion and a half fewer man-hours were spent in producing feed and food grains than in 1919-21. Tremendous quantities of these grains could have been

TABLE 11.--*Average value of production per man-hour of labor used for selected groups of crops, and kinds of livestock, by geographic division, 1935-39*

Item	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Feed grains	0.46	0.60	0.95	0.83	0.30	0.31	0.36	0.65	1.11	0.60
Hay	1.42	1.35	.93	.67	.91	.80	.55	.70	1.05	.83
Food grains	---	.85	1.02	1.15	.61	.55	1.33	1.13	2.03	1.11
Trucks crops and gardens	.58	.66	.48	.32	.69	.41	.36	.66	.96	.55
Vegetables, except truck	1.80	1.21	.91	.91	.79	.67	.63	1.08	1.55	.99
Fruits and nuts	.69	.61	.54	.36	.70	.49	.36	.58	.58	.57
Sugar crops	.63	.77	.50	.54	.28	.22	.35	.60	.85	.44
Cotton	---	---	---	.30	.26	.27	.29	.45	.58	.28
Tobacco	1.10	.51	.42	.48	.37	.48	---	---	---	.41
Oil crops	---	1.06	1.51	1.31	.30	.22	.26	.96	2.05	.52
All crops	.93	.78	.86	.79	.39	.34	.36	.74	.81	.55
Milk cows [1]	.75	.75	.51	.36	.55	.39	.40	.48	.72	.50
Meat animals [1]	1.31	1.82	2.54	2.31	1.43	1.50	1.29	1.27	1.33	1.88
Poultry [1]	2.10	1.60	1.14	.92	1.22	.89	.90	1.12	1.38	1.13
All meat animals and animal products [1]	1.00	.98	.94	.91	.87	.70	.73	.85	.97	.89
All meat animals and animal products [2]	.49	.47	.39	.35	.35	.29	.28	.32	.43	.36
Gross farm production [3]	.60	.55	.54	.50	.34	.29	.31	.53	.62	.43

[1] Gross livestock production per hour of labor; includes product added plus the value of feed and pasture consumed.

[2] Product added per hour of labor.

[3] Gross farm production includes the farm-produced power of horses and mules. Gross production per hour in 1935-39 was less than that for either crops or livestock in the South Atlantic Division, and was the same as for livestock and less than for crops in the East South Central Division. These apparent inconsistencies result chiefly from the narrow range between crop and livestock production per hour of direct labor and the fact that gross production per hour is based on total man-hours of direct labor for crops and livestock plus an allowance for overhead work and farm maintenance.

produced in 1937-39 with this expenditure of labor. But there was not a market for these quantities and farmers had turned to other enterprises, as fruit, truck crops, and livestock, even though the change meant a less rapid climb in production per man-hour of labor.

Most of the changes in enterprises that came during the interwar period also prevailed during the quarter-century that included both the interwar and World War II periods. In 1944-46 slightly more of the direct labor for all crops was spent in the more labor-extensive areas than in 1919-21, and somewhat more of the direct labor for livestock was devoted to the more labor extensive livestock enterprises, particularly poultry. These changes tended to increase gross farm production per hour. The proportion of farm labor devoted to the more labor-intensive crops and to livestock production increased, however, and these changes held down the increase in gross farm production per hour during the 25-year period. If these changes had not taken place production per hour would have risen by 52 percent instead of 47 percent.

Although the general effects of changes in relative importance of enterprises on production per hour are clear, there are some noteworthy variations in some of the geographic divisions. Some of these highlights are given in the following section.

Regional Variations in Effects of Changes in Importance of Enterprises on Production per Hour.--There is considerable variation in the quantity of products returned per man-hour spent on the different crop and livestock enterprises within an area and on the same enterprises within different areas. In the United States as a whole, in 1935-39, the value of production of food grains per man-hour was four times greater than cotton and the value of production of meat animals per man-hour was almost four times greater than milk (table 11). Even larger differences in value of production per hour among enterprises were found in certain of the Geographic Divisions.

A greater quantity of crops than livestock products are produced per man-hour in all areas. In 1935-39, crop production per hour ranged from about 10 percent more than livestock in the South Atlantic States to more than 2 1/4 times as much in the Mountain States. Crop production per hour was about 50 percent more than livestock production in the United States as a whole.

The South Atlantic Division is the only one in which changes in importance of enterprises resulted in a greater increase in gross production per hour than would have occurred without such changes during the interwar period (table 12). It was a significant influence, as more than 40 percent of the increase in gross production per hour was associated with changes in importance of enterprises. This resulted chiefly from a decrease in cotton production and an increase in tobacco which returns more per man-hour than cotton.

Many factors have a bearing on the effect of changes in importance of enterprises on gross production per hour and these factors occur in a myriad of combinations. In the regional example just given, crops are very important from the labor standpoint. They used almost four-fifths of the man-hours of direct labor for crop and livestock production in the South Atlantic States, in 1935-39, and so weight heavily the gross farm production per hour. On the

[10] Livestock production as used here refers to "product added" by livestock. For method of calculating product added, see page 3.

TABLE 12.--*Change in gross production per man-hour associated with change in relative importance of enterprises, by geographic division, indicated periods, 1919-46*[1]

Geographic division	Change in production per man-hour from 1919-21 to 1937-39			Change in production per man-hour from 1937-39 to 1944-46			Change in production per man-hour from 1919-21 to 1944-46		
	Actual	Assuming no change in relative importance of enterprises	Difference	Actual	Assumming no change in relative importance of enterprises	Difference	Actual	Assumming no change in relative importance of enterprises	Difference
	Percent	*Percent*	*Percentage points*	*Percent*	*Percent*	*Percentage points*	*Percent*	*Percent*	*Percentage points*
New England------	17.8	18.2	- 0.4	20.2	6.4	13.8	41.7	25.7	16.0
Middle Atlantic--	21.1	24.4	- 3.3	12.8	8.5	4.3	36.6	34.9	1.7
East North Central	26.0	37.5	-11.5	19.1	24.6	- 5.5	50.1	71.4	-21.3
West North Central	12.2	30.5	-18.3	32.2	34.6	- 2.4	48.3	75.7	-27.4
South Atlantic---	24.5	14.1	10.4	18.6	13.5	5.1	47.7	29.5	18.2
East South Central	18.8	19.4	- .6	15.8	14.0	1.8	37.5	36.1	1.4
West South Central	23.3	27.5	- 4.2	20.4	12.3	8.1	48.5	43.1	5.4
Mountain---------	22.2	28.4	- 6.2	23.4	23.0	.4	50.8	58.0	- 7.2
Pacific----------	28.7	37.8	- 9.1	16.2	13.8	2.4	49.5	56.8	- 7.3

[1] The sum of the figures in comparable columns for the two subperiods will not equal that for the entire period because a different base is used for the 1937-39 to 1944-46 subperiod.

other hand, livestock took almost three-fifths of the direct man-hours in the New England States during 1935-39 and these enterprises rather than crops had the greatest influence on gross production per hour in this region. In the South Atlantic Division, the difference between crop and livestock production per hour was small and it would have taken a large change in importance to exert much influence on gross farm production per hour. In some other regions the spread in production per hour between crops and livestock was so great that small changes in importance were reflected in gross production per hour of labor.

In all geographic divisions, except the South Atlantic, changes in relative importance of enterprises slowed the increase in gross production per hour during the interwar period. This occurred because relatively more time was spent on the more labor intensive crops and kinds of livestock. The most substantial changes of this sort took place in the East and West North Central Divisions. In the latter division the increase in gross farm production per hour would have been one and one-half times greater and in the East North Central it would have been almost 50 percent greater if there had been no changes in importance of enterprises from 1919-21 to 1937-39. In essence, the further mechanization of some of the more labor-extensive crops in these areas has meant that farmers spend a greater proportion of their time on livestock and on the more labor-intensive crops and have thus slowed the increase in the productivity of their labor.

During World War II the trend toward the production of livestock and the more labor-intensive crops continued in the two North Central Divisions. In the other regions from 2 percent to more than 66 percent of the increase in labor productivity resulted from increases in the relative importance of the more labor-extensive kinds of crop and livestock enterprises. In the New England States, for example, more than 25 percent of the man-hours spent at farm work in 1944-46 were devoted to enterprises which are rated as highly labor efficient as hay, vegetables except truck, and poultry, compared with less than 20 percent in 1937-39.

During the 25-year period since the end of World War I, the increase in labor productivity would have been greater if there had been no changes in importance of enterprises in the two North Central Divisions and the two Western Divisions. But in the other areas the changes in importance of enterprises increased gross production per hour. Changes among the different crops and among the different kinds of livestock were the most influential in these instances.

Effects of Changes in Importance of Enterprises on Production per Hour in the United States.--Gross farm production per hour in the United States would have increased 26.8 percent from 1919-21 to 1937-39, rather than 19.5 percent, if the distribution of man-hours among both enterprises and areas had not changed between 1919-21 and 1937-39 (table 13). An increase in the proportion of farm labor spent on the more labor-intensive crops and kinds of livestock was chiefly responsible for this lower rate of increase, but some shifts to the more labor-intensive areas also contributed to it.

During World War II change in relative importance of enterprises among regions was a noteworthy influence. During the 1944-46 period, 9 billion of the 20 billion man-hours used annually

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in farm work in the United States were used in the geographic divisions that have a gross production per hour that is below the average. In the 1937-39 period, 10 billion out of 21 billion hours were used in the less labor productive areas. As there is considerable difference in the quantity of farm products produced per hour of labor in these two groups of areas this shift was a decided influence in raising the increase in labor productivity in the country as a whole. Changes to the more labor-extensive crops and kinds of livestock had little effect on gross production per hour during World War II.

For the entire quarter-century changes in relative importance of crop and livestock enterprises within regions retarded, and regional shifts in enterprises accelerated, the rise in gross production per hour. The former was the most important. This means that if the distribution of total man-hours among areas and enterprises in 1944-46 had been the same as it was in 1919-21, the increase in the productivity of labor would have been greater than ctually occurred.

AREA DIFFERENCES IN LABOR PRODUCTIVITY

Not only was there considerable variation among geographic divisions in the trend and in the year-to-year changes during the last several years in the quantity of farm products produced per hour of labor, but similarly, during any given year or period, the production per hour has not been the same in all areas. A combination of several factors determines the productivity of labor, and the combination is not uniform by areas. Varying quantities of different products are obtained per unit of labor, hence the kinds of enterprises carried on are of primary importance. But, even a different products are obtained per unit of labor, hence the kinds

TABLE 13.--*Change in gross production per man-hour associated with change in relative importance of enterprises, United States, indicated periods, 1919-46* [1]

Item	Unit	1919-21 to 1937-39	1937-39 to 1944-46	1919-21 to 1944-46
Actual change in production per man-hour	Percent	19.5	23.0	47.0
Change in production per man-hour assuming no change in relative importance of enterprises within regions and among regions	Percent	26.8	19.8	51.9
Difference	Percentage points	-7.3	3.2	-4.9
Change in production per man-hour associated with change in relative importance of enterprises within regions [2]	Percentage points	-6.9	.4	-7.9
Change in production per man-hour associated with change in relative importance of enterprises among regions [2]	Percentage points	- .4	2.8	3.0

[1] The sum of the figures for the two subperiods will not equal that for the entire period, in most instances, because a different base is used for the 1937-39 to 1944-46 subperiod.

[2] Slight adjustments were made in these figures for each period to permit a summation to the total difference.

single enterprise is handled in a variety of ways, and under a variety of conditions, in the United States, which results in differences in labor productivity.

Area Differences in Labor Productivity for Individual Enterprises

Some crops are grown in all parts of the country while others are grown only in limited areas. Whereas cotton, because of its long growing season, is grown only in the southern part of the United States, corn is widely distributed, but concentrated production is found in the level fertile area stretching westward from Ohio to the Great Plains. Likewise, cotton production is more concentrated in some parts of the South than in others. Concentration occurs partly because more corn or more cotton can be produced per unit of input than in other areas. As labor is the most important input, the ratio of production to man-hour requirements provides a major clue to the output per unit of total inputs.

What are the reasons behind area differences in ratio of production to labor requirements? The data in appendix table 39 provide part of the answer, in regard to corn. The Corn Belt forms a part of each of the East and West North Central Divisions and more corn is obtained per hour of labor in these divisions than elsewhere. No other area in the world has such favorable conditions for corn. The warm summers, relatively high summer rainfall, and other climatic features are particularly adapted to corn and the level land and deep, fertile soils are conducive to high yields. Hybrid seed, where used, has added about 20 percent to the yield. Here many of the operations, all the way from breaking the land in the spring through picking and storing or marketing the corn in the fall, are done with tractors and mechanized equipment.

Other areas, because of relatively low yields or high man-hour requirements or both, do not produce as much corn per hour of labor. In the New England States much of the corn is put up for silage which is a time-consuming job. The uneven topography and small fields in this area are not adapted to machine methods so the labor requirements per acre are high and production per hour is rather low despite the good yields.

The story is much the same for cotton except that it is not raised in areas that have a growing season of less than 200 days. It has rather exacting requirements regarding rainfall as to amount and distribution, but it can be produced successfully on almost any well-drained soil. Where cotton will be grown within the area climatically adapted to it, including the western irrigated areas, is dictated chiefly by economic factors.

The time required to pick cotton is closely related to the yield but the man-hour requirements up to picking time, excluding some hand operations such as chopping, depend chiefly on the kind of power and the size of equipment used. This varies all the way from half-row horse or mule equipment to four-row tractor machinery. Thus, in the western areas where tractors and associated equipment are more widely used the time before harvest is low. In the Pacific and Mountain regions the high yields raise the time for harvest but these same high yields coupled with the moderate number of total hours per acre result in a big production per man-hour (appendix table 40).

Higher than average yields of cotton were obtained in the South Atlantic and East South Central Divisions in 1943-45. The nature of the topography, the small irregular fields, and a relatively ample labor supply have delayed farm mechanization in these areas. This accounts for the above-average man-hours per acre and the below-average production per hour of direct labor. The lowest yield per acre in 1943-45 was in the West South Central States. The fewest man-hours per acre were also required there because of the low yields and the high level of mechanization, particularly in the western high plains. The low yield, coupled with the relatively lower labor requirement per acre, resulted in a production per man-hour above the average.

Wheat, though not as notable a user of farm labor as corn or cotton, also illustrates the regional variation in productivity of labor. Excluding mixed wheat, six commercial classes of wheat are produced in four more-or-less well-defined areas in the United States. The most important class is hard red winter which is raised in an area centering in Kansas and including parts of Nebraska, Colorado, Oklahoma, and Texas. To the north--in the Dakotas, western Minnesota, and eastern Montana--hard red spring wheat is grown, as are also the durum and red durum classes. White wheat is produced chiefly in the Columbia basin of Washington, Oregon, and Idaho. The sixth class of wheat, soft red winter, is grown in the southern part of the Corn Belt. The climate, topography, and soils, and the methods used in raising wheat vary among these areas, which means that the yield and man-hours per acre are different (appendix table 41).

In the Pacific States which include a large part of the white wheat area, wheat is produced chiefly with a system of summer fallow and yields per acre harvested are good; they were almost 50 percent above the United States average in 1943-45. As it takes 2 years to produce wheat on summer fallow, the annual yields would be lower. The combined harvester-thresher first came into common use in this region and is still more widely used there than elsewhere. Other operations also are highly mechanized and the number of man-hours per acre used are less than the average despite the high yield. This results in a relatively high production per hour. Yields are not so high in the West South Central, Mountain, and West North Central Divisions, but the level plains lend themselves admirably to the use of machine methods and large-scale operations which result in a low labor requirement and a labor productivity that is above average.

Wheat is grown in the Corn Belt and other areas chiefly because it fits well in the crop rotation and its inclusion provides for a more uniform seasonal distribution of labor and power. It also serves as a nurse crop for hay and green-manure crops. But labor requirements are relatively high and the quantity of wheat produced per hour of labor is below the average of the whole country.

The range of the differences per hour among geographic divisions is much less in livestock production than in that for crops. The quantity of corn produced per hour in the different divisions, for example, varied in 1943-45 from 35 percent to 177 percent of the average for the whole country, whereas the range in milk production per hour was less than half of this figure. The quantity of livestock products obtained per animal is much less affected by rainfall, temperature, soils, and other physical factors than is

true of crop yields. Or, put another way, crops respond to favorable or unfavorable conditions to a greater degree than livestock. During the drought of the 1930's, for example, livestock production per animal dropped much less than the yields of crops. Likewise, the time required to feed and care for an animal is more nearly the same in the different geographic divisions than is true of the time spent on an acre of most crops. To illustrate: An acre of wheat is seeded and harvested by vastly different methods in the various areas and even with identical yields has greatly different labor requirements, whereas sows on commercial farms are handled in more nearly the same way and there is much less difference in labor requirements, area by area.

Even though the regional differences in livestock production per hour are not so large as those for crops, these differences are considerable. And their influence on over-all farm labor productivity is increasing as the proportion of the farmers' workday spent in caring for livestock is growing larger. In 1947, about two-fifths of the direct man-hour requirements for crops and livestock in the whole country was for livestock whereas it was approximately one-third in 1910. The milk-cow enterprise now requires more labor than any other on farms in the United States, and it is illustrative of the regional variation in the production of livestock products per hour of labor.

Milk is sold from the farm or used on the farm where produced in several forms. In regions that have large urban populations such as the three northeast divisions and the Pacific States, a greater share is sold for consumption as fresh milk or cream. Milk of high quality is demanded by strict sanitary regulations in these areas. This better care of the cows and the milk results in a higher quality of dairy product, but it also adds to the labor required on the farms (appendix table 42). High-producing cows are the rule in these commercial areas and this means more time required to milk and to care for and market the product. Man-hours per cow are high because of the sanitary methods used and the high production per cow but they would be even higher were it not for two other factors. First, the herds are larger and the large-scale operations have advantages; and second, more milking machines are used. But as the milk production is relatively higher than the labor requirements per cow, the milk production per hour is above the average.

Many of the milk cows in other regions are of dual-purpose or beef type. Frequently the number milked depends on the needs of the farm family, and more attention is given to the production of beef. The time spent on milk cows is low but the production is relatively lower. Throughout these regions, surrounding the larger cities, dairy farms are located that compare favorably with farms in the commercial dairy regions. But such farms are in the strict minority and have little effect on the average of the region.

The regional pattern of dairy farming coincides fairly well with that for poultry raising, particularly egg production. This is not necessarily because these enterprises fit well together in the farm organization, but rather because milk and eggs are both semi-perishable products and so are produced close to consuming centers. The four areas in which the greatest quantity of milk was produced per hour of direct labor, in 1943-45, were also high in number of eggs obtained per man-hour spent on the laying flock (appendix table 43). There was one notable change in rank, however, among

these four areas. New England was fourth in milk production per hour but first in egg production. The rate of lay was highest there whereas the region ranked third in milk per cow. The labor requirements for layers were slightly above the United States average but were 15 percent above the average for milk cows. One reason for the relatively less time per hen was the large proportion of layers in large flocks. Of the three southern areas, the West South Central shows the greatest number of eggs produced per hour. But in all these areas a sizable proportion of the eggs are for home consumption and the production per hen and per hour of labor is less than the average.

Area Differences in Labor Productivity for All Crops, Livestock, and All Farm Work

Thus far in this section production has been measured in bushels, pounds, etc. in arriving at regional variations in quantities of individual products obtained per man-hour. In carrying this analysis an additional step, and measuring area differences in production of groups of products or all farm production per hour, a common denominator is necessary to add the items of production. The common denominator used was average geographic division prices in 1935-39. Use of other weights--average United States prices, for example--would give somewhat different regional variations in quantity of production per hour. A discussion and analysis of the relation of price weights to measures of labor productivity are given in the Appendix, page 63.

