Volume Title: Income in the Various States: Its Sources and Distribution, 1919, 1920, and 1921

Volume Author/Editor: Maurice Leven

Volume Publisher: NBER

Volume ISBN: 0-87014-006-X

Volume URL: http://www.nber.org/books/leve25-1

Publication Date: 1925

Chapter Title: Agricultural Receipts

Chapter Author: Maurice Leven

Chapter URL: http://www.nber.org/chapters/c4996

Chapter pages in book: (p. 133 - 165)

CHAPTER VII

AGRICULTURAL RECEIPTS

Within the memory of a great number of persons now living, the United States has emerged from the position of a nation of predominantly rural pursuits into one of the most important industrial and commercial powers of the world. Not to go back further than the beginning of the present century, we find that in the Census of 1900 only 40 per cent of the population of the country was classed as urban. However, by the time of the 1920 Census, the manufacturing and commercial activities of the country had grown to such an extent that the balance of population was thrown to the cities. In the twenty years intervening between 1900 and 1920, the population of places of over 2,500 increased from about 30,000,000 to 54,000,000.

The tremendous growth of manufacturing and kindred industries, which has been responsible for cities attaining ascendancy in the United States, has also been indirectly responsible for the gradual reduction in the importance of agriculture as a factor in the national economy. There is no record prior to 1920 of the total farm population of the country. However, from the records of the number of farms and the size of the rural population,[1] we can judge that agriculture has not kept pace with the general development of the country.

The apparent gain of city over country has by some observers been viewed with anxiety. Remedies have been sought whereby to keep the farm population on the farm and "back to the farm" movements have been started at various times. However, it would appear that if cause for alarm exists, it is concerning the relative rather than the absolute status of the industry. We may say that, in general, the waning in importance of agriculture is only relative. Agriculture, as an industry, has not grown as rapidly

[1] The Census classifies as rural all population residing in places with less than 2,500 inhabitants.

as some of the other industries in recent years, but it certainly has not lost ground [1] in the absolute sense.

In spite of the industrial changes of the country, and the ever present concern about the migration from farm to city, agriculture is still the most important single basic industry of the country. Nearly 32,000,000 people directly depend upon it for a living,[2] and in normal years the value of its products approaches very closely the value of the products added by all manufacturing industries combined.

The importance of agriculture in the life of the nation is measured not merely by the size of the farm population and the total value of its products. It is socially of great significance that in an age of industrial centralization and corporate form of organization agriculture has retained the predominance of the individual entrepreneur.[3] Only a small portion of agriculture is controlled by corporations, since over 90 per cent of the industry is in the hands of individual entrepreneurs. It is estimated that there are, in all, about 10,000,000 individual entrepreneurs in the United States. Of this number, about 6,400,000, or nearly two-thirds, are farmers. The influence of such a large body of entrepreneurs upon the social, political, and economic life of the country must be very great indeed.

Although agriculture is carried on in one form or another in every State in the Union, the relative importance of the industry varies in the different States. In some States, as we shall see, agriculture furnishes a very small portion of the income of the people. In others, however, the industry is of paramount importance. Consequently, in any study of the geographic distribution of income, agriculture should take a very prominent place.

Notwithstanding the fact that the data pertaining to agriculture are both abundant and reasonably reliable, the task of arriving at accurate estimates of the net income from the industry in each State is not simple. As will appear, to obtain the final totals, it

[1] Between 1910 and 1920 the number of farms increased from 6,361,502 to 6,448,343, or 1.4 per cent; the farm acreage increased from 878,798,325 to 955,883,715, or 8.8 per cent; the rural population, which is, of course, not the same as the farm population, also increased 3.2 per cent. The figures are as reported by the *Census of Agriculture*, 1920, Vol. V, p. 34.

[2] The *Census of Agriculture*, 1920, Vol. V, p. 894, gives the farm population as 31,614,269.

