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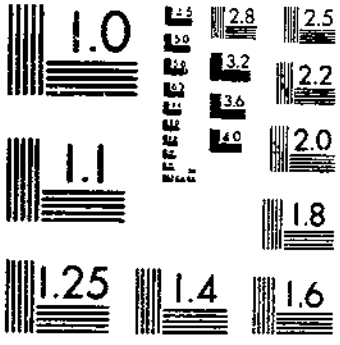

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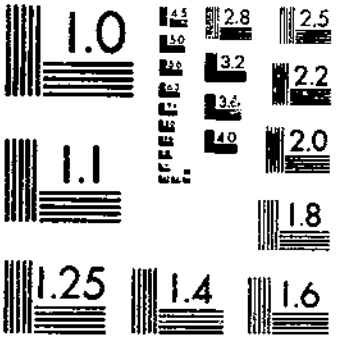

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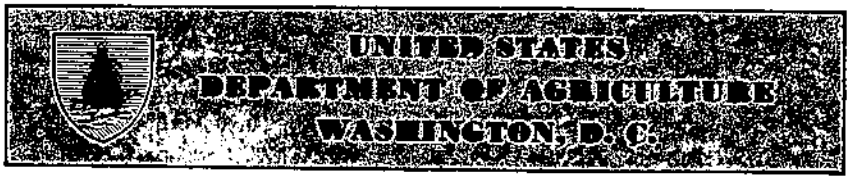

Interregional Competition in the Production of Chickens and Eggs [1] [2]

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CONTENTS

INTRODUCTION

Why is the production of chickens and eggs distributed so widely throughout the United States? Why do prices received by farmers differ so much between regions and between areas? Why has production increased much more in some places than in others? How have changes in supply from competing regions affected prices in each region? What are the more important factors which are likely to affect regional changes in production over the next few years? This bulletin is concerned with such questions.

The phenomenal upward trend in the production of chicken meat and eggs in the United States as a whole has received more attention than have the differing trends by regions and areas. In the future, supply responses by regions are likely to assume significance in

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[2] The work represented by this publication was supported by the Bankhead-Jones special research fund.

[3] Suggestions and comments from others working in the field of poultry economics in the States and in the U. S. Department of Agriculture have been very helpful.

appraising desirable adjustments in case the industry should be faced either with periods of slower growth or with the need for substantial new increases. Changes in the production of chickens and eggs come about in response to changes in relative prices, to advances in technology, and to other forces. The impact of these factors varies greatly from region to region.

In an earlier bulletin the competitive position of chicken and egg production as compared with alternative products was examined from a national standpoint (*1*).[4] The purpose of the present analysis is to break the problem down further and explain regional trends and their interrelationships. The first step in the process is to look at the recent pattern of production.

In this bulletin frequent use is made of data published both by the Bureau of the Census and by the Bureau of Agricultural Economics. It is important to understand some of the differences between the two sources. The Bureau of the Census data show the number of farms reporting chickens on hand, number of chickens on hand, number of chickens raised, and eggs produced by size of flocks and by type of farm and by regions and smaller areas for recent years of census enumeration. In the 1945 census, the latest from which data are currently available, the number of chickens on hand includes all those on farms 4 months of age or older on Jan. 1, 1945. Chickens raised comprise, all chickens raised on farms for all purposes, for replacement of laying flocks, for consumption as young farm chickens, and for commercial broilers. On the other hand, data of the Bureau of Agricultural Economics separate the commercial broilers from the farm chickens. Commercial broilers include all young chickens of the heavy or cross-breeds, 2 to 4 pounds live weight, raised for meat, and from which pullets as well as cockerels are sold. The Bureau of Agricultural Economics estimates of the number of farm chickens on hand and the farm chickens raised do not include commercial broilers.

GEOGRAPHIC DISTRIBUTION OF PRODUCTION

The Regional Production Pattern

Production of chickens and eggs is more widely distributed throughout the United States than is the production of most other farm products. The location of chicken production is shown by the distribution of chickens raised (fig. 1). These are census data and include both farm chickens and commercially raised broilers, which, unlike farm chickens, are mainly found in a few areas. These areas include southern New England, the Delmarva (Delaware-Maryland-Virginia) Peninsula, northwestern Virginia, northern Georgia, south central Texas, northwestern Arkansas, and scattered areas in the Midwest and along the Pacific Coast.

The number of all chickens on hand on farms at the beginning of the year usually is less than half the number of chickens raised, including broilers, during the preceding year. The distribution of chickens on hand as reported by the census differs from that of all chickens raised because those on hand do not include those less than 4 months old and therefore exclude most of the broilers (fig. 2). The

[4] Italic numbers in parentheses refer to Literature Cited, p. 60.

distribution of laying hens is indicated approximately by chickens on hand. Numbers are widely dispersed except for a few areas of heavy concentration in the Northeast and along the Pacific Coast.

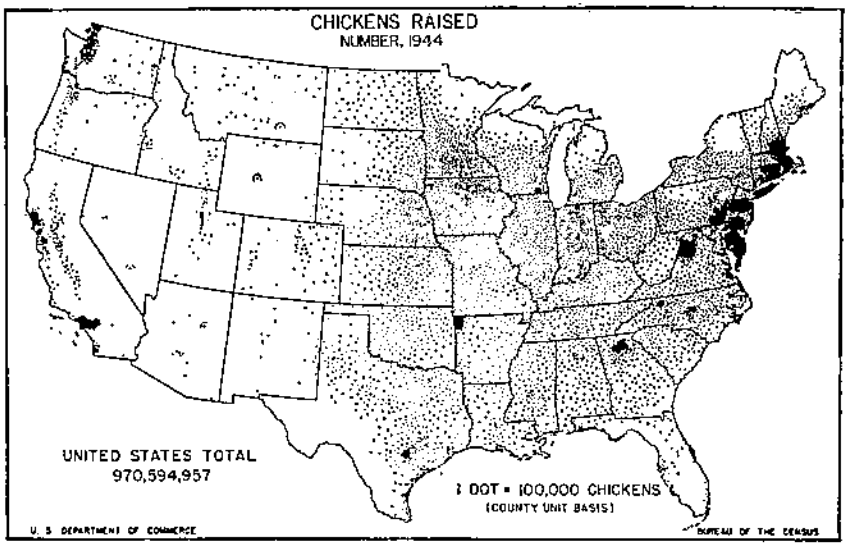

FIGURE 1.—Chickens are raised in all regions. Commercial broiler areas are indicated by comparing this map with the following one for chickens on hand. Areas of relatively greater concentration for chickens raised are centers of broiler production as chickens on hand do not include chickens less than 4 months old in the 1945 census, the latest available.

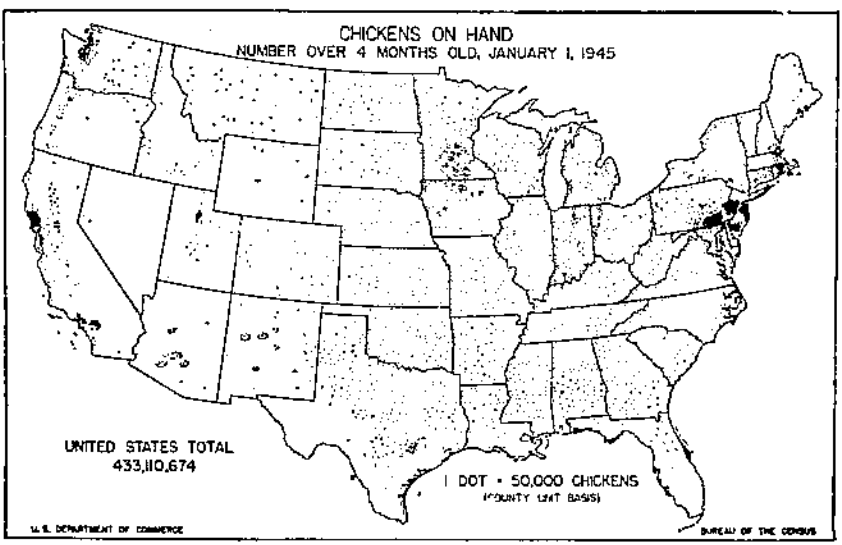

FIGURE 2.—The distribution of chickens on hand is similar to the distribution of the total volume of farm production. But the relative position of chicken production among the farm enterprises is most important in the Northeast.

Egg production is distributed differently from chickens on hand because rate of lay differs between regions. Rate of lay is highest in the Northeast and Pacific regions and lowest in the South. Therefore, density of egg production is greater, relative to chickens on hand, in the North than the basic pattern of chicken numbers might suggest (fig. 3).

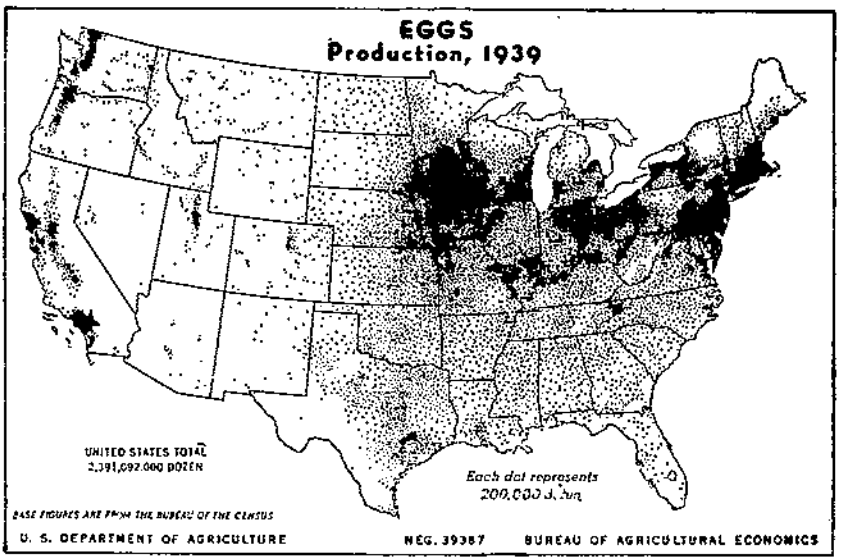

FIGURE 3.—Eggs are produced in all regions, but there are areas of especially heavy concentration in the North Atlantic, North Central, and Pacific States. Production of eggs has increased in all regions since 1939. A map for a current year would be similar but would show a still greater density in the North Atlantic States, Minnesota, and Utah, in which expansion has been greatest.

In recent years the two North Central regions have been the source of half of the eggs produced and more than half of those sold from farms in the United States (table 1).[5] The three southern regions accounted for about 24 percent of the eggs produced but for only 20 percent of those sold. The two western regions provided 10 percent of the eggs produced and the two northeastern regions 16 percent. The distribution of eggs sold departs from that of eggs produced because of differences between regions in the percentage of production sold. For example, only about 75 percent of the eggs produced in the South are sold, as compared with more than 90 percent in the North. The number of eggs produced per layer on hand at the beginning of the year averages about 60 percent higher in New England and 40 percent higher in the Pacific region than in the South (table 1).

[5] The regions used in table 1 and throughout this bulletin are the conventional areas employed by the U. S. Bureau of the Census and by the Agricultural Estimates Branch of the Bureau of Agricultural Economics. As they cut across type-of-farming regions they are not always fully satisfactory but they have the advantage of familiar usage and of comparability with other series. Furthermore, some of the data are available only on this regional basis.

TABLE 1.—*Number of layers, eggs per layer, eggs produced and eggs sold, by regions, United States, averages 1945–49*

Region	Number of layers [1]	Eggs per layer [2]	Eggs produced	Percentage of egg production sold	Percentage of total	
					Eggs produced	Eggs sold
	Millions	*Number*	*Millions*	*Percent*	*Percent*	*Percent*
New England	14. 9	161	2, 404	92. 5	4. 3	4. 7
Middle Atlantic	47. 0	139	6, 529	92. 1	11. 7	12. 6
East North Central	85. 7	134	11, 438	87. 6	20. 6	21. 1
West North Central	128. 9	129	16, 583	89. 3	29. 8	31. 1
South Atlantic	42. 8	105	4, 510	73. 0	8. 1	6. 9
East South Central	35. 6	97	3, 440	68. 6	6. 2	5. 0
West South Central	50. 6	104	5, 258	77. 6	9. 4	8. 6
Mountain	13. 4	128	1, 723	80. 5	3. 1	2. 9
Pacific	25. 7	146	3, 763	89. 4	6. 8	7. 1
United States	444. 6	125	55, 648	85. 5	100. 0	100. 0

[1] Potential layers, including both hens and pullets of laying age and pullets not of laying age on Jan. 1. The latter are young pullets which have not yet been added to laying flocks.

[2] Eggs produced during year per layer on hand Jan. 1.

Production of farm chickens is distributed among the regions in roughly the same way as that of eggs (table 2). But the South accounts for a larger and the West for a smaller proportion. Differences between regions in the percentage of the farm chicken production that is sold are greater than is true of eggs. Only two-thirds of the farm chickens produced in the South are sold, compared with 80 percent or more in most other regions.

The production of broilers is highly localized in a few areas. Nearly 60 percent is produced in the South Atlantic region (table 2). For this reason, total production of chicken meat is distributed differently from that of farm chickens. For example, the South Atlantic region is the source of more than 20 percent of all chicken meat produced. Almost all of the broilers are sold.

The preceding discussion of chicken production by regions has been in terms of the total farm weight of production. Data also are available showing numbers produced and numbers and average weights of young and mature farm chickens sold (table 32 in statistical tables). In recent years, in all regions, especially in the Pacific, the number of young farm chickens sold has been higher than the number of mature birds sold. Differences between regions in pounds of farm chickens sold from farms are affected by weights of chickens as well as by numbers. Weights of young and mature chickens have averaged highest in the Northeast and lowest in Pacific.

Differences between regions in average weights of chickens sold are affected by breeds of chickens raised. According to a survey made by the Bureau of Agricultural Economics in 1943, 34 percent of the farm

chickens raised in the United States were Leghorns and other light breeds and 66 percent were heavier breeds (*13*). The percentages for Leghorns in the regions were as follows: North Atlantic 30, East North Central 35, West North Central 37, South Atlantic 15, South Central 35, and the West 47. Weights of mature birds sold average lowest in the West. Since 1943, there apparently has been a slight shift to more of the heavy breeds as weights of mature chickens sold have increased.

TABLE 2.—*Farm chicken production, farm chickens sold, commercial broiler production, and percentage of farm chicken production sold, by regions, United States, averages 1945–49* [1]

Region	Farm chicken production	Farm chickens sold	Commercial broiler production	Total chicken production	Percentage of farm chicken production sold [2]
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
New England	4.4	5.2	8.0	5.3	91.4
Middle Atlantic	11.1	12.4	5.8	9.8	86.0
East North Central	20.7	21.4	7.5	17.3	79.8
West North Central	29.1	31.5	3.2	22.5	83.6
South Atlantic	9.4	6.8	55.7	21.3	55.9
East South Central	8.0	6.3	3.5	6.8	61.4
West South Central	9.4	8.5	10.2	9.6	70.3
Mountain	3.0	2.9	.3	2.3	73.7
Pacific	4.9	5.0	5.8	5.1	79.5
United States	100.0	100.0	100.0	100.0	77.3

[1] In terms of live weight.
[2] Does not include commercial broilers.

The relative contribution of chicken and egg production to farm income varies between regions (table 3). In 1945–49 cash receipts from chickens and eggs were 25 percent of cash receipts from all farm products in the New England, 20 percent in the Middle Atlantic States, and 13 percent in the South Atlantic region, compared with 10 percent for the United States and a lower percentage in other regions. Variations between States and smaller areas are larger. For example, chickens and eggs accounted for two-thirds of the total cash receipts from all farm products in Delaware and for nearly one-half in New Hampshire. The percentage was close to one-fourth in Maryland, New Jersey, Pennsylvania, Connecticut, Rhode Island, and Massachusetts. On the other hand, chickens and eggs are only a minor source of farm income in many southern and western States. Consequently, the influence of changes in the economic position of chickens and eggs on incomes of farmers is quite different in different parts of the country.

TABLE 3.—*Sales of eggs, farm chickens, commercial broilers, as a percentage of sales of all farm products, by regions, United States, averages 1925–29 and 1945–49* [1]

Region	1925–29			1945–49			
	Eggs	Farm chickens	Total	Eggs	Farm chickens	Commercial broilers	Total
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	9.2	4.9	14.1	15.7	5.3	3.9	24.9
Middle Atlantic	11.6	4.7	16.3	14.7	4.9	1.1	20.7
East North Central	8.0	4.4	12.4	6.7	2.5	.5	9.7
West North Central	5.9	3.4	9.3	6.3	2.3	.1	8.7
South Atlantic	5.6	2.8	8.4	4.7	1.7	6.8	13.2
East South Central	5.2	2.5	7.7	4.7	2.2	.7	7.6
West South Central	3.7	1.8	5.5	4.3	1.6	1.1	7.0
Mountain	3.1	1.2	4.3	2.9	.9	.1	3.9
Pacific	6.7	1.8	8.5	4.8	1.1	.7	6.6
United States	6.3	3.1	9.4	6.3	2.2	1.3	9.8

[1] Commercial broilers were included with farm chickens in 1925–29.

DISTRIBUTION ON FARMS

The widespread distribution of the production of farm chickens and eggs comes from the fact that there is some production on most farms. According to the United States Census of Agriculture, nearly 85 percent of all farms reported chickens on hand in 1945 (table 4). The percentage varied from 56 in New England to nearly 90 in the central regions. Variations for individual States are still greater. The percentages of all farms reporting chickens raised and eggs produced were also high in all regions and in most States.

Many poultry enterprises are very small. This is apparent from data showing the number of chickens on hand, chickens raised, and eggs produced per farm (table 4). The average size of enterprise is largest in the New England, Middle Atlantic, and Pacific regions and smallest in the South. The data in this table include commercial broilers. This is why the number of chickens raised is so large in relation to the number of chickens on hand in the South Atlantic region. In other regions the number of chickens raised is about twice the number on hand at the end of the year. The number of eggs produced per chicken on hand is highest in the Northeast and lowest in the South.

SIZE OF ENTERPRISE

The number of chickens on hand at the beginning of 1945 may be used as a convenient measure of size of enterprise. Census data show distribution of: (1) Number of farms reporting chickens on hand, (2) chickens on hand, (3) chickens raised, and (4) eggs produced. Chickens on hand in the 1945 census include those 4 months old and older on January 1.

TABLE 4.—*Percentage of farms reporting, and average per farm reporting chickens on hand January 1, 1945, chickens raised, and eggs produced in 1944, by regions, United States* [1]

Region	Percentage of farms reporting			Average per farm reporting		
	Chickens on hand	Chickens raised	Eggs produced	Chickens on hand	Chickens raised	Eggs produced
	Percent	*Percent*	*Percent*	*Number*	*Number*	*Dozens*
New England	56	54	54	166	499	1,770
Middle Atlantic	74	71	72	163	355	1,506
East North Central	83	79	80	103	210	831
West North Central	88	84	86	139	258	1,126
South Atlantic	85	81	82	48	260	316
East South Central	87	84	86	42	84	256
West South Central	89	85	87	67	140	511
Mountain	78	74	75	81	151	672
Pacific	69	66	66	132	271	1,319
United States	84	80	81	88	208	708

[1] Computed from U. S. Bureau of Census (*18, pp. 406–411*).

Of all farms in the United States reporting chickens on hand at the beginning of 1945, 72 percent had less than 100 chickens, 26 percent had from 100 to 400, and only 2 percent had 400 or more (table 5 and table 33 in statistical tables). The corresponding percentages differ widely between regions. Flocks with fewer than 100 birds account for a large part of the total number of flocks in each region, but percentages vary from 39 in the West North Central to 93 in the East South Central. Flocks with 100 to 400 birds account for a large part of the total in the North Central regions. Large flocks are relatively most numerous in the North Atlantic and Pacific regions.