Crop production in the United States is characterized by extreme variation. This applies to the kinds of crops grown, to the yields obtained, to the methods used, and to many other aspects of crop production. All these variations exert an influence on the differences among areas in crop production per hour of labor.

The West North Central and New England regions represented almost the extremes in crop production per acre in 1943-45--one of

TABLE 14.--*Crop production per man-hour of direct labor and related factors, by geographic division, average 1943-45*

[For indexes, United States = 100]

Geographic division	Crop production per man-hour	Crop production per acre of cropland [1]	Man-hour per acre of cropland [1]	Proportion of farms reporting tractors [2]	Value of land, buildings, and equipment per man-hour [3]
	Index	*Index*	*Index*	*Percent*	*Index*
West North Central	165	66	40	61	172
New England	154	195	126	31	156
East North Central	149	106	71	56	189
Mountain	141	76	54	44	143
Pacific	130	197	150	38	141
Middle Atlantic	118	138	116	50	127
South Atlantic	63	184	287	11	42
West South Central	62	81	129	25	68
East South Central	56	142	250	7	40
United States	100	100	100	34	100

[1] See footnote 6, page 12.

[2] From the Census of Agriculture, 1945 *(11)*.

[3] Value on January 1, 1945 from the 1945 Census of Agriculture *(11)*. Man-hours required by crops are for 1943-45.

the important varying factors--and were drastically different in intensity of labor use, yet both were at the top in crop production per hour (table 14). In other words, the labor used on crops in both of these regions was highly productive but it was achieved by very different methods in the two areas. The man-hours per acre were high in the New England States. Fewer of the farms had tractors but the uneven topography, small fields, production methods used, and kinds of crops grown were important influences in the high labor requirement per acre.

In the West North Central Division, on the other hand, two-fifths of the average number of hours were used per crop acre. More of the farms had tractors. Crop production is on an extensive basis and few operations are necessary on some of the predominating crops, particularly small grains. In this division the high crop production per man-hour was achieved by low production per acre and reduced hours per acre, whereas in New England it resulted from high production and many hours per acre.

Another illustration of two areas that are greatly different in labor used per acre but similar in quantity of crops obtained per hour, is provided by the South Atlantic and West South Central Divisions. Farm mechanization is more advanced in the latter division; more of the farms have tractors and more land and equipment are combined with an hour of work than in the South Atlantic Division. Cotton is important in both regions but tobacco is grown only in the eastern area and many operations in growing, harvesting, and curing it have proved difficult to mechanize. The same may be said of fruits and truck crops which are more prevalent in the South Atlantic States. The crop yields however, in each of these areas during 1943-45 were commensurate with the labor used, and crop production per hour was nearly the same, although it was much less than the United States average.

In general, high crop production per hour of work is obtained in the areas where soils are productive and the topography and crops grown are suited to the widespread use of machines. Farm mechanization has progressed rapidly in these areas, more of the farms are equipped with tractors and tractor machines, and less labor is used per unit of land. But in the South much of the work on most crops is done by hand. Remarkable progress has been made, however, on the mechanization of some southern crops. For example, mechanical dryers and special self-propelled combines have been widely accepted by rice growers in Texas, Louisiana, and Arkansas. Mechanization of the more dominant crops, as cotton and tobacco, will come slowly, because of the many engineering, economic, and social problems involved.

In general, the same parts of the country that were above average in quantity of crops produced per hour of labor, in 1943-45, were also high in livestock and total farm production per hour (table 15). Crops take around three-fourths of the direct man-hour requirements in the three southern divisions and so set the pattern for both farm output and gross farm production per hour in these areas. In the rest of the country, livestock is more important and exerts a greater influence on all farm production per hour.

Among the kinds of livestock, milk cows are by far the greatest users of labor. The three groups of States (New England, Middle Atlantic, and Pacific) where value of milk produced per man-hour was highest were also at the top in all meat animals and animal

TABLE 15.--*Crop, livestock, and total farm production per man-hour and related factors, by geographic division, average 1943-45*

[For indexes, United States = 100]

Geographic division	Farm output per hour	Gross farm production per hour	Horse and mule production--percent of gross production	Crop production per hour	Livestock production per hour [1]	Labor requirements for livestock [2]
	Index	*Index*	*Percent*	*Index*	*Index*	*Percent*
Pacific	138	130	2.5	130	116	34
New England	136	133	5.7	154	140	57
West North Central	128	128	6.8	165	100	53
Mountain	124	124	6.8	141	89	49
East North Central	122	120	6.1	149	104	53
Middle Atlantic	112	113	7.8	118	122	21
South Atlantic	70	74	10.9	63	100	29
West South Central	70	72	9.1	62	82	29
East South Central	58	63	13.7	56	76	23
United States	100	100	7.8	100	100	39

[1] Product added by all livestock except horses and mules.

[2] Percentage of direct man-hour requirements for crops and livestock, excluding horses and mules, required by livestock.

TABLE 16.--*Index numbers of gross farm production per man-hour and value of farm property associated with a man-hour of labor, by geographic division, average 1943-45*

[United States = 100]

Geographic division	Gross farm production per man-hour	Value of farm property per man-hour [1]		
		Land and buildings	Machinery and equipment	Livestock
New England	133	110	132	112
Pacific	130	162	104	85
West North Central	128	129	140	146
Mountain	124	118	120	183
East North Central	120	138	152	127
Middle Atlantic	113	89	172	127
South Atlantic	74	56	44	49
West South Central	72	80	68	78
East South Central	63	51	40	51
United States	100	100	100	100

[1] Value of indicated items of farm property on January 1, 1945, from the U. S. Census of Agriculture and 1943-45 average number of man-hours for all farm work.

products obtained per hour. Two of these divisions, New England and Pacific, also outranked all others in farm output and gross farm production per hour.

There are greater differences among regions in output per hour than in gross production per hour. This reflects the variation in the proportion of farm power purchased from industry in the form of tractors, gasoline, oil, etc., and those produced on the farm in the form of work stock and feed crops. A greater than average proportion of farm power is produced on the farms in the southern areas. Use of gross farm production per hour, which includes farm-produced power as an item of total production from each hour of farm work, raises the relative position of the southern areas over that obtained from use of the farm-output measure. The reverse is true of divisions like the Pacific and New England where farm-produced power is relatively unimportant. The Pacific region ranks above New England in farm output per hour, but the opposite is true for gross production per hour, because farm-produced power in the Pacific region is of minor consequence.

The data in table 16 summarize the reasons behind the area variations in farm production per hour. They indicate that farmers produce fairly well in accordance with the land, tools, and animals they have to work with. In the areas in which production per hour was above average, the value of each capital item was also above average, except for land and buildings in the Middle Atlantic States and livestock in the Pacific Division.

The amount of the capital items associated with an hour of work in the different areas is closely related to the type of farming. Livestock ranching in the Mountain States is reflected in the high value of livestock with which the ranchers work. This relationship would be even more apparent on a head basis, excluding the smaller kinds of livestock, because the average value per head is lower in this area. The ranch land likewise has a low value and the ratio of man-hour requirements to acres would be wider than that based on values. On the other hand, the high value of land and buildings associated with an hour of work in the Pacific Division reflects (rather than a great number of acres) the productiveness of the land, which has been augmented by construction of irrigation facilities.

The balance among the capital items in the North Central States represents the diversified farming--corn, small grains, hay, dairy cows, hogs, beef cattle--that predominates there. Farmers in the South Atlantic and South Central Divisions had relatively little land, machinery, and livestock, to work with and the product of their effort was small.

If the data in table 16 were on a per worker basis rather than on a man-hour basis, the rank of the areas would be materially different in regard to both the production and the capital items. The New England States, for example, have many part-time farms, and workers on these farms put in fewer hours at farm work than the average farm worker in the United States. Conversely, West North Central farmers spend more than the average number of hours at farm work. On a per worker basis, then, the New England area would be down the scale and the West North Central area would rank nearer the top.

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LABOR REQUIREMENTS, FARM EMPLOYMENT, AND LABOR PRODUCTIVITY

Man-hour requirements and farm employment[11] are the two commonly used measures of the labor input in farming. Certain advantages are inherent in the use of each measure but in most analyses of farm labor they supplement one another. In a study of farm labor productivity, estimates of production of individual commodities, groups of commodities, or total production per man-hour, help to explain the changes over time and the area differences in production per worker. Although an enterprise comparison is impossible on the basis of production per worker, total farm production per worker and hours per worker provide valuable clues to the well-being of farm people.

Labor productivity deals with workers or people, and the worker rather than an hour of work is the unit upon which the American family and other institutions are built. In this respect, production per worker is a more realistic measure of labor productivity than is production per man-hour. If, on the other hand, worker productivity is high merely because the work day or work week is long it is a less meaningful measure. An adequate analysis of labor productivity should consider both production per worker and production per hour.

The trends in man-hour requirements and number of farm workers have been similar since 1919 in the United States as a whole and in all parts of the country (fig. 12). Year-to-year movements and changes over periods of a few years, likewise, have usually been in the same direction but frequently the magnitudes of such short-time changes have been far from proportional. Labor requirements are more sensitive to changes in farming. They vary more in accordance with changes in acres and in yields of crops and in numbers and production of livestock and livestock products than is true of number of workers. A yield of corn, a little higher than usual, for example, means an increase in man-hour requirements during the harvest season, but by working harder and longer the usual number of workers would be able to gather the crop. On the other hand, during slack seasons or periods, the farm workers adapt themselves to the needs of the job and work less hard and fewer hours in a day.

During recent years farm operators and unpaid family workers have constituted almost four-fifths of all farm workers. A farmer does not "lay off" himself or a member of his family who works without wages merely because work is slack for a month or so, or even for a longer time. In addition, some of the 20 percent who

[11] The farm-employment data used in this publication are those estimated by the Bureau of Agricultural Economics from 1936 through 1948, as an extension of the series published in Trends in Employment in Agriculture, 1909-36 *(8)*. These series extended back to 1909 on a United States basis and to 1925 on a State group basis. The distribution of the United States farm employment among geographic divisions for 1919-24 was based on data from Changing Technology and Employment in Agriculture *(7)*. Through 1948, persons (farm operators, unpaid members of their families, and hired workers) doing the equivalent of 2 or more days of farm work during the week of inquiry each month were counted as employed on farms. Beginning with January 1949, the BAE has estimated the number of farm workers on the basis of a broadened definition of farm employment; see Farm Labor, January 1949 (Processed) *(9)*. The new series was available for relatively few years when this analysis was made and the old series was used throughout this publication.

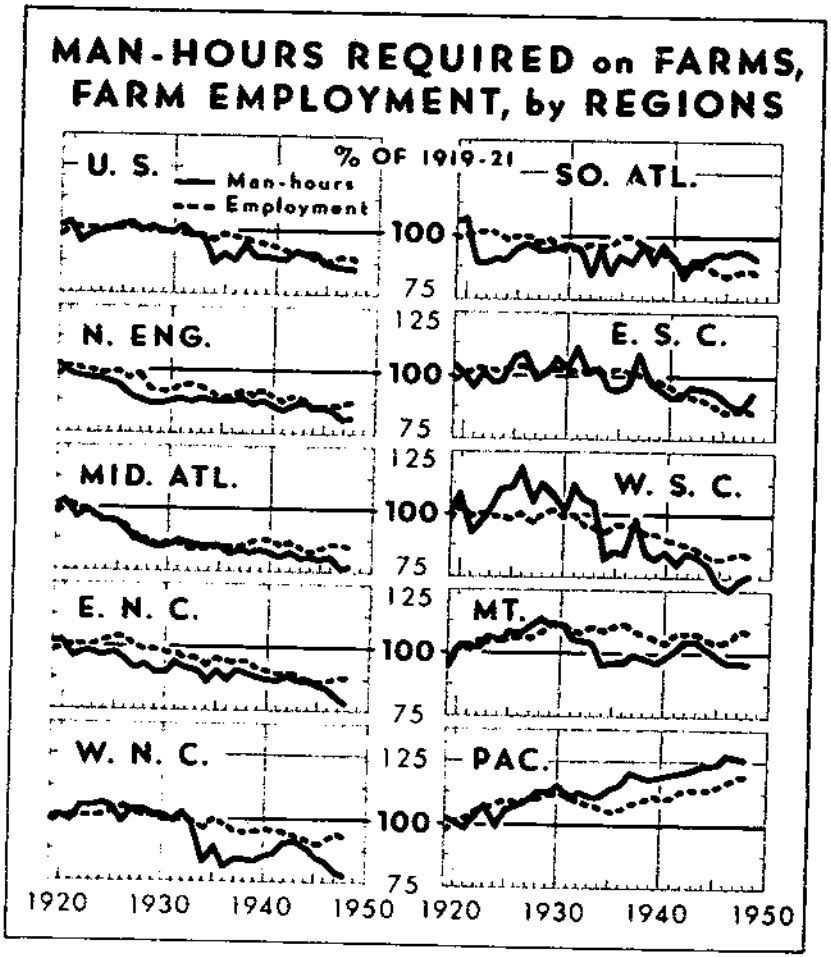

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FIGURE 12.--Total labor requirements and farm employment have shown similar long-time trends in each geographic division. Employment and labor requirements have shown upward trends in the Pacific States in contrast to the downward trends in practically all other regions. Underemployment of farm workers during the depression and drought of the 1930's is indicated by the gap between employment and relatively lower man-hour requirements.

are hired workers are also members of the farmer's family and he would probably want to keep them on the farm.

The years, 1919-21, the base period for the data shown in figure 12, were years of relatively full employment as a whole. There was some return of soldiers and war workers to farms and the severe freeze in 1921 and the ravages of the boll weevil resulted in some lowering of labor requirements, but trends based on these years must be interpreted in the light of this full-employment situation. The relation between trends in labor requirements and farm em-

ployment was the same during both World Wars; employment was down relative to labor requirements (table 17). Both wars seriously disturbed the farm labor force; this was particularly true of World War II because of its length and severity. Many farm workers were drawn into the armed forces and the war industries. Those remaining were supplemented by children, women, and older workers. In addition, foreign workers were brought in for farm work, war prisoners were used, and, in some instances, soldiers, industrial, and "white-collar" workers helped during rush seasons. But almost everyone worked harder and more hours per day and per year.

The return of soldiers and war workers to farms resulted in an increase in number of both family and hired workers during 1946 and 1947, but a slight reduction in total farm employment occurred in 1948. These changes likewise follow the pattern of the few years that came after World War I, except that in that instance the postwar upward movement in farm employment was of longer duration. Despite the 1948 downward movement, the 1946-48 average farm employment was higher than during the last 3 years of World War II, whereas during this period labor requirements went down almost 5 percent.

In summary, the data in table 17 indicate that, during periods of national emergency and a tight labor market, farm employment goes down relative to labor requirements. But during periods when the labor market is easier the man-hour requirements decrease in relation to number of farm workers. This latter situation is well exemplified by the drought and depression period of the 1930's. Industrial jobs for surplus farm people were strictly limited, so many remained on farms with less than enough work to occupy them effectively. This situation was most pronounced in the West North Central and Mountain Divisions where the droughts were most severe (fig. 12). It was evident in the Cotton Belt except for the year 1937 when there was a large acreage of cotton. But the gap was closed during World War II when members of this reservoir of workers were attracted to the war industries or were taken into the armed forces.

The relation between changes in man-hour requirements and farm employment since 1919 is unique in the Pacific States. The number of man-hours increased more than the number of workers until the late 1930's and since then they have risen at about the same rate. The increase in the crops that took considerable labor in winter - cotton, fruits (particularly citrus), winter vegetables including lettuce and carrots--was chiefly responsible for this.

TABLE 17.--*Percentage change in man-hour requirements for all farm work, and in farm employment, United States, indicated periods, 1910-48*

Item	1910-12 to 1919-21	1919-21 to 1937-39	1937-39 to 1943-45	1943-45 to 1946-48
	Percent	*Percent*	*Percent*	*Percent*
Man-hour requirements	0.9	-8.4	-2.3	-4.8
Total farm employment	-6.8	-4.0	-7.3	.3
Family workers	-8.2	-3.3	-4.8	.8
Hired workers	-1.2	-8.4	-13.5	-1.5

They spread the work more uniformly during the year or tended to fill the winter gap, so rather fewer additional workers were needed compared with the increased work in man-hours.

The difference between the movements in man-hour requirements and farm employment is reflected in the trend in man-hours per worker.[12] In the United States as a whole and in most parts of the country there has not been an enduring change in man-hours per worker since 1919. There were considerable changes during parts of this 30-year period, however. There was little change in hours per worker during the decade of the 1920's in most areas. The piling up of population and workers on farms during the depression resulted in a sizable reduction in hours per worker which was rapidly dissipated during World War II. A general decrease has occurred during the last few years. The World War II increase and the postwar decrease in man-hours per worker are also reflected in length of workday for farm operators (table 18). Hired workers usually put in fewer hours per day than do farm operators but changes in the length of their workday since 1939 have been similar to those for the operators.

The most influential causal factors in changes in man-hours per worker have been nonagricultural in nature, as wars and general economic conditions. But some factors within agriculture have had an influence. The increasing importance of work on livestock has, in effect, shifted labor from crops in the growing season to livestock in the winter. The rapid mechanization of crop production has aided this shift of labor to livestock and winter work. This has permitted a more uniform seasonal distribution of labor and

TABLE 18.--*Average length of workday of farm operators during specified months, by geographic division, indicated years and periods, 1939-48*

Geographic division	June			September			December		
	1940	1943-45	1946-48	1939	1943-45	1946-48	1939	1943-45	1946-48
	Hours	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*
New England	12.0	12.3	11.9	12.0	12.3	11.7	11.5	11.5	10.9
North Atlantic	12.5	12.9	12.3	12.3	12.7	12.1	11.1	11.6	11.1
East North Central	12.5	13.3	12.5	12.1	12.5	11.8	11.0	11.4	10.8
West North Central	12.6	13.4	12.6	12.3	12.8	12.1	10.5	11.3	10.4
South Atlantic	11.8	12.2	11.7	11.3	11.7	11.2	10.0	10.5	10.1
East South Central	11.7	12.3	11.8	11.0	11.5	11.0	9.8	10.4	10.1
West South Central	11.8	12.3	11.6	11.4	11.6	10.9	9.9	10.5	9.8
Mountain	12.3	13.0	12.2	11.9	12.7	11.9	10.1	10.5	9.5
Pacific	11.3	11.9	11.2	11.2	11.7	10.8	10.0	10.5	9.7
United States	12.1	12.7	12.1	11.7	12.1	11.4	10.3	10.8	10.3

[12] Man-hours per worker is based on average annual farm employment and as such is on a full-time-worker equivalent basis. Actually the number of workers on farms varies considerably from week to week and from month to month. In addition, the number of people who are counted as being employed on farms at some time during the year far exceeds the number at work at any one time. The man-hours data are on the basis of an average adult male worker; and as it is often true that a woman, child, and older worker accomplishes less in an hour than an average adult male the actual hours of work exceed those shown.

would have resulted in more hours per worker per year if there had not been conflicting influences. But there has been an inclination for farm workers to put in about the same hours and the reduction in man-hour requirements over the long pull has been reflected in a reduction in numbers of workers rather than in hours per worker.

There is considerable variation among areas in the number of man-hours per farm worker used per year. These differences have tended to persist for a long time (table 19). The more important the livestock is in an area the greater the number of hours per worker per year. A livestock farmer must be on the job every day and livestock chores form a big part of the daily work. The New England and Pacific regions, however, are two notable exceptions to this general rule. The average farm worker in the latter group of States puts in a relatively high number of hours a year, yet livestock is not so prevalent in the farm organization as it is in most other regions. The mild climate which permits year- round work on crops accounts for this. Even in the Northern Pacific States, where the winters are less mild, large jobs on crops, as pruning and clearing orchards, are done during the winter.