[3] The term *individual entrepreneur*, as used here, does not refer to any person whose relationship to a business enterprise is merely that of stock ownership.

has been necessary to compute separate estimates for the individual items of gross income and expense entering into the operation of the industry. These items are necessarily of different magnitudes, and, consequently, their importance, in so far as the final results are concerned, is not the same in each case. However, assuming that each individual factor contributing to the total agricultural income may prove of interest in itself, the same degree of care has been taken with the smaller items as with the larger ones.

The method adopted in making the estimates of the individual items by States consists of the distribution of carefully prepared national totals in accordance with index numbers showing the relative share of the total contributed by each State.

Whenever independent estimates by States were made, they have been adjusted by scaling up or down, without disturbing their relationship, so as to correspond with the national totals computed by a different method.[1] The figures used in the computation of the indices or preliminary estimates are derived chiefly from the Census of Agriculture and the reports of the United States Department of Agriculture.

Farm Crops.

The production of farm crops forms the backbone of agriculture. In comparison, the other agricultural activities of the country are very small indeed. In 1919, out of a total gross agricultural income of about $21,000,000,000, $15,000,000,000 was derived from crop raising. The relative importance of farm crops as compared with that of all the other farm products is, of course, considerably greater than that indicated by the above figures, as a large portion of the gross value of the animal products is merely a duplication of the value of crops fed to livestock.

To deal intelligently with the problem of estimating the total income derived from the production of farm crops, we must consider carefully the disposition of the crops. The total crops raised may be divided into four parts, namely:

1. Crops sold.
2. Crops, such as vegetables, etc., consumed by the farmers and their families.

[1] Practically all the national totals used in this report are as estimated by W. I. King, of the National Bureau of Economic Research.

3. Crops fed to livestock.
4. Crops reserved for seed.

The relative proportion of the total crops disposed of in any one of the above four ways is, presumably, not the same in different parts of the country. Thus, in the "Corn Belt" the portion of the total crops fed to livestock is undoubtedly relatively greater than in the "Cotton Belt," where the principal crop is almost exclusively sold for money. Similarly, the proportion of the total crops consumed as food by the farmers and their families will vary from place to place, and so also with seed. As will be shown later (see Table XXVII, p. 177), the average ratio of yield to seed requirements for corn is 175, while for wheat it is only 10, and hence, the portion of total crop reserved for seed in the "Corn Belt" is very small when compared with the seed requirements in the wheat regions.

From the standpoint of computing the total income derived from agriculture, we are really not interested in the value of the crops fed to livestock, nor are we concerned about the value of the crops reserved for seed. It would be quite sufficient for our purposes to know the value of the crops sold, and of those consumed by the farmers and their families. However, there are no available data that would enable us to estimate with accuracy the value of these items for each State separately, and we are, therefore, compelled to compute for each State the total value of the crops, including crops fed to livestock and those reserved for seed as well as the crops sold and eaten.

The Census of Agriculture gives us for 1919 the total value of the crops raised. For the intercensal years, similar data are estimated by the Department of Agriculture. However, these figures do not represent actual receipts, as the total values are computed on the basis of average prices as of a single date. Manifestly, the farmers do not dispose of all their crops on one day and at one set of prices. The movement of farm products, though at its peak in the late autumn, continues more or less throughout the year, and at prices covering in some years a very substantial range. It follows, then, that the Census figures, as well as those of the Department of Agriculture, though probably fairly representative of the relative values in each State, do not give a fair picture of the values actually realized by the farmers.

W. I. King, in his estimates of income covering the entire Continental United States, has computed yearly figures of the total value of the crops sold and consumed by farmers and their families on the basis of monthly sales and consumption and average prices taken at the middle of each month. These figures are manifestly more accurate from the standpoint of income realized than are the totals based on the December prices alone. Consequently, in computing the gross income from all farm crops by States, the national totals have been obtained by adding estimates of the total value of seed and the total value of crops fed to livestock to the value of crops sold or consumed by farmers and their families, as computed by W. I. King.