As the total number of chickens is larger there are actually almost as many farms with 400 or more chickens in the West North Central region as there are in the North Atlantic States. Similarly, the East North Central region has about as many farms in this class as the West. But the average size of flock on farms with 400 or more chickens is much larger in the North Atlantic and Western regions and these larger flocks are more typical here than in the North Central regions.

For the United States as a whole, 27 percent of the eggs produced were from farms with fewer than 100 chickens, 49 percent were from flocks with 100 to 400, and 24 percent were from flocks with 400 or more (table 5). Large flocks accounted for more than half of the eggs produced in the New England, Middle Atlantic, and Pacific States. In the North Central regions more than half of the eggs were from the medium-sized flocks. In most Southern States small flocks of less than 100 birds accounted for more than half of the eggs produced.

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TABLE 5.—*Farms reporting chickens on hand, and eggs produced, by size of flock, by regions, United States* [1]

Region	Number of farms having				Eggs produced on farm having			
	Under 100 birds	100–399 birds	400 birds and over	Total	Under 100 birds	100–399 birds	400 birds and over	Total
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	76	14	10	100	15	15	70	100
Middle Atlantic	63	27	10	100	14	28	58	100
East North Central	57	41	2	100	23	63	14	100
West North Central	39	58	3	100	15	74	11	100
South Atlantic	91	8	1	100	55	27	18	100
East South Central	93	7		100	73	23	4	100
West South Central	78	21	1	100	43	49	8	100
Mountain	77	21	2	100	34	36	30	100
Pacific	83	11	6	100	19	14	67	100
United States	72	26	2	100	27	49	24	100

[1] Computed from U. S. Bureau of Census (*17, pp. 26–45*). Data relating to size of flock and numbers of chickens on hand are for chickens 4 months old or older on Jan. 1, 1945 and those for eggs produced are for 1944.

Despite the small percentage of farms with 400 or more chickens in the North Atlantic and West this size group includes more than half of the chickens on hand in these regions (table 5). In the South Atlantic and South Central States nearly 60 percent of chickens were in flocks with less than 100. In the North Central regions combined, the size group of 100 to 400 accounted for 70 percent of all chickens on hand.

Distribution of eggs produced, by regions and by size of enterprise, departs from that for chickens on hand mainly because of differences in rate of lay. Differences in rate of lay are indicated roughly by computations based on numbers of chickens on hand on January 1, 1945 and number of eggs produced in 1944. For the entire United States it averaged higher in the large flocks, but this is not so in all regions. For example, farms with less than 50 chickens had the highest rate of lay in the North Atlantic and West North Central regions (table 33 in statistical tables).

The census data on chickens raised for sale include broilers. Many broiler producers had no chickens on hand that were 4 months old or older. If flocks with no chickens over 4 months old were excluded, the percentage distribution by regions would be even more like that for chickens on hand. As it is, the same general regional characteristics stand out clearly. The Southern regions have most of their chickens raised on farms with less than 100 birds, the North Central regions are mainly in the 100- to 400-group, and the North Atlantic and West have nearly half in the over-400 group. (See table 33 in statistical tables.)

TYPES OF FARMS

The 1945 census classified a farm as of a particular type if the value of products sold exceeded the value of the products produced for home use and if more than 50 percent of the value of products sold came from the specified-type sources. On the basis of this definition, poultry farms accounted for nearly half of the value of poultry and products sold in the United States in 1944 (table 6). Poultry, dairy, and livestock farms, taken together, made up two-thirds of the value of all poultry and poultry products.

By regions, New England, the Pacific, South Atlantic, Middle Atlantic, and Mountain, stand out with a high percentage of value of sales from poultry farms and from poultry plus dairy and livestock farms. On the other side, the bulk of the sales of poultry and poultry products in the remaining regions are from other types of farms than poultry, dairy, or livestock. These are mainly general farms and cash-crop farms.

For the United States as a whole, 24 percent of the eggs produced in 1944 were from poultry farms, 18 percent were from livestock, 10 percent from dairy, and 48 percent from all others (table 6). Major differences appear between regions. More than half of the eggs produced in the New England, Middle Atlantic, and Pacific regions were from poultry farms. But in the North Central and South Central regions poultry farms accounted for less than 15 percent of the eggs. Eggs are produced chiefly on the types that are relatively most numerous in each of these regions. For example, dairy, livestock, and general farms account for most of the eggs in the North Central

region. Livestock, field crops, and general farms are sources of most of the eggs in the South. (See table 34 in statistical tables for detailed data.)

TABLE 6.—*Value of poultry and poultry products sold, and eggs produced, by type of farm, by regions, United States, 1944*

Region	Type of farm				
	Poultry	Dairy	Live-stock	Other	Total
Value of poultry and poultry products sold:[1]	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	86	6	------	8	100
Middle Atlantic	67	14	1	18	100
East North Central	29	16	15	40	100
West North Central	23	4	32	41	100
South Atlantic	76	2	2	20	100
East South Central	21	4	9	66	100
West South Central	34	3	9	54	100
Mountain	57	4	10	29	100
Pacific	85	3	1	11	100
United States	48	7	13	32	100
Eggs produced:[2]					
New England	74	9	1	16	100
Middle Atlantic	55	19	2	24	100
East North Central	14	21	18	47	100
West North Central	9	5	38	48	100
South Atlantic	24	5	6	65	100
East South Central	6	4	9	81	100
West South Central	13	3	10	74	100
Mountain	28	6	19	47	100
Pacific	67	6	3	24	100
United States	24	10	18	48	100

[1] Computed from U. S. Bureau of the Census (*18, pp. 656–867*).
[2] Computed from U. S. Bureau of the Census (*16, pp. 109–117*).

Chickens on hand at the beginning of 1945 show less concentration on poultry farms than do eggs produced. This is explained by the fact that the rate of lay averages higher on poultry than other types of farms. (See table 34 in statistical tables.) For the United States as a whole, the figure for eggs produced in 1944 per chicken on hand at the end of the year was 30 percent higher on poultry farms than on all farms. There also are large differences between regions in rates of lay on farms of the same type.

The distribution of chickens raised among types of farms differs from that of chickens on hand because the number raised includes broilers (table 34 in statistical tables). About one-fourth of all chickens raised in 1944 were commercial broilers. The proportion has risen sharply since then. They are produced chiefly on specialized poultry farms. For the United States as a whole, 38 percent of all

chickens were raised on poultry farms as compared with about 15 percent each on livestock, general, and field crop farms. Poultry farms accounted for nearly 70 percent of all chickens raised in the South Atlantic, 65 in the North Atlantic, 56 percent in the West and much lower percentages in other regions.

Poultry farms account for a much larger part of sales than they do of production. There are several reasons. Poultry and poultry products include turkeys and other poultry in addition to chickens and eggs and much of these are produced on specialized poultry farms. Further, a larger proportion of the poultry and poultry products produced on the specialized poultry farms is sold than is the case for other types. Specialized poultry producers probably receive higher prices than other producers. This may be related to products of higher quality as well as to the fact that more of them are in areas close to large consuming centers.

Although poultry farms are most numerous relative to other types in the Northeast, they are widely scattered throughout the United States (fig. 4). The East and West North Central regions each had

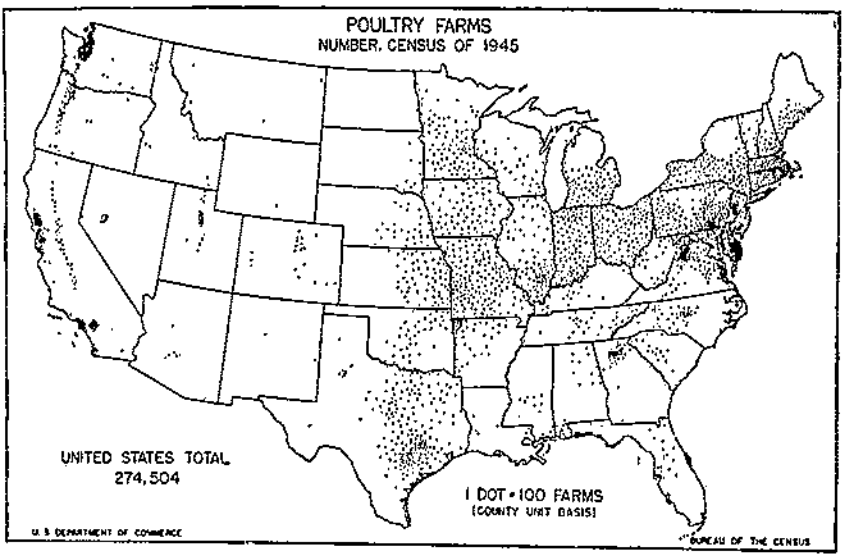

FIGURE 4.—Poultry farms are widely dispersed throughout the United States although there is a relative concentration in the Northeast.

more poultry farms than the Middle Atlantic or New England (table 7). There also are many poultry farms in other regions. The value of poultry and poultry products sold per poultry farm averages highest in the Pacific and lowest in the East South Central region. However, poultry farms with sales of $10,000 or more of farm products had sales averaging about $26,000 per farm in the North Central region as compared with $20,000 in the North Atlantic and $22,000 in the West.

TABLE 7.—*Number of poultry farms, and value of poultry and poultry products sold, and percentage distribution by value of products sold, by regions, United States, 1944* [1]

Region	Number or value	Value of sales per farm [2]			
		Under $2,500	$2,500–9,999	$10,000 and over	Total
Poultry farms:	*Thousands*	*Percent*	*Percent*	*Percent*	*Percent*
New England	18	54	33	13	100
Middle Atlantic	42	62	30	8	100
East North Central	49	84	13	3	100
West North Central	47	82	13	5	100
South Atlantic	40	59	31	10	100
East South Central	12	88	11	1	100
West South Central	33	85	13	2	100
Mountain	8	66	25	9	100
Pacific	25	48	36	16	100
United States	274	71	22	7	100
Sales of poultry and poultry products: [3]	*Million dollars*				
New England	83	9	33	58	100
Middle Atlantic	135	13	36	51	100
East North Central	81	24	25	51	100
West North Central	95	20	20	60	100
South Atlantic	161	9	30	61	100
East South Central	12	34	32	34	100
West South Central	41	34	32	34	100
Mountain	28	12	27	61	100
Pacific	135	7	29	64	100
United States	771	14	29	57	100

[1] Computed from U. S. Bureau of the Census (*18, pp. 656–867*).
[2] Value groups refer to value of all farm products sold per farm.
[3] Value of poultry and poultry products sold from poultry farms.

As we have seen, many poultry enterprises are small. Many of these small enterprises are on poultry farms. This is indicated by data showing the percentage distribution of poultry farms and total value of poultry and poultry products sold among groups of farms classified by value of farm products sold per farm. For example, in the United States in 1944, 71 percent of all poultry farms had sales of all farm products valued at less than $2,500 and 7 percent had sales valued at $10,000 or more. But the 71 percent were the source of only 14 percent of the total value of all poultry and poultry products sold from poultry farms while the 7 percent were the source of 57 percent. By regions, similar relationships are found with some important differences (table 7). For example, over 80 percent of all poultry farms in the North and South Central regions had sales of farm products valued at less than $2,500. But in all regions except the South Central, farms that sold more than $10,000 worth of farm

products accounted for more than half of the value of poultry and poultry products sold from poultry farms.

Poultry farms with sales amounting to more than $10,000 produced more than one-fourth of the poultry and poultry products sold in the United States in 1944. The corresponding figure was about 50 percent in the Pacific and South Atlantic regions, 40 in the North Atlantic, 15 in the North Central, and 10 in the South Central.

SUMMARIZATION OF DISTRIBUTION

The geographic distribution of chicken and egg production in the United States is thus seen to be more complex than a first impression from the dot maps on chickens raised, chickens on hand, and egg production, would suggest. But such maps reveal the rather wide distribution of production and suggest its correlation with the distribution of human population as well as the location of the centers of broiler production and they delineate some other areas of denser output.

Closer examination of census and other data on sizes of flocks, types of farms, and related factors, and their regional distribution, discloses further information. The chicken and egg enterprise is unique among livestock enterprises in several respects. The whole range from a minor sideline to large-scale specialized poultry farms is represented. In the aggregate, about half of the total value of poultry and poultry products sold in the United States comes from specialized poultry farms. Many of these specialized farms are rather large in terms of value produced for sale. Most poultry flocks are small, but most of the production comes from medium and large flocks. Suppose all flocks are divided into the three size groups: under 100 birds, 100–399, and 400 and over. Then about half the egg production in the United States comes from the middle size and about one-fourth each from the small and the large flocks.

The outstanding points about the regional distribution of chicken and egg production to bear in mind are that New England, the Middle Atlantic, and the Pacific States, are characterized by the specialized poultry farms with relatively large flocks. These are not the most numerous, but they are the flocks that produce the greater part of the output in these regions. Similarly, in the North Central States the middle-sized flocks account for most of the chicken and egg production, usually as a supplementary enterprise rather than as a specialized business. In the South Atlantic and South Central region most of the egg production is from small flocks, each with less than 100 birds. The remaining regions have a less pronounced distribution.

FACTORS AFFECTING LOCATION OF PRODUCTION

The present pattern of chicken and egg production is the result of continual evolution and the interaction of many forces. These forces, for convenience in analysis, can be considered under the two headings of supply and demand. Under supply we include all of the things that affect production costs and the quantities of chickens and eggs that farmers will produce at each of several different prices. Under demand are all of the things that affect the quantities that the market will take at each price. Geographic differences in supply

conditions and geographic differences in demand conditions are thus responsible for the pattern that has emerged.

As presently shown, the production of chickens and eggs is strikingly different from that of most other types of farm production in being almost entirely divorced from the physical locational advantages which so sharply delimit areas of comparative advantage for most crops, and for many kinds of livestock. We are dealing with a type of farm production which in many respects resembles manufacturing. Comparatively little land area is needed other than as site for buildings and equipment. The raw materials can be readily obtained at any location and the whole matter hangs heavily on the factor of alternative uses of labor. These alternatives appear in two contrasting ways. On general farms in the Midwest and elsewhere poultry is a sideline that makes use of otherwise waste feed and unused family labor, and to some extent must compete with other livestock enterprises for additional feed and labor beyond this point.

On specialized poultry farms, especially in the East, the alternatives in regard to labor are sometimes other types of farming, but more often urban employment. In both instances there is a strong element of immobility in the labor supply as between regions, so that the adjustment is mainly one of getting the best use of the human resources within each region.

Geographic Structure of Demand

The geographic pattern of domestic demand for chickens and eggs is related to the location of consumers, their incomes, their food preferences, and the location of supplies of other foods. Because of the peculiar conditions of supply for poultry products—the absence of the usual physical locational advantages of particular areas—the geographic pattern of demand has more significance than is true in other types of farm production. The tendency for the production to be geographically diffused to correspond with the location of consumer demand is greater than otherwise would be the case.

The distribution of population among regions provides a very general view of how demand for food is distributed. Nearly half (47 percent) of the Nation's population is located in the New England, Middle Atlantic, and East North Central regions which cover only about one-sixth of the land area of the United States (table 8). Distribution of total income payments to individuals provides still another indication of how demand is dispersed. Per capita demand for chicken meat and eggs can be expected to average highest in areas with the highest per capita incomes. It is significant that 55 percent of total income payments to individuals was made to people in these same regions. Less is known about the effects of differences among regions in food preferences or in supplies of substitute foods, but they probably are less important than differences in number of consumers and income payments per capita.

Studies of family food consumption suggest some area variations, especially in consumption of poultry meat. On a regional basis, however, the evidence is less complete and for the present one may assume that population and income are the principal factors influencing the regional demand structure (*14*).

TABLE 8.—*Population, income payments to individuals, farm price as a percentage of United States average farm price, and production per capita as a percentage of United States consumption per capita, by regions, United States averages 1945–49*

Region	Population	Income payments [1]	Farm price as a percentage of U. S. average farm price			Production per capita as a percentage of U. S. consumption per capita [2]	
			Eggs	Farm chickens	Commercial broilers	Eggs	Chicken meat
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	6	7	136	116	100	75	85
Middle Atlantic	20	25	124	121	104	63	48
East North Central	20	22	95	101	105	110	86
West North Central	10	9	85	86	97	339	236
South Atlantic	14	11	109	112	98	65	157
East South Central	7	5	95	99	108	88	90
West South Central	10	7	91	96	101	105	98
Mountain	3	3	104	99	----------	107	73
Pacific	10	11	118	109	107	76	52
United States	100	100	100	100	100	108	100

[1] Data are for 1947 computed from Schwartz and Graham (*11, pp. 10–21*).

[2] Production of eggs in the 1945–49 period exceeded total domestic disappearance, including eggs used for hatching, by about 8 percent. Government purchases accounted for most of the 8 percent. Consumption per capita in this table includes an allowance for eggs used for hatching. It is assumed that nonfarm production of eggs and chickens is distributed in the same way as farm production.

THE DEMAND PATTERN

It is demand at the farm level (as indicated by prices received by farmers) rather than at retail, that influences the location of farm production of chickens and eggs. The two general aspects of demand at the farm that differ between regions are the elasticity of demand and the level of demand. The elasticity of demand is shown by the effect of a given change in volume of output on the average farm prices of chickens and eggs in the region. The demand for eggs in one region may be said to be more elastic than the demand in another region if given changes in production have less effect on the farm price of eggs. Regional differences in average level of demand from farms are indicated by differences in average prices received by farmers. Differences in transportation, and other marketing costs will influence the level of farm prices and demand for eggs from each region.

As the production of chickens and eggs is widely distributed, a large expansion or contraction in any single area will have relatively little effect on farm prices. Even a whole region like New England produces only about 5 percent of the national output of chickens and eggs (tables 1 and 2). A 10-percent increase in New England's output would mean only a 0.5 percent expansion in national output. An increase of this size could be sold with relatively little reduction in price. In this sense, then, the demand for the production of any one region is more elastic than national demand for chickens or eggs. But this circumstance has little relevance if the usual situation is one in which output increases or decreases at the same time in all regions. More pertinent also will be the exceptions to the general assumption that the regional demand for chickens and eggs is a part of the national demand. As will be indicated, this is not entirely adequate.

Let us take the case of commercial broiler production. The Delaware-Maryland-Virginia areas, for example, now account for one-third of the broilers produced. As this makes up only about 10 percent of all the chicken meat produced, a considerable expansion in broiler production would not result in a very large percentage increase in the national production of chicken meat. The effect on prices received would be slight if many consumers were to substitute broilers for the heavier farm chickens as their relative prices changed. But if this were not the case, as seems probable, production of commercial broilers could not be expanded or contracted much in any of the major producing areas without influencing the prices of broilers.

Differences in the level of demand for chickens and eggs between the regions are partly indicated by differences in prices received. For example, in 1945–49 the average farm price of eggs in the United States was 43 cents per dozen. But it was 58 cents or 36 percent higher in New England and 36 cents or 15 percent lower in the West North Central region (table 8). The national average price of farm chickens was 27 cents per pound as compared with a high of 33 cents in the North Atlantic and a low of 24 cents in the West North Central region. In the instance of commercial broilers, prices received by farmers did not differ so widely between regions. Prices of eggs and farm chickens at the farm also differ widely between States and smaller areas within the regions (fig. 5).