In New England, a greater proportion of the man-hour requirements are for livestock than in any other area, but hours per worker are lower than in other areas because of the prevalence of part-time farming. In this industrial area there are many opportunities to combine an off-farm job and part-time farming. Then, too, many farmers combine farming with other on-farm but nonagricultural work, as having roadside stands or stations and taking boarders. Hours per worker are low in the three southern divisions principally because of the dominating position of cotton with its seasonal work loads and the unimportance of livestock production. Some progress has been made toward a more diversified type of farming in these areas--more livestock and more crops other than cotton--so the man-hours per farm worker are relatively higher than they were 25 years ago. Man-hours per worker are high in the North Central and Mountain Divisions because of the importance of livestock and the great diversity of both crop and livestock enterprises.

TABLE 19.--*Average number of man-hours worked annually per farm worker, by geographic division, indicated periods, 1920-48*

Geographic division	1920-24	1935-39	1940-44	1945-48
	Hours	*Hours*	*Hours*	*Hours*
New England	1,525	1,513	1,522	1,496
Middle Atlantic	2,023	1,979	1,938	1,880
East North Central	2,259	2,170	2,278	2,158
West North Central	2,786	2,374	2,553	2,407
South Atlantic	1,496	1,547	1,654	1,770
East South Central	1,525	1,537	1,604	1,636
West South Central	2,079	1,874	1,925	1,781
Mountain	2,505	2,221	2,390	2,265
Pacific	2,150	2,414	2,388	2,379
United States	2,007	1,909	2,003	1,963

TABLE 20.--*Percentage change in gross farm production per man-hour and per farm worker, by geographic division, indicated periods, 1919-46*

Geographic division	1919-21 to 1937-39		1937-39 to 1944-46		1919-21 to 1944-46	
	Per man-hour	Per farm worker	Per man-hour	Per farm worker	Per man-hour	Per farm worker
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England ------	18	14	20	25	42	42
Middle Atlantic --	21	17	13	12	37	31
East North Central	26	19	19	24	50	48
West North Central	12	-1	32	41	48	40
South Atlantic ---	25	23	19	33	48	64
East South Central	19	19	16	20	38	44
West South Central	23	17	20	14	48	33
Mountain ---------	22	11	23	29	51	42
Pacific ----------	29	41	16	16	50	63
United States	19	15	23	28	47	47

Production per Man-hour and per Worker

As the long-time changes in man-hour requirements and number of farm workers have been about proportional, there has been little difference between the movements in production per man-hour and production per worker. As previously discussed, however, during certain parts of the period since 1919 the two measures of labor input have not moved in unison. In these instances there are differences in the changes in labor productivity as measured by the two methods.

During the interwar period, 1919-21 to 1937-39, gross farm production per man-hour increased more than did production per worker in the United States as a whole, and in seven of the nine geographic divisions (table 20). Effects of the depression were still felt in 1937-39. Some unneeded workers were on the farms and man-hour requirements were lower than number of workers, as compared with 1919-21. In the seven areas in which production per hour increased more than production per worker, the difference ranged from 13 percentage points more in the West North Central to two percentage points more in the South Atlantic Division. A similar difference would have occurred in the East South Central Division if the effect of the large acreage of cotton on the labor requirements in 1937 had been excluded from the 1937-39 base period. Such an exclusion would also increase the difference in other areas in which cotton was important.

The rise in both production per hour and production per worker was accelerated during World War II. But this time, unlike the inter-war period, production per worker increased more than production per hour. Farm workers were drawn off by the wartime demands for manpower, but labor requirements on farms decreased less rapidly.

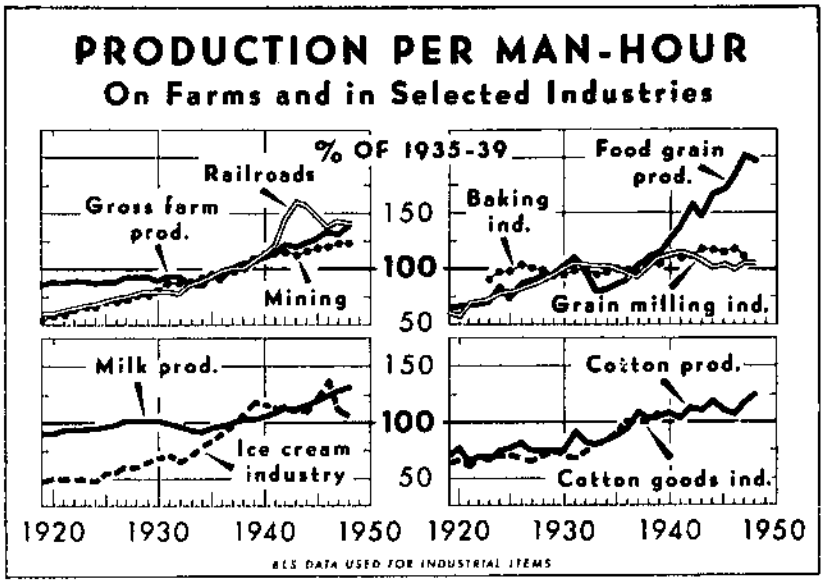

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FIGURE 13.--Recent gains in farm labor productivity have been similar to those in industry. This differs from the situation that prevailed during the 1920's. There is considerable variation in the labor-productivity gains made in producing and processing the indicated farm products.

The Pacific region was unlike the United States as a whole and most of the other regions during each of these periods. Agriculture was expanding from the standpoint of labor used during the interwar period and man-hour requirements increased more than number of workers. Because of the nature of farming and the composition of the farm-labor force, in such a situation the hours per day and per year are increased before additional workers are employed. During World War II man-hour requirements and number of workers increased at about the same rate; consequently there was no difference between changes in production per hour and per worker.

Thus far in the postwar period there has been some reduction in labor requirements relative to number of workers. If this movement continues on an appreciable scale the production per hour will increase more rapidly than the production per worker.

LABOR PRODUCTIVITY IN AGRICULTURE AND INDUSTRY

The segments of the United States economy are interdependent. One important sector cannot prosper indefinitely while another lags. One significant factor in both a prosperity or a depression situation within an industry is the productivity of labor. Farm people are interested in the changes that have occurred in production per man-hour of industrial workers. Likewise industrialists and nonfarm workers want to know what the trend has been in productivity of agricultural labor. Only limited comparisions can be

made because of a lack of reliable data, particularly since 1939. Conversion to a defense and war economy so disrupted the pattern of production and work in many industries that productivity indexes had to be discontinued. It is expected that they will be resumed at a later date.

During the course of the last 30 years both farm and industrial workers have increased the quantity of products resulting from an hour of work. There was some lag from 1919 until the late 1930's in the agricultural increase, compared with mining and steam railroad transportation (fig. 13). But agriculture has kept pace with industry since about 1933. From 1937-39 to 1944-46, gross farm production per hour (adjusted for shifts to enterprises and areas with a greater or less than average production per man-hour) rose 20 percent, whereas the increase was only 14 percent in mining (table 21). The actual increase in both farm output and gross farm production per hour was greater. Even in the East South Central Division, where the gain in production per hour of farm labor was the smallest of any division, the increase compares favorably with that in mining for the country as a whole during this period. This also applies to many other industries. There was little increase in labor productivity in the fertilizer industry, for example. Production of fertilizer rose during the war but man-hours increased almost proportionately. This increased production was of great benefit to farmers, however, as it influenced decidedly the higher crop yields and the greater crop production per man-hour.

The increase in both freight and passenger traffic which was near phenomenal during the recent war, with a much less than proportional increase in man-hour inputs, resulted in a big increase in labor productivity. As far as passenger travel is concerned, the production measure used--revenue passenger miles--fails to consider the distress resulting from overcrowded cars and the discomforts caused by pressing into service old and out-of-date equipment. But gigantic troop movements were executed and huge quantities of war material were hauled expeditiously and the revenue traffic per hour put in by passenger and freight employees increased almost one-half from 1937-39 to 1944-46. The increase would have been even greater if the peak year 1943 had been included in the computation of the data in table 21. In 1946, a downward point was reached which was only slightly above gross farm production per hour.

For the entire period since the end of World War I the gains in production per man-hour have been greater in industry than in farming primarily because of the great strides made in industry before World War II. Productivity of agricultural labor undoubtedly would have risen more between the wars if the demand for farm products had been higher. The potentialities were there, but it took the upward surge of wartime demand to realize them. Many of the technological advances that contributed to the advance during World War II were not concurrent developments but rather the wider application of previous discoveries. Weather that was better than average also helped during recent years.

Fabricant *(5)* found that from about 1900 to 1939 the lag in the decrease in number of workers per unit of farm production, as compared with industry, was understated from the standpoint of number of man-hours because hours per average worker fell only slightly, if at all, in agriculture and fell more decidedly in in-

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dustry. As far as agricultural workers are concerned the same is true for the period 1919 to date. Comparable data for industrial workers are not available for this period but there is some evidence that hours per industrial worker rose materially during the war. This increase may have been enough to nullify any decrease that occurred from 1919 to 1939. If so, an agricultural-industrial comparison of labor productivity from 1919 to date, based on number of workers, would not be materially different from a comparison made on the basis of man-hours. Relatively full employment existed at the end of the period under consideration and this conclusion might have been vastly different if the period had ended with something less than a full-employment situation.

Most farm products go through one or more processes before they reach the ultimate consumers. How do the changes in productivity of the farm worker who raises the wheat, the apples, and the chickens compare with those of the worker who cleans, combs, spins, and weaves the wool, cleans and cans the spinach, or halves and dries the apricots? Part of the answers are supplied for a few products in the statistics shown in figure 13 and for additional products in the figures shown in table 22.

These comparisons should be considered only in general terms as each industry and as agriculture operates under its own partic-

TABLE 21.--*Labor productivity in agriculture and industry, United States and selected areas, indicated periods, 1919-46* [1,2]

Agriculture, industry, and area		Percentage change in production per man-hour		
		1919-21 to 1937-39	1937-39 to 1944-46	1919-21 to 1944-46
		Percent	*Percent*	*Percent*
Gross farm production	United States - Actual	19	23	47
Gross farm production	United States - Adjusted	27	20	52
Farm output	United States - Actual	35	28	73
Gross farm production	East North Central - Actual	26	19	50
Gross farm production	East North Central - Adjusted	38	25	71
Farm output	East North Central - Actual	42	25	77
Gross farm production	East South Central - Actual	19	16	38
Gross farm production	East South Central - Adjusted	19	14	36
Farm output	East South Central - Actual	35	19	60
Steam railroad transportation [3]	United States - Actual	68	43	142
Mining	United States - Actual	79	14	104
Manufacturing	United States - Actual	89	([4])	([4])
Manufacturing of fertilizers [5]	United States - Actual	88	6	99

[1] Source of data for industrial items: Handbook of Labor Statistics, 1947 *(10)* and more recent releases, U. S. Bureau of Labor Statistics.

[2] Production per man-hour in mining is based on production indexes weighted with current year man-hours and is not strictly comparable with the unadjusted agricultural items and the other industrial items (except fertilizers) which are based on value-weighted production indexes. Production per man-hour in mining is comparable with gross farm production per man-hour adjusted for shifts in importance of enterprises. For details of adjustments see pages 36 to 42.

[3] Passenger and freight revenue traffic per man-hour.

[4] Not available.

[5] Based on an unweighted index of production.

TABLE 22.--*Change in labor productivity in producing and processing selected farm products, United States, indicated periods, 1919-46* [1]

Agricultural enterprise or industry	Percentage change in production per man-hour		
	1919-21 to 1937-39	1937-39 to 1944-46	1919-21 to 1944-46
	Percent	*Percent*	*Percent*
Production of food grains	66	60	166
Manufacturing of flour and grain mill products	63	-1	62
Manufacture of bread and other bakery products [2]	6	15	21
Production of milk	12	18	33
Manufacturing of ice cream	117	15	150
Production of cotton	50	5	57
Manufacturing of cotton goods	63	([3])	([3])
Production of feed grains	25	37	70
Production of meat animals	6	10	17
Slaughtering and meat packing	43	([3])	([3])
Production of sugar beets	47	12	64
Beet sugar refining	([3])	-17	([3])
Production of tobacco	1	9	11
Manufacturing of tobacco products	137	20	186

[1] See footnote 1, table 21.
[2] Not available before 1923, appropriate percentage changes based on average of 1923-25 rather than 1919-21.
[3] Not available.

ular set of circumstances, and identical changes in production per hour may result from extremely different causes. Then, too, industry is more specialized than agriculture. In many industrial plants the work done by some workers is so repetitious that the doing becomes almost mechanical. No such specialization occurs in farming even though the daily pattern varies little for some jobs, as in livestock chores. In addition, a manufacturing plant usually turns out a few similar products, whereas on most farms work on many different crops and kinds of livestock and their products is combined.

No other farm product and few old and established industries can match the gains made in production of food grains per hour of labor during the last 30 years. The climb was even steeper for wheat, the most important food grain. The story behind this tremendous rise has been told; and although food grains have not been a major factor in the gain in over-all farm labor productivity, their use demonstrates what can and does happen to long-established products and processes. Production of food grains and the manufacture of flour per man-hour ran a similar course from 1919 until 1931; then grains took a big drop but the flour was much less affected by the depression.

The recent drop in production per hour in milling resulted from a more rapid rise in labor input than in production, as measured in wheat ground for flour. The milling industry was low on the wartime priority list and very little new machinery was available, which partly accounts for this decrease. A higher extraction rate was a wartime expediency but this had little effect on wheat ground per hour of labor. The baking industry has made a moderate gain in labor productivity since 1923-25 - nearly all of it since 1937-39.

The production of milk and ice cream per hour of labor is, in some respects, an inappropriate comparison because man has used milk from cows and other animals from time immemorial, whereas its manufacture into ice cream is a relatively recent development. As a young industry, the manufacture of ice cream is more subject to rapid improvement. Plants and machines were improved within a short time and, as production has mounted, they have increased in size. Because of this, the rise in labor productivity in the manufacture of ice cream has been far greater than that in the production of milk. Other factors, as the increase in quantity of ice cream frozen, which has about quadrupled since 1919, have helped in this direction.

The production of cotton and cotton goods per man-hour ran a rather similar course from 1919 to 1939. The percentage change from 1919-21 to 1937-39 was higher in the cotton industry than in its agricultural counterpart largely because of choice of periods. The difference would have been much less if the change had been computed from the period 1922-24 rather than from 1919-21.

Labor productivity in both beet-sugar refining and sugar-beet production dropped during the first part of World War II primarily because of the drop in production with less than a proportional drop in man-hours. Both reached a low point in 1943. Following this, the production per hour made a more rapid recovery in regard to beets than occurred in the sugar factories. In 1944-46, production of beets per hour of labor was above the 1937-39 level whereas beet-sugar refined per hour was 17 percent below. The rate of gain in quantity of beets produced per hour was less during this period than it had been during the interwar period. The same was undoubtedly true for sugar-beet refining.

Tremendous gains have been made since just after World War I in the quantity of tobacco products manufactured per man-hour. A large part of this gain can be attributed to the big increase in the cigarette industry. This, in turn, can be attributed to the phenomenal rise in quantity of cigarettes manufactured. Numbers rose from around 50 billions in 1920 to almost 400 billions in 1948. The manufacture of cigarettes, like the freezing of ice cream, can be classed as a young industry; remarkable advances have been made in plants, machines, and other factors. The increase in labor productivity in the manufacture of cigars, smoking tobacco, and other tobacco products, has also contributed to the rise for all tobacco products, but, in each instance the gain was less than for cigarettes. The production of tobacco per man-hour has increased slowly but the annual gain has been greater during recent years than it was before 1937-39.

No attempt is made in this discussion to compare changes in labor productivity in the whole of agriculture with the rest of the economy. Adequate data for many industries are lacking. This applies particularly to the marketing and other service industries and occupations, as wholesaling and retailing. According to Fabricant (*5*), available data indicate that if quality of service is ignored the labor productivity in the service industries has increased less rapidly than in the rest of the economy, including agriculture. This discussion does not tell the whole story of labor productivity for any of the individual farm products, which pass through many other processes or steps on their way to the ultimate consumers.

Although the remarkable climb in the productivity of farm labor that occurred during World War II may never be duplicated, the upward trend of the last 40 years in all likelihood will continue. Indications are that mechanization of farm operations, which has contributed significantly to higher production per man-hour in the past, will continue unabated. The South particularly offers a fertile field for the greater use of machines on farms. The full impact of farm electrification on the productivity of labor is yet to be felt. On the production side, plant and animal breeders indicate that the fields of hybridization and the development of higher yielding crops and animals are far from exhausted. Results of experimentation and research have aided in the gains in labor productivity in the past and their contributions will continue to be made.

Continued advance in farm labor productivity will depend, partly at least, on the ability of industry to provide machines, gasoline, and other materials and supplies to farmers at a reasonable cost. The continued upward movement in productivity of industrial labor likewise depends on the availability at reasonable rates of agricultural raw materials for factories and of food for industrial workers. Because of this interdependence, the productivity of farm and industrial workers must move upward together in order to provide for a continued general rise toward a desirable level of living for people throughout the economy.

SUMMARY

Agricultural technology has made possible outstanding gains in productivity of farm labor. Compared with 40 years ago, a man-hour of farm labor now produces 200 percent more food grains, 100 percent more feed grains, 75 percent more fruits and tree nuts, 50 percent more truck crops and cotton, about 50 percent more milk and poultry products--in short, twice as much farm output for human use.

Gains in productivity of farm labor have not been uniform over time, among geographic divisions, or among the crop and livestock enterprises. Practically all of the two-fold rise in farm output per man-hour during the last 40 years has occurred since World War I. Farm output per man-hour in the United States increased at an average annual rate of 1.7 percent for the period 1910-46. But during World War II the annual rate of increase was more than twice that for the period as a whole and 7 times the annual rate of increase during World War I.

The rise in the productivity of labor in crop production has exceeded that in the production of livestock. During the last 40 years crop production per man-hour increased at about twice the average annual rate of all meat animals and animal products; most of this gain took place during World War II. The sharpest increase in labor productivity in crop production occurred in food grains. Milk products led in the list of livestock enterprises.

The increase in crop production per hour has resulted from both a decrease in man-hours per acre and a rise in production of crops per acre. Mechanization has been the chief factor in cutting man-hours per acre. Increases in production of milk per cow, of eggs per hen, and per livestock breeding unit, in general, have contributed significantly to the increase in livestock production per man-hour.

Shifts in the importance of the various crop and livestock enterprises have affected average man-hour productivity. Between the two World Wars there was a shift toward the kinds of crops and livestock that return less product per hour of labor. An opposite shift took place during World War II.

The two North Central Geographic Divisions and the Mountain Division outranked other regions in increases in output per hour during the last 30 years. The East South Central Division showed the smallest rise. The differences in rates of change among regions have not been great. As a result, marked differentials in the level of man-hour productivity among regions have persisted for a long time.

Although the trends of total labor requirements and farm employment have been similar during the last 40 years, the relation between the two has varied for periods of a few years. Hours per worker increased during each of the great wars. A decline in the number of hours per farm worker during the drought and depression period reflected an increase in under-employment.

Labor productivity in both agriculture and industry has increased within the last 30 years. The rate of increase varied considerably among industries and farm enterprises. The productivity of the labor used in producing some farm commodities rose more than production per man-hour in plants where the same commodities were processed. In other instances the opposite has occurred.

Prospects are excellent in most parts of the economy for further gains in labor productivity. But a balance must be maintained among the occupations to provide for the continued well-being of all.

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APPENDIX

Effects of Weighting Factors on Measures of Labor Productivity

As was indicated on page 3 , in constructing a farm-production index, it is necessary to use a common denominator as a weighting factor in combining bushels of wheat and corn, tons of hay, dozens of eggs, etc., into total farm production. The weights used in the construction of the production indexes that are utilized in this analysis were the conventional "average price" weights. The indexes of production were originally developed for several purposes, one of the most important of which was to ascertain what changes had occurred in the different regions of the United States in volume of agricultural production *per se*. Majority opinion seems to favor this sort of weighting system when a production index is wanted for this and other general purposes.