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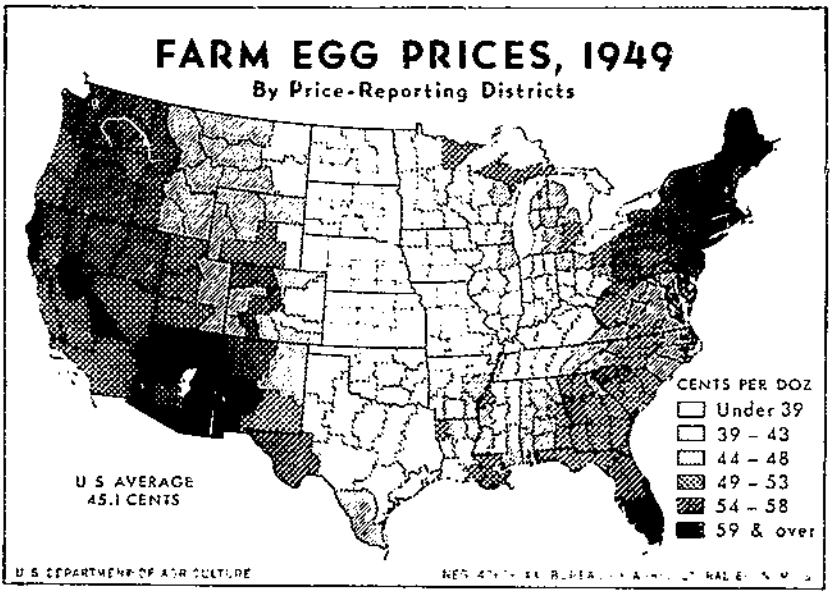

FIGURE 5.—Prices received by farmers for eggs in 1949 averaged 15 to 20 cents higher per dozen in States along the Atlantic and Pacific Coasts than in the interior regions.

SURPLUS AND DEFICIT REGIONS

Interregional differences in farm prices of chickens and eggs are explained partly by surpluses or deficits of production in relation to consumption. Prices for eggs of the same quality average higher in areas with deficits than in those with surpluses, as greater transfer costs are involved in bringing additional supplies in. A region may have seasonal changes in its surplus-deficit position. Data showing State and regional consumption are not available.

But annual surpluses and deficits can be estimated approximately by computing the percentage that per capita production in each region is of per capita consumption in the United States (table 8). In these estimates it is assumed that nonfarm production of eggs and chickens, which is estimated to be 10 percent of farm production, is distributed among States and regions in the same way as farm production, and similarly for eggs used for hatching. It is recognized that these assumptions are not entirely correct. For example, States that produce large numbers of broilers usually import hatching eggs from other States. Per capita consumption in the several regions is not the same as the United States average. But despite these discrepancies, the estimates probably reflect the general picture of regional surpluses and deficits with reasonable accuracy.

The West North Central region has a large surplus of egg production over consumption. The West North Central and South Atlantic regions have the chief surpluses of chicken meat (table 8). The New England, Middle Atlantic, South Atlantic, East South Central, and

Pacific regions, seem to be either deficit regions for eggs or, as in the South, regions of low consumption per capita. For chicken meat, the principal deficit regions are the Middle Atlantic and Pacific.

Data on receipts of shell eggs and dressed poultry at six markets by States of origin provide additional information about farm-to-market movement in recent years. For example, receipts at these markets (including small duplications resulting from intermarket shipments) were 11 percent of national farm egg production in 1948. Half of the total receipts were from the West North Central region (table 9). This region is the chief source of the eggs received at Chicago, New York, and Philadelphia. It also is an important source for Boston, San Francisco, and Los Angeles.

Receipts of dressed poultry at the six markets in 1948 were 13 percent of chicken-meat production in the United States. Shipments of live poultry received were additional. About one-third of total receipts of dressed poultry at these markets were from the West North Central region and about one-fourth from the South Atlantic (table 10). The South Atlantic region was the chief source of receipts in New York, but the West North Central was the chief source in Boston, Philadelphia, Chicago, and Los Angeles.

TABLE 9.—*Percentage distribution of receipts of shell eggs at six markets, by region of origin, 1948* [1]

Region of origin	Boston	New York	Philadelphia	Chicago	San Francisco	Los Angeles	Total 6 markets
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	52.7	0.1	0	0	0	0	4.1
Middle Atlantic	5.4	31.8	32.5	[2]	0	0	14.8
East North Central	11.3	10.9	17.7	38.8	.1	1.9	19.3
West North Central	30.4	54.6	43.6	60.9	23.5	28.1	50.0
South Atlantic	[2]	.9	5.8	[2]	0	0	.8
East South Central	.2	.3	.4	.1	0	0	.2
West South Central	0	.1	0	[2]	.2	.2	.1
Mountain	[2]	1.2	0	.2	.7	21.7	2.5
Pacific	0	.1	0	[2]	75.2	15.1	8.2
United States	100	100	100	100	100	100	100

[1] Data computed from Production and Marketing Administration (*19*).
[2] Less than 0.1 percent.

FURTHER ANALYSIS OF INTERREGIONAL PRICE DIFFERENCES

Among the factors that account for interregional differences in average farm prices of chickens and eggs are the following:

(1) The surplus-deficit position of the region,
(2) The quality and characteristics of the poultry products sold,
(3) The extent to which the marketing services are performed by the farmer himself,
(4) The percentage of eggs used for hatching, and
(5) The seasonality of production.

TABLE 10.—*Percentage distribution of receipts of dressed poultry at six markets, by region of origin, 1948* [1]

Region of origin	Boston	New York	Philadelphia	Chicago	San Francisco	Los Angeles	Total 6 markets
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	23. 5	5. 2	0. 1	0	0	0	5. 8
Middle Atlantic	3. 5	10. 0	7. 1	2. 0	. 4	2. 3	7. 1
East North Central	14. 0	6. 3	10. 3	9. 4	1. 0	. 6	7. 7
West North Central	37. 3	22. 9	50. 5	66. 0	25. 9	45. 1	34. 6
South Atlantic	3. 8	42. 4	17. 9	3. 1	. 9	0	26. 6
East South Central	. 1	1. 3	1. 0	. 5	0	0	. 9
West South Central	1. 7	1. 6	2. 1	7. 6	4. 1	4. 9	2. 8
Mountain	6. 7	3. 9	4. 3	4. 3	1. 7	3. 1	4. 2
Pacific	9. 4	6. 4	6. 7	7. 1	66. 0	44. 0	10. 3
United States	100	100	100	100	100	100	100

[1] Data computed from Production and Marketing Administration (*19*).

Farm prices of chickens and eggs tend to be higher in deficit regions and lower in surplus regions (table 8). This is strikingly illustrated by the pattern of farm egg prices by price-reporting districts and prices of retail eggs by principal cities in 1949 (figs. 5 and 6).

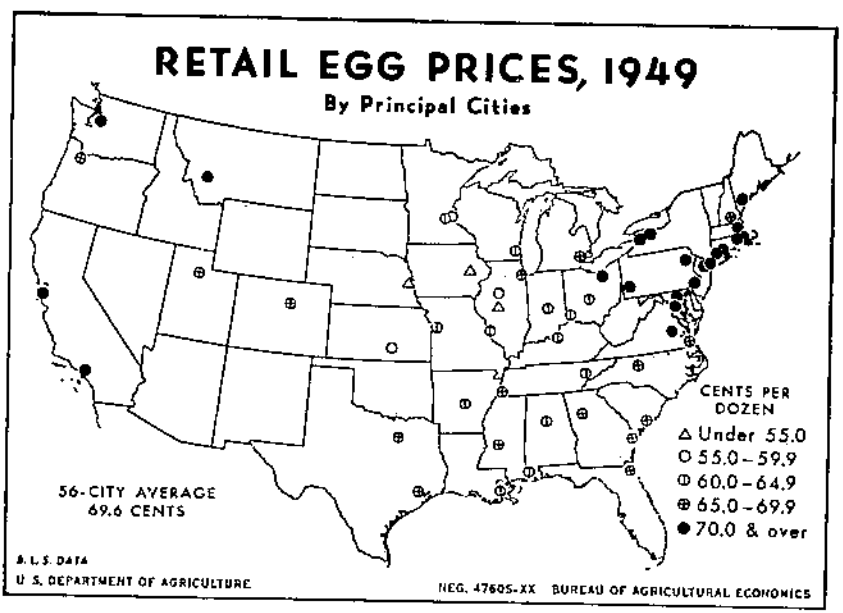

FIGURE 6.—Retail egg prices are highest in cities along the Atlantic and Pacific Coasts and lowest in cities in the interior regions which have large surpluses of production in relation to consumption.

The range in farm prices of eggs covers a spread of more than 20 cents from the West North Central region to areas on the East and West Coasts near large urban centers. The retail-price range from interior to exterior cities is a little less, perhaps a range of 15 cents.

These interregional differences in prices are much larger than can be attributed to transportation and other transfer costs associated with interregional movement. For example, in 1948 the average farm price of eggs in New York was 61 cents per dozen compared with 40 cents in Minnesota. But transportation and other transfer costs of moving eggs from Minneapolis to New York City (not including other marketing costs that would be about the same for Minnesota and New York eggs) were only about 3 cents per dozen (2). The average price received by farmers for farm chickens was 37 cents in New York compared with 26 cents in Minnesota, although shipping costs including refrigeration and other items for dressed poultry from Minneapolis to New York were only about 2.5 cents per pound.

Information is scanty on wholesale prices of poultry and poultry products of comparable grade and quality for the large markets. But price differences between markets on identical products are pretty well explained by differences in transportation and other transfer costs. For example, in 1948 eggs classified in wholesale grades, extras, large, averaged about 2 cents per dozen higher in New York and Philadelphia than in Chicago (table 11). Eggs classified as consumer

TABLE 11.—*Wholesale price per dozen of shell eggs and per pound of live poultry at major markets in the United States, 1948* [1]

Market	Shell eggs [2]		Live poultry			
			Fowl			
	Wholesale grades, extras, large	Consumer grade A, large	Heavy	Light	Fryers	Broilers
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Boston		59	37			
New York	54		40	32	42	
Philadelphia	54	56	39	30	39	
Cincinnati	54	56	31	24	40	40
Cleveland	54	63	36	28	42	42
Detroit	54	57	35	30	42	
Chicago	52		33	27	30	
Seattle		60				
Portland		59				
San Francisco		60	39	31	42	40
Los Angeles		61	38	28	40	37

[1] Data are from Production and Marketing Administration (*20, pp. 68–83*). These data are representative of price differentials between markets in different regions, but it should be recognized that they are not entirely comparable because of such factors as quality, weights of birds and eggs, and seasonality of marketings.

[2] These are for the most part nearly comparable grades used in the respective markets. Some grade differences may remain.

grade A large averaged about 4 cents per dozen higher in Los Angeles and San Francisco than in Philadelphia, Cincinnati, or Detroit. Prices of chickens classified as fowl also show intermarket differences. But prices of fryers and broilers do not vary much between markets.

Although the surplus-deficit position of a region may be responsible for a part of the interregional differences in farm prices, these differences are related mainly to other factors than transfer costs. Recent studies of egg marketing in the Northeast and in the Lake States confirm the conclusion that transportation costs and other transfer costs are relatively minor items (*3, 10*). For example, more than three-fourths of the costs of marketing eggs by midwestern handlers from the midwestern farms to the eastern market consist of items that would also be incurred by a similar handler in the East (*10*).

A large part of the explanation of differences in price appears to be a difference in quality. The proportion of high-quality eggs in the total output is greater in the Northeast than in the Midwest or South so the average quality is higher.

Differences in the quality of products as sold from farms and differences in rate of deterioration in marketing channels are both involved. Larger and more specialized poultry farms account for more of the eggs and chickens sold in the North Atlantic and Pacific regions than in the North Central and Southern regions. Quality of products sold from such farms tends to be higher. A study made in the North Central States, in 1948, shows that about two-thirds of the eggs sold graded U. S. grade A or higher (*6*). Another study made in the Northeast about the same time shows that the proportion of U. S. grade A and AA eggs sold was around 90 percent (*4*). As the farm chickens and eggs produced in the surplus areas of the Midwest are shipped longer distances to markets and are handled by more middlemen than are those produced in the East, the possibilities of deterioration in quality are greater. Of course, if products from distant sources are low in quality when sold at wholesale markets, they bring lower prices, and these lower prices are reflected in lower prices at the farm level.

In the deficit areas of production, particularly in the Northeast, a large part of the eggs and chickens are sold direct to consumers and retail stores (*4*). In these instances the farmer performs a part or all of the marketing functions. Prices received can be expected to average higher where a large part of the eggs and chickens are so marketed. Of course, farm costs of production including those of marketing also will be higher.

The proportion of eggs produced that is used for hatching also differs between areas. Eggs used for hatching usually bring premium prices. They generally are from high-quality birds, and costs of production may be higher. The proportion of eggs produced that is used for hatching is much higher in the Northeast than in the Midwest.

Farmers in the North Atlantic and Pacific regions sell a larger part of their farm chickens and eggs in months of the year when prices are highest than do those in other regions. However, differences in seasonality of production have a very minor influence on weighted average annual prices of eggs. Percentage differences in

prices of eggs between regions are about the same in each month as those indicated by weighted averages for the entire year. On the other hand, there are large differences between regions in the distribution of sales of farm chickens. In the United States, in recent years, about 40 percent has been sold in the 2 months of August and September as compared with 50 percent in the West North Central region, 45 percent in the East North Central, 38 percent in the North Atlantic, 30 percent in the West, and about 28 percent in the South. The large sales in the months of heaviest total marketings partly account for the relatively lower prices received by farmers in the North Central region.

Prices received for farm chickens also vary among regions because of differences in weights and breeds of chickens. Higher prices are received for the heavy breeds than for the light. Weights of mature birds sold in the North Atlantic region have averaged 10 percent higher than those in the West North Central States and nearly 15 percent higher than those in the West. This suggests that more of the chickens sold in the North Atlantic region are of heavy breeds than is true elsewhere. As we know, a larger proportion of the chickens raised in the North Atlantic and South Atlantic regions are heavy breeds than is the case in other regions.

Prices received by farmers for commercial broilers do not differ much between regions. They are highest in regions in which marketing weights are highest. The quality of broilers produced apparently is more uniform than is true of farm chickens and eggs. Regional differences in price for birds of the same weight appear to be those due to costs of moving them from surplus to deficit areas.

Geographic Structure of Supply

The regional pattern of production for chickens or for eggs shows the result of the interaction of supply and demand forces. If these forces have been operating uniformly for some time the pattern may approximate a situation of equilibrium. By the geographic structure of supply, we mean something more than just the pattern of production, however. We would like to know something about the character of the supply responses which would follow given changes in price relationships or in technology. To what extent would these be alike, from region to region, and to what extent would they be unlike? From the production pattern and the associated prices we have only one price-quantity point on a supply schedule for each area or region. A first step in approaching the problem of supply response is to examine some of the cost factors associated with the average volume of production in each region, in recent years.

As we have seen, the supply response and the geographic relationships for chickens and eggs may be rather different than for many other farm products. This is a type of specialized livestock production that appears to be less tied to fixed physical resources than other kinds of farm output. The necessary resources are flexible and can be brought together almost anywhere. Climate and weather, for the most part, have little influence. Poultry production is a

sort of manufacturing process suitable for either small-scale or large-scale operation. It exists both as a sideline to other farm operations and as a specialized type of production.

Evidently the prices paid for the resources used in different regions are important determinants in fixing the regional level of output. Any differences in techniques of operation affecting efficiency will have a bearing. Perhaps most important will be the matter of alternative opportunities for labor, which is probably the most fixed of the resources used.

The data on farm prices and production of chickens and eggs show that the national supply is widely distributed. In each area the volume of output doubtless would be larger if prices were higher and smaller if prices were lower. The production data merely indicate output associated with the average prices that have prevailed in each area during the last few years, and it is not easy to estimate how much output would be expanded or contracted if prices were higher or lower. But the effects of factors that have influenced volume of production in each region in recent years can be appraised.

As in the case of other farm products, the quantities of chickens and eggs produced in a region at a particular price depend upon (1) the quantities of required resources available, (2) prices paid by producers for these resources, and (3) techniques of production that influence resources used per unit of production. As prices received by farmers for farm chickens and eggs differ between regions, it is probable that unit costs for the volumes in which they are produced also differ.

COSTS OF FEED

Among the items used in chicken and egg production, feed inputs are most influential in causing differences between areas in total costs per unit of output Feed accounts for about half of the estimated total cost of producing farm chickens and eggs and for about two-thirds of the total of producing commercial broilers (*1, table 13*). In order to show how cost of feed per unit of eggs and chickens differs between areas, it is necessary to consider costs to farmers of the feeds contained in poultry rations, the composition of the ration fed, and the feed consumed per unit of production.

Prices of feed grains are highest in the regions that have deficits of feed production in relation to consumption, and lowest in those that have surpluses. Most States in the North Central regions have surpluses whereas most of those in other regions have deficits. As a result, prices of feed grains are lowest in the North Central States. For example, in 1945–49 prices received by farmers for corn averaged one-fourth higher in the North Atlantic and Pacific regions than in the North Central (table 12). Differences in farm prices of other feed grains also are large. But prices paid for commercial mash and scratch feeds do not differ so much between regions (fig. 7). They averaged only about 5 percent higher in New England than in the West North Central region. These regional differences are low compared with those for prices received by farmers for grains.

TABLE 12.—*Prices received by farmers for corn, oats, and wheat, prices paid by farmers for laying mash and scratch feed, and cost to farmers of poultry ration fed, by regions, United States, averages 1945–49*

Region	Prices received [1]			Prices paid [1]		Cost of poultry ration [1 2]
	Corn	Wheat	Oats	Commercial mash	Commercial scratch	
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New England	3. 38	-------	3. 12	4. 53	4. 30	4. 32
Middle Atlantic	3. 00	3. 32	2. 75	4. 57	4. 21	3. 97
East North Central	2. 66	3. 27	2. 47	4. 49	4. 18	3. 56
West North Central	2. 59	3. 23	2. 31	4. 40	4. 14	3. 25
South Atlantic	2. 89	3. 43	3. 03	4. 82	4. 47	4. 14
East South Central	2. 91	3. 35	3. 12	4. 85	4. 53	3. 87
West South Central	2. 73	3. 07	2. 69	4. 52	4. 15	3. 66
Mountain	2. 75	3. 07	2. 44	4. 42	4. 00	3. 57
Pacific	3. 20	3. 13	2. 88	4. 61	4. 26	4. 02
United States	2. 64	3. 18	2. 41	4. 54	4. 22	3. 66

[1] Per 100 pounds.

[2] The composition of the ration differs between States (table 13). Farm grains fed alone are valued at prices received by farmers. Commercial feeds, including laying mash, are valued at prices paid by farmers.

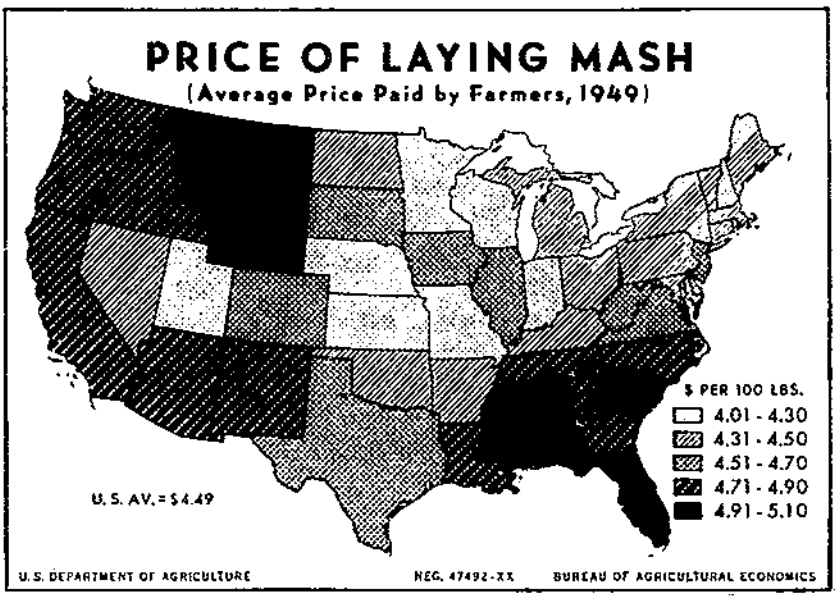

FIGURE 7.—Prices paid by farmers for laying mash average highest in the Southeast and West and lowest in the Northeast and Midwest. States with surplus feed production or concentration of poultry production generally have the lowest prices.