Many would prefer a system of labor weights if the specific purpose of constructing the production index were to derive a measure of the productivity of labor. An agricultural production index constructed with unit-labor-requirement weights shows the same general changes in production and in labor productivity as those used in this publication. The chief difference between aggregative types of production indexes constructed with these two kinds of weights is that individual products may receive more or less weight in a set of average prices than in a set of unit-labor requirements. Cotton, for example, is a labor-intensive product so it has less weight in a set of average prices than in a set of labor weights. Consequently, price-weighted indexes have shown a greater increase in all agricultural production and in total labor productivity than similar labor-weighted indexes during these recent years when the production of most agricultural items has risen more than the production of cotton.

Although geographic-division average prices were used as weights in developing the production indexes utilized in this study there are other sets of average prices that might have been applied - United States average prices for example. As an accurate picture of changes that had occurred in each part of the United States was desired, regional average prices were used. The average 1935-39 farm prices of the broadly defined commodities used, as all corn and all wheat, varied among regions (table 23). Corn, for example, was priced at $0.56 per bushel in the West North Central Division and at $0.85 per bushel in New England.

TABLE 23.--*Farm prices of selected farm products, by geographic division, average 1935-39*

Farm product	Unit	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
All wheat	Bushel	-	0.87	0.84	0.81	0.93	0.92	0.79	0.70	0.73	0.800
Rye	do	-	.68	.56	.44	.89	-	-	.43	-	.491
All corn	do	0.85	.76	.59	.56	.73	.75	.64	.72	.79	.618
Oats	do	.50	.42	.31	.26	.51	.49	.34	.34	.38	.302
Barley	do	-	.58	.62	.40	.60	.66	.44	.47	.50	.461
All sorghums-grain	do	-	-	-	.50	-	-	.54	.55	.66	.542
All tame hay	Ton	11.60	10.10	7.90	6.50	12.45	10.30	8.75	7.60	9.30	8.593
Cotton and cottonseed	Bale	-	-	-	56.55	61.60	60.20	57.55	60.25	61.30	59.192
Soybeans	Bushel	-	1.20	.79	.83	1.05	1.50	1.45	-	-	.827
Peanuts	Pound	-	-	-	-	.03	.03	.03	-	-	.030
Flaxseed	Bushel	-	-	-	1.55	-	-	1.63	1.52	1.75	1.566
Tobacco	Pound	.32	.12	.12	.18	.20	.18	-	-	-	.191
Dry edible beans (cleaned)	Hundredweight	-	3.55	2.80	3.36	-	-	-	3.20	3.90	3.330
White potatoes	Bushel	.70	.77	.69	.60	.81	.76	.88	.56	.70	.694
Sweetpotatoes	do	-	.90	.89	.93	.74	.80	.76	-	1.16	.780
Sugar beets	Ton	-	-	5.90	4.90	-	-	-	5.05	5.45	5.242
Apples	Bushel	1.03	.78	.74	.87	.72	1.00	.81	.76	.71	.90
Peaches	do	1.53	1.13	1.06	.99	1.29	.96	1.01	.86	.61	.87
Grapes	Ton	67.25	34.30	30.19	42.67	61.07	66.69	38.39	46.58	15.39	17.11
Beef cattle	Pound	.0513	.0635	.0687	.0708	.0563	.0514	.0541	.0618	.0638	.0643
Veal calves	do	.0814	.0900	.0853	.0775	.0755	.0720	.0655	.0715	.0818	.0776
Sheep	do	.0400	.0390	.0337	.0378	.0350	.0311	.0459	.0393	.0376	.0397
Lambs	do	.0750	.0833	.0834	.0803	.0815	.0874	.0679	.0744	.0732	.0771
Hogs	do	.0858	.0894	.0846	.0797	.0785	.0769	.0712	.0807	.0866	.0806
Butter	do	.300	.300	.300	.292	.238	.236	.278	.333	.300	.267
Butterfat	do	.333	.273	.298	.287	.235	.244	.247	.279	.312	.285
Milk											
Wholesale	Pound	.0222	.0196	.0161	.0168	.0250	.0185	.0200	.0153	.0179	.018
Retail	Quart	.114	.109	.095	.088	.109	.093	.100	.099	.106	.101
Consumed on farms	Pound	.0267	.0235	.0169	.0128	.0265	.0189	.0190	.0162	.0191	.019
Eggs	Dozen	.315	.260	.198	.173	.219	.187	.175	.218	.229	.205
Commercial broilers	Pound	.198	.196	.196	.184	.195	.185	.181	.218	.184	.192
Chickens	do	.185	.185	.153	.129	.168	.140	.124	.138	.163	.148
Turkeys	do	.257	.247	.182	.162	.201	.163	.139	.172	.185	.172
Wool	do	.150	.292	.255	.227	.302	.270	.250	.229	.235	.239

Many factors account for the variations in prices among regions, and for that matter, among States and even among parts of a State. There are area differences in the grade and quality of the products and in the form in which they leave the farm, which influence the prices received. The tobacco grown in Connecticut and Massachusetts, for example, is chiefly a cigar-wrapper type and the price obtained for it is regularly considerably above average. In regions in which milk is sold from the farms as whole milk for consumption as fresh milk or cream, it generally is a higher grade product and commands a higher price than does milk in regions in which cream for the manufacture of butter is sold.

There are differences among regions in the supply and demand conditions of a specific farm product and these affect the price. To illustrate, prices for corn are higher in New England because it is a feed-deficit area and corn or some other feed is shipped in to supply the need, involving transportation and handling costs. The seasonal pattern of production also influences decidedly the area differentials in prices of some farm products. Potatoes grown in areas in which the new crop is put on the market early have a price advantage over potatoes grown in late-season areas.

In order to compare measures of labor productivity, using regional and United States average prices as weights, the production indexes in each geographic division were recalculated for 1919-21 and 1943-45 using 1935-39 average United States prices.[13] The latter set of price weights assigns to corn, for example, the same absolute weight in each region. Use of United States prices as weights would conceivably affect in two respects, the measures of labor productivity that have been used. The percentage changes in production per man-hour in the various regions over a period of years might be different than when regional prices are used as weights. And United States price weights might give different results regarding relative levels of labor productivity among regions.

A significant question in building up farm production indexes under either set of price weights is just how far to go in determining average prices. For example, different varieties of fruits of various kinds, or tobacco of different types, or cotton of different staples, are in effect different commodities having different average prices and, in principle at least, each should be weighted by its average price.

As there are greater differences in varieties, types, etc., of most farm products in the United States than in any geographic division, the determination of average prices for a detailed classification of farm commodities is more important when United States average price weights are used. This is accomplished to a certain degree by using geographic division average prices. The Pacific Division average price of wheat, for example, approximates the United States average price of white wheat as the production of white wheat is chiefly limited to the Pacific States and other classes are not extensively grown in the region. A similar situation prevails for many of the other farm products. Limitations of

[13] Owing to methods originally used in calculating the indexes of production it was not possible to convert all products in all regions to a United States price-weight basis; the most important omission related to truck crops. In the case of some other products, the conversion to United States price weights was only approximate.

TABLE 24.--*Change in production per man-hour spent on crops, livestock, and all farm production, under two systems of price weights, by geographic division, 1919-21 to 1943-45*

Geographic division	Crops			Meat animals and animal products			Gross farm production		
	Change by using		Ratio: (1)/(2)	Change by using		Ratio: (4)/(5)	Change by using		Ratio: (7)/(8)
	Regional average prices	U. S. average prices		Regional average prices	U. S. average prices		Regional average prices	U. S. average prices	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Percent	*Percent*		*Percent*	*Percent*		*Percent*	*Percent*	
New England	33.4	40.5	0.82	63.2	55.3	1.14	39.9	42.6	0.94
Middle Atlantic	35.1	36.7	.96	38.2	35.8	1.07	31.3	31.1	1.01
East North Central	63.7	63.8	1.00	33.2	35.3	.94	44.4	43.7	1.02
West North Central	63.6	62.6	1.02	27.2	26.9	1.01	42.0	38.4	1.09
South Atlantic	47.9	50.7	.94	38.0	37.1	1.02	43.7	45.6	.96
East South Central	41.8	41.9	1.00	17.6	16.3	1.08	34.5	34.8	.99
West South Central	51.0	42.8	1.19	18.7	16.7	1.12	43.0	36.8	1.17
Mountain	77.6	69.3	1.12	23.3	24.0	.97	47.9	45.0	1.06
Pacific	50.0	56.2	.89	37.5	38.5	.97	45.7	51.0	.90
United States	53.3	53.9	.99	29.9	29.6	1.01	42.0	41.5	1.01

data, plus the necessity of economizing on clerical work, made it impossible to go beyond the broadly defined products used.

A comparison of the changes in production per hour of labor on crops, livestock, and gross farm production, from 1919-21 to 1943-45, under the two sets of prices is given in table 24. For most geographic divisions, the changes in productivity under the two weighting systems are not greatly different. The largest difference in crop-labor productivity occurs in the West South Central region. Use of United States average prices results in a smaller increase in labor productivity than the use of average regional prices, chiefly because United States prices give greater weight to cotton. It is a major crop in the region and production of it decreased from 1919-21 to 1943-45. The lowering influence of cotton when United States prices are used is partly offset by the effect of corn and wheat. Corn has less weight in the set of United States average prices and the production in 1943-45 was about half that in 1919-21. United States prices give more weight to wheat, and its production increased during this quarter-century.

Use of United States average prices also results in a smaller increase in livestock-labor productivity in the West South Central Division. There were various degrees of change in volume of production over the 25-year period in this area, and various degrees of difference between regional and national prices of the livestock items. Use of United States prices generally gave greater weight to the livestock items that increased the least and less weight to the items that increased the most.

In New England, use of United States average prices results in a greater increase in labor productivity in crop production than when regional prices are used. The 1935-39 average price of potatoes is about the same for New England as for the United States, but the prices of other crops are much higher in New England than in the United States as a whole. This results in a greater weight for potatoes when United States prices are used. Potatoes are a major crop in New England and their production increased greatly from 1919-21 to 1943-45. Tobacco is another important crop there. Use of United States prices gives less weight to tobacco than use of regional prices, and the production of this crop decreased during the period. The combinations of these changes in production and differences in weights for potatoes and tobacco both contributed to the greater increase in productivity obtained with the use of United States average prices.

Use of United States prices had an opposite effect on livestock-labor productivity in New England. Egg production increased almost four-fold during the period and use of United States prices means that eggs influence the total change less than when regional prices are used. There was the same effect with respect to the influence of cattle and calves. Production of these animals decreased greatly and their importance in the total was greater when United States average prices were used.

In New England, the effect of differences between the two sets of prices was in opposite directions for crops and livestock, so changes in total gross production per man-hour were not very different under the two weighting systems. In the West South Central region, however, use of United States prices resulted in smaller increases in labor productivity for crops, livestock, and total gross production.

TABLE 25.--*Production per hour of work spent on crops, livestock, and all farm production, under two systems of price weights, by geographic division, average 1943-45*

[United States average = 100]

Geographic division	Crops			Meat animals and animal products			Gross farm production		
	Regional average prices (1)	U. S. average prices (2)	Ratio: (1)/(2) (3)	Regional average prices (4)	U. S. average prices (5)	Ratio: (4)/(5) (6)	Regional average prices (7)	U. S. average prices (8)	Ratio: (7)/(8) (9)
	Percent	*Percent*		*Percent*	*Percent*		*Percent*	*Percent*	
New England	154	132	1.17	120	96	1.25	133	110	1.21
Middle Atlantic	118	107	1.10	107	94	1.14	113	100	1.13
East North Central	149	153	.97	106	107	.99	120	123	.98
West North Central	165	179	.92	110	113	.97	128	136	.94
South Atlantic	63	60	1.05	98	92	1.07	74	68	1.09
East South Central	56	52	1.08	75	80	.94	63	60	1.05
West South Central	62	58	1.07	78	86	.91	72	71	1.01
Mountain	141	149	.95	89	93	.96	124	131	.95
Pacific	130	140	.93	103	99	1.04	130	135	.96
United States	100	100	1.00	100	100	1.00	100	100	1.00

The two systems of price weights do not give such different results in relative production per man-hour among regions during 1943-45 as might be expected (table 25). The most important differences occur in the New England and Middle Atlantic Divisions where the level of farm prices is generally higher than in the rest of the country owing chiefly to their proximity to markets and population centers.

The regional price weights used in this study have some limitations when they are used in measuring the productivity of labor. But they are reasonably satisfactory for all measurements here attempted.

Tables

References have been made in the text to tables 1 to 43. Tables 44 to 66 contain most of the data upon which the foregoing analysis is based. Data in this group of tables were used in preparing several of the charts. In some of the charts, however, for more effective graphic presentation the base period is different from that used in the tables. The 1935-39 average is the base for the index numbers in all the tables.

TABLE 26.--*Man-hours per acre, yield, and man-hours per unit of production for designated crops, United States, indicated periods, 1910-48*[1]

Crop	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
Corn:								
Man-hours per acre	35.2	34.1	32.5	30.2	28.1	28.0	26.2	23.7
Yield - bushels	26.0	25.9	27.3	26.4	22.1	25.0	32.0	35.2
Man-hours per 100 bushels	135	132	119	114	127	112	82	67
Oats:								
Man-hours per acre	15.7	15.1	13.2	11.9	10.7	10.1	9.2	8.1
Yield - bushels	29.4	32.5	29.8	29.5	26.3	29.2	31.8	35.0
Man-hours per 100 bushels	53	46	44	40	41	35	29	23
Hay:								
Man-hours per acre	11.9	13.0	12.5	12.0	10.3	11.2	11.7	11.6
Yield - ton	1.15	1.25	1.22	1.22	1.08	1.24	1.35	1.37
Man-hours per ton	10.3	10.4	10.2	9.8	9.5	9.0	8.7	8.5
Wheat:								
Man-hours per acre	15.2	13.6	12.4	10.5	9.4	8.8	7.4	6.1
Yield - bushels	14.4	13.9	13.8	14.1	13.5	13.2	17.1	17.7
Man-hours per 100 bushels	106	98	90	74	70	67	43	34
Rice:								
Man-hours per acre	55.0	51.7	46.9	37.2	33.0	31.8	29.2	26.1
Yield - bushels	35.8	38.8	39.3	42.9	47.1	49.7	45.5	46.4
Man-hours per 100 bushels	154	133	119	87	70	64	64	56
Potatoes:								
Man-hours per acre	76.0	73.8	75.2	73.1	67.9	69.6	71.4	80.1
Yield - bushels	99.7	94.8	107.6	114.0	107.6	117.2	136.7	182.3
Man-hours per 100 bushels	76	78	70	64	63	59	52	44
Sweetpotatoes:								
Man-hours per acre	132	128	122	122	116	116	115	118
Yield - bushels	94.4	97.3	92.8	93.8	81.1	84.9	87.4	96.3
Man-hours per 100 bushels	140	132	131	130	143	137	132	123
Drybeans:								
Man-hours per acre	47.2	42.0	33.1	29.8	28.3	27.5	23.7	20.8
Yield - pounds	778	645	667	655	714	855	898	988
Man-hours per cwt.	6.1	6.5	5.0	4.5	4.0	3.2	2.6	2.1

See footnote at end of table.

TABLE 26.--*Man-hours per acre, yield, and man-hours per unit of production for designated crops, United States, indicated periods, 1910-48*[1] *--Continued*

Crop	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
Sugar beets:								
Man-hours per acre	128	125	111	109	104	97	95	90
Yield - tons	10.6	9.6	9.8	10.9	11.2	11.6	12.7	13.2
Man-hours per ton	12.1	13.0	11.3	10.0	9.3	8.4	7.5	6.8
Cotton:								
Man-hours per acre	116	105	96	96	97	99	103	102
Yield - pounds	200.6	167.9	154.8	171.3	184.0	226.2	259.9	268.6
Man-hours per bale	277	299	297	268	252	210	190	182
Tobacco:								
Man-hours per acre	356	353	353	370	370	415	448	495
Yield - pounds	816	803	773	772	784	886	1,026	1,164
Man-hours per 100 pounds	44	44	46	48	47	47	44	43
Soybeans:								
Man-hours per acre	---	---	---	15.9	12.9	11.8	10.7	9.8
Yield - bushels	---	---	---	12.6	14.3	18.5	18.3	19.0
Man-hours per 100 bushels	---	---	---	126	90	64	58	52

[1] Man-hours per acre harvested and include preharvest work on abandoned acreage.

TABLE 27.--*Effect of change in yield per acre, and mechanization and other factors on bushels of corn produced per 100 man-hours, by geographic division, indicated periods, 1919-46*

Geographic division	Production per 100 man-hours			Change in production per 100 man-hours from 1919-21 to 1937-39			Change in production per 100 man-hours from 1937-39 to 1944-46			Change in production per 100 man-hours from 1919-21 to 1944-46		
					Associated with change in			Associated with change in			Associated with change in	
	1919-21	1937-39	1944-46	Total	Mechanization and other factors	Yield per acre	Total	Mechanization and other factors	Yield per acre	Total	Mechanization and other factors	Yield per acre
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
New England --	46	53	60	7	12	- 5	7	5	2	14	17	- 3
Middle Atlantic ---	66	76	93	10	16	- 6	17	17	0	27	33	- 6
East North Central ----	120	180	227	60	35	25	47	39	8	107	74	33
West North Central ----	151	175	249	24	37	-13	74	31	43	98	68	30
South Atlantic ---	40	41	50	1	2	- 1	9	2	7	10	4	6
East South Central ----	37	42	55	5	7	- 2	13	6	7	18	13	5
West South Central ----	51	50	54	- 1	8	- 9	4	4	0	3	12	9
Mountain -----	90	75	128	-15	6	-21	53	16	37	38	22	16
Pacific ------	101	114	130	13	13	0	16	5	11	29	18	11

TABLE 28.--*Use of tractor power, mechanical pickers, and hybrid seed in producing corn, by geographic division, 1938 or 1939 and 1946*

Geographic division	Percentage of specified operations on corn acreage done with tractor power[1]				Percentage of acreage of corn for grain harvested with mechanical picker[1]		Percentage of acreage of corn planted with hybrid seed	
	Breaking land[2]		Cultivating					
	1939	1946	1939	1946	1938	1946	1938	1946
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	41	70	13	43	---	13	1	58
Middle Atlantic	49	81	16	56	3	28	3	70
East North Central	70	92	42	82	27	64	33	97
West North Central	74	94	48	84	19	57	21	88
South Atlantic	13	40	3	12	(3)	4	(3)	16
East South Central	12	36	5	14	(3)	3	1	25
West South Central	26	57	16	50	(3)	4	(3)	25
Mountain	74	91	41	76	3	23	(3)	23
Pacific	71	94	26	75	---	30	1	43
United States	51	78	30	64	12	41	15	69

[1] Adapted from Use of Tractor Power, Animal Power, and Hand Methods in Crop Production. *(4)*.
[2] Includes plowing with moldboard and disk plows, listing, middle busting, and bedding.
[3] Less than 0.5 percent.