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Data from a survey made by the Bureau of Agricultural Economics in January 1944 show the composition of poultry rations fed in the States and regions (table 13). These data probably reflect fairly well the differences between regions in the composition of rations fed throughout the year. Commercial mash accounts for half of the feed fed in the New England and Pacific regions, but for only 20 percent in the West North Central States. Commercial scratch is not a very large part of the ration except in the North and South Atlantic regions which have large deficits in feeds. Other feeds, mainly grains fed on farms where produced, are a large part of the poultry ration in the North Central and Western regions.

The cost to farmers of 100 pounds of the poultry ration fed in the various regions has been computed by applying regional average prices to the contents of the ration (table 12). Differences between regions in the cost of the poultry ration are due to differences in the composition of the ration and in prices of ingredients. Cost of the poultry ration fed in the West North Central region was about 25 percent lower than in New England and 20 percent lower than in the Pacific region. Cost of the poultry ration also is lower than the United States average in the East North Central, and Mountain regions. But it is higher in the South Atlantic, Middle Atlantic, and East South Central regions.

TABLE 13.—*Percentages of total poultry ration consisting of specified feeds, by regions, United States, January 1944* [1]

Region	Commercial mash	Home-mixed feeds	Commercial scratch	Corn	Wheat	Oats	All other [2]	Total
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	66. 2	0. 5	26. 5	2. 0	2. 5	2. 0	0. 3	100
Middle Atlantic	45. 2	4. 7	17. 2	13. 5	11. 5	5. 9	2. 0	100
East North Central	23. 3	23. 7	2. 5	29. 0	8. 7	12. 2	. 6	100
West North Central	19. 5	16. 8	2. 3	28. 1	10. 4	18. 6	4. 3	100
South Atlantic	47. 7	4. 8	11. 3	22. 5	8. 7	4. 5	. 5	100
East South Central	39. 6	6. 3	6. 2	40. 0	5. 0	2. 4	. 5	100
West South Central	41. 5	7. 1	5. 8	20. 3	10. 2	4. 0	11. 1	100
Mountain	28. 9	12. 4	4. 3	9. 6	32. 3	4. 9	7. 6	100
Pacific	53. 2	4. 2	6. 0	2. 9	23. 8	3. 1	6. 8	100
United States	33. 4	12. 4	6. 3	23. 8	10. 6	9. 8	3. 7	100

[1] Compiled from Johnson, Ronald E. (*9*).
[2] Mainly barley and grain sorghum.

Estimates by States of the feed consumed per dozen of eggs and per pound of farm chickens and commercial broilers produced have been made by Jennings for the year beginning October 1, 1941 (*8, pp. 34–36*). These are approximations based on the results of feeding experiments, farm surveys, and data showing rate of lay and weight of chickens sold. Although changes in feed consumption per unit of

production have taken place since 1941, regional differences probably have not changed much (table 14). Regions with the highest rates of lay might be expected to have the lowest feed consumption per unit of production. That this is not always true is probably because feed picked up around farmsteads is not included in the estimates of feed consumption. The percentage of all feed obtained from this source undoubtedly is largest in areas where small farm flocks are most numerous, particularly in the North and South Central regions.

TABLE 14.—*Estimates of feed consumed and of feed costs per unit of production of eggs, chickens, and commercial broilers, by regions, United States*

Region	Feed consumed per unit of [1]—			Feed cost per unit in 1945–49 [2]		
	Eggs	Chickens	Broilers	Eggs	Chickens	Broilers
	Pounds	*Pounds*	*Pounds*	*Cents*	*Cents*	*Cents*
New England	7.0	5.1	4.3	30.2	23.3	19.7
Middle Atlantic	7.4	5.7	4.4	29.4	22.6	20.5
East North Central	7.5	5.3	4.4	26.7	18.9	20.8
West North Central	7.0	5.1	-------	22.8	16.6	-------
South Atlantic	7.6	5.0	4.5	31.5	20.7	22.0
East South Central	6.7	5.0	-------	25.9	19.4	-------
West South Central	6.6	4.9	4.8	24.2	17.9	23.8
Mountain	6.8	5.0	-------	24.3	17.8	-------
Pacific	7.0	4.9	4.9	28.1	19.7	24.1
United States	7.4	5.1	4.5	27.1	18.7	21.4

[1] Estimates of feed consumed in year beginning October 1, 1941, by Jennings (*8, pp. 34–36*).

[2] Computed by multiplying estimates of feed consumed per pound of farm chickens and per dozen eggs by prices of poultry ration in 1945–49 (table 12), and feed consumed per pound of broilers by prices of chick starter.

Feed costs per dozen of eggs and per pound of farm chickens and commercial broilers in each region can be computed by multiplying feed consumption by cost per pound of poultry ration. These estimates show that feed costs of producing eggs are highest in the South Atlantic and lowest in the West North Central region (table 14). For farm chickens feed costs are highest in New England. This procedure may overestimate feed costs in the North Central region and in other surplus regions because some of the feed consumed by chickens is low in quality and could not be sold at the prices used in computing the cost of the poultry ration. Significantly, these estimates show feed costs lowest in the regions in which prices received for farm chickens and eggs are lowest.

Feed costs of producing commercial broilers do not differ much between regions. Prices of rations fed and quantity of feed used per unit of production are about the same in the several regions.

COSTS OF LABOR

In studies in which imputed values are placed on all resources used, labor accounts for about 20 percent of the total cost in producing eggs, 15 percent in farm chickens, and 10 percent in commercial broilers (*1, table 13*). Preliminary estimates of the farm labor used to produce these products in the various regions have been made (table 15). They show that hours of labor used per unit of output are lowest in the North Atlantic regions and highest in the South Central States. Labor inputs are highest in regions in which a large part of the farm production is in small flocks. Labor inputs in commercial broiler production do not differ much between regions.

TABLE 15.—*Estimates of labor used and labor costs per unit of production of eggs, farm chickens, and commercial broilers, by regions, United States, 1949*

Region	Labor used per 100 units [1]			Labor costs per unit [2]		
	Eggs	Farm chickens	Broilers	Eggs	Farm chickens	Broilers
	Hours	*Hours*	*Hours*	*Cents*	*Cents*	*Cents*
New England	12. 8	6. 0	7. 5	10. 9	5. 1	6. 4
Middle Atlantic	15. 6	6. 8	8. 2	12. 5	5. 4	6. 6
East North Central	16. 7	7. 0	8. 5	13. 5	5. 7	6. 9
West North Central	16. 9	7. 2	8. 8	14. 5	6. 2	7. 6
South Atlantic	20. 0	8. 5	8. 0	9. 8	4. 2	3. 9
East South Central	21. 4	8. 8	9. 9	9. 2	3. 8	4. 3
West South Central	17. 9	9. 1	9. 3	10. 2	5. 2	5. 3
Mountain	17. 1	8. 3	8. 3	14. 0	6. 8	6. 8
Pacific	13. 8	9. 4	8. 2	12. 8	8. 7	7. 6
United States	16. 9	7. 6	8. 2	11. 5	5. 2	5. 6

[1] Based on BAE estimates per 100 dozen eggs and per 100 pounds of farm chickens and commercial broilers (*7*).

[2] Hours of labor used per unit multiplied by wage rates per hour, without board, in 1949. Estimates are per dozen eggs and per pound of farm chickens and commercial broilers.

Wage rates paid for hired workers differ decidedly between regions. They are much lower in the South than elsewhere (table 16). The labor costs per unit of eggs, farm chickens, and commercial broilers produced in the several regions have frequently been computed by using wage rates paid to hired labor. Estimated labor costs per unit of production average highest in the North Central and Western regions where wage rates are highest (table 16). But it should be recognized that most of the work on poultry is done by operator and family labor. The proportion probably is highest in regions in which a large part of the production is from small flocks. On many farms much of the operator-and-family labor used to produce farm chickens and eggs has little money value if used in other ways. Therefore the

estimates are too high, especially in the case of the North Central and South Central regions where nearly all of the labor used is supplied by the family.

OTHER ITEMS OF COST

Other costs include interest on investment in buildings and equipment, minor supplies, baby chicks for producing farm chickens and commercial broilers, and flock depreciation for laying flocks.

Differences between regions in costs of baby chicks may have marked effects on costs of producing farm chickens and broilers, as chicks account for 15 to 20 percent of all costs (*1, table 13*). Prices paid by farmers for chicks were 40 to 50 percent higher in the New England and Pacific regions than in the South Central (table 16). Costs of producing chicks are affected by prices of eggs, labor, and other items which vary between regions. Of course, there may be large differences in the quality and kinds of chickens bought.

TABLE 16.—*Prices paid by farmers for poultry ration, chick starter mash, and baby chicks, and wage rates per month with board, and death loss of chickens on hand January 1, United States, averages 1945–49*

Region	Prices paid				Death loss of chickens on hand January 1
	Poultry ration [1]	Chick starter mash [1]	Baby chicks [2]	Wage rates [3]	
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Percent*
New England	4. 32	4. 58	19. 50	94	14. 1
Middle Atlantic	3. 97	4. 65	17. 82	88	18. 4
East North Central	3. 56	4. 72	16. 82	86	18. 1
West North Central	3. 25	4. 65	16. 20	94	16. 9
South Atlantic	4. 14	4. 89	14. 90	51	18. 2
East South Central	3. 87	5. 01	14. 06	44	16. 5
West South Central	3. 66	4. 96	14. 14	64	20. 0
Mountain	3. 57	4. 94	18. 36	116	20. 6
Pacific	4. 02	4. 91	21. 46	149	19. 1
United States	3. 66	4. 76	16. 44	90	17. 9

[1] Per 100 pounds.
[2] Per 100 chicks.
[3] Per month with board, average (1945–48).

Depreciation of the laying flock accounts for about 20 percent of the imputed cost of producing eggs. Depreciation results from death losses and from decline in value of birds as they grow older. Death rates do not differ much between regions. The percentage of chickens lost, measured from those on hand at the beginning of the year, varied from 14 percent in New England to 21 percent in the Mountain region (table 16). Death losses appear to be higher for the light breeds than for the heavy. The light breeds also depreciate more in value during the year because the final meat value is less. Depreciation costs may vary because of interregional differences in initial value of layers.

However, differences between regions in depreciation costs do not appear to be very large.

Comparable data are not available on regional costs for buildings and equipment, interest on investment, and other items which together account for about 15 percent of the total in producing farm chickens and eggs and for about 10 percent in producing commercial broilers. Costs of housing may be lower in the South than in the North because the climate is milder. Buildings do not need to be so well insulated and costs of heating brooder houses in raising young chickens may be lower. This is an important initial consideration in producing broilers. Actual investments in buildings and equipment per unit of farm chickens and eggs produced probably are lowest in regions where flocks are small on the average. Although costs per unit of production included in this category are probably lowest in the North Central and South Central regions and highest in the North Atlantic and Western, the regional differences may not be very large.

COMPARISON OF PRICES RECEIVED AND COSTS

The differences in imputed costs are obviously insufficient to explain why farmers in surplus-producing regions produce farm chickens and eggs when prices received are so much lower than in other regions. For example, computed feed and labor costs are only 6 cents lower per dozen eggs in the West North Central region than in the North Atlantic and Pacific regions. But farm prices are 15 to 20 cents lower in the West North Central region (fig. 5). Similar relationships are found in the case of farm chickens.

Even allowing for the fact that production may not be finally adjusted to an equilibrium position, it is fairly clear that the calculations of imputed cost are incomplete or faulty. Farm prices in the North Atlantic region, for example, probably reflect additional services rendered by farmers in delivering at retail or to special outlets. Additional costs are represented by these services. Perhaps more significant in explaining the situation is the fact that imputing wage-rate values to all operator and family labor used in producing chickens and eggs overlooks the truth that a considerable part of this labor may not have much money value in alternative uses. In effect, it costs little to use this labor for nearly everything earned is a net addition to the cash farm income. The same reasoning applies to any farm-raised feed that otherwise might go to waste if the chickens were not there.

It also was pointed out that prices received by farmers differ between regions because of differences in the extent to which farmers sell chickens and eggs direct to consumers, retail stores, and hatcheries. In instances where this is done production costs would be higher, too.

REGIONAL TRENDS IN PRODUCTION

The regional distribution of the national production of chickens and eggs has changed greatly in the last 20 years. The distribution of production among sizes of enterprises and types of farms within regions also has been modified. Regional trends will be described before turning to the causal factors.

Egg Production

Changes in egg production, of course, depend upon changes in number of layers and in rate of lay. The number of layers on hand at the beginning of the year declined in all regions except the North Atlantic from 1925–29 to 1935–39 (table 17). Numbers increased during World War II but have since declined to nearly the preceding level, except in the North Atlantic region in which layers on hand averaged nearly 50 percent higher than in 1925–29.

The number of eggs produced per layer has gone up almost continuously in all regions, since 1925. But changes differ between regions. Rate of lay increased nearly 50 percent in the North Central regions, 31 percent in the North Atlantic, and more than 20 percent in other regions, from 1925–29 to 1945–49. In all regions except the North Atlantic the increases in rate of lay have contributed more to the expansion in egg production than have the increases in number of layers.

TABLE 17.—*Index of number of layers, eggs per layer, and egg production, by regions, United States, averages 1925–49 (1925–29=100)*

Year	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Layers: [1]	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1925–29	100	100	100	100	100	100	100
1930–34	99	96	97	94	98	105	98
1935–39	105	91	81	90	92	92	90
1940–44	132	100	106	106	115	105	109
1945–49	148	98	108	108	108	104	110
Eggs per layer: [2]							
1925–29	100	100	100	100	100	100	100
1930–34	105	102	98	99	95	102	100
1935–39	115	111	106	103	102	107	108
1940–44	124	122	123	110	111	108	118
1945–49	131	143	148	122	123	121	134
Egg production:							
1925–29	100	100	100	100	100	100	100
1930–34	105	99	96	93	93	107	98
1935–39	121	101	86	94	94	99	97
1940–44	163	123	132	117	128	114	130
1945–49	194	140	160	133	132	126	148

[1] Potential layers on hand Jan. 1 including both hens and pullets of laying age and those not of laying age.

[2] Number of eggs produced per layer on hand Jan. 1.

For the United States, the total egg production has averaged nearly 50 percent higher in the last few years than in 1925–29. But the increases vary considerably by regions. They are nearly 100 percent in the North Atlantic, 60 percent in the West North Central, 40 percent in the East North Central, and about 30 percent in the other regions (table 17).

The North Atlantic and West North Central regions have produced a larger part of the national output of eggs in recent years than formerly as the result of these changes. The North Atlantic was the

source of 12 percent of all eggs produced in the United States in 1924 as compared with 16 percent in 1948. The percentage produced in the West North Central region went up from 28 to 30. The Southern and Western regions show small decreases in their shares of the national total.

Shorter run variations from the long-time trend are also different between regions. The decline in national production from 1925–29 to 1935–39 was due mainly to reduction in feed supplies brought about by the drought. Feed supplies were reduced more in the West North Central States than elsewhere. This is mainly responsible for the larger variations in production in the West North Central region.

Changes in egg production in the individual States differ from those for regions (fig. 8). Output of eggs increased more than 100

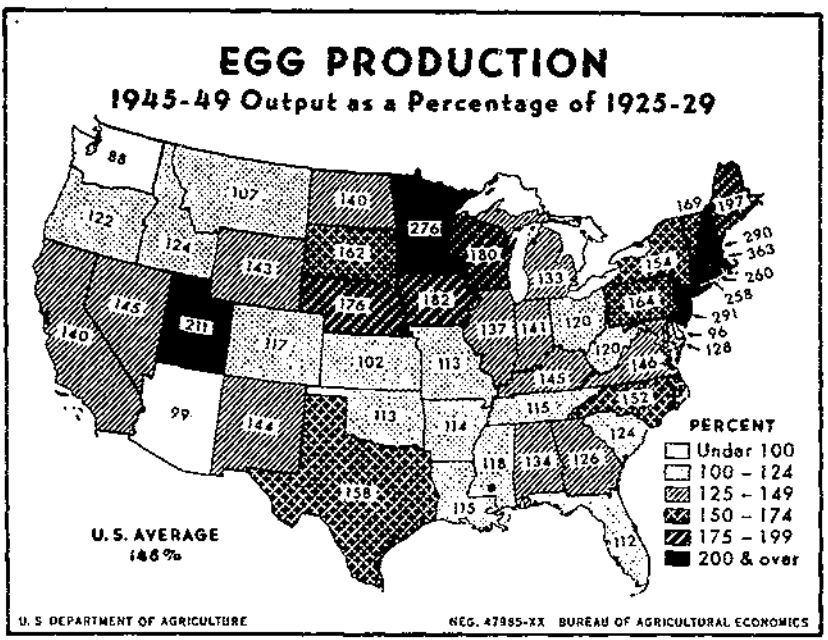

FIGURE 8.—Egg production has been increased much more in some States and areas than in others, in the last 20 years. Percentage increases are largest in New England, New Jersey, Minnesota, and Utah.

percent in Minnesota, New Jersey, Utah, and several States in New England. Other major producing States where output expanded more than 50 percent include Iowa, Wisconsin, New York, Pennsylvania, Nebraska, and Texas. In three States—Washington, Delaware, and Arizona—production declined slightly. Changes in areas within States also differ widely.

FARM CHICKENS RAISED

The number of farm chickens raised increased greatly in all regions during the war years (table 18). But the number raised in each region, except the North Atlantic, in the last few years has been about

TABLE 18.—*Farm chickens raised, pullets on hand on December 31 as a percentage of chickens raised, pullets on hand as a percentage of all layers on December 31, and October 1, by regions, United States averages 1925–49* [1]

Year	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Farm chickens raised (1925–29=100):	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1925–29	100	100	100	100	100	100	100
1930–34	108	101	102	101	96	95	100
1935–39	113	93	87	95	92	85	92
1940–44	138	103	112	111	113	109	113
1945–49	141	97	101	99	105	108	105
Pullets, Dec. 31, as a percentage of chickens raised:							
1930–34	32. 4	35. 4	33. 9	24. 5	29. 3	33. 8	32. 1
1935–39	37. 4	39. 4	37. 9	27. 4	32. 3	36. 9	35. 7
1940–44	39. 7	40. 3	40. 8	28. 0	32. 1	32. 8	36. 7
1945–49	43. 0	42. 4	44. 9	30. 8	30. 3	32. 8	38. 6
Pullets, Dec. 31, as a percentage of all layers:							
1930–34	61. 6	64. 4	65. 2	55. 4	55. 0	54. 1	60. 6
1935–39	66. 9	68. 0	68. 2	57. 8	57. 4	56. 2	63. 6
1940–44	68. 4	69. 2	71. 1	57. 7	56. 7	55. 9	64. 8
1945–49	69. 7	71. 7	74. 6	59. 0	56. 7	56. 1	66. 8
Pullets, Oct 1, as a percentage of all layers:							
1931–34	55. 8	57. 4	59. 4	55. 4	54. 6	52. 9	56. 7
1935–39	62. 6	64. 4	63. 5	58. 9	58. 3	56. 5	61. 4
1940–44	52. 8	56. 2	56. 1	51. 1	51. 1	48. 1	53. 6
1945–49	63. 4	67. 6	64. 4	58. 2	56. 6	58. 5	62. 4

[1] Chickens raised excludes young chickens lost. Pullets include all pullets of laying and not of laying age, on Dec. 31. Layers include hens and pullets of laying and not of laying age, on hand Dec. 31. Data on pullets are available only since 1930.