TABLE 29.-- *Effect of change in yield per acre, and mechanization and other factors, on pounds of cotton lint produced per 100 man-hours, by geographic division, indicated periods, 1919-46*

Geographic division	Production per 100 man-hours			Change in production per 100 man-hours from 1919-21 to 1937-39			Change in production per 100 man-hours from 1937-39 to 1944-46			Change in production per 100 man-hours from 1919-21 to 1944-46		
					Associated with change in			Associated with change in			Associated with change in	
	1919-21	1937-39	1944-46	Total	Mechanization and other factors	Yield per acre	Total	Mechanization and other factors	Yield per acre	Total	Mechanization and other factors	Yield per acre
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
West North Central-----	207	268	275	61	18	43	7	6	1	68	24	44
South Atlantic---------	161	202	231	41	14	27	29	6	23	70	20	50
East South Central-----	135	222	237	87	11	76	15	6	9	102	17	85
West South Central-----	172	256	267	84	39	45	11	13	- 2	95	52	43
Mountain---------------	243	362	359	119	20	99	- 3	4	- 7	116	24	92
Pacific----------------	305	460	464	155	26	129	4	12	- 8	159	38	121

TABLE 30. -- *Percentage of indicated operations on cotton acreage done with tractor power, by geographic division, 1939 and 1946* [1]

Geographic division	Breaking land [2]		Planting		Cultivating	
	1939	1946	1939	1946	1939	1946
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
West North Central--	24	76	4	30	13	55
South Atlantic------	11	40	1	12	1	10
East South Central--	14	36	4	15	6	15
West South Central--	40	74	33	62	32	65
Mountain-----------	75	90	56	75	64	83
Pacific------------	85	97	71	85	73	90
United States-----	30	60	21	43	21	45

[1] See footnote 1, table 28.
[2] See footnote 2, table 28.

TABLE 31.--*Effect of change in yield per acre, and mechanization and other factors, on bushels of wheat produced per 100 man-hours, by geographic division, indicated periods, 1919-46*

Geographic division	Production per 100 man-hours			Change in production per 100 man-hours from 1919-21 to 1937-39			Change in production per 100 man-hours from 1937-39 to 1944-46			Change in production per 100 man-hours from 1919-21 to 1944-46		
					Associated with change in			Associated with change in			Associated with change in	
	1919-21	1937-39	1944-46	Total	Mechanization and other factors	Yield per acre	Total	Mechanization and other factors	Yield per acre	Total	Mechanization and other factors	Yield per acre
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Middle Atlantic	76	118	149	42	20	22	31	26	5	73	46	27
East North Central	96	136	213	40	21	19	77	42	35	117	63	54
West North Central	106	168	297	62	64	- 2	129	50	79	191	114	77
South Atlantic	54	73	107	19	8	11	34	20	14	53	28	25
East South Central	55	71	90	16	3	13	19	14	5	35	17	18
West South Central	136	228	306	92	121	-29	78	46	32	170	167	3
Mountain	104	185	284	81	61	20	99	52	47	180	113	67
Pacific	162	309	410	147	106	41	101	45	56	248	151	97

TABLE 32.--*Use of tractor power and combines in producing wheat, by geographic division, 1938 and 1945 or 1939 and 1946*

Geographic division	Percentage of specified operations done with tractor power [1]				Percentage of acreage harvested with combines [3]	
	Breaking land [2]		Seeding			
	1939	1946	1939	1946	1938	1945
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Middle Atlantic	47	80	10	46	8	41
East North Central	68	91	26	68	29	70
West North Central	80	96	64	90	49	77
South Atlantic	21	51	7	35	6	49
East South Central	16	44	5	27	7	42
West South Central	71	89	71	89	74	92
Mountain	75	92	58	82	51	79
Pacific	78	93	67	86	84	94
United States	74	92	57	84	49	78

[1] See footnote 1, table 28.
[2] See footnote 2, table 28.
[3] Adapted from Harvesting Small Grains and Utilization of the Straw. *(3)*.

TABLE 33.--*Change in production of all meat animals and animal products per man-hour of direct labor, and man-hours and production per unit of breeding livestock, United States, indicated periods, 1919-46* [1]

Item	Annual rate of change			Total change
	1919-21 to 1937-39	1937-39 to 1944-46	1919-21 to 1944-46	1919-21 to 1944-46
	Percent	*Percent*	*Percent*	*Percent*
Man-hours per breeding unit	0.9	-2.0	0.1	2.8
Livestock production per breeding unit	1.3	.8	1.2	33.3
Livestock production per man-hour	.4	2.9	1.1	30.2

[1] Includes all livestock except horses and mules.

TABLE 34.--*Change in production of all meat animals and animal products per man-hour, by geographic division, indicated periods, 1919-1946*[1]

Geographic division	Annual rate of change			Total change 1919-21 to 1944-46
	1919-21 to 1937-39	1937-39 to 1944-46	1919-21 to 1944-46	
	Percent	*Percent*	*Percent*	*Percent*
New England	1.3	3.9	2.0	64.4
Middle Atlantic	.8	3.0	1.4	40.4
East North Central	.5	2.8	1.1	33.2
West North Central	(2)	3.6	1.0	26.6
South Atlantic	.7	2.8	1.3	38.0
East South Central	.1	1.8	.6	16.4
West South Central	.2	1.9	.7	18.1
Mountain	.3	2.3	.8	23.6
Pacific	.9	2.5	1.3	39.4

[1] See footnote 1, table 33.
[2] A slight decrease.

TABLE 35.--*Change in production of meat animals and animal products per man-hour, United States, indicated periods, 1910-46*

Enterprise	Annual rate of change				Total change 1910-12 to 1944-46
	1910-12 to 1919-21	1919-21 to 1937-39	1937-39 to 1944-46 [1]	1910-12 to 1944-46	
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Meat animals and animal products	0.2	0.4	2.9	0.8	32.6
Milk cows	.6	.6	2.4	1.0	39.9
Meat animals	.4	.3	1.3	.5	20.3
Poultry	.3	.7	2.8	.9	34.4

[1] The average annual rate of change in production of all meat animals and animal products per man-hour was greater than for any class of livestock because of shifts in importance among the livestock enterprises between 1937-39 and 1944-46. The shift was toward meat animals and poultry, more of which are produced per hour as compared to milk per man-hour spent on milk cows.

TABLE 36.--*Man-hours per unit of production and related factors for designated livestock enterprises, United States, indicated periods,, 1910-48*

Enterprise	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
Milk cows:								
Man-hours per cow	146	141	142	145	147	148	140	135
Milk per cow - pounds	3,842	3,790	4,000	4,437	4,289	4,401	4,657	4,927
Man-hours per hundredweight of milk	3.8	3.7	3.6	3.3	3.4	3.4	3.0	2.7
Chickens and eggs:								
Man-hours per 100 layers	172	169	172	172	172	172	164	165
Eggs per layer[1]	86	84	91	91	91	101	109	127
Man-hours per 100 eggs	2.0	2.0	1.9	1.9	1.9	1.7	1.5	1.3
Hogs:								
Man-hours per hundredweight produced[2]	3.6	3.6	3.5	3.3	3.2	3.2	3.0	2.9

[1] Per hen or pullet on farms January 1.
[2] Liveweight production.

TABLE 37.--*Milk production and change in milk production per 100 man-hours of direct labor, by geographic division, indicated periods, 1919-46*

Geographic division	Milk production per 100 man-hours			Change in milk production per 100 man-hours	
	1919-21	1937-39	1944-46	1919-21 to 1937-39	1937-39 to 1944-46
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
New England	2,764	2,992	3,575	228	583
Middle Atlantic	3,103	3,407	4,214	304	807
East North Central	2,875	3,302	3,962	427	660
West North Central	2,782	2,972	3,354	190	382
South Atlantic	2,264	2,535	2,827	271	292
East South Central	2,255	2,474	2,662	219	188
West South Central	1,854	2,426	2,476	572	50
Mountain	2,612	3,190	3,586	578	396
Pacific	3,264	3,923	4,823	659	900
United States	2,704	3,041	3,508	337	467

TABLE 38.--*Factors associated with changes in milk production per 100 man-hours of direct labor, by geographic division, 1937-39 to 1944-46*

Geographic division	Total change in milk production per 100 man-hours	Change in milk production per 100 man-hours associated with		
		Increase in use of milking machines	Miscellaneous factors	Change in production per cow
	Pounds	*Pounds*	*Pounds*	*Pounds*
New England	583	338	134	111
Middle Atlantic	807	436	269	102
East North Central	660	185	285	190
West North Central	382	91	172	119
South Atlantic	292	53	140	99
East South Central	188	23	120	45
West South Central	50	29	98	-77
Mountain	396	111	168	117
Pacific	900	382	373	145
United States	467	151	203	113

TABLE 39.--*Production of corn per man-hour of direct labor and related factors, by geographic division, average 1943-45*

Geographic division	Production per 100 man-hours	Yield per acre [1]	Acreage planted with hybrid seed	Man-hours per acre	Acreage harvested		Land breaking done with tractor power [3]
					For silage	For grain with mechanical picker [2]	
	Bushels	*Bushels*	*Percent*	*Hours*	*Percent*	*Percent*	*Percent*
West North Central	235	36.2	78	15.4	3	51	94
East North Central	216	45.5	93	21.1	9	58	92
Pacific	130	35.9	35	27.7	35	13	94
Mountain	122	18.0	16	14.8	8	13	91
Middle Atlantic	88	37.2	52	42.3	35	17	81
New England	59	40.3	43	68.1	78	2	70
East South Central	52	20.8	16	40.3	1	3	36
West South Central	50	15.7	8	31.1	(4)	4	57
South Atlantic	47	19.3	9	40.9	1	4	40
United States	133	32.6	59	24.6	5	37	78
	Index numbers (United States = 100)						
West North Central	177	111	--	63	--	--	--
East North Central	162	140	--	86	--	--	--
Pacific	98	110	--	113	--	--	--
Mountain	92	55	--	60	--	--	--
Middle Atlantic	66	114	--	172	--	--	--
New England	44	124	--	277	--	--	--
East South Central	39	64	--	164	--	--	--
West South Central	38	48	--	126	--	--	--
South Atlantic	35	59	--	166	--	--	--
United States	100	100	--	100	--	--	--

[1] Includes grain equivalent on acreage harvested for fodder, silage, etc.
[2] For 1946, see footnote 1, Appendix table 28.
[3] For 1946, see footnotes 1 and 2, Appendix table 28.
[4] Less than 0.5 percent.

TABLE 40.--*Production of cotton per man-hour of direct labor and related factors, by geographic division, average 1943-45*

Geographic division	Production per 100 man-hours	Yield per acre	Man-hours per acre	Acreage worked with tractor power[1]	
				Breaking land[2]	Cultivating
	Pounds	*Pounds*	*Hours*	*Percent*	*Percent*
Pacific	460	536	117	97	90
Mountain	344	406	118	90	83
West South Central	273	205	75	74	65
West North Central	269	411	153	76	55
East South Central	244	347	142	36	15
South Atlantic	229	316	138	40	10
United States	258	268	104	60	45
	Index numbers (United States = 100)				
Pacific	178	201	112	--	--
Mountain	133	151	113	--	--
West South Central	106	76	72	--	--
West North Central	104	153	147	--	--
East South Central	95	129	137	--	--
South Atlantic	89	118	133	--	--
United States	100	100	100	--	--

[1] For 1946, see footnote 1, table 28.
[2] See footnote 2, table 28.

TABLE 41.--*Production of wheat per man-hour of direct labor and related factors, by geographic division, average 1943-45*

Geographic division	Production per 100 man-hours	Yield per acre	Man-hours per acre[1]	Acreage harvested with combines[2]
	Bushels	*Bushels*	*Hours*	*Percent*
Pacific	388	24.8	6.4	94
West South Central	295	13.0	4.4	92
Mountain	286	20.3	7.1	79
West North Central	284	15.9	5.6	77
East North Central	193	21.2	11.0	70
Middle Atlantic	137	21.2	15.5	41
South Atlantic	98	15.9	16.3	49
East South Central	87	14.3	16.4	42
United States	251	17.1	6.8	78
	Index numbers (United States = 100)			
Pacific	155	145	94	--
West South Central	118	76	65	--
Mountain	114	119	104	--
West North Central	113	93	82	--
East North Central	77	124	162	--
Middle Atlantic	55	124	228	--
South Atlantic	39	93	240	--
East South Central	35	84	241	--
United States	100	100	100	--

[1] Includes summer fallow work, and time spent in preparing land and seeding acreage not harvested.

[2] For 1945, see footnote 3, table 32.

TABLE 42.--*Production of milk per man-hour of direct labor and related factors, by geographic division, average 1943-45*

Geographic division	Milk production per hour	Milk production per cow	Man-hours per cow	Milking machines per 100 cows milked[1]	Milk cows in large herds[2]
	Pounds	*Pounds*	*Hours*	*Number*	*Percent*
Pacific	46	6,516	141	2.0	57
Middle Atlantic	41	5,743	141	2.8	48
East North Central	38	5,358	140	2.5	24
Mountain	35	5,076	143	1.7	16
New England	35	5,488	157	2.7	52
West North Central	33	4,464	135	1.3	11
South Atlantic	28	3,812	138	.5	20
East South Central	26	3,305	127	.2	12
West South Central	25	3,027	123	.3	13
United States	34	4,659	136	1.6	23
	Index numbers (United States = 100)				
Pacific	135	140	104	125	-
Middle Atlantic	121	123	104	175	-
East North Central	112	115	103	156	-
Mountain	103	109	105	106	-
New England	103	118	115	169	-
West North Central	97	96	99	81	-
South Atlantic	82	82	101	31	-
East South Central	76	71	93	13	-
West South Central	74	65	90	19	-
United States	100	100	100	100	-

[1] Census of Agriculture, 1945 *(11)*. Number of cows milked divided by number of farms reporting milking machines. Some farms reported milking machines but no cows milked and some farms that reported machines would have more than one. These reports tend to compensate one another in computing the machines per cow milked.

[2] Census of Agriculture, 1945 *(11)*. Cows in herds of 20 or more cows per herd.

TABLE 43.--*Production of eggs per man-hour of direct labor and related factors, by geographic division, average 1943-45*

Geographic division	Egg production per hour	Egg production per hen	Man-hours per 100 hens	Chickens in large flocks[1]
	Number	*Number*	*Hours*	*Percent*
New England	94	153	162	81
Pacific	87	137	158	72
Middle Atlantic	77	128	167	75
East North Central	72	121	168	39
West North Central	71	114	162	52
Mountain	70	116	166	43
West South Central	67	97	145	28
South Atlantic	60	97	161	25
East South Central	56	91	163	9
United States	71	114	161	44
	Index numbers (United States = 100)			
New England	132	134	101	-
Pacific	123	120	98	-
Middle Atlantic	108	112	104	-
East North Central	101	106	104	-
West North Central	100	100	101	-
Mountain	99	102	103	-
West South Central	94	85	90	-
South Atlantic	85	85	100	-
East South Central	79	80	101	-
United States	100	100	100	-

[1] Census of Agriculture, 1945 *(11)*. Chickens in flocks of 200 or more birds per flock.

TABLE 44.--*Gross farm production, by selected enterprises and periods, United States, 1910-48*
[*Production in 1935-39 average dollars*]

Enterprise	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million dollars	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*
Feed grains	2,050	2,160	2,178	2,112	1,828	1,887	2,321	2,475
Corn	1,617	1,647	1,692	1,600	1,401	1,431	1,733	1,854
Oats	332	399	378	365	300	316	369	434
Barley	78	86	73	111	100	110	155	129
Sorghums for grain	23	28	35	36	27	30	64	58
Hay[1]	629	748	763	717	647	751	907	896
Food grains	629	730	725	708	636	668	800	1,043
Wheat	587	667	658	654	587	608	736	976
Rye	18	31	33	20	15	21	17	11
Buckwheat	7	6	6	5	4	3	4	3
Rice	17	26	28	29	30	36	43	53
Truck crops and farm gardens	249	271	341	439	484	560	646	731
Vegetables, except truck	314	314	335	326	357	350	387	407
Potatoes	247	232	257	242	258	247	268	299
Sweet potatoes	44	53	52	48	56	53	50	46
Dry edible beans	23	28	24	33	38	45	56	51
Dry field peas	-	1	2	3	5	5	13	11
Fruits, berries, and tree nuts	311	310	344	374	385	432	484	525
Sugar crops	70	78	76	63	79	90	84	89
Sugar cane	26	24	21	14	19	29	25	28
Sugar beets	28	33	38	38	47	50	50	53
Sorgo sirup	9	15	12	7	10	7	6	6
Maple products	7	6	5	4	3	4	3	2
Cotton	847	681	648	901	788	778	707	656
Tobacco	193	244	244	256	252	280	285	401
Oil crops	38	40	46	61	59	100	239	290
Soybeans for beans	-	1	3	6	14	46	126	168
Peanuts	12	23	19	24	27	37	58	64
Flaxseed	26	16	24	31	18	17	55	58
Other crops	35	33	36	43	45	56	61	65
All crops	5,365	5,609	5,736	6,000	5,560	5,952	6,921	7,578

See footnotes at end of table.

TABLE 44. --*Gross farm production, by selected enterprises and periods, United States, 1910-48--Continued*

[*Production in 1935-39 average dollars*]

Enterprise	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million dollars	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*	*Million dollars*
Product added by:								
Horses and mules	637	670	600	504	422	[1] 377	326	251
All cattle	942	1,025	1,019	1,086	1,193	1,223	1,444	1,562
Hogs	247	280	309	311	311	273	410	381
Sheep, lambs, and wool	44	37	41	55	67	66	71	55
Poultry	417	422	471	544	549	552	757	851
All livestock[2]	2,288	2,435	2,441	2,502	2,544	2,493	3,011	3,102
Pasture used by all livestock	555	595	582	599	632	617	693	662
Gross farm production	8,208	8,639	8,759	9,101	8,736	9,062	10,625	11,342

[1] Includes sorghums for forage.

[2] Includes mohair, which is not shown separately.

TABLE 45.--*Man-hours of labor required for farm work, by selected enterprises and periods, United States, 1910-48*[1]

Enterprise	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	4,301	4,298	4,023	3,693	3,494	3,131	2,919	2,551
Corn	3,539	3,498	3,296	2,999	2,910	2,594	2,331	2,050
Oats	583	609	558	488	401	360	350	332
Barley	129	127	100	136	131	120	139	92
Sorghums for grain	50	64	69	70	52	57	99	77
Hay[2]	878	1,039	1,046	937	836	907	1,045	964
Food grains	905	1,007	924	727	599	601	489	499
Wheat	767	805	736	611	510	503	402	427
Rye	75	126	120	63	48	57	40	24
Buckwheat	27	27	21	18	12	9	8	6
Rice	36	49	47	35	29	32	39	42
Truck crops and market gardens	195	217	290	387	423	478	531	634
Farm gardens	437	436	473	519	496	532	620	584
Vegetable, except truck	389	405	388	355	388	353	339	301
Potatoes	267	257	260	224	234	211	203	190
Sweetpotatoes	79	91	89	80	102	93	84	73
Dry edible beans	43	57	39	50	49	47	48	35
Dry field peas	---	(3)	(3)	1	3	2	4	3
Fruits, berries, and tree nuts	800	744	748	772	759	753	751	772
Sugar corps	197	234	215	161	199	205	179	178
Sugar beets	64	80	82	74	83	81	71	70
Sugarcane	90	87	75	53	66	87	76	83
Sorgo sirup	32	57	50	27	44	31	27	22
Maple products	11	10	8	7	6	6	5	3
Cotton	3,937	3,421	3,247	4,086	3,367	2,749	2,269	2,018
Tobacco	457	579	597	649	631	683	655	891
Oil crops	77	107	112	134	152	192	324	344
Soybeans for beans	---	2	4	9	15	36	88	103
Peanuts	43	86	84	96	119	143	209	219
Flaxseed	34	19	24	29	18	13	27	22

See footnotes at end of table.