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the same as the average for 1925-29. Regional changes in numbers of farm chickens raised generally are similar to those for numbers of layers. In all regions, however, there have been small decreases in the ratio of chickens raised to number of layers on hand.

Farm chickens are raised for sale and for consumption on farms as young chickens as well as for replacement of laying flocks. In the North Atlantic and North Central regions nearly 45 percent of the chickens raised in 1945-49 were on hand at the end of the year as pullets in laying flocks and 55 percent were sold or consumed on farms (table 18). In the South and West, however, only about one-third were kept as pullets and about two-thirds were sold or consumed on farms.

The proportion of chickens raised that are kept as pullets at the end of the year has increased gradually in all regions except the South Central and West (table 18). The number of farm chickens raised for sale as young chickens undoubtedly has been affected by the large expansion in output of commercial broilers and the increased availability of chicks from commercial hatcheries and more recently by more sexed chicks.

The increase in the percentage of pullets saved from chickens raised makes it unnecessary to raise as many chickens to provide a given number of layers at the end of the year. On the other hand, an increase in the percentage of pullets in laying flocks has had an opposite effect. From 1930-34 to 1945-49, the increase in percentage of pullets saved has more than offset the effect of increase in the percentage of pullets in laying flocks, so the ratio of farm chickens raised to hens and pullets on hand at the end of the year has declined in most regions.

The proportion of pullets in laying flocks at the end of the year differs widely between regions (table 18). In 1945-49, about 70 percent of the layers on hand were pullets in the North Atlantic and North Central regions as compared with 59 percent in the South Atlantic and 56 percent in the West and South Central. No substantial change has taken place in the proportion of pullets in laying flocks in the West or South Central regions although the trend toward more pullets has been slightly upward in other regions. Other factors than the percentage of pullets also influence rate of lay. For example, rate of lay is relatively high in the West where only 56 percent of the layers at the end of the year were pullets in 1945-49.

Chicken Meat Production

Production of farm chickens has not increased nearly so much as production of eggs, in the regions, since 1925-29 (table 19). Production of farm chickens expanded greatly from 1940 to 1945 but has contracted in all regions since then. Nevertheless, meat production from farm chickens in the North Atlantic region was 80 percent higher in 1945-49 than in 1925-29. The West was about one-fourth higher and the other regions were close to the 1925-29 level.

Changes in production of farm chickens have been influenced by changes both in numbers produced and in average weights. Changes in numbers produced in the several regions have been like those in numbers of chickens raised. They are not identical because changes

in death losses have not been the same. Average weights have increased in all regions and, consequently, production of farm chicken meat has expanded more than number of chickens raised.

TABLE 19.—*Production of farm chickens, commercial broilers, and total chickens by regions, United States, averages 1925–49* [1]

Year	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Farm chickens (1925–29=100):	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1925–29	100	100	100	100	100	100	100
1930–34	108	100	102	104	95	94	100
1935–39	121	93	83	99	81	86	90
1940–44	168	108	112	123	102	118	116
1945–49	180	106	104	113	96	124	113
Commercial broilers (1935–39=100):							
1935–39	100	100	100	100	100	100	100
1940–44	250	242	279	394	275	239	322
1945–49	457	342	503	612	473	482	523
Total chickens (1925–29=100): [2]							
1925–29	100	100	100	100	100	100	100
1930–34	110	101	102	107	95	94	101
1935–39	134	97	84	140	87	91	98
1940–44	201	118	114	286	119	137	142
1945–49	241	121	109	366	124	161	155

[1] Computed from live weight of farm chickens and commercial broilers produced.
[2] Includes nonfarm chicken production assumed to equal 10 percent of farm production.

The higher rate of lay is chiefly responsible for the greater expansion in eggs than in meat from farm chickens. Moreover, increased purchases of sexed pullets have lowered the ratio of farm chicken to egg production. The use of sexed in place of straight-run chicks makes it possible to separate chicken meat and egg production more adequately. Some production of chicken meat as a joint product with eggs will always be necessary, but the ratio is much less than before.

Commercial broiler production has risen sharply in all regions since 1935–39; the South Atlantic stands out especially (table 19). Despite this widespread expansion, broiler production still is concentrated in a few specialized areas (fig. 9). For example, seven States—Delaware, Maryland, Virginia, Georgia, Arkansas, North Carolina, and Texas—have accounted for 60 percent of the broilers produced in recent years. Within these States, as well as in others, broiler production is further concentrated in certain areas and on specialized broiler farms.

Because of the sharp rise in number of commercial broilers, total production of chicken meat has more than doubled in the North Atlantic region and has quadrupled in the South Atlantic since 1925–29. A substantial increase has taken place in the West too, but changes in the other regions have been small.

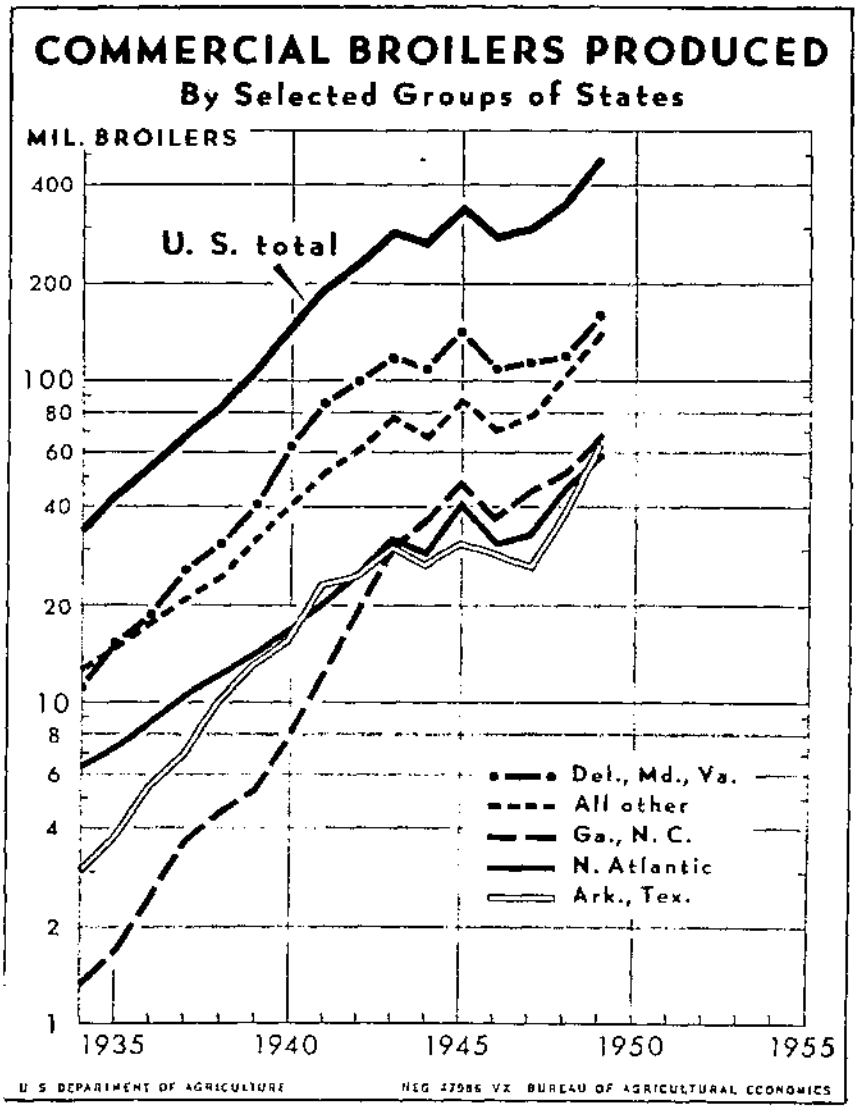

FIGURE 9.—Commercial broiler production is a recent phenomenon and the pattern of expansion in the specialized areas has followed a similar course.

These differential trends have modified the percentage distribution of national production among regions. The proportion produced in the North Atlantic region has gone up from 10 percent in 1925–29 to 16 percent in recent years. The proportion in the South Atlantic rose from 9 percent to 24 percent. The West has not changed much, but the North Central regions now produce a smaller share of the national total.

Distribution on Farms

Changes in the distribution of chicken and egg production among sizes of enterprises and types of farms differ between regions.

There has been little change in the proportion of all farms that have chickens (table 4). But the number of farms reporting chickens on hand declined in each region from 1935 to 1945 as the number of all farms was reduced (table 20). The reduction in number of farms reporting chickens, together with expansion in chicken and egg production, has meant more production per farm. For example, egg production per farm with chickens on hand has doubled in the North Atlantic, West North Central, and West South Central regions. These regions and the South Atlantic also show large increases in the number of chickens raised per farm. As these data on chickens raised include commercial broilers the increases are very large for regions that have many specialized broiler farms.

TABLE 20. *Total number of farms, farms reporting chickens on hand, and average number of chickens on hand, chickens raised, and eggs produced per farm, 1945 as percentage of 1935, by regions, United States*[1]

Region	Total number of farms	Farms reporting chickens	Averages per farm reporting		
			Chickens on hand	Chickens raised	Eggs produced
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
New England	95	83	200	228	226
Middle Atlantic	87	79	156	190	191
East North Central	88	83	123	135	156
West North Central	87	86	147	142	200
South Atlantic	91	88	119	326	172
East South Central	81	81	117	125	180
West South Central	77	78	160	176	218
Mountain	78	82	111	136	161
Pacific	91	96	108	133	121
United States	86	81	137	172	182

[1] Computed from U. S. Bureau of the Census, *1945, pp. 27–35*. Data on number of chickens on hand are for chickens 4 months old or older on Jan. 1, 1945, and 3 months or older on Jan. 1, 1935. Data on chickens raised and eggs produced are for 1944 and 1934.

Distribution of egg production by size of enterprise within regions has been modified so that the large flocks account for a larger proportion of output in all regions. In the North Atlantic and North Central regions much of the increase in egg production was on farms with more than 400 chickens (table 21). In the other regions, the smaller flocks also contributed substantially to the expansion in production. These data show that the number of eggs produced per chicken on hand has gone up in flocks of all sizes within all regions. In most

regions the percentage increases in rate of lay were largest in the small flocks.

Distribution of chickens raised by size of flocks within regions has changed differently. The estimates of chickens raised include commercial broilers in addition to farm chickens. The expansion in commercial broilers accounts for the large percentage increases in number of chickens raised on farms that had no chickens on hand that were more than 3 months old. In all regions there was a reduction in number of chickens raised on farms that had 400 or more chickens. Production of farm chickens has become more concentrated on farms that have less than 400 chickens. This is the reverse of what has happened in egg production.

TABLE 21. *Number of farms reporting chickens on hand, and eggs produced, by size of flocks, 1945 as a percentage of 1935, by regions, United States* [1]

Region	Number of farms with chickens on hand				Eggs produced on farms with chickens on hand			
	Under 100 birds	100–399 birds	400 birds and over	Total	Under 100 birds	100–399 birds	400 birds and over	Total
	Per-cent	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*	*Per-cent*
New England	75	95	190	83	108	108	290	194
Middle Atlantic	70	88	161	79	91	116	232	155
East North Central	71	107	161	83	92	143	203	131
West North Central	56	128	263	86	82	200	328	172
South Atlantic	85	119	151	88	110	156	201	153
East South Central	82	118	190	81	118	175	202	155
West South Central	67	184	319	78	138	290	322	198
Mountain	73	136	147	82	100	158	169	134
Pacific	99	80	92	96	128	87	128	120
United States	71	121	170	84	112	171	206	155

[1] Computed from U. S. Bureau of the Census (*17, pp. 26–45*). Data on number of chickens on hand are for chickens 3 months old or older on Jan. 1, 1945, and 3 months old or older on Jan. 1, 1935. Data on eggs produced are for 1944 and 1934. See table 35 in statistical tables for more detailed data.

Complete data are *not* available to show changes in the distribution of chicken and egg production by types of farms within regions. But it is apparent that the percentage of poultry and poultry products produced by poultry farms has increased in recent years. The proportion of all farms classified as poultry farms increased in all regions from 1940 to 1945 (table 22). The distribution of poultry farms among regions also has been modified. The total number of poultry farms in the United States was 43 percent higher in 1945 than in

1940. But increases were much higher in the South Atlantic, South Central, and West North Central regions, and were much lower in the others.

TABLE 22.—*Poultry farms as a percentage of all classified farms in 1940 and 1945, and number of poultry farms in 1945 as a percentage of 1940, by regions, United States*

Region	Poultry farms as a percentage of all classified farms		Poultry farms in 1945 as a percentage of 1940
	1940	1945	
	Percent	*Percent*	*Percent*
New England	10.8	12.6	129
Middle Atlantic	10.6	12.3	116
East North Central	3.6	5.3	141
West North Central	2.5	4.6	174
South Atlantic	2.4	3.9	169
East South Central	.7	1.3	164
West South Central	1.7	3.8	198
Mountain	3.3	4.1	115
Pacific	9.2	9.3	103
United States	3.2	4.8	143

OTHER FARM PRODUCTS

Regional trends in production of chickens and eggs are striking. Production of both chickens and eggs has risen much more than that of all farm products in the New England and Middle Atlantic regions, since 1925–29 (table 23). Egg production has also expanded more than total farm output in the West North Central and the West South Central regions. Because of the rapid expansion in commercial broilers, chicken-meat production has gone up much more than that of other farm products in the South Atlantic region. In the South Central and Western States the output of poultry products has risen about the same, or somewhat less, than total output of other farm products.

As a result of these divergent production trends, the proportion of total cash income from sale of all farm products obtained from chickens and eggs has been greatly modified. For example, the proportion obtained from sale of eggs and chickens (including commercial broilers) went up from 9.4 percent in 1925–29 to 9.8 percent in 1945–1949 in the United States (table 3). But the proportion increased from 14 to 25 percent in New England, from 16 to 21 percent in the Middle Atlantic, and from 8 to 13 percent in the South Atlantic. But these products have become relatively less important as sources of farm income in the East North Central and Pacific regions, where production increases have been much larger for other products.

TABLE 23.—*Total farm production, and production of chicken meat and eggs, 1945–49 as a percentage of 1925–29, by regions, United States* [1]

Region	Farm production			Farm output for human use [5]	Chicken meat	Eggs
	All livestock [2]	Crops and pasture [3]	Gross [4]			
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	138	124	129	144	339	267
Middle Atlantic	119	118	119	132	202	176
East North Central	125	135	132	149	119	140
West North Central	112	119	117	132	108	160
South Atlantic	154	135	139	152	343	133
East South Central	129	118	121	133	120	128
West South Central	125	104	109	122	123	135
Mountain	116	131	127	141	117	135
Pacific	142	170	163	174	186	123
United States	125	126	125	140	151	148

[1] Changes in farm output for human use, gross farm production, all livestock, and crops and pasture computed from U. S. Bureau of Agricultural Economics (*12*).
[2] Product added by all livestock, excludes feed consumed.
[3] Total of all farm produced pasture, feed, and other crops.
[4] Product added by all livestock plus crop and pasture production.
[5] Gross farm production minus value added by horses and mules.

REGIONAL SHIFTS IN DEMAND

Analysis of national changes in demand for chicken meat and eggs indicates that expansion in output has been accompanied by increases in demand due to population growth, higher real incomes, and Government purchases of eggs (*1, pp. 34 42*). But perhaps demand may have increased more in some regions than in others. If so, differential trends in production could be expected even if production costs had changed uniformly. For evidence of how demand at the farm for chickens and eggs has changed in the regions, we can examine changes in farm prices.

EVIDENCE OF SHIFTS IN DEMAND

Two aspects of change in farm-price relationships need to be considered—changes between regions and interproduct changes within regions.

Prices received by farmers for chickens and eggs were much higher in all regions in 1945–49 than in 1925–29 (table 24). They went up more for eggs than for chickens, especially in the Pacific States. Relative increases in price for both eggs and farm chickens were least in New England. In relation to the national average, egg prices have been higher in the West and lower in New England recently than they were 20 years ago. Regional prices for farm chickens do not show much change in relation to the national average except in New England where they are lower.

Farm prices of commercial broilers, available since 1934, indicate an almost uniform rise in all regions, but a relative decline as compared with prices of farm chickens.

TABLE 24.—*Prices received by farmers for eggs, farm chickens, and commercial broilers, 1945–49 as a percentage of 1925–29 and regional prices as a percentage of United States average prices in 1925–29 and 1945–49* [1]

Region	1945–49 prices as a percentage of 1925–29 prices		Regional prices as a percentage of United States prices					
			Eggs		Farm chickens		Commercial broilers [2]	
	Eggs	Farm chickens	1925–29	1945–49	1925–29	1945–49	1935–39	1945–49
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	133	112	153	136	133	116	103	100
Middle Atlantic	147	125	126	124	124	121	102	104
East North Central	143	128	99	95	102	101	101	105
West North Central	145	124	87	85	88	86	94	97
South Atlantic	151	124	108	109	115	112	102	98
East South Central	154	129	92	95	98	99	96	108
West South Central	158	139	86	91	88	96	94	101
Mountain	157	144	99	104	88	99		
Pacific	166	129	106	118	109	109	96	107
United States	150	128	100	100	100	100	100	100

[1] See tables 36, 37, and 38 in statistical tables for additional data on regional price changes for eggs, farm chickens, and commercial broilers.
[2] Prices of commercial broilers were not reported before 1934 by regions.

Interregional price differentials have increased less with rising prices than might have been expected (tables 36, 37, and 38 in statistical tables). For example, farm prices of eggs per dozen were 19 cents higher in New England than in the West North Central region in 1925–29 and in 1945–49 nearly 22 cents higher. Prices of farm chickens were about 10 cents higher in New England than in the West North Central region in both periods. Looked at in another way, prices of farm chickens have risen between 6 and 7 cents per pound in all regions except in the Northeast and West North Central where the increases are less. But, price rises for eggs vary from a low of 11 cents per dozen in the West North Central region to a high of 20 cents in the Pacific region.

Farmers are interested not only in the level of prices received for chickens and eggs but also in how prices of these products compare with prices for other products. In the earlier study of national trends, it was pointed out that farm prices of eggs and especially of chickens

have declined in relation to prices of all farm products (*1*). For the United States as a whole, relative farm prices of eggs declined 11 percent and of farm chickens 24 percent from 1925–29 to 1945–49. Data showing changes in prices of all farm products combined are available for many individual States, although not for regions. For these States it is possible to make intercommodity price comparisons (table 25). Prices of all farm products were 70 to 80 percent higher in 1945–49 than in 1925–29 in most States in the Midwest and West, but only about 50 percent higher in the North Atlantic. Prices of eggs and chickens rose less than those of all farm products in most States so that relative prices became lower. Variations between States in the relative changes were small. There is little evidence that relative price declines for chickens and eggs differ much between regions.

TABLE 25.—*Prices received by farmers for all farm products, eggs and farm chickens, 1945–49 as a percentage of 1925–29, and price ratios of eggs and farm chickens to all farm products 1945–49, selected States and United States* [1]

State	Prices received by farmers 1945–49 as a percentage of 1925–29			Price ratios [2]	
	All farm products	Eggs	Farm chickens	Eggs—all farm products	Chickens—all farm products
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
North Atlantic		145	121		
Massachusetts	148	122	107	82	72
New York	159	147	128	92	81
New Jersey	140	136	113	97	81
North Central		138	125		
Wisconsin	172	146	128	85	74
Minnesota	159	144	126	91	79
Illinois	174	138	128	79	74
Iowa	179	142	126	79	70
Nebraska	180	147	124	82	69
South Atlantic		151	124		
Maryland	169	145	115	86	68
North Carolina	167	152	127	91	76
Florida	126	154	134	122	106
South Central		157	135		
Alabama	170	159	134	94	79
Arkansas	179	159	141	89	79
Texas	174	160	141	92	81
West		163	134		
Montana	174	151	161	87	93
Washington [3]	167	167	141	100	84
United States	169	150	128	89	76

[1] Percentage changes in prices received for all farm products are computed from index numbers of prices received by farmers for farm products developed in the individual States, usually with 1910–14 as the base period. These index numbers are not computed in precisely the same way in all States and may not be entirely comparable, but they are indicative of general price movements.