TABLE 45.--*Man-hours of labor required for farm work, by selected enterprises and periods, United States, 1910-48*[1]--*Continued*

Enterprise	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Other crops	217	217	217	217	217	217	217	217
All crops	12,790	12,704	12,280	12,637	11,561	10,801	10,338	9,953
Horses and mules	1,859	1,972	1,906	1,651	1,349	1,091	919	732
Milk cows	2,658	2,821	2,965	3,107	3,521	3,483	3,487	3,253
Meat animals [4]	1,151	1,265	1,187	1,162	1,219	1,151	1,456	1,397
Other cattle and calves	634	693	581	543	602	596	721	747
Hogs	438	495	529	511	498	436	608	552
Sheep, lambs, and wool	191	175	168	216	248	242	250	187
Poultry	786	810	872	992	988	943	1,127	1,175
Misc. livestock	129	129	129	129	129	129	129	129
All livestock	6,695	7,095	7,150	7,149	7,335	6,920	7,241	6,775
Farm maintenance	3,439	3,494	3,429	3,492	3,335	3,118	3,102	2,951
All farm work	22,924	23,293	22,859	23,278	22,231	20,839	20,681	19,679

[1] The sum of the geographic division figures for an item presented in tables 46 to 54 may not exactly agree with those shown in this table because of rounding.
[2] Includes man-hours for sorghums for forage and silage.
[3] Less than 500 thousand hours.
[4] Excludes man-hours for wool.

TABLE 46.--*Man-hours of labor required for farm work, by selected enterprises and periods, New England Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	30	25	23	21	18	15
Corn	21	17	16	15	13	11
Oats	9	8	7	6	5	4
Barley	(1)	(1)	(1)	(1)	(1)	(1)
Sorghums for grain	---	---	---	---	---	---
Hay [2]	30	29	26	27	28	31
Food grains	1	1	(1)	(1)	(1)	(1)
Wheat	(1)	(1)	(1)	(1)	(1)	(1)
Rye	---	---	---	---	---	---
Buckwheat	1	1	(1)	(1)	(1)	(1)
Rice	---	---	---	---	---	---
Truck crops and market gardens	14	17	19	24	21	19
Farm gardens	11	12	14	17	17	16
Vegetables, except trucks	19	19	21	19	21	25
Potatoes	19	19	21	19	21	25
Sweetpotatoes	---	---	---	---	---	---
Dry edible beans	(1)	(1)	(1)	(1)	(1)	(1)
Dry field peas	---	---	---	---	---	---
Fruits, berries, and tree nuts	25	23	22	18	17	17
Sugar crops	4	4	3	3	2	1
Sugar beets	---	---	---	---	---	---
Sugarcane	---	---	---	---	---	---
Sorgo sirup	---	---	---	---	---	---
Maple products	4	4	3	3	2	1
Cotton	---	---	---	---	---	---
Tobacco	15	12	10	8	9	10
Oil crops	---	---	---	---	---	---
Soybeans for beans	---	---	---	---	---	---
Peanuts	---	---	---	---	---	---
Flaxseed	---	---	---	---	---	---
Other crops	1	1	1	1	1	1
All crops	150	143	139	138	134	135
Horses and mules	32	26	19	15	11	10
Milk cows	143	128	131	131	122	108
Meat animals [3]	15	12	13	12	13	13
Other cattle and calves	11	8	9	9	10	10
Hogs	3	3	3	3	3	3
Sheep, lambs, and wool-	1	1	1	1	1	(1)
Poultry	19	21	23	26	36	40
Misc. livestock	3	3	3	3	3	3
All livestock	212	190	189	188	186	174
Farm maintenance	64	59	58	58	56	54
All farm work	426	392	386	384	376	363

[1] Less than 500 thousand hours.
[2] Includes man-hours for sorghums for forage and silage.
[3] Excludes man-hours for wool.

TABLE 47.--*Man-hours of labor required for farm work, by selected enterprises and periods, Middle Atlantic Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	208	177	160	151	129	115
Corn	151	128	120	117	100	91
Oats	53	44	35	30	25	21
Barley	4	5	5	4	4	3
Sorghums for grain	---	---	---	---	---	---
Hay[1]	86	82	67	64	76	80
Food grains	60	45	36	35	27	25
Wheat	39	30	24	26	20	19
Rye	8	4	4	3	2	2
Buckwheat	13	11	8	6	5	4
Rice	---	---	---	---	---	---
Truck crops and market gardens	50	56	60	72	78	101
Farm gardens	39	41	42	42	45	42
Vegetables, except truck	57	44	46	41	38	36
Potatoes	51	39	40	34	33	31
Sweetpotatoes	2	2	2	3	2	2
Dry edible beans	4	3	4	4	3	3
Dry field peas	---	---	---	---	---	---
Fruits, berries, and tree nuts	87	76	72	62	53	46
Sugar crops	3	2	2	2	2	1
Sugar beets	---	---	---	---	---	---
Sugarcane	---	---	---	---	---	---
Sorgo sirup	---	---	---	---	---	---
Maple products	3	2	2	2	2	1
Cotton	---	---	---	---	---	---
Tobacco	15	13	10	9	12	14
Oil crops	---	---	(2)	(2)	1	1
Soybeans for beans	---	---	(2)	(2)	1	1
Flaxseed	---	---	---	---	---	---
Other crops	3	3	3	3	3	3
All crops	608	539	498	481	464	464
Horses and mules	121	95	74	62	51	37
Milk cows	383	357	375	371	356	323
Meat animals[3]	39	37	37	39	42	42
Other cattle and calves	21	22	25	26	27	28
Hogs	15	12	9	11	13	13
Sheep, lambs, and wool	5	5	5	4	4	2
Poultry	68	81	82	86	100	112
Misc. livestock	11	11	11	11	11	11
All livestock	624	583	581	571	562	526
Farm maintenance	218	198	191	186	177	173
All farm work	1,450	1,320	1,270	1,238	1,203	1,163

[1] Includes man-hours for sorghums for forage and silage.
[2] Less than 500 thousand hours.
[3] Excludes man-hours for wool.

TABLE 48.--*Man-hours of labor required for farm work, by selected enterprises and periods, East North Central Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	831	787	690	622	546	505
Corn	643	599	542	501	442	412
Oats	168	160	124	102	92	89
Barley	20	28	24	19	12	4
Sorghums for grain	---	---	(1)	(1)	(1)	(1)
Hay [2]	173	154	123	156	173	153
Food grains	170	113	108	114	72	68
Wheat	132	99	94	99	63	63
Rye	35	12	12	14	8	4
Buckwheat	3	2	2	1	1	1
Rice	---	---	---	---	---	---
Truck crops and market gardens	42	53	60	66	80	103
Farm gardens	99	102	85	98	106	96
Vegetables, except truck	80	70	72	61	49	33
Potatoes	66	53	56	48	35	24
Sweetpotatoes	1	1	1	1	1	1
Dry edible beans	13	16	14	12	13	8
Dry field peas	---	(1)	1	(1)	(1)	(1)
Fruits, berries, and tree nuts	76	70	70	66	55	51
Sugar crops	24	16	16	17	15	10
Sugar beets	21	14	15	15	13	9
Sugarcane	---	---	---	---	---	---
Sorgo sirup	2	1	(1)	1	1	(1)
Maple products	1	1	1	1	1	1
Cotton	1	1	(1)	(1)	1	(1)
Tobacco	33	26	24	17	18	19
Oil crops	1	3	7	23	50	54
Soybeans for beans	1	3	7	23	50	54
Peanuts	---	---	---	---	---	---
Flaxseed	(1)	(1)	(1)	(1)	(1)	(1)
Other crops	28	28	28	28	28	28
All crops	1,558	1,423	1,283	1,268	1,193	1,120
Horses and mules	330	268	214	176	135	87
Milk cows	758	789	874	881	889	854
Meat animals [3]	206	198	209	210	268	247
Other cattle and calves	62	65	71	80	92	90
Hogs	135	121	124	117	164	148
Sheep, lambs, and wool	19	24	28	26	23	17
Poultry	188	205	203	197	208	212
Misc. livestock	25	25	25	25	25	25
All livestock	1,517	1,497	1,539	1,502	1,536	1,433
Farm maintenance	543	515	498	489	482	450
All farm work	3,618	3,435	3,320	3,259	3,211	3,003

[1] Less than 500 thousand hours.
[2] Includes man-hours for sorghums for forage and silage.
[3] Excludes man-hours for wool.

TABLE 49.--*Man-hours of labor required for farm work, by selected enterprises and periods, West North Central Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	1,120	1,130	1,003	784	776	710
Corn	834	850	773	570	544	527
Oats	214	187	149	138	134	132
Barley	51	73	69	63	72	40
Sorghums for grain	21	20	12	13	26	11
Hay [1]	286	250	202	226	276	230
Food grains	394	310	234	229	181	182
Wheat	328	272	212	200	164	173
Rye	64	36	21	29	17	8
Buckwheat	2	2	1	(2)	(2)	1
Rice	---	---	---	---	---	---
Truck crops and market gardens	14	18	18	22	24	38
Farm gardens	93	103	82	87	114	113
Vegetables, except truck	57	45	44	36	34	28
Potatoes	55	43	41	34	32	25
Sweetpotatoes	2	2	2	1	1	1
Dry edible beans	(2)	(2)	1	1	1	2
Dry field peas	---	---	---	---	(2)	(2)
Fruits, berries, and tree nuts	39	35	28	21	15	12
Sugar crops	14	15	17	15	13	11
Sugar beets	10	13	15	13	11	10
Sugarcane	---	---	---	---	---	---
Sorgo sirup	4	2	2	2	2	1
Maple products	---	---	---	---	---	---
Cotton	32	51	52	62	68	58
Tobacco	2	2	3	2	2	3
Oil crops	23	28	18	16	42	47
Soybeans for beans	(2)	1	2	4	20	29
Peanuts	---	---	---	---	---	---
Flaxseed	23	27	16	12	22	18
Other crops	27	27	27	27	27	27
All crops	2,101	2,014	1,728	1,527	1,572	1,459
Horses and mules	579	503	402	287	227	172
Milk cows	717	812	951	899	892	801
Meat animals [3]	433	446	458	357	485	453
Other cattle and calves	185	183	205	176	216	212
Hogs	241	252	238	165	249	225
Sheep, lambs, and wool	16	22	31	32	41	30
Poultry	258	289	288	254	316	324
Miscellaneous livestock	15	15	15	15	15	15
All livestock	2,011	2,076	2,130	1,828	1,956	1,779
Farm maintenance	725	722	681	592	623	572
All farm work	4,837	4,812	4,539	3,947	4,151	3,810

[1] Includes man-hours for sorghums for forage and silage.
[2] Less than 500 thousand hours.
[3] Excludes man-hours for wool.

TABLE 50.--*Man-hours of labor required for farm work, by selected enterprises and periods, South Atlantic Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	540	463	490	514	469	433
Corn	513	441	466	489	437	400
Oats	26	21	22	23	28	29
Barley	1	1	2	2	4	4
Sorghums for grain	---	---	---	---	---	(2)
Hay[1]	55	49	49	62	74	79
Food grains	56	45	46	49	41	32
Wheat	48	39	38	42	34	27
Rye	6	5	7	6	7	5
Buckwheat	2	1	1	1	(2)	(2)
Rice	---	---	---	---	---	---
Truck crops and market gardens	58	69	69	79	83	90
Farm gardens	60	67	68	81	94	86
Vegetables, except truck	61	56	64	59	56	50
Potatoes	24	24	24	22	22	21
Sweetpotatoes	37	32	40	37	34	29
Dry edible beans	---	---	---	---	---	---
Dry field peas	---	---	---	---	---	---
Fruits, berries, and tree nuts	100	108	108	112	129	139
Sugar crops	25	18	26	26	23	25
Sugar beets	---	---	---	---	---	---
Sugarcane	14	12	15	18	16	19
Sorgo sirup	11	6	11	8	7	6
Maple products	(2)	(2)	(2)	(2)	(2)	(2)
Cotton	833	895	736	599	499	399
Tobacco	340	435	407	502	460	655
Oil crops	55	68	82	97	130	137
Soybeans for beans	2	3	4	5	8	8
Peanuts	53	65	78	92	122	129
Flaxseed	---	---	---	---	---	---
Other crops	53	53	53	53	53	53
All crops	2,236	2,326	2,198	2,233	2,111	2,178
Horses and mules	175	154	137	131	128	120
Milk cows	233	228	256	259	261	266
Meat animals[3]	79	73	80	87	105	116
Other cattle and calves	38	35	41	44	54	64
Hogs	39	35	35	40	48	50
Sheep, lambs, and wool	5	6	7	6	5	4
Poultry	93	101	99	99	133	150
Miscellaneous livestock	16	16	15	16	16	15
All livestock	599	575	590	595	645	669
Farm maintenance	500	512	492	496	486	503
All farm work	3,335	3,413	3,280	3,324	3,242	3,350

[1] Includes man-hours for sorghums for forage and silage.
[2] Less than 500 thousand hours.
[3] Excludes man-hours for wool.

TABLE 51.--*Man-hours of labor required for farm work, by selected enterprises and periods, East South Central Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	653	551	551	527	481	399
Corn	639	542	542	520	464	382
Oats	14	9	8	6	13	14
Barley	(1)	(1)	1	1	4	2
Sorghums for grain	---	---	---	---	---	1
Hay [2]	50	46	53	69	78	85
Food grains:	17	13	14	19	15	13
Wheat	15	11	12	17	13	11
Rye	2	2	2	2	2	2
Buckwheat	(1)	(1)	(1)	(1)	(1)	(1)
Rice	---	---	---	---	---	---
Truck crops and market gardens	25	33	25	23	25	29
Farm gardens	74	87	93	92	103	98
Vegetables, except truck	31	31	39	35	34	27
Potatoes	7	8	9	9	11	9
Sweetpotatoes	24	23	30	26	23	18
Dry edible beans	---	---	---	---	---	---
Dry field peas	---	---	---	---	---	---
Fruits, berries, and tree nuts	33	31	30	28	26	23
Sugar crops	34	21	36	31	24	23
Sugar beets	---	---	---	---	---	---
Sugarcane	12	9	13	15	11	11
Sorgo sirup	22	12	23	16	13	12
Maple products	---	---	---	---	---	---
Cotton	687	971	854	773	654	624
Tobacco	191	161	178	145	153	191
Oil crops	25	23	28	34	48	46
Soybeans for beans	1	1	1	2	4	6
Peanuts	24	22	27	32	44	40
Flaxseed	---	---	---	---	---	---
Other crops	33	33	33	33	33	33
All crops	1,853	2,001	1,934	1,809	1,674	1,591
Horses and mules	177	165	148	142	141	129
Milk cows	202	210	256	258	263	263
Meat animals [3]	69	64	70	83	100	104
Other cattle and calves	31	30	35	42	48	55
Hogs	36	31	31	38	47	45
Sheep, lambs, and wool	6	6	8	8	8	7
Poultry	75	83	78	77	86	86
Miscellaneous livestock	11	11	11	11	11	11
All livestock	538	536	567	576	604	596
Farm maintenance	422	448	441	419	402	386
All farm work	2,813	2,985	2,942	2,804	2,680	2,573

[1] Less than 500 thousand hours.
[2] Includes man-hours for sorghums for forage and silage.
[3] Excludes man-hours for wool.

TABLE 52.--*Man-hours of labor required for farm work, by selected enterprises and periods, West South Central Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	538	462	484	428	408	298
Corn	453	381	409	350	304	207
Oats	42	34	38	38	34	29
Barley	2	2	2	3	6	2
Sorghums for grain	41	45	35	37	64	60
Hay [1]	140	109	126	123	147	117
Food grains	93	73	65	69	73	90
Wheat	49	42	40	40	37	53
Rye	1	(2)	(2)	1	2	1
Buckwheat	---	---	---	---	---	---
Rice	43	31	25	28	34	36
Truck crops and market gardens	35	56	70	76	89	97
Farm gardens	66	74	77	79	99	91
Vegetables, except truck:	29	28	36	34	33	30
Potatoes	7	9	11	10	11	8
Sweetpotatoes	22	19	25	24	22	22
Dry edible beans	---	---	---	---	(2)	---
Dry field peas	---	---	---	---	---	---
Fruits, berries, and tree nuts	41	50	54	60	65	62
Sugar crops	61	38	45	59	54	57
Sugar beets	---	---	---	(2)	(2)	(2)
Sugarcane	49	32	38	54	49	53
Sorgo sirup	12	6	7	5	5	4
Maple products	---	---	---	---	---	---
Cotton	1,671	2,116	1,670	1,225	967	825
Tobacco	1	(2)	(2)	(2)	(2)	(2)
Oil crops	7	11	16	20	49	56
Soybeans for beans	(2)	1	1	1	5	6
Peanuts	7	10	15	19	44	49
Flaxseed	---	---	---	(2)	(2)	1
Other crops	42	42	42	42	42	42
All crops	2,724	3,059	2,685	2,215	2,026	1,765
Horses and mules	290	270	223	177	142	109
Milk cows	265	284	347	356	368	337
Meat animals [3]	160	135	151	155	200	191
Other cattle and calves	117	91	103	101	131	131
Hogs	38	35	37	40	51	44
Sheep, lambs, and wool	11	16	23	29	33	28
Poultry	93	111	113	107	132	128
Miscellaneous livestock	19	19	19	19	19	19
All livestock	833	826	865	829	876	796
Farm maintenance	628	686	626	534	512	452
All farm work	4,185	4 571	4,176	3,578	3,414	3 013

[1] Includes man-hours for sorghums for forage and silage.
[2] Less than 500 thousand hours.
[3] Excludes man-hours for wool.

TABLE 53.--*Man-hours of labor required for farm work, by selected enterprises and periods, Mountain Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	68	67	62	54	61	51
Corn	35	36	36	27	24	17
Oats	21	16	11	10	12	9
Barley	7	12	12	12	20	21
Sorghums for grain	5	3	3	5	5	4
Hay [1]	141	140	114	109	119	113
Food grains	88	85	59	53	51	56
Wheat	84	82	58	52	49	55
Rye	4	3	1	1	2	1
Buckwheat	---	---	---	---	---	---
Rice	---	---	---	---	---	---
Truck crops and market gardens	12	23	21	27	31	36
Farm gardens	14	15	16	16	19	19
Vegetables, except truck:	27	38	41	38	42	39
Potatoes	17	18	20	19	21	24
Sweetpotatoes	---	---	---	---	---	---
Dry edible beans	10	19	19	18	19	14
Dry field peas	---	1	2	1	2	1
Fruits, berries, and tree nuts	23	22	19	18	17	18
Sugar crops	43	41	44	39	34	34
Sugar beets	43	41	44	39	34	34
Sugarcane	---	---	---	---	---	---
Sorgo sirup	---	---	---	---	---	---
Maple products	---	---	---	---	---	---
Cotton	18	33	31	43	39	47
Tobacco	---	---	---	---	---	---
Oil crops	2	2	2	(2)	2	1
Soybeans for beans	---	---	---	---	---	---
Peanuts	---	---	---	---	---	---
Flaxseed	2	2	2	(2)	2	1
Other crops	9	9	9	9	9	9
All crops	445	475	418	406	424	423
Horses and mules	132	115	91	67	58	48
Milk cows	107	124	140	131	135	122
Meat animals [3]	125	132	135	130	155	147
Other cattle and calves	75	68	71	69	84	94
Hogs	14	14	13	11	18	13
Sheep, lambs, and wool	81	103	112	105	107	78
Poultry	29	35	37	33	40	40
Miscellaneous livestock	15	15	15	15	15	15
All livestock	453	474	479	431	457	410
Farm maintenance	158	168	158	147	155	147
All farm work	1,056	1,117	1,055	984	1,036	980

[1] Includes man-hours for sorghums for forage and silage.
[2] Less than 500 thousand hours.
[3] Excludes man-hours for wool.