[2] Price ratios show change in prices of eggs and farm chickens relative to prices of all farm products between 1925–29 and 1945–49.

[3] Average for 1945–47.

The data on farm prices of eggs and chickens that have been described are averages for all grades and qualities sold. Regional differences are explained in part by transfer costs between surplus and deficit regions, as pointed out earlier. But differences in quality of products as sold from the farm and differences in quality deterioration between the farm and wholesale market account for most of the difference in prices received. Improvement in quality may not have progressed at the same rate in all regions. This factor alone may be responsible for much of the change in price differentials between regions.

Regional price trends suggest that changes in demand for chickens and eggs at the farm in the regions may not differ greatly from the national changes. Farm prices in each region provide an indication of the level of demand for chickens and eggs. It is not possible at this point to say much about how elasticity of demand at the farm may have changed.

As the farm price of eggs has gone up most in the Pacific region, it may be concluded that demand for eggs at the farm level has risen most. The reverse seems to be true for New England. It also appears that demand for farm chickens has risen least in New England, where price increases have been smallest.

Demand for chickens and eggs at the farm level apparently has declined in all regions relative to the demand for other farm products, but differences between States within regions are so considerable that available State data do not furnish sufficient basis for regional conclusions.

Factors Affecting Demand

Demand at the farm level for the chickens and eggs produced in a region may change for several reasons. Among these are (1) changes in demand at consumer outlets in the same region and elsewhere, (2) changes in transportation and marketing costs between farmers and consumers, and (3) changes in supplies from competing regions. Government purchases for price support and for military and foreign uses have been another factor.

Demand at consumer outlets

Demand at retail for chicken meat and eggs may be modified by changes in population, income per capita, preferences for other foods, and supplies of substitute foods. The total population of the United States increased nearly 20 percent in the 20-year period, 1925–29 to 1945–49. But population nearly doubled in the Pacific region and rose one-fourth in the South Atlantic States. In contrast, increases were only 3 percent in the West North Central, 14 percent in the North Atlantic, 15 percent in the South Central, and 16 percent in the East North Central States. Data showing long-term trends in the distribution of income payments among regions are not available, but they probably correspond. Not much is known about regional changes in consumer preferences and in supplies of substitute foods but these may not differ much. Retail demand for chickens and eggs has probably increased most in the Pacific and South Atlantic regions and least in the West North Central and other regions in which population has had a smaller increase.

TRANSPORTATION AND MARKETING COSTS

Demand at the farm depends not only upon demand at retail, but also upon transportation and marketing costs. An increase in these charges would have the effect of reducing demand at the farm with the same retail demand. Costs of transporting products from farms to places of consumption may be altered because of changes in distances as well as from changes in charges per unit of transportation services.

Estimates on a national basis show that transportation and marketing charges for eggs were only 18 percent higher in 1945–49 than in 1925–29; those for chickens were 35 percent higher (*1, p. 88*). These national increases are due chiefly to higher rates for transportation and marketing services as the average distances these products are moved from farms to retail outlets have not changed much. Estimates on a regional basis suggest that costs of transportation and marketing services have increased about the same percentage for each region. But with changes in relative movements of chicken meat and eggs in response to shifts in surplus-deficit positions, regional transportation costs may have changed differently.

Changes in transportation and marketing charges have not been enough to have much effect on the regional pattern of demand at the farm. The main reason, of course, is that transportation charges are only a very small part of the total cost of marketing. Another is that shifts in directions of movement have been limited.

TABLE 26.—*Production of chicken meat and eggs as a percentage of consumption, by regions, United States, 1925–29 and 1945–49* [1]

Region	Chicken meat		Eggs	
	1925–29	1945–49	1925–29	1945–49
	Percent	*Percent*	*Percent*	*Percent*
New England	35	85	35	75
Middle Atlantic	35	48	47	63
East North Central	106	86	105	110
West North Central	284	236	250	339
South Atlantic	72	157	70	65
East South Central	106	90	88	88
West South Central	119	98	105	105
Mountain	97	73	112	107
Pacific	65	52	128	76
United States	100	100	100	108

[1] Data indicate percentage that per capita production in each region is of United States per capita consumption (see footnote 2 of table 8 on p. 16).

Changes in the market movements of chickens and eggs in the last 20 years are indicated by the percentages that estimates of production are of consumption, in each region, in 1925–29 and 1945–49 (table 26). For eggs, the shift of the Pacific region from a surplus to a deficit position is most significant. According to these estimates, this region produced nearly 30 percent more eggs than it consumed in 1925–29, but

produced 20 percent less than it consumed in 1945–49. Shipments of eggs from the Pacific States to Eastern cities were formerly large, but they have declined in recent years to very small quantities during surplus seasons. The New England and Middle Atlantic regions have continued to have deficits. They have been reduced relatively but only slightly in total quantity. The surplus in the West North Central States, the chief surplus region, has increased in both percentage and quantitative terms. It has doubled in total quantity in this region. In other regions the relation of production to consumption has not changed greatly.

Eggs produced in the West North Central States have moved longer distances to retail outlets with these regional changes in consumption and production. Eggs produced in the Pacific and Mountain regions have moved much shorter distances as consumption in the Pacific Coast cities increased rapidly with the large growth in population. This is one reason for the larger increase in the farm price of eggs in the West.

In the case of chicken meat the most significant changes are the shift of the South Atlantic region from a deficit to a large surplus position, the shift of the East North Central from a surplus to a deficit position, and a large increase in the deficit in the Pacific region (table 26). The surplus in the West North Central region has remained about the same in total quantity although it has become a smaller percentage of production. The deficit in the North Atlantic has declined slightly in total quantity. With the large expansion in commercial broiler production, the South Atlantic region has become an important source of chicken meat for the North Atlantic and East North Central States. More chicken meat moves from the West North Central region to the Pacific States than formerly but there has been little change in regional price differentials for farm chickens or commercial broilers. This may be explained largely by the fact that in the case of no region have shifts in surplus or deficit position had much influence on the average distances chicken meat travels to reach consumers.

PRICE-SUPPORT AND PURCHASE PROGRAM

As explained in the earlier report, Government purchases of eggs, chiefly in dried form, have (from the producers' point of view) also added to the national demand for eggs (*1, pp. 39–42*). Most of these purchases have been exported under foreign food-supply programs financed by United States funds even though in recent years they were made initially to support farm prices. Approximately 5 percent of the eggs produced in the 1945–49 period were exported, mainly under these programs.

Purchases of dried eggs for price-support reasons have been made chiefly in the surplus midwestern States, and particularly in the spring (fig. 10). Purchases of eggs have accounted for a substantial part of total egg production in these States, in late years. For example, they made up 15 percent of the total in Minnesota and 10 percent in Iowa, in 1949. As purchases have been largest in the spring when surpluses are especially large, seasonal variations in farm prices of eggs have been smoothed out to some extent.

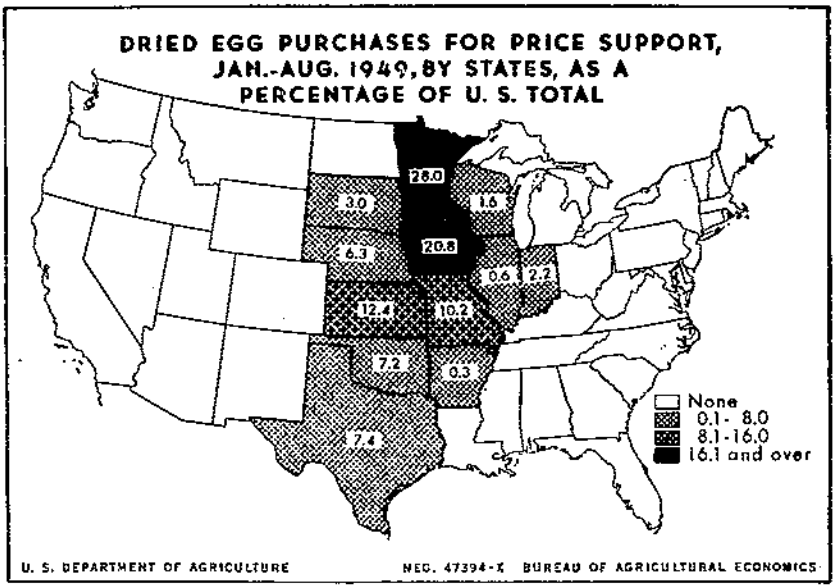

FIGURE 10.—Purchases of dried eggs for price-support reasons have been chiefly in the Midwest. Purchases in January–August 1949 were equivalent to 5 percent of United States total egg production in this period. They were equivalent to 10 percent or more of production in Minnesota, Iowa, Missouri, Nebraska, Kansas, and Oklahoma. (The eggs that were dried were not necessarily produced in the States indicated.)

The first impact of these purchases has been to raise the demand for eggs at the farm level in the Midwest. But demand elsewhere has also been improved as fewer eggs from the Midwest have moved to outside markets than otherwise would have been true. Purchases of dried eggs have been mainly from eggs classified as "current receipts," rather than from the eggs of highest quality. The current-receipts category comprises a larger part of total production in the Midwest than in the Northeast or Pacific States. Hence, without purchase programs, farm prices for eggs in the Midwest would have compared less favorably with those in other regions.

It is worth noting that the support-price program has helped Midwestern farmers to maintain poultry flocks and productive capacity so that they have been more able to meet the increased demands resulting from the defense program than would otherwise have been the case.

CHANGES IN SUPPLIES FROM COMPETING REGIONS

As explained in the next section, supply changes for chickens and eggs differ widely between regions. Regional trends in production diverge, despite little difference in regional changes in farm prices. In general, we can say that increases in supply have been largest in regions in which increases in production are largest (table 23).

It has been concluded here that changes in demand for chickens and eggs from farms in the several regions do not differ much. But this does not mean that demand in each region has not been affected by

changes in supply in competing regions. As most regions account for a small part of the national production, demand from farms in each obviously is affected by supply changes in other regions. Prices for eggs from farms in the North Atlantic region, for example, would have been higher in recent years if the supply from the North Central States had not increased so much. Similarly, in the case of chicken meat the large expansion in supply from the South Atlantic region has affected the demand for chickens from farms in the North Atlantic.

Effects on Production Trends

Changes in the geographic structure of demand at the farm for chickens and eggs have been slight during the last 20 years. Some changes have taken place, but they are responsible for only a small part of the wide divergence in trends in production. Changes on the supply side in the various regions have been mainly responsible.

REGIONAL SHIFTS IN SUPPLY

In the earlier study of national trends, it was concluded that the large shifts in the supply schedules for chickens and eggs during the last 20 years, although due chiefly to technological improvements in production methods, reflected the presence of larger supplies of feed and other resources on farms (*1, pp. 19–34*). On a national basis the percentage increase in the output of chickens and eggs was more than for all other livestock products combined. This is why relative farm prices of chickens and eggs decreased, as demand increased at least as much as for other livestock products.

In the preceding section, it was noted that total demand for chickens and eggs has increased in each region. But the lower level of relative prices that faces producers in each region means that for them the demand for chickens and eggs has decreased as compared with the demand for all other farm products. However, the decreases do not differ much between regions. The divergent trends in chicken and egg production are due in some part to different regional shifts in demand, but it is clear that different regional shifts in supply are chiefly responsible.

In order to explain changes in the regional pattern of chicken and egg production, it is necessary to examine the factors that have influenced output in each region. But before doing this, it is desirable to decide how the supply schedules in each region have shifted.

Evidence of Shifts in Supply

Regional changes in the supply schedules for chickens and eggs from farms cannot be measured very closely as prices have not remained constant. As pointed out, farm prices of chickens and eggs decreased relative to those of other farm products in all regions from 1925–29 to 1945–49 (tables 24 and 25). The decreases for eggs are small in most regions, but large for chickens in all. As farm production has increased in all regions despite lower relative prices, it is evident the supply of chickens and eggs at any given relative price has increased in each region.

Percentage changes in production provide an approximate measure of the extent to which supply (in the schedule sense) has increased in each region since 1925–29 (table 23). As the expansion of chickens has been largest in the South Atlantic, North Atlantic, and Pacific regions, it is clear that these regions have had the largest percentage shifts in supply. Differences between regions are not pronounced but percentage increases in supply have been largest from farms in the North Atlantic and North Central States. The supply changes for States and local areas show still more variability as production trends for the smaller areas differ even more.

Factors Affecting Supply

The supplies of chickens and eggs from farms in a region (as indicated by the quantities that farmers would produce at specified prices) have been modified by developments affecting the costs of production. These include changes in the technology of production that influence the quantities of resources used per unit of output and changes in supplies of feed, labor, and other resources available for producing chickens and eggs.

Technological Improvements

Resources used in terms of feed, labor, and other items per pound of chickens and eggs have decreased in all regions as methods of production have improved. As explained in the earlier study, these improvements include the distribution of better breeds or strains of chickens on farms, the application of improved feeding methods, the use of more effective measures in the control of health and disease, and the general improvement in management practices as production has been concentrated in fewer but larger enterprises (*17, pp. 26–32*). Progress in this respect differs between regions, however.

Eggs.—Change in the number of eggs produced per layer provides an approximate measure of improvement in the efficiency of egg production. As rate of lay increases, the operators use less feed, labor, building space, and supplies per egg produced. Charges to cover costs of depreciation in the value of layers also are reduced. Therefore it is significant that the number of eggs produced per layer on hand, during the year, averaged about 45 percent higher in 1945–49 than in 1925–29 in the North Atlantic and North Central regions and only about 20 percent in the South and West (table 27).

The effects of changes in rate of lay on the feed consumed per layer and per egg produced have been estimated from information concerning the relation of feed consumption to rate of lay. These estimates show that feed consumed per egg produced has decreased much more in the North Atlantic and North Central regions than in the South or West although reductions are substantial in all regions (table 27). But actual reductions in feed per egg may be smaller than indicated, particularly for the North Central regions, because less of the feed consumed has been picked up around farmsteads as flocks have increased in size.

Labor inputs per egg have declined with the higher rate of lay, although not in proportion because more labor has been used to

handle the additional feed and eggs per layer. But labor inputs also have been reduced with the trend toward fewer and larger flocks in all regions. Therefore labor used per egg may have declined nearly as much as rate of lay has increased, in each region. Charges to cover building costs probably have decreased about as much.

TABLE 27.—*Number of eggs produced per layer and estimates of feed consumed per layer and per egg produced, by regions, United States averages 1925–29 and 1945–49*

Region	Eggs per layer [1]		Feed per layer [2]		Feed per egg [3]		Reduction in feed per egg
	1925–29	1945–49	1925–29	1945–49	1925–29	1945–49	
	Number	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Percent*
New England	138	197	85. 7	94. 6	0. 62	0. 48	23
Middle Atlantic	130	180	84. 5	92. 0	. 65	. 51	22
East North Central	118	165	82. 7	89. 8	. 70	. 54	23
West North Central	110	162	81. 5	89. 3	. 74	. 55	26
South Atlantic	112	138	81. 8	85. 7	. 73	. 62	15
East South Central	105	128	80. 8	84. 2	. 77	. 66	14
West South Central	112	132	81. 8	84. 8	. 73	. 64	12
Mountain	127	160	84. 0	89. 0	. 66	. 56	15
Pacific	146	177	86. 9	91. 6	. 60	. 52	13
United States	117	158	82. 6	88. 7	. 71	. 56	21

[1] Number of eggs produced per layer during the year.
[2] Feed consumed per layer during the year estimated by assuming that each layer requires 65 pounds of feed for maintenance plus an additional 0.15 pound of feed per egg produced.
[3] Computed from estimates of feed consumed per layer and number of eggs produced per layer.

CHICKENS.—In considering technological change in production of chicken meat, it is necessary to distinguish between farm chickens and commercial broilers. The numbers of farm chickens produced in the last few years has been about the same as in 1925–29 except in the North Atlantic and Pacific regions where great increases have taken place (table 19). Even in these regions, commercial broilers account for most of the expansion in total chicken production.

Efficiency in production of farm chickens, in terms of feed, labor, and other resources used per pound produced, probably has not changed much in any region in recent years. Some improvement has taken place where there has been a shift to more of the heavier breeds. Heavy breeds grow more rapidly and require less feed per pound of gain than do the light breeds. Data showing changes in breeds or varieties of chickens raised in each region are not available. But changes in the average weights of farm chickens sold suggest that the shift to heavier breeds has been most marked in the Atlantic and Pacific regions. Weights of farm chickens sold averaged about 30 percent higher in the North Atlantic and 25 percent higher in the

South Atlantic and Pacific in 1945–49 than in 1931–35 (table 28). Increases were 18 percent in the East North Central, only 8 percent in the West North Central, and less in the South Central. Of course, weights may average higher as a result of feeding chickens longer and to heavier weights than formerly. This would have the effect of raising feed inputs because chickens use more feed per pound of gain as they are fed to heavier weights.

TABLE 28.—*Average weights of chickens sold from farms, 1931–35 and 1945–49 and percentage reductions in feed consumed per pound of chicken produced from 1931–35 to 1945–49, by regions, United States*

Region	Average weights of chickens sold				Reduction in feed consumed per pound of chicken, 1931–35 to 1945–49 [3]
	1931–35 [1]	1945–49 [2]			
		Farm chickens	Commercial broilers	All chickens	
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Percent*
New England	3.8	5.2	3.6	4.4	10
Middle Atlantic	3.7	4.7	3.4	4.4	5
East North Central	4.0	4.7	3.1	4.3	3
West North Central	4.2	4.5	3.1	4.1	1
South Atlantic	3.2	4.1	3.0	3.2	20
East South Central	3.7	4.0	2.7	3.6	4
West South Central	3.8	3.7	2.7	3.2	9
Mountain	3.6	4.0	2.7	3.9	0
Pacific	2.8	3.6	3.2	3.4	9
United States	3.8	4.4	3.0	3.8	8

[1] Data are simple averages of average weights of farm chickens reported for each year. Commercial broilers were included in farm chickens sold in this period.

[2] Data are weighted averages obtained by dividing total weight of chickens sold in 1945–49 by number sold.

[3] Change in feed consumed per pound of all chickens sold was computed with assumption that pounds of feed consumed per pound of weight are 6 for farm chickens and 4.5 for commercial broilers.

The large expansion in production of commercial broilers relative to farm chickens, particularly in certain regions, is the main development that has affected resources used per pound of all chickens produced. Broilers use less feed (but usually more labor) per pound than do the heavier farm chickens. Approximate estimates can be made of the effects on feed consumption of a larger proportion of broilers. Reductions in feed consumed per pound of all chicken since 1931–35 are estimated at about 20 percent in the South Atlantic, nearly 10 percent in New England, West South Central, and Pacific region, and lower percentages in other regions in which production of broilers expanded relatively less (table 28).

Differences between regions in the extent to which production methods have been improved apparently have not been enough to affect regional production trends very much. Heavier breeds of

chickens have been available in all areas. Technical efficiency in producing broilers has improved at about the same rate in all of the specialized areas. Although resources used per pound of all chickens produced have decreased most in the Atlantic and Pacific regions, where shifts to heavier breeds and more broilers were greatest, similar shifts probably would have been made in the other regions if farmers had believed that they would be profitable.