TABLE 54.--*Man-hours of labor required for farm work, by selected enterprises and periods, Pacific Division, 1920-48*

Enterprise	1920-24	1925-29	1930-34	1935-39	1940-44	1945-48
	Million hours	*Million hours*	*Million hours*	*Million hours*	*Million hours*	*Million hours*
Feed grains	33	30	30	31	31	26
Corn	6	5	5	5	4	3
Oats	11	9	8	8	7	6
Barley	15	14	15	16	17	15
Sorghums for grain	1	2	2	2	3	2
Hay [1]	84	78	75	71	76	76
Food grains	46	40	36	33	29	33
Wheat	40	36	31	28	23	26
Rye	1	(2)	1	1	1	1
Buckwheat	---	---	---	---	---	---
Rice	5	4	4	4	5	6
Truck crops and market gardens	40	62	82	90	100	121
Farm gardens	18	18	19	20	23	23
Vegetables, except truck	29	25	25	27	31	33
Potatoes	14	12	12	14	17	22
Sweetpotatoes	1	1	1	1	1	1
Dry edible beans	14	12	11	11	11	8
Dry field peas	---	(2)	1	1	2	2
Fruits, berries, and tree nuts	319	358	356	367	374	404
Sugar crops	8	5	9	14	13	15
Sugar beets	8	5	9	14	13	15
Sugarcane	---	---	---	---	---	---
Sorgo sirup	---	---	---	---	---	---
Maple products	---	---	---	---	---	---
Cotton	7	20	24	48	41	64
Tobacco	---	---	---	---	---	---
Oil crops	---	---	---	1	3	2
Soybeans for beans	---	---	---	---	---	---
Peanuts	---	---	---	---	---	---
Flaxseed	---	---	(2)	1	3	2
Other crops	22	22	22	22	22	22
All crops	606	658	678	724	743	819
Horses and mules	70	56	41	33	26	19
Milk cows	157	175	191	196	200	181
Meat animals [3]	60	65	66	78	87	85
Other cattle and calves	40	40	41	52	59	64
Hogs	9	10	9	11	15	11
Sheep, lambs, and wool	25	32	34	31	27	19
Poultry	48	64	65	64	76	83
Miscellaneous livestock	14	14	14	14	14	14
All livestock	363	391	395	401	417	391
Farm maintenance	171	185	190	198	205	213
All farm work	1,140	1,234	1,263	1,323	1,365	1,423

[1] Includes man-hours for sorghums for forage and silage.
[2] Less than 500 thousand hours.
[3] Excludes man-hours for wool.

TABLE 55.--*Index numbers of man-hours of labor required for farm work, by selected enterprises, United States, 1910-48*
[1935-39 = 100]

Year	All farm work	Livestock					Crops										
		All livestock	Horses and mules	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1910------	107	95	164	76	94	84	115	143	93	140	60	111	103	95	127	73	37
1911------	110	95	168	76	95	82	119	136	82	148	63	105	110	101	153	60	42
1912------	111	96	171	76	99	80	121	143	107	147	68	117	109	94	138	71	47
1913------	109	98	173	76	103	85	117	132	97	154	60	108	97	100	145	65	38
1914------	113	99	176	77	108	86	121	132	104	164	63	111	113	90	154	66	38
1915------	110	101	179	78	110	87	116	140	115	177	59	110	107	96	118	74	39
1916------	110	102	179	80	111	85	114	132	121	144	62	101	101	104	126	77	51
1917------	113	103	181	82	112	83	120	148	110	138	70	133	94	130	123	84	67
1918------	114	104	183	83	114	85	120	136	108	180	67	122	96	128	132	91	69
1919------	112	103	183	82	102	89	118	130	120	199	65	108	96	117	123	97	53
1920------	114	101	180	83	96	87	122	137	119	170	75	111	100	126	133	102	59
1921------	105	102	178	83	100	87	107	135	110	161	67	107	86	120	96	67	55
1922------	109	104	176	85	107	92	112	127	120	166	77	123	106	96	107	83	49
1923------	110	105	172	87	108	96	113	125	114	142	77	107	105	93	117	99	55
1924------	111	105	168	88	105	100	115	119	114	130	82	102	100	91	138	85	76
1925------	113	104	162	89	99	101	120	123	95	120	90	93	98	84	158	93	68
1926------	114	103	157	89	100	103	120	119	95	123	89	97	109	81	165	88	60
1927------	109	103	151	88	102	108	113	117	119	127	88	105	99	75	131	88	72
1928------	111	103	146	89	102	108	117	119	102	123	87	111	106	73	144	99	73
1929------	110	103	140	91	102	106	115	112	105	111	94	98	101	80	146	107	75

See footnotes at end of table.

TABLE 55.--*Index numbers of man-hours of labor required for farm work, by selected enterprises, United States, 1910-48--Continued*
[1935-39 = 100]

Year	All farm work	Livestock					Crops										
		All livestock	Horses and mules	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1910	109	104	135	94	103	109	112	110	89	112	94	100	101	85	139	116	73
1911	112	105	129	98	107	104	116	119	97	110	91	112	108	89	142	106	83
1912	108	106	123	102	108	104	109	121	105	100	93	115	100	99	119	70	85
1913	108	109	118	106	113	105	107	111	92	91	94	107	99	110	124	97	73
1914	96	106	114	106	99	101	90	96	78	85	82	116	97	102	88	74	84
1915	100	100	110	102	90	94	100	107	111	98	96	113	105	100	91	90	96
1916	97	101	104	101	99	101	95	96	83	93	91	97	92	97	101	82	96
1917	105	99	100	99	96	103	109	101	94	112	95	101	105	98	132	105	91
1918	99	99	95	99	103	97	98	100	108	109	107	97	97	105	89	95	100
1919	99	101	91	99	112	105	98	96	104	88	111	92	101	100	87	128	117
1920	98	101	89	99	113	106	97	95	117	85	113	92	98	89	89	92	128
1921	97	102	87	100	118	107	93	93	115	87	112	92	102	88	79	81	127
1922	101	106	84	101	131	118	98	94	121	79	115	92	101	101	87	91	199
1923	100	109	82	101	142	133	95	92	113	74	113	111	95	82	79	92	213
1924	100	106	79	100	129	133	96	91	111	82	118	93	101	79	78	122	177
1925	96	104	75	99	124	134	91	85	116	83	118	89	99	88	63	126	179
1926	95	100	70	95	122	127	92	84	105	80	128	93	107	92	62	143	172
1927	93	96	64	92	121	120	92	76	103	86	117	79	104	92	77	137	185
1928	94	92	59	87	119	117	95	81	101	83	120	80	101	76	92	115	180

[1] Excludes man-hours for wool.
[2] Includes man-hours for sorghums for forage and silage.

TABLE 56.--*Index numbers of man-hours of labor required for farm work, by geographic division, 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
1919	117	121	115	119	114	106	115	97	87
1920	113	123	115	120	114	103	125	106	85
1921	112	114	108	117	96	97	106	107	83
1922	111	119	111	124	96	103	111	105	88
1923	111	114	111	125	98	99	116	110	91
1924	109	115	109	126	97	100	127	108	84
1925	107	113	110	124	103	110	128	112	90
1926	103	109	108	117	105	111	137	111	92
1927	101	106	104	123	101	100	121	115	93
1928	99	104	105	123	101	103	129	117	96
1929	99	101	101	121	103	109	124	114	96
1930	100	101	101	121	105	105	118	115	99
1931	102	105	106	118	103	114	129	108	94
1932	100	104	104	122	91	104	122	108	96
1933	102	103	102	116	101	105	120	107	94
1934	100	101	97	98	92	97	94	98	94
1935	100	103	102	105	99	96	98	99	97
1936	100	98	97	96	96	98	97	99	99
1937	101	100	102	100	105	111	113	102	103
1938	99	99	100	100	96	99	97	101	101
1939	100	100	99	99	104	96	95	99	100
1940	98	99	98	101	99	93	98	101	101
1941	96	97	98	102	91	93	93	104	102
1942	98	99	100	108	98	98	98	108	103
1943	100	96	98	109	98	97	96	108	104
1944	98	97	98	106	102	96	92	105	105
1945	98	95	96	101	100	93	83	102	105
1946	96	97	95	98	103	89	81	99	109
1947	92	91	90	94	101	90	85	99	108
1948	92	92	88	93	99	95	88	99	107

TABLE 57 --*Index numbers of production per man-hour by selected enterprises, United States, 1910-1948*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and garden	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1910--	74	82	94	86	92	88	76	82	88	59	70	79	58	80	70	103	78
1911--	72	80	94	86	93	93	71	74	87	55	70	76	67	82	78	103	93
1912--	78	86	95	87	91	92	81	87	87	65	71	86	72	79	76	104	115
1913--	72	81	95	88	91	87	73	73	87	63	72	80	62	81	74	102	92
1914--	76	84	96	88	91	86	79	80	87	70	73	84	77	82	80	105	87
1915--	80	89	99	90	93	88	84	88	86	73	73	81	76	79	72	103	82
1916--	73	83	98	88	93	87	77	78	88	60	73	74	72	79	69	104	76
1917--	76	85	97	88	91	88	79	84	86	61	73	80	68	74	70	105	66
1918--	75	84	97	86	94	88	79	81	86	67	78	77	72	77	69	105	71
1919--	76	86	95	90	95	88	81	85	87	64	77	79	75	73	71	99	60
1920--	81	89	95	90	95	87	86	95	87	66	77	87	83	81	77	99	66
1921--	77	87	98	93	95	92	83	87	86	66	78	81	63	81	64	100	62
1922--	82	89	101	94	98	93	86	88	89	69	81	86	84	78	69	100	69
1923--	82	89	103	94	100	94	85	94	88	70	82	89	85	82	66	103	84
1924--	81	87	100	96	98	89	83	84	90	85	84	93	83	80	75	98	97
1925--	82	88	99	97	99	90	83	97	93	73	86	87	78	87	77	99	88
1926--	83	89	102	99	100	94	84	91	93	87	84	91	93	85	82	99	88
1927--	87	92	104	102	101	94	89	94	92	89	88	93	78	93	75	94	97
1928--	89	92	103	102	102	92	89	97	93	94	90	97	87	93	76	94	84
1929--	88	92	103	103	101	95	88	96	93	96	91	94	85	90	77	96	90

See footnotes at end of table.

TABLE 57.--*Index numbers of production per man-hour by selected enterprises, United States, 1910-48--Continued*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1930--	87	90	103	102	100	94	86	86	94	103	91	94	83	98	76	97	90
1931--	93	94	102	100	102	96	91	92	92	111	95	93	98	88	92	99	77
1932--	94	94	101	97	102	96	94	102	91	98	92	90	86	92	82	97	69
1933--	86	88	99	94	102	94	84	86	97	79	95	91	88	93	80	97	64
1934--	82	85	92	92	98	91	81	65	95	81	105	96	85	82	83	100	69
1935--	96	97	93	96	97	99	97	96	96	86	98	94	99	90	89	100	103
1936--	88	90	100	98	100	98	86	71	99	89	102	93	89	98	94	98	78
1937--	103	102	98	100	99	96	103	111	104	103	102	105	103	98	110	102	96
1938--	106	105	103	103	100	104	107	109	102	110	99	104	100	109	103	99	102
1939--	107	106	106	103	104	103	107	113	99	112	99	104	109	105	104	101	121
1940--	112	110	109	106	104	104	112	116	101	126	98	111	110	115	108	108	129
1941--	128	114	113	110	106	114	119	126	102	139	100	112	113	111	102	105	143
1942--	127	122	120	114	109	119	126	143	106	159	103	117	116	109	112	105	144
1943--	125	120	125	113	113	122	122	135	108	147	101	118	106	99	110	104	141
1944--	130	124	123	116	112	120	128	142	108	166	103	118	119	101	119	109	144
1945--	134	128	126	121	110	126	133	149	109	171	106	125	112	107	110	108	153
1946--	141	133	126	125	110	121	140	164	112	182	110	138	122	112	106	111	154
1947--	139	130	128	129	110	128	133	142	114	201	109	137	121	117	116	109	152
1948--	149	139	132	132	110	129	145	188	115	198	108	149	90	118	124	113	187

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 58.--*Inuex numbers of production per man-hour by selecteu enterprises, New Englana Division, 1919-48*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	78	87	81	88	93	75	89	84	89	---	92	74	87	124	---	106	---
1920---	75	85	81	89	92	78	86	87	89	---	92	71	76	115	---	102	---
1921---	78	87	82	89	92	81	88	89	90	---	94	87	61	114	---	103	---
1922---	76	84	84	91	92	82	84	86	90	---	89	68	71	110	---	91	---
1923---	81	88	85	92	94	83	92	87	90	---	92	89	80	115	---	103	---
1924---	83	91	85	92	95	79	94	89	91	---	94	94	82	108	---	101	---
1925---	83	90	87	94	97	80	91	92	93	---	93	87	86	106	---	100	---
1926---	85	92	89	96	98	81	93	93	92	---	93	95	91	104	---	102	---
1927---	86	92	90	99	97	84	92	90	91	---	94	87	78	106	---	96	---
1928---	88	93	90	97	95	84	95	91	95	---	94	88	77	105	---	96	---
1929---	93	97	92	98	94	87	101	95	95	---	95	102	88	102	---	102	---
1930---	96	99	94	100	95	88	102	99	96	---	94	97	103	102	---	103	---
1931---	94	97	93	99	95	89	100	96	96	---	98	97	81	105	---	101	---
1932---	93	96	92	98	96	90	100	99	97	---	91	95	105	103	---	105	---
1933---	94	96	92	95	97	91	98	97	98	---	99	100	108	97	---	101	---
1934---	96	97	92	96	97	91	101	99	98	---	99	110	62	101	---	104	---
1935---	96	97	95	98	99	97	96	98	99	---	99	94	90	102	---	103	---
1936---	98	98	98	100	100	98	99	99	100	---	100	105	81	99	---	104	---
1937---	103	103	100	100	101	99	105	99	99	---	101	105	116	100	---	99	---
1938---	99	99	102	100	100	103	98	99	100	---	99	98	92	99	---	90	---
1939---	104	103	105	102	100	103	102	105	102	---	101	98	121	100	---	104	---

See footnotes at end of table.

TABLE 58.--*Index numbers of production per man-hour by selected enterprises, New England Division, 1919-48--Continued*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops									
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	107	106	108	105	99	106	106	108	103	---	99	106	101	110	---	102	---
1941---	111	109	114	109	99	112	107	110	105	---	102	108	113	117	---	104	---
1942---	119	116	123	115	100	120	111	114	104	---	103	108	128	121	---	102	---
1943---	127	123	130	114	104	122	122	111	106	---	105	118	107	130	---	104	---
1944---	122	118	132	118	107	119	113	114	107	---	106	109	98	133	---	104	---
1945---	125	121	136	120	101	124	116	116	108	---	107	107	74	145	---	100	---
1946---	134	129	132	123	100	114	127	123	108	---	109	125	103	134	---	102	---
1947---	136	130	141	130	98	127	125	124	109	---	108	125	110	135	---	99	---
1948---	139	133	140	131	96	120	129	126	110	---	110	130	105	146	---	99	---

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 59.--*Index numbers of production per man-hour by selected enterprises, Middle Atlantic Division, 1919-48*
(1935-39 = 100)

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	74	84	89	90	98	85	78	81	81	63	76	79	65	105	---	96	---
1920---	80	87	87	90	100	85	85	84	81	64	78	87	106	104	---	100	---
1921---	73	82	89	92	99	90	76	83	82	66	79	76	50	106	---	98	---
1922---	82	88	91	94	98	90	85	81	82	69	79	84	96	105	---	95	---
1923---	79	86	91	93	98	90	82	79	82	70	80	83	84	101	---	95	---
1924---	83	89	91	93	100	87	85	80	83	65	86	87	83	101	---	94	---
1925---	82	88	92	94	99	87	83	88	84	73	85	79	80	98	---	98	---
1926---	85	90	94	98	100	88	86	86	83	74	83	85	103	102	---	97	---
1927---	87	91	97	100	99	89	86	83	84	74	88	87	68	99	---	97	---
1928---	88	91	97	100	98	87	87	83	89	65	89	92	85	101	---	98	---
1929---	87	90	97	101	97	92	84	80	85	74	90	85	75	98	---	95	---
1930---	89	91	97	100	97	89	87	79	86	84	91	89	96	99	---	86	---
1931---	94	95	96	101	98	94	94	91	87	90	92	101	99	96	---	98	---
1932---	90	91	95	98	98	94	88	82	87	75	87	96	99	97	---	90	---
1933---	91	92	94	96	98	92	89	85	87	87	93	94	87	96	---	86	---
1934---	93	94	94	98	97	91	93	90	88	79	98	105	79	97	---	97	150
1935---	97	98	98	100	98	96	96	96	87	96	98	94	98	98	---	100	115
1936---	95	96	99	100	100	98	94	94	88	94	100	99	83	101	---	104	83
1937---	103	103	100	100	100	98	105	100	115	105	102	102	110	103	---	97	108
1938---	103	102	101	101	101	103	104	106	120	104	99	102	94	99	---	100	105
1939---	102	101	102	99	101	105	101	104	90	101	101	103	115	99	---	99	89

See footnotes at end of table.

TABLE 59.--*Index numbers of production per man-hour by selected enterprises, Middle Atlantic Division, 1919-48--Continued*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	104	103	104	104	103	104	103	110	93	107	100	105	99	101	---	102	96
1941---	107	105	110	109	102	113	103	116	94	106	101	111	101	109	---	103	95
1942---	113	110	116	114	103	117	108	122	94	111	102	110	110	120	---	95	100
1943---	110	107	120	113	106	118	104	105	95	97	99	109	83	113	---	95	88
1944---	115	111	122	115	107	119	108	116	96	126	100	110	103	116	---	102	95
1945---	119	114	124	120	104	117	111	128	96	132	102	117	57	113	---	97	109
1946---	128	122	127	125	104	116	118	141	98	139	107	136	106	115	---	101	119
1947---	128	122	133	134	104	125	116	133	98	151	103	134	101	117	---	103	110
1948---	134	125	134	134	105	125	121	154	99	151	105	143	93	107	---	102	122

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 60.--*Index numbers of production per man-hour by selected enterprises, East North Central Division, 1919-48*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals [1]	Poultry	All crops	Feed grains	Hay [2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919--	75	84	94	85	91	89	76	72	86	74	75	79	56	84	---	96	---
1920--	77	85	92	86	93	89	77	76	88	60	67	91	92	90	---	100	50
1921--	72	81	94	90	93	94	73	71	88	63	74	74	41	88	---	100	50
1922--	78	86	99	93	94	95	77	73	89	69	78	90	86	79	---	97	60
1923--	81	87	100	95	95	96	80	76	90	80	77	92	84	83	---	96	57
1924--	78	83	97	97	95	91	76	69	90	80	83	95	70	79	---	89	50
1925--	84	88	96	97	95	93	83	83	91	75	87	89	70	95	---	100	56
1926--	83	88	98	99	95	97	82	77	92	93	83	90	95	89	---	96	60
1927--	81	86	101	100	97	95	79	71	92	82	84	87	61	86	---	93	62
1928--	85	89	101	101	98	94	81	81	93	52	88	95	81	76	---	97	71
1929--	86	89	101	103	98	99	81	77	93	87	90	87	74	78	---	104	81
1930--	81	85	99	101	97	98	77	71	94	63	94	79	67	88	---	98	78
1931--	93	94	99	99	98	100	92	85	94	119	98	93	109	100	---	99	90
1932--	94	95	99	96	99	101	94	93	95	94	90	98	79	109	---	94	89
1933--	83	85	99	93	99	98	80	73	96	89	101	84	79	94	---	93	78
1934--	80	84	92	92	98	90	79	68	99	92	110	101	72	94	---	100	89
1935--	95	96	94	96	97	101	96	94	97	94	100	96	105	88	---	100	93
1936--	87	89	99	99	99	100	83	75	100	98	103	92	74	104	---	99	83
1937--	104	103	97	100	100	87	106	108	100	96	104	96	116	89	---	99	99
1938--	104	104	103	102	101	105	104	106	101	105	97	108	81	109	---	98	111
1939--	110	108	107	103	103	107	111	117	102	107	96	108	124	110	---	104	114

See footnotes at end of table.