SUPPLIES OF RESOURCES

FEED.—As feed accounts for a large part of the total cost of producing chickens and eggs, changes in prices and quantities of feed that are available have a decided influence on production costs. Data showing prices received by farmers for corn, oats, wheat, and other grains, by States and regions, are available from early years to the present. But they are not available for laying mash before 1936 or for scratch grains before 1941. The value of the poultry ration fed in each State and region has been computed for the years since 1941.

Prices paid for laying mash and scratch grains did not differ much from national average prices throughout the 1941–49 period (table 29). This also is true of chick starter mash. Farm prices of corn, oats, wheat, and other grains differ considerably between regions (table 12, p. 25). These differences widened from 1941 to 1949 as feed prices went up. But when prices of corn, oats, and wheat in regions are expressed as percentages of United States average prices, they do not show much change. This also is true for the value of the poultry ration.

The quantities of feed available for poultry, livestock, and other uses, in each region, have been affected by changes in the production of feed and by reduction in number of horses and mules (table 30). Total production of corn and small grains for feed has declined in New England and has not changed much in the Middle Atlantic and West South Central regions, since 1925. Percentage increases in production of these grains were largest in the West, South Atlantic, and East Central regions. Reductions in feed grains fed to horses, when expressed as percentages of 1925–29 average production, have been largest in New England and in the West. As the result of these changes, production of feed grains available for poultry, livestock, and other uses, has nearly doubled in the West. It has gone up about 40 percent in the South Atlantic and 30 percent in the East North Central and South Central regions.

Changes in production of wheat also may be significant since it is an important feed for poultry particularly in the West. The total quantity of wheat used for feed on farms where produced increased from 45 million bushels per year in 1925–29 to nearly 100 million bushels in 1940, but it has not changed much since then. Increases in production have been substantial in all regions.

Percentage changes in production of feed grains differ greatly from those in production for chickens and eggs. They also differ from changes in total output of meat animals and animal products (table 23). There apparently is little direct relation between change in production of feed grain and change in production of chickens and eggs or other livestock products.

TABLE 29.—*Prices received for corn, and prices paid for scratch grains, laying mash, and poultry ration, regions as a percentage of United States, selected years* [1]

Region	Corn			Laying mash			Scratch grains		Poultry ration [2]	
	1925	1941	1949	1936	1941	1949	1941	1949	1941	1949
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	147	125	130	107	105	97	106	100	129	120
Middle Atlantic	119	120	112	100	103	99	100	97	113	109
East North Central	91	101	100	100	100	98	100	96	99	95
West North Central	90	93	98	98	95	97	98	98	84	86
South Atlantic	140	111	106	108	108	104	108	105	119	114
East South Central	130	109	103	112	111	106	107	103	109	102
West South Central	146	103	98	101	96	100	94	97	97	101
Mountain	107	99	108	103	102	101	95	101	96	104
Pacific	149	123	128	92	101	107	102	106	110	119
United States	100	100	100	100	100	100	100	100	100	100

[1] Price data by States and regions are not available for laying mash before 1936 and for scratch grains and poultry ration before 1941.

[2] Composition of poultry ration differs between regions (table 13). Price of poultry ration is computed by valuing farm-produced grains, such as corn, oats, and wheat, at prices received by farmers and valuing laying mash and scratch grains at prices paid by farmers.

TABLE 30.—*Feed grain production in 1945–49 as percentage of 1925–29 by regions, United States*

Region	Corn	Oats	Barley	Sorghum [1]	Total 4 grains	Total available for poultry and livestock [2]
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
New England	91	65	74		82	115
Middle Atlantic	117	85	128		108	121
East North Central	143	109	29		131	138
West North Central	109	119	85	179	110	118
South Atlantic	134	221	888		143	150
East South Central	121	329	808		127	134
West South Central	71	110	109	252	102	131
Mountain	80	109	303	234	155	203
Pacific	75	113	191	200	159	194
United States	119	116	113	234	119	130

[1] All sorghums for grain; 1929 only in base period as revised series begins with 1929.

[2] Includes feed grains made available by expansion in production and reduction in number of horses and mules. Change in feed grains fed to horses and mules computed by multiplying reduction in number of horses and mules by 1839 which is number of pounds of feed grains consumed per horse and mule in 1941–42 according to Jennings (*8, p. 29*).

OTHER ITEMS.—Changes in prices paid for baby chicks, labor, and other items also may influence regional production trends. Prices of baby chicks have gone up much more in some regions than in others since 1941 (table 31). Differences between regions in prices paid for chicks are due largely to differences in quality and breeding although they also may be due to regional differences in costs of eggs, labor, and other resources used to produce chicks (table 16, p. 29). It is probable that percentage changes in prices paid for chicks since 1930 differ between regions mainly because of different changes in the quality and breeding.

As the labor used to produce chickens and eggs is largely operator and family labor, changes in wages paid for hired labor may not have much influence on regional production trends. But it is noteworthy that wage rates have gone up much more in the West than in the East since 1941 (table 31). Total farm employment has declined in all regions except the Mountain, the Pacific, and the Middle Atlantic States. The larger increase in wage rates in the West than in the East may have influenced production trends on poultry farms that hire labor—they may have encouraged greater expansion in chicken and egg production on these farms in the East than in the West.

Information about changes in prices and quantities of other resources used to produce chickens and eggs is not readily available by regions. But changes in supplies of these other items probably show little difference between regions.

TABLE 31.—*Prices paid for baby chicks, chick-starter mash and poultry ration, wage rates, and total farm employment, 1948 as a percentage of 1941, by regions, United States*

Region	Prices paid by farmers for—			Wage rates per month with board	Total farm employment
	Baby chicks	Chick-starter mash	Poultry ration		
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
New England	195	226	211	249	99
Middle Atlantic	203	227	223	266	100
East North Central	214	224	233	270	99
West North Central	238	226	253	311	97
South Atlantic	186	220	218	268	99
East South Central	184	212	224	251	93
West South Central	201	217	241	305	94
Mountain	205	221	234	295	101
Pacific	214	230	232	291	108
United States	208	223	234	293	97

EFFECTS ON PRODUCTION TRENDS

ADDITIONAL CONSIDERATIONS

The changes in production technology and in supplies of resources just described do not fully explain regional changes in the supply of chickens and eggs. In regard to eggs, somewhat more rapid improvement of production methods in the North Atlantic and North Central States may partly account for the large increases in supply from these regions. But differences between regions in technological advance in chicken and egg production appear small and do not explain much of the wide differences in production trends.

Nor does the explanation seem to lie in variations in supplies of resources. Changes in feed prices do not differ appreciably between regions. Nor do changes in prices of other resources, except labor. But as only a small part of the labor used to produce chickens and eggs is hired, changes in wage rates for hired labor may have limited meaning.

The changes in supplies of resources that have been described apply to the production of other livestock products as well as to chickens and eggs. They do not indicate how the supply of feed, labor, and other items available for producing chickens and eggs have changed on farms where these products are produced in combination with other products, or on farms where most of the feed used is farm produced and most of the labor is done by the family. In these instances, feed and labor can readily be shifted from one use to another, and the supply of labor and feed available for producing chickens and eggs depends upon the returns they would bring if used to produce other products. To judge how the supply of feed and labor available for producing chickens and eggs has changed in each region, it would be necessary to examine changes in demand for these alternative uses.

COMPETITION BETWEEN ENTERPRISES

Some of the major trends in the agriculture of the several regions as they relate to chicken and egg production are reviewed briefly in the discussion that follows. Attention is directed to developments that have influenced the total volume of farm production and its composition in each region. Factors that have affected returns to resources, especially operator and family labor and farm-produced supplies of feed, will suggest a more complete explanation of production trends.

NORTH ATLANTIC.—Agriculture in New England has become increasingly specialized in chicken and egg production in recent years. So also in the Middle Atlantic region but to a lesser extent. Percentage increases in the production of chickens and eggs in these regions are much larger than those for other farm products including livestock (table 23). They also are larger than those for all feed grains made available for livestock and poultry as the result of change in the production of feed grains and the reduction in number of horses (table 30). The number of workers employed on farms has not changed appreciably. Expansion in chickens and eggs provided a profitable use for labor that was released by the general progress in technology. Much of the additional feed was imported from other regions, but labor accounts for a large part of the total cost of producing chickens and eggs. Dairy production also was expanded, but this expansion was limited by the extent to which the production of roughage feed could be increased, particularly in New Hampshire, southern New England, and New Jersey. The presence of available farm labor for producing chickens and eggs, and advances in production methods, together with the nearness of good market outlets, apparently have been mainly responsible for increased specialization in chicken and egg production in these two regions.

SOUTH ATLANTIC.—Production of chickens and eggs relative to production of other farm products has declined in this region except in the specialized areas that produce broilers. Total farm output has increased 50 percent since 1925–29 although total farm employment has declined about 15 percent (table 23). Production of farm grains increased 40 percent and roughage feed even more. These changes have resulted in a larger expansion in other livestock products than in chickens and eggs in most areas in the region.

The large increases in commercial broiler production in a few areas may be related to changes in alternative uses for labor. In the Delmarva (Delaware-Maryland-Virginia) area, for example, broilers have replaced vegetables as a source of income as these crops gradually became less profitable. The location of the specialized areas of broiler production may be mainly a matter of chance. But it may be noted that costs of feed are as low in this region as anywhere, and large market outlets are near. Farmers in the areas in which broiler production was first established in large volume have advantages over new areas with respect to knowledge about feeding, disease control, and marketing practices. This may be the major factor in the continued large expansion in output in the older producing areas.

NORTH CENTRAL.—Trends in the production of chickens and eggs differ greatly among States in this region (fig. 8). In the last few

years production of chickens was little larger than in 1925–29 but production of eggs was 50 percent larger. According to the data showing the changes in the relative importance of chickens and eggs as sources of income from the sale of all farm products, eggs have become more important in the agriculture of the West North Central region but not in the East North Central (table 3, p. 7). Feed production expanded and farm employment declined slightly in both regions. In the East North Central States the production of eggs did not increase so much as that of other livestock products, perhaps because a great deal of the additional feed produced was roughage. In the West North Central, on the other hand, most of the additional feed was in the form of farm grains. This, together with rapid improvement in production and expanded market outlets for eggs, caused the output of eggs to increase more than other livestock products in the West North Central region. Production of eggs was a profitable use for labor that was released with the greater use of mechanized methods of producing crops and livestock. Large percentage changes in production of eggs and chickens were possible as they account for only about 10 percent of total farm output in these regions.

SOUTH CENTRAL.—Production of all animal products has gone up sharply, although relatively less than feed crops and pasture in this region, since 1925–29 (table 23). But expansion has been less in output of eggs than in other livestock products. Farm employment declined much more in these regions than in any others. Production of farm grains increased 27 percent in the East South Central and 2 percent in the West South Central region. In the East South Central region most of the additional feed was used to expand the output of dairy and other livestock products. In the West South Central States the large proportion of grains in the additional feed production, together with the new market outlets created by purchases of eggs for drying, apparently made profitable a large expansion in egg production.

WEST.—In the Pacific region production of chickens has increased and production of eggs has decreased in relation to all farm output and in relation to the production of other animal products. In the Mountain region expansion has been less in eggs than in farm output and expansion in chicken numbers has been much less. In both regions, agriculture has become more specialized in the production of cash crops. Production of feed grains has nearly doubled. But except in the case of chickens in the Pacific region, it apparently has been more profitable to use this additional grain to expand the output of other livestock products. The data showing changes in prices of chickens and eggs relative to prices for other products indicate that the demand for eggs has not increased as much as the demand for other farm products (table 25). As technology in egg production is already at a high level in this region, further advances may not have taken place so rapidly as in the case of other farm products. The large expansion in total farm output in the Pacific region—74 percent since 1925–29—indicates that possibilities for over-all expansion were large. There apparently was little need for shifting to intensive labor-using enterprises such as egg production in order to

utilize labor effectively. Employment of farm workers and wage rates have gone up much more in the West than in other regions, since 1925.

FUTURE TRENDS IN PRODUCTION

Interregional adjustments in the production of chickens and eggs in the next few years will depend not only upon national trends but upon changes in demand and supply conditions in each region. The future cannot be read from the record of the past but analysis of the past provides a much better basis for estimating future trends.

Demand and Supply Prospects

Population growth will be one of the chief sources of additional demand for chickens and eggs during the next decade. Forecasts of expansion in national population vary from 7 to 18 percent for the 1950–60 decade, depending upon assumptions used with respect to fertility and mortality rates and net immigration (*15*). In the earlier study of national trends, an estimated population growth of 7 percent from 1950 to 1960, or 10 percent from 1945–49 to 1960, was used for illustrative purposes (*1, p. 47*). It was recognized that changes in levels of employment and in consumer incomes would affect prices of chickens and eggs. But it was estimated that if they were to average as high as in the last few years there would be market outlets, in 1960, for 10 percent more chicken meat and 6 percent more eggs than were produced annually in 1945–49.

A lower volume of exports for eggs in 1960 than in 1945–49 would account for the smaller increase in market outlets for eggs. A rise in employment and income above the 1945–49 levels would mean higher prices for chickens and eggs, but demand might not show much change relative to demand for other farm products.

The regional distribution of the national retail demand will depend upon changes in the regional distribution of total population and consumer incomes. Population growth may not be so rapid during the next decade as in the recent past. Perhaps population will continue to grow most rapidly in the Pacific and Eastern industrial areas (*5*).

Changes in the distribution of the retail demand do not greatly affect the level of demand at the farm, unless a particular region changes from a surplus to a deficit position, or the reverse. Changes in transportation and other transfer costs have some influence on demand at the farm, but these costs are a minor part of the explanation of regional differences in prices. Consequently, regional differences in demand are of less influence than regional differences in supply conditions. The total national demand situation is the more important element to watch on the demand side.

Demand for eggs at the farm in each region, of course, will be influenced by changes in supply from competing regions. If the output of eggs from farms in the Midwest continues to increase as in the last decade, prices received by farmers in the Northeast will be affected. Perhaps of more immediate interest to Northeastern producers is the possibility that more eggs of high quality from the Midwest may reach

Northeastern markets in the next few years. If this should occur, present premiums for nearby eggs are likely to become lower.

In regard to eggs, new technology aimed toward a higher rate of lay has been adopted more rapidly in the North Atlantic and North Central regions. But this may not be true in the future. Possibilities for improvement seem greater in the South where rate of lay is about 15 percent lower than the United States average and 40 percent lower than in the North Atlantic region. Even in the North Central region the rate of lay is 17 percent below that in the North Atlantic region. It seems probable that differences between regions in rate of lay and therefore in the physical quantities of feed, labor, and other items used per egg will be reduced in the course of the coming decade.

In regard to farm chickens, technological strides have been more moderate and differences between regions are less noticeable. The main development affecting resources used per pound of all chickens produced in each region will continue to be expansion in production of commercial broilers. Farmers in the specialized broiler-producing areas may have had some advantages from the standpoint of knowledge with respect to desirable feeding practices, disease-control measures, and marketing methods. But these advantages will gradually disappear as farmers in other areas gain experience.

Among the cost items used to produce chickens and eggs, local changes in the supply of feed might be expected to influence regional changes in supply. But prices paid by farmers for commercial egg mash, chick-starter mash, and scratch grains, have been found to be about the same in all regions. As costs of most of the ingredients of these feeds are lower in the Midwest, it is possible that prices for the prepared feeds may, in time, reflect this circumstance more than they now do. Regional differences in prices received by farmers for corn, oats, and other grains, are more affected by transportation costs between surplus and deficit regions. Prices of these separate grains can be expected to continue higher in the East than in the Midwest. Changes in the quantities of farm-produced grains available for feed in each region may influence chicken and egg production, but past regional changes do not show much relationship.

Changes in prospects for alternative enterprises, on the farm and off the farm, probably will continue to be the chief influence in regional changes in the output of chickens and eggs. This applies especially to family and operator labor. Production of chickens and eggs frequently provides a profitable use for labor that has been released from other uses as the enterprise is very flexible with respect to size.

Probable Trends

The earlier national appraisal of demand and supply prospects concluded that it might be profitable to expand the production of chicken meat at about the same rate as the population grows during the 1950's. With eggs, however, production in recent years has been larger than domestic markets would take at prevailing prices. It was suggested then that if prices of eggs remained no higher, in relation to other livestock products, than in the last few years, farmers might not find it profitable to expand egg production until after 1955. With the rise in

consumer demand resulting from the defense program, the present outlook is more favorable.

In view of probable regional trends in growth of population, consumer incomes, and charges for transportation and marketing services, it appears that demand for chicken meat and eggs produced in the Atlantic and Pacific regions may increase slightly, relative to other regions. But on the supply side, it has been noted that developments may favor expansion in the Midwest and South, where technological improvement may be more rapid than in the other regions. Prices paid for mixed poultry feed may tend to decrease in the Central regions relative to those in others. The net result may mean little change in the present regional pattern of production.

Many farmers in the Central regions may not find it desirable to increase their production of eggs if other alternatives are more favorable. However, if deterioration in quality of eggs on farms and in marketing channels is reduced sufficiently so that more midwestern eggs sell at higher prices, egg production in the Central regions may increase about as much as elsewhere.

Almost surely, most of the expansion in chicken-meat production in the next few years will take the form of expansion in the output of commercial broilers. If the North Central regions maintain their present shares of the national output of chicken meat, it will be through expanding production of broilers. Prices of many of the ingredients in feed rations are lower in the Midwest than in the Atlantic or Pacific regions. Many midwestern markets do not have nearby sources of supply and have depended upon shipments of broilers from Eastern and Southern areas.

SUMMARY

This is a second bulletin resulting from a study of the economic position of chickens and eggs in the United States. In the preceding one, the problem was examined from the over-all national point of view (*1*). In this bulletin regional and interregional relationships are explored.

The answers to all questions about the state of affairs in the poultry industry are necessarily colored by the phenomenal expansion in production that has taken place during recent years. The rapid adoption of new technology, aided by favorable market demand, explains much of the over-all picture. But regional and local differences in prices, in trends, and in other factors, require more explanation. It is this changing configuration of the production map and its meaning for the future to which we turn our attention.

In the past, the production of chickens and eggs has been widely dispersed, with some tendency toward producing nearer the market than nearer the production resources. Technology works partly toward a continuation of dispersal but perhaps more toward concentration. Improvements in transportation, refrigeration, and the like, make it possible to maintain quality of perishable products through more space and time. Commercial hatching, advances in breeding, use of sexed chicks, use of commercial broilers, control of disease and sanitation, and other changes, are strong influences toward specialization.

The geographic distribution of the production of chickens and eggs

and its relation to sizes and types of farms is far more complex than a cursory reading of dot maps would suggest. The North Atlantic and Pacific regions are characterized by specialized poultry farms that have relatively large flocks. In the North Central States, middle-sized flocks account for most of the chicken and egg production, usually as a supplementary enterprise. In the South Atlantic and South Central States most of the eggs come from small flocks having less than 100 birds. Commercial broiler production is found to be relatively concentrated in a number of specialized areas in several regions.

The tenor of this analysis indicates that both demand and supply conditions will be significant, but that supply conditions may be relatively more influential in shaping the future map of the production of chickens and eggs.

On the side of demand, a large part of the country can be regarded as a single market for eggs and chicken meat. Costs of transportation do not explain a very large part of interregional price differences. These are mainly related to variations in average grade and quality.

In considering the supply factors that influence location, labor appears to be most controlling. Differences in prices for feed between regions are small and are partly offset by differences in prices of eggs and chickens. The growth of the broiler industry in widely separated areas, for example, follows a remarkably similar path, suggesting that differences in feed costs have not been very influential. Additional study is needed to furnish a satisfactory explanation of why broiler production has arisen in particular places rather than in other areas in which similar conditions apparently prevail.

The availability of labor together with comparisons between its alternative uses appears to be one of the principal determinants of location. The poultry enterprise is flexible in terms of size, making it physically possible to use the free time of the farm operator and his family in a small sideline enterprise or to expand to a full-scale specialized commercial poultry farm. In either case, the real comparison is in terms of alternative uses for labor.

The two areas that have had the most rapid rates of growth in recent years—southern New England and Minnesota—illustrate these two different lines of development.

The forces of technology as applied to poultry are by no means spent. If market outlets become available further expansion of both eggs and chicken meat may take place. The geographic pattern that may evolve will depend in part on developments in alternative enterprises. If crop and livestock enterprises offer better returns, there will be less expansion in poultry in the Midwest especially. On the other hand, programs to improve the quality of eggs produced in the Midwest and South will raise the average price received and improve their competitive position.

LITERATURE CITED

(1) Christensen, Raymond P., and Mighell, Ronald L.
1950. Competitive position of chicken and egg production in the United States. U. S. Dept. Agr. Tech. Bul. 1018, 58 pp., illus.

(2) Dankers, W. H., and Sloan, H. J.
1948. Analysis of transportation cost comparisons for eggs and feeds. American Egg and Poultry Review, April 1948.

(3) EARLE, WENDELL.
1950. BUSINESS OPERATIONS OF NORTHEASTERN WHOLESALE EGG BUYERS. N. Y. (Cornell) Agr. Expt. Sta. Bul. 868, 24 pp., illus. (Northeast Regional Pub. No. 4)

(4) ———
1950. MARKETING PRACTICES AND EGG QUALITY, 1948–49. N. Y. (Cornell) Agr. Expt. Sta. Bul. 858, 23 pp., illus. (Northeast Regional Pub. No. 3)

(5) HAGOOD, MARGARET JARMAN, AND SIEGEL, JACOB S.
1951. PROJECTIONS OF THE REGIONAL DISTRIBUTION OF THE POPULATION OF THE UNITED STATES TO 1975. U. S. Bur. Agr. Econ. Agricultural Economics Research, April 1951.

(6) HANSEN, WESLEY, LARZELERE, HENRY, AND ODERKIRK, A. D.
1949. CHANGES IN EGG QUALITY DURING MARKETING. Mich. Agr. Expt. Sta. Special Bul. 361, 39 pp., illus. (North Central Regional Pub. 15)

(7) HECHT, REUBEN W., and BARTON, GLEN T.
1950. GAINS IN PRODUCTIVITY OF FARM LABOR. U. S. Dept. Agr. Tech. Bul. 1020, 121 pp., illus.

(8) JENNINGS, R. D.
1946. FEED CONSUMED BY LIVESTOCK, 1941–42, BY STATES. Bur. Agr. Econ. 108 pp., illus. [Processed.]

(9) JOHNSON, RONALD E.
1946. POULTRY-RATION COSTS AND POULTRY-FEED PRICE RATIOS, 1942–45. Bur. Agr. Econ. 75 pp., illus. [Processed.]

(10) MORTENSON, W. P., and GRAF, TRUMAN F.
1950. MARKETING EGGS IN THE LAKE STATES. Wis. Agr. Expt. Sta. Res. Bul. 168, 33 pp., illus.

(11) SCHWARTZ, CHARLES F., and GRAHAM, ROBERT E., JR.
1948. STATE INCOME PAYMENTS IN 1947. Survey of Current Business, Aug. 1948, pp. 10–21.

(12) UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS.
1949. FARM PRODUCTION PRACTICES, COSTS AND RETURNS. U. S. Dept. Agr. Statis. Bul. 83, 115 pp., illus. [Processed.]

(13) ———
1944. SOURCE OF CHICKENS RAISED IN 1934 AND 1943. April 12, 1944, 4 pp. [Processed.]

(14) UNITED STATES BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS.
1950. EGGS AND POULTRY IN CITY DIETS. Commodity Summary No. 4, Based on Food Consumption Surveys of 1948. 9 pp., illus. [Processed.]

(15) UNITED STATES BUREAU OF THE CENSUS.
1950. ILLUSTRATIVE PROJECTIONS OF THE POPULATION OF THE UNITED STATES 1950 TO 1960. U. S. Bur. Census. Current Population Reports. Series P–25, No. 43, 12 pp. Washington, D. C.

(16) ———
1948. SPECIAL REPORT FARMS AND FARM CHARACTERISTICS BY TYPE OF FARM. United States Census of Agriculture, 1945. Washington, D. C.

(17) ———
1947. SPECIAL REPORT ON THE 1945 SAMPLE CENSUS OF AGRICULTURE. WASHINGTON, D. C.

(18) ———
1947. UNITED STATES CENSUS OF AGRICULTURE, 1945. Vol. II, Washington, D. C.

(19) UNITED STATES DEPARTMENT OF AGRICULTURE.
1949. AGRICULTURAL STATISTICS, 1949. Washington, D. C.

(20) UNITED STATES PRODUCTION AND MARKETING ADMINISTRATION.
1950. DAIRY AND POULTRY MARKET STATISTICS, 1949. U. S. Prod. and Market. Admin. Statis. Bul. No. 87, 101 pp. [Processed.]

STATISTICAL TABLES

TABLE 32.—*Numbers of farm chickens and commercial broilers produced and sold, average weights, and total live-weight produced and sold, by regions, United States, averages 1945–49*

Region	Farm chickens				Commercial broilers produced	Total produced [3]
	Total produced [1]	Sold [2]				
		Total	Young	Mature		
Number:	*Millions*	*Millions*	*Millions*	*Millions*	*Millions*	*Millions*
New England	24. 1	21. 9	12. 9	9. 0	23. 6	47. 7
Middle Atlantic	65. 8	56. 8	31. 5	25. 3	18. 4	84. 2
East North Central	126. 8	99. 8	53. 0	46. 8	26. 0	152. 8
West North Central	186. 5	152. 1	76. 0	76. 1	11. 3	197. 8
South Atlantic	70. 8	36. 2	19. 0	17. 2	197. 5	268. 3
East South Central	62. 1	34. 7	19. 1	15. 6	14. 1	76. 2
West South Central	75. 1	50. 2	28. 8	21. 4	40. 4	115. 5
Mountain	21. 7	15. 6	10. 0	5. 6	1. 1	22. 8
Pacific	37. 9	30. 2	21. 0	9. 2	19. 5	57. 4
United States	670. 8	497. 5	271. 3	226. 2	351. 9	1, 022. 7
Average live weight:	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
New England	----------	5. 2	4. 5	6. 1	3. 6	----------
Middle Atlantic	----------	4. 7	4. 2	5. 4	3. 4	----------
East North Central	----------	4. 7	4. 0	5. 4	3. 1	----------
West North Central	----------	4. 5	3. 9	5. 1	3. 1	----------
South Atlantic	----------	4. 1	3. 1	5. 2	3. 0	----------
East South Central	----------	4. 0	2. 8	5. 4	2. 7	----------
West South Central	----------	3. 7	2. 8	4. 9	2. 7	----------

Mountain		4.0	3.4	4.9	2.7	
Pacific		3.6	3.2	4.5	3.2	
United States		4.4	3.7	5.2	3.0	
Total live weight:	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
New England	124	113	58	55	85	200
Middle Atlantic	313	269	133	137	62	374
East North Central	582	464	214	251	79	662
West North Central	816	683	294	388	34	851
South Atlantic	265	148	58	90	593	858
East South Central	223	137	53	84	37	261
West South Central	263	185	80	105	109	371
Mountain	84	62	34	27	3	86
Pacific	136	108	67	41	62	198
United States	2,806	2,169	991	1,178	1,064	3,870

[1] Chickens produced equals chickens sold, plus those consumed in households of producers, plus or minus changes in inventory.
[2] Excludes commercial broilers.
[3] Total production of farm chickens and commercial broilers.

TABLE 33.—*Number of farms reporting chickens on hand, and number of chickens on hand January 1, 1945; chickens raised and eggs produced, 1944; and rate of lay; as percentages of totals, by size of flock, by regions, United States* [1]

Item	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Farms reporting chickens:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Under 50	48. 6	31. 1	17. 7	73. 1	62. 0	59. 9	49. 6
50–99	17. 9	26. 3	21. 3	18. 1	23. 6	20. 1	22. 0
100–199	14. 1	29. 3	35. 4	6. 1	10. 8	10. 8	17. 8
200–399	9. 8	11. 3	22. 5	1. 9	3. 1	4. 8	8. 4
400 and over	9. 6	2. 0	3. 1	. 8	. 5	4. 4	2. 2
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0
Chickens on hand:							
Under 50	6. 4	8. 0	3. 5	36. 4	28. 5	13. 7	13. 8
50–99	6. 7	16. 7	10. 3	23. 3	27. 1	12. 0	15. 9
100–199	10. 8	36. 6	33. 9	15. 6	24. 2	12. 9	25. 8
200–399	15. 4	26. 9	40. 5	10. 3	13. 9	11. 6	23. 8
400 and over	60. 7	11. 8	11. 8	14. 4	6. 3	49. 8	20. 7
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0
Chickens raised:							
None [2]	11. 9	4. 5	3. 5	30. 4	8. 9	12. 7	12. 7
Under 50	8. 9	11. 1	4. 8	33. 8	35. 8	15. 3	19. 1
50–99	7. 9	17. 6	11. 1	14. 0	24. 0	10. 6	14. 4
100–199	10. 0	34. 4	34. 8	9. 2	18. 5	11. 2	20. 9
200–399	11. 9	22. 0	36. 3	4. 9	9. 0	9. 5	16. 8
400 and over	49. 4	10. 4	9. 5	7. 7	3. 8	40. 7	16. 1
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0

Eggs produced:							
None [2]	.8	.7	.9	.3	.4	1.2	.7
Under 50	7.0	7.0	3.6	33.0	26.7	12.4	12.1
50–99	6.1	15.6	9.9	21.2	26.3	9.9	14.2
100–199	10.0	36.0	33.5	15.6	25.6	11.2	25.2
200–399	14.9	27.1	40.6	11.5	14.8	10.4	24.0
400 and over	61.2	13.6	11.5	18.4	6.2	54.9	23.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Rate of lay: [3]							
Under 50	108	87	103	91	94	91	87
50–99	91	94	97	91	98	83	89
100–199	93	99	99	100	106	86	98
200–399	96	101	100	112	106	89	101
400 and over	101	116	97	127	99	111	116
Total	100	100	100	100	100	100	100

[1] Computed from United States Bureau of the Census (*17, pp.*).
[2] Farms that had no chickens 4 months or older on January 1, raised some chickens and produced some eggs in 1944.
[3] Computed from number of chickens on hand January 1, 1945, and eggs produced in 1944.

TABLE 34.—*Chickens on hand January 1, 1945; chickens raised, eggs produced, value of poultry and poultry products sold, and rate of lay, 1944, as percentages of totals, by type of farm, by regions, United States* [1]

Type of farm	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Chickens on hand:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Poultry	55. 9	10. 8	7. 1	17. 5	7. 3	46. 3	18. 6
Dairy	17. 7	21. 9	5. 3	4. 1	3. 5	6. 9	9. 7
Livestock	1. 7	19. 6	38. 6	5. 4	9. 7	10. 3	18. 7
Field crop	2. 5	11. 8	17. 0	37. 5	44. 7	12. 2	21. 3
General	12. 2	29. 4	29. 3	10. 2	15. 3	10. 1	20. 7
All other	10. 0	6. 5	2. 7	25. 3	19. 5	14. 2	11. 0
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0
Chickens raised:							
Poultry	64. 7	17. 5	9. 3	68. 7	21. 2	55. 8	37. 6
Dairy	13. 2	17. 3	4. 7	1. 5	3. 0	5. 2	6. 9
Livestock	1. 3	19. 3	37. 4	2. 0	7. 9	8. 3	14. 2
Field crop	1. 9	11. 9	17. 5	14. 5	37. 6	10. 1	16. 5
General	10. 3	27. 9	28. 5	4. 5	12. 6	8. 5	16. 2
All other	8. 6	6. 1	2. 6	8. 8	17. 7	12. 1	8. 6
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0
Eggs produced:							
Poultry	60. 6	13. 8	8. 7	24. 4	10. 4	54. 7	24. 1
Dairy	16. 0	21. 2	5. 4	4. 6	3. 7	6. 2	9. 7
Livestock	1. 4	18. 3	37. 5	5. 7	9. 7	8. 3	17. 8
Field crop	2. 1	10. 2	14. 6	29. 6	40. 7	9. 8	17. 1
General	12. 4	31. 7	31. 8	12. 2	18. 1	9. 5	22. 5
All other	7. 5	4. 8	2. 0	23. 5	17. 4	11. 5	8. 8
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0

Value of poultry and poultry products sold:							
Poultry	73.3	29.2	23.0	75.5	29.7	78.7	48.6
Dairy	11.1	15.7	4.1	2.2	3.2	3.0	6.9
Livestock	.9	15.3	31.6	2.1	8.7	3.3	12.8
Field crop	1.2	8.1	11.5	7.1	28.9	4.3	9.4
General	10.2	29.3	28.8	7.6	20.5	6.7	18.7
All other	3.3	2.4	1.0	5.5	9.0	4.0	3.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Rate of lay: [2]							
Poultry	108	129	124	140	143	119	130
Dairy	90	97	101	112	107	89	100
Livestock	81	94	98	105	100	80	96
Field crop	83	87	86	79	91	81	81
General	102	109	108	119	118	95	109
All other	75	74	75	92	89	81	81
All farms	100	100	100	100	100	100	100

[1] Computed from United States Bureau of the Census (*18, pp. 656–867, 16, 109–117*).
[2] Computed from number of chickens on hand January 1, 1945, and eggs produced in 1944.

TABLE 35.—*Number of farms reporting chickens on hand, number of chickens on hand, chickens raised, and eggs produced, 1945 as a percentage of 1935, by size of flock, by regions, United States* [1]

Number	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Farms reporting chickens:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Under 50	75	72	49	82	68	84	71
50–99	64	70	63	101	104	92	83
100–199	80	98	106	115	146	108	108
200–399	106	136	188	136	235	106	161
400 and over	168	161	263	151	281	102	170
All groups	80	83	86	88	81	89	84
Chickens on hand:							
Under 50	67	70	49	86	74	85	74
50–99	62	70	65	100	104	91	82
100–199	79	101	110	114	149	109	111
200–399	107	138	195	137	238	106	164
400 and over	219	167	269	176	284	123	187
All groups	131	102	126	105	113	108	115
Chickens raised:							
None	1, 195	737	497	2, 523	2, 771	876	1, 509
Under 50	150	103	50	209	95	126	122
50–99	123	85	63	189	110	110	101
100–199	115	113	116	221	155	140	127
200–399	125	146	205	209	238	132	177
400 and over	44	57	38	32	44	67	48
All groups	187	120	126	297	129	152	155
Eggs produced:							
None	266	309	308	344	383	352	313
Under 50	103	87	64	138	126	111	110
50–99	81	91	84	142	163	107	110
100–199	100	130	152	150	230	125	148
200–399	128	165	270	166	319	105	205
400 and over	247	203	328	201	287	134	206
All groups	164	131	172	153	181	124	155

[1] Computed from Bureau of the Census (*17, pp. 26–45*). Number of chickens on hand relate to numbers over 3 months old on January 1, 1935, and over 4 months old on January 1, 1945. Number of chickens raised and number of eggs produced are for 1934 and 1944. The category with no chickens on hand at the beginning of the year consists chiefly of specialized broiler farms.

TABLE 36.—*Prices received by farmers for eggs, by regions, and regional differentials, United States, averages 1925–49*

Year	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Cents per dozen:							
1925–29	37.4	28.3	24.9	30.8	25.2	29.7	28.5
1930–34	25.1	16.5	13.7	19.5	14.6	18.8	17.3
1935–39	27.5	19.9	17.4	22.1	18.1	22.4	20.8
1940–44	35.1	27.1	25.1	29.3	25.7	30.8	28.2
1945–49	54.1	40.4	36.1	46.5	39.5	48.5	42.6
Indexes (1925–29=100):							
1925–29	100	100	100	100	100	100	100
1930–34	67	58	55	63	58	63	61
1935–39	74	70	70	72	72	75	73
1940–44	94	96	101	95	102	104	99
1945–49	145	143	145	151	157	163	149
Cents differential from United States average:							
1925–29	8.9	−.2	−3.6	2.3	−3.3	1.2	----------
1930–34	7.8	−.8	−3.6	2.2	−2.7	1.5	----------
1935–39	6.7	−.9	−3.4	1.3	−2.7	1.6	----------
1940–44	6.9	−1.1	−3.1	1.1	−2.5	2.6	----------
1945–49	11.5	−2.2	−6.5	3.9	−3.1	5.9	----------
Percentage of United States average:							
1925–29	131	99	87	108	88	104	100
1930–34	145	95	79	113	84	109	100
1935–39	132	96	84	106	87	108	100
1940–44	124	96	89	104	91	109	100
1945–49	127	95	85	109	93	114	100

TABLE 37.—*Prices received by farmers for farm chickens, by regions, and regional differentials, United States, averages 1925–49*

Year	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Cents per pound:							
1925–29	27. 1	21. 8	18. 9	24. 7	19. 7	21. 7	21. 4
1930–34	18. 2	13. 3	11. 1	16. 4	11. 8	14. 3	13. 3
1935–39	18. 5	15. 3	13. 0	16. 8	13. 2	15. 4	15. 0
1940–44	22. 9	19. 6	17. 2	21. 4	18. 0	20. 4	19. 3
1945–49	32. 7	27. 8	23. 5	30. 7	26. 5	29. 0	27. 4
Indexes (1925–29=100):							
1925–29	100	100	100	100	100	100	100
1930–34	67	61	59	66	60	66	62
1935–39	68	70	69	68	67	71	70
1940–44	85	90	91	87	91	94	90
1945–49	121	128	124	124	135	134	128
Cents differentials from U. S. average:							
1925–29	5. 7	. 4	−2. 5	3. 3	−1. 7	. 3	----------
1930–34	4. 9	0	−2. 2	3. 1	−1. 5	1. 0	----------
1935–39	3. 5	. 3	−2. 0	1. 8	−1. 8	. 4	----------
1940–44	3. 6	. 3	−2. 1	2. 1	−1. 3	1. 1	----------
1945–49	5. 3	. 4	−3. 9	3. 3	−. 9	1. 6	----------
Percentage of U. S. average:							
1925–29	127	102	88	115	92	101	100
1930–34	137	100	84	123	89	108	100
1935–39	123	102	87	112	88	103	100
1940–44	119	102	89	111	93	106	100
1945–49	119	101	86	112	97	106	100

TABLE 38.—*Prices received by farmers for commercial broilers by regions, and regional differentials, United States averages 1935–1949*

Year	North Atlantic	East North Central	West North Central	South Atlantic	South Central	West	United States
Cents per pound:							
1935–39	20.0	19.8	18.5	20.0	18.6	18.9	19.6
1940–44	23.6	23.7	23.5	22.9	23.4	24.6	23.2
1945–49	32.2	33.1	30.8	30.9	32.5	34.1	31.6
Indexes (1935–39=100):							
1935–39	100	100	100	100	100	100	100
1940–44	118	120	127	114	126	130	118
1945–49	161	167	166	154	175	180	161
Cents differential from U. S. average:							
1935–39	.4	.2	−1.1	.4	−1.0	−.7	----------
1940–44	.4	.5	.3	−.3	.2	1.4	----------
1945–49	.6	1.5	−.8	−.7	.9	2.5	----------
Percentage of U. S. average:							
1935–39	102	101	94	102	95	96	100
1940–44	102	102	101	99	101	106	100
1945–49	102	105	97	98	103	108	100

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