TABLE 60.--*Index numbers of production per man-hour by selected enterprises, East North Central Division, 1919-48-Continued*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals [1]	Poultry	All crops	Feed grains	Hay [2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940--	109	107	111	107	104	105	107	113	103	126	96	99	102	115	---	104	89
1941--	118	114	117	114	106	114	118	126	104	136	103	110	116	132	---	104	105
1942--	124	119	121	118	108	120	122	138	106	109	105	108	113	126	---	106	106
1943--	122	117	126	116	111	124	119	130	107	110	100	102	85	83	---	101	106
1944--	124	118	123	119	112	121	120	126	109	149	103	109	114	107	---	107	107
1945--	133	126	124	124	111	130	131	144	110	171	104	118	86	117	---	107	111
1946--	139	130	125	129	111	123	138	156	111	173	110	128	117	123	---	108	121
1947--	132	123	128	131	110	129	126	136	113	180	107	117	121	97	---	108	109
1948--	156	144	131	134	111	127	157	181	115	203	103	145	114	123	---	107	133

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 61.--*Index numbers of production per man-hour by selected enterprises, West North Central Division 1919-48*
[1935-39 =100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	82	93	103	92	92	94	85	90	91	62	84	80	93	69	76	107	55
1920---	92	100	102	95	92	93	95	101	91	70	85	98	88	78	77	107	63
1921---	88	97	107	99	93	98	91	96	93	67	85	84	35	85	88	96	65
1922---	93	99	114	96	95	98	94	96	93	74	85	95	124	96	88	105	79
1923---	92	98	115	98	96	99	93	100	94	63	84	98	103	93	67	105	72
1924---	91	97	112	100	95	94	92	85	94	94	88	107	97	88	63	102	85
1925---	93	98	108	101	96	96	93	96	96	77	92	94	88	98	79	105	77
1926---	89	95	111	102	97	99	90	87	100	83	88	100	109	90	72	99	76
1927---	100	103	112	104	98	97	100	99	96	92	88	107	93	93	61	110	92
1928---	104	106	113	107	99	97	104	100	99	105	91	113	100	114	68	111	89
1929---	100	102	112	107	99	100	99	98	96	98	94	99	103	91	78	107	77
1930---	100	102	112	107	99	100	99	91	98	114	94	99	65	99	77	104	85
1931---	96	97	114	105	100	101	94	84	101	116	93	96	117	96	97	109	69
1932---	104	104	108	101	99	98	104	105	100	104	93	99	83	99	94	104	81
1933---	91	92	106	98	99	99	88	89	102	76	99	90	91	97	81	101	73
1934---	67	73	94	91	97	92	62	47	94	73	110	72	71	73	95	87	69
1935---	95	95	93	95	96	98	95	97	97	82	102	104	116	93	84	105	95
1936---	75	80	98	98	98	95	70	53	100	91	100	56	53	90	98	93	57
1937---	105	105	96	98	99	97	109	111	102	105	103	113	117	106	96	102	100
1938---	111	109	103	105	101	106	113	116	101	108	100	113	85	112	106	101	119
1939---	114	111	110	104	106	104	113	123	100	114	95	114	129	99	116	99	129

See footnotes at end of table.

TABLE 61.--*Index numbers of production per man-hour by selected enterprises, West North Central Division, 1919-48--Continued*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	121	116	111	107	104	103	122	127	102	140	94	126	119	113	106	109	138
1941---	130	124	118	112	106	113	130	137	105	160	99	120	108	119	113	111	141
1942---	146	137	127	115	109	122	149	159	110	198	101	133	116	110	110	109	144
1943---	141	132	135	114	113	124	142	148	111	181	97	127	84	103	101	108	140
1944---	147	137	129	112	113	122	148	158	113	180	94	121	87	106	110	113	138
1945---	154	143	133	123	114	129	153	153	115	206	96	142	111	113	95	113	146
1946---	163	151	133	128	114	126	167	174	118	215	105	147	128	122	111	115	160
1947---	154	141	137	130	114	131	151	135	119	238	101	148	132	113	99	104	151
1948---	182	165	137	132	114	129	181	202	122	233	110	167	129	119	110	110	189

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 62.--*Index numbers of production per man-hour by selected enterprises, South Atlantic Division, 1918-48*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	73	81	91	86	101	84	78	96	93	75	85	97	65	92	82	86	91
1920---	79	85	91	88	101	83	83	103	93	84	87	101	82	93	86	84	88
1921---	71	81	92	88	101	88	77	97	94	75	87	92	54	90	70	87	88
1922---	78	86	92	88	99	88	84	96	93	81	89	101	80	89	71	89	80
1923---	82	88	92	88	99	89	87	100	94	89	90	99	83	88	78	94	92
1924---	79	87	90	90	98	85	84	89	95	85	90	109	93	85	79	85	86
1925---	79	84	91	91	99	86	82	93	95	95	92	92	77	79	83	92	94
1926---	86	90	96	97	100	90	87	101	95	103	91	103	94	91	88	93	97
1927---	85	89	99	101	102	91	87	102	96	91	94	112	70	89	80	94	100
1928---	84	88	97	102	100	86	85	92	95	94	94	115	86	88	77	90	91
1929---	87	90	97	102	99	89	88	102	96	95	97	112	81	96	82	92	97
1930---	85	87	96	98	98	89	84	83	96	108	96	100	70	94	91	94	85
1931---	93	94	95	99	99	93	93	100	95	117	96	101	105	93	95	91	100
1932---	84	87	96	95	99	94	83	85	95	79	97	87	69	96	83	87	83
1933---	89	90	93	91	97	90	89	94	98	88	96	92	88	96	86	96	82
1934---	92	95	90	91	95	91	94	87	97	92	100	102	85	95	96	97	92
1935---	98	98	92	93	95	95	99	98	100	99	99	99	96	96	98	101	100
1936---	93	94	97	97	99	97	94	92	99	93	100	91	88	98	100	98	100
1937---	102	101	100	101	101	99	100	104	99	103	100	104	105	100	106	100	106
1938---	101	102	104	103	102	104	102	104	101	104	100	104	100	103	92	99	100
1939---	106	105	107	106	103	105	105	102	101	101	101	102	111	103	104	102	94

See footnotes at end of table.

TABLE 62.--*Inaex numbers of production per man-hour by selected enterprises, South Atlantic Division, 1919-48--Continued*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	110	109	109	104	100	112	110	107	103	111	100	109	119	111	113	106	120
1941---	109	109	114	112	99	121	108	111	105	117	100	93	119	107	88	101	106
1942---	116	114	120	114	103	127	115	116	104	118	102	105	130	104	109	104	104
1943---	115	113	126	115	104	131	112	117	105	108	104	100	118	104	109	102	103
1944---	123	119	124	117	101	127	118	123	106	148	105	94	130	113	120	107	109
1945---	127	123	128	121	97	135	122	136	104	135	106	109	135	110	113	107	106
1946---	129	124	126	124	99	128	125	143	105	160	108	122	142	112	111	109	106
1947---	130	124	128	128	99	132	124	150	107	171	106	114	139	109	108	108	117
1948---	134	127	133	134	102	136	128	152	106	167	108	122	143	114	122	111	121

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 63.--*Index numbers of production per man-hour by selected enterprises, East South Central Division, 1919-48*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	77	87	101	90	102	95	83	85	95	89	91	96	74	99	63	98	87
1920---	81	89	99	89	101	96	86	96	96	76	92	100	102	102	61	96	89
1921---	76	87	101	91	101	102	82	89	96	79	93	92	65	101	64	97	86
1922---	83	89	102	92	102	101	86	88	95	82	93	100	118	100	70	100	77
1923---	76	85	100	91	100	103	80	89	96	84	94	101	83	100	47	100	69
1924---	79	87	98	96	97	98	83	85	96	71	95	96	118	92	71	99	85
1925---	83	87	98	97	99	99	85	87	98	90	95	90	85	96	85	98	82
1926---	89	93	102	104	100	105	90	101	97	112	95	106	110	104	83	98	75
1927---	82	88	107	106	102	104	83	91	97	70	96	103	67	100	76	93	84
1928---	80	85	101	106	101	92	80	84	97	57	97	108	111	100	73	97	77
1929---	88	90	99	106	99	99	88	96	96	77	98	109	84	101	83	99	86
1930---	76	81	98	103	99	98	76	62	94	88	98	94	77	96	76	94	81
1931---	95	94	96	100	97	100	94	104	95	113	98	94	122	102	86	99	92
1932---	85	87	97	97	100	104	83	89	96	75	98	97	65	100	71	95	75
1933---	88	89	96	93	100	98	87	97	98	86	99	92	102	100	70	94	72
1934---	92	94	91	89	98	99	94	92	98	92	99	101	103	104	88	101	92
1935---	92	94	94	93	98	102	92	90	99	85	100	100	96	100	90	98	103
1936---	93	94	97	97	99	97	93	92	100	101	100	87	83	98	100	94	111
1937---	109	106	99	100	100	98	109	114	99	118	100	105	119	103	111	104	99
1938---	106	105	104	105	101	104	106	109	101	106	100	107	89	101	103	99	110
1939---	100	101	106	105	104	99	100	95	101	90	100	101	113	98	96	105	77

See footnotes at end of table.

TABLE 63.--*Index numbers of production per man-hour by selected enterprises, East South Central Division, 1919-48--Continued*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	102	103	102	102	102	97	103	108	103	115	101	99	86	95	91	108	111
1941---	112	112	107	108	102	111	113	123	103	131	102	105	130	104	101	108	132
1942---	117	115	116	112	106	117	117	129	103	120	102	108	109	101	113	108	140
1943---	117	114	121	111	109	122	113	124	104	105	102	105	87	102	112	107	136
1944---	122	118	118	114	106	114	118	126	104	138	103	102	99	104	119	115	132
1945---	125	122	115	117	102	120	125	146	100	110	103	114	119	104	113	111	142
1946---	127	122	117	120	103	117	125	151	106	118	104	116	108	106	99	118	142
1947---	128	122	120	123	103	136	126	152	106	142	104	110	122	103	110	116	162
1948---	139	131	123	126	105	123	134	181	106	145	105	113	123	108	124	118	211

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 64.--*Index numbers of production per man-hour by selected enterprises, West South Central Division, 1919-48*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	79	87	99	76	94	96	83	107	81	64	89	99	127	70	71	---	110
1920---	81	87	99	77	95	96	85	110	81	60	90	100	69	80	82	---	100
1921---	75	84	101	84	96	101	79	99	80	61	89	95	78	91	62	---	93
1922---	72	80	100	86	97	101	75	88	81	48	91	96	100	85	71	---	94
1923---	69	78	99	89	98	102	71	83	80	65	91	100	92	75	70	---	93
1924---	75	80	9	92	97	98	77	91	82	84	93	97	104	64	78	---	73
1925---	69	75	99	95	98	98	69	78	81	56	94	100	89	81	75	---	96
1926---	83	86	102	101	100	107	84	111	82	103	94	108	106	60	83	---	110
1927---	79	83	103	105	100	105	79	102	82	73	95	105	77	80	76	---	93
1928---	81	84	102	104	99	98	81	98	82	99	96	110	100	84	80	---	108
1929---	79	82	103	107	98	101	79	89	96	112	97	106	101	89	74	---	88
1930---	75	80	99	102	97	97	74	74	91	99	97	108	76	87	72	---	80
1931---	96	95	100	102	98	99	96	105	69	131	97	108	109	79	95	---	90
1932---	90	91	101	100	100	99	89	102	73	101	99	94	92	80	90	---	84
1933---	81	83	98	93	98	94	78	72	96	78	98	96	88	79	83	---	97
1934---	77	82	91	89	99	93	76	56	80	94	99	87	93	82	76	---	60
1935---	90	93	93	95	100	101	92	101	101	77	100	100	98	92	87	---	99
1936---	87	89	97	96	99	98	84	79	89	81	100	94	77	102	87	---	86
1937---	107	105	100	101	98	97	107	111	103	115	101	106	112	100	111	---	106
1938---	108	106	104	105	100	103	110	109	105	110	100	102	98	104	107	---	104
1939---	108	107	106	103	103	101	107	100	102	117	99	98	115	102	108	---	105

See footnotes at end of table.

TABLE 64.--*Index numbers of production per man-hour by selected enterprises, West South Central Division, 1919-48--Continued*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	115	112	105	103	102	100	114	123	108	115	101	109	116	83	112	---	134
1941---	117	114	110	107	103	115	114	113	118	98	100	118	132	97	108	---	136
1942---	123	118	115	108	106	116	118	113	119	134	102	119	128	95	114	---	140
1943---	118	114	118	106	110	117	111	107	110	101	104	110	116	104	112	---	87
1944---	138	130	118	109	109	116	135	131	118	164	105	112	131	101	122	---	147
1945---	131	125	119	111	107	121	127	128	112	119	106	116	140	105	107	---	144
1946---	135	128	117	115	106	114	132	135	120	135	106	118	142	98	106	---	173
1947---	145	134	117	115	106	118	140	138	119	180	106	115	150	91	118	---	141
1948---	141	130	120	118	107	121	133	148	121	142	107	112	146	101	122	---	165

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 65. -- *Index numbers of production per man-hour by selected enterprises, Mountain Division, 1919-48*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals [1]	Poultry	All crops	Feed grains	Hay [2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	66	79	92	81	100	94	71	86	87	48	67	70	76	60	73	---	45
1920---	76	87	96	87	100	93	81	100	87	66	69	82	66	73	65	---	58
1921---	79	89	101	92	98	98	84	89	87	69	71	89	77	75	67	---	75
1922---	79	89	100	94	100	97	86	92	88	70	77	91	83	71	68	---	84
1923---	84	92	101	95	100	97	89	109	88	76	78	85	88	82	74	---	89
1924---	80	87	100	96	96	92	82	80	89	78	78	72	69	71	74	---	93
1925---	82	89	98	96	96	94	87	94	91	71	87	84	87	83	78	---	75
1926---	84	90	98	98	95	97	87	80	91	82	85	76	92	84	84	---	77
1927---	95	98	98	100	95	95	100	106	91	97	91	95	93	91	84	---	118
1928---	93	97	98	100	95	96	98	104	92	96	92	84	97	90	85	---	113
1929---	89	93	98	103	97	97	92	100	93	83	95	86	101	85	84	---	75
1930---	94	97	99	102	95	99	97	114	95	84	95	95	90	97	88	---	76
1931---	86	90	98	98	96	98	86	86	95	73	92	83	95	87	86	---	44
1932---	91	94	98	93	103	93	93	78	94	97	86	88	96	95	83	---	74
1933---	88	91	97	92	103	96	88	85	96	71	89	92	78	95	84	---	47
1934---	84	87	94	89	98	93	85	62	95	80	96	79	88	73	94	---	65
1935---	94	96	95	94	97	96	97	97	97	91	98	93	96	98	95	---	88
1936---	92	93	100	99	102	97	89	85	100	68	96	96	93	96	98	---	48
1937---	98	98	99	99	100	101	96	91	100	90	103	103	97	99	102	---	87
1938---	111	109	101	103	100	104	112	119	101	131	100	106	108	110	100	---	140
1939---	105	104	105	105	101	102	106	108	102	120	103	102	106	97	105	---	137

See footnotes at end of table.

TABLE 65.--*Index numbers of production per man-hour by selected enterprises, Mountain Division, 1919-48--Continued*
(1935-39 = 100)

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals [1]	Poultry	All crops	Feed grains	Hay [2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	112	110	106	107	103	101	113	122	104	125	103	117	111	112	101	---	170
1941---	120	117	107	111	103	107	123	149	105	162	105	121	109	115	94	---	174
1942---	123	119	113	112	107	112	126	155	108	180	109	132	98	107	93	---	203
1943---	129	124	118	112	112	114	134	157	109	181	111	132	107	111	93	---	205
1944---	130	126	118	115	113	112	133	160	110	167	112	136	120	106	101	---	208
1945---	134	127	120	118	113	115	134	170	111	175	120	139	122	114	96	---	154
1946---	137	130	119	121	111	115	139	172	114	179	121	148	115	117	107	---	231
1947---	145	137	122	124	111	118	144	187	113	191	126	148	122	127	103	---	236
1948---	148	139	122	128	112	121	147	199	116	206	127	152	117	121	106	---	293

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

TABLE 66.--*Index numbers of production per man-hour by selected enterprises, Pacific Division, 1919-48*
[1935-39 = 100]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1919---	71	78	87	79	97	92	75	72	81	50	70	50	77	53	67	---	---
1920---	71	78	85	80	97	91	75	74	82	52	72	56	72	63	65	---	---
1921---	73	80	87	83	97	91	78	76	83	64	73	59	73	62	67	---	---
1922---	74	80	90	85	96	95	77	78	83	54	76	61	77	58	56	---	---
1923---	79	84	89	86	96	95	82	83	84	76	77	64	84	64	75	---	---
1924---	71	77	88	86	95	90	74	71	86	51	79	63	76	65	74	---	---
1925---	76	80	90	89	94	92	77	81	84	57	81	71	75	45	82	---	---
1926---	80	84	91	89	95	96	83	84	85	70	82	71	86	62	83	---	---
1927---	84	87	93	93	96	91	86	87	86	83	85	73	85	66	80	---	---
1928---	84	86	95	93	98	88	85	90	88	84	88	72	84	83	82	---	---
1929---	85	88	96	96	97	92	87	86	88	79	89	74	88	79	86	---	---
1930---	88	89	96	97	98	93	87	91	89	76	91	81	86	86	91	---	---
1931---	88	90	97	96	99	95	88	74	92	77	92	76	91	86	91	---	---
1932---	91	92	96	95	100	96	91	93	93	84	93	80	90	90	93	---	---
1933---	89	90	93	92	100	96	90	93	94	74	92	91	89	101	92	---	---
1934---	90	91	94	95	97	97	91	85	97	78	96	90	87	101	98	---	107
1935---	98	98	96	98	96	98	98	101	97	96	99	90	100	93	97	---	95
1936---	97	98	100	99	98	100	97	100	99	94	99	98	94	102	99	---	92
1937---	100	100	101	100	101	103	99	102	100	98	101	105	96	95	100	---	97
1938---	102	102	101	102	102	99	103	95	101	106	99	103	104	96	101	---	110
1939---	103	102	102	101	103	100	103	102	103	106	102	104	106	114	103	---	106

See footnotes at end of table.

TABLE 66.--*Index numbers of production per man-hour by selected enterprises, Pacific Division, 1919-48--Continued*
[*1935-39 = 100*]

Year	Farm output	Gross farm production	Livestock				Crops										
			Meat animals and animal products	Milk cows	Meat animals[1]	Poultry	All crops	Feed grains	Hay[2]	Food grains	Truck crops and gardens	Vegetables except truck	Fruits and tree nuts	Sugar crops	Cotton	Tobacco	Oil crops
1940---	107	106	105	107	104	101	106	104	104	101	104	108	109	114	106	---	118
1941---	108	107	108	109	105	106	108	111	106	127	105	113	107	106	101	---	88
1942---	113	111	110	112	107	107	112	133	107	130	107	123	108	107	100	---	125
1943---	113	112	116	114	109	111	112	134	106	117	105	123	105	108	103	---	117
1944---	119	117	119	121	109	111	117	134	109	127	108	124	115	115	100	---	125
1945---	118	115	121	126	104	113	113	136	109	121	111	121	107	119	101	---	124
1946---	124	121	121	132	104	110	120	150	111	140	115	132	114	120	104	---	141
1947---	123	120	125	137	104	117	116	156	112	120	116	132	112	125	106	---	146
1948---	124	121	129	144	105	118	116	162	112	143	117	136	106	121	103	---	169

[1] Excludes wool.
[2] Includes sorghums for forage and silage.

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END