As already indicated, seed and feed values are added merely for the purpose of facilitating the apportionment by States which must be made on the basis of the value of total crops raised. The values of crops fed to livestock and crops reserved for seed will subsequently be subtracted from the gross income as expense items in each State, so that the adding in of the feed and seed factors does not affect the national totals in the final analysis.

It is obvious that the crop year does not correspond with the calendar year in so far as the sale and consumption of crops are concerned. The total amount produced within any year is only partially disposed of during the same year. Part of it is carried over to the next calendar year, so that the amount sold, and the amount consumed by farmers' families during any calendar year, are obtained from at least two crop years. Consequently, in computing indices for the distribution of income from all farm crops during any calendar year, the production of two years must be considered.

In its *Year Books* [1] the Department of Agriculture furnishes figures showing averages of monthly sales of crops from farms in different sections of the country. These figures were used in the computation of weights representing the share of each of the two contributing crop years in the total crops sold during a calendar year in each geographic division. By applying these weights to the production figures covering two successive crop years, it has been possible to arrive at adjusted figures for the calendar years. Thus,

[1] See *Year Book* of the Department of Agriculture, 1922, p. 992.

for the calendar year 1919 a portion of the value of the crops raised in each State in 1918 has been combined with a portion of the value of the crops raised in 1919. These adjustments for the calendar year are obviously very crude; nevertheless, it is believed that they add materially to the accuracy of the final estimates.

The adjusted values of all farm crops that were raised in the different States have been used as indices for the distribution by States of the estimated total gross income from the production of all farm crops. These indices, on a percentage basis, in terms of the United States as a whole, are given in Table XVI. In the same table are also recorded the final estimates by States of the income received from farm crops in 1919, 1920, and 1921.

1921 marks a year of particular hardship in the economic life of the agricultural population of the United States. After the prolonged price inflation of farm products which reached its peak early in 1920, there was a sudden and sharp recession which swept away a considerable portion, if not all, of the gains made during and immediately after the War. For the crop year 1919 the value of all farm crops, as reported in the *Census of Agriculture*, was about $15,250,000,000. In 1920 the value of the crops, as estimated by the Department of Agriculture, was only about $10,000,000,000, and in 1921 the value dropped to $6,500,000,000.

The effect of the 1921 depression was apparently not felt in all sections of the country with the same degree of severity. The West North Central States seem to have been hit hardest, while the Pacific, New England, and the Middle Atlantic States came through with comparatively small losses. Reference to Table XVI, which gives a comparison of the estimated income from all the farm crops in each State for the three years, will tell the story. Glancing at the percentage columns, we note that in 1921 the New England States seemingly gained on the other sections of the country as regards their share of the total value of all crops. In 1919 these States were credited with but 2.069 per cent of the total. Their share in 1920 was 2.564 per cent, and in 1921 we find that the value of all crops in New England amounted to 3.47 per cent of the total. The same is, on the whole, true in the Middle Atlantic States. From about 6.6 per cent of the total in 1919, the share of these States rose to about 8.6 per cent in 1921. These apparent

TABLE XVI.—GROSS AGRICULTURAL INCOME FROM ALL FARM CROPS IN EACH STATE, 1919–1920–1921

State and Geographic Division	Dollars (000's Omitted)			Per Cent of Total		
	1919	1920	1921	1919	1920	1921
Continental United States	**14,504,576**	**13,610,676**	**8,056,727**	**100.000**	**100.000**	**100.000**
New England	**300,158**	**348,942**	**279,615**	**2.069**	**2.564**	**3.470**
Maine	99,449	100,594	76,318	.685	.739	.947
New Hampshire	28,378	34,485	29,353	.196	.253	.364
Vermont	51,428	68,269	51,681	.354	.502	.642
Massachusetts	63,348	77,716	62,283	.437	.571	.773
Rhode Island	7,099	8,452	6,054	.049	.062	.075
Connecticut	50,456	59,426	53,926	.348	.437	.669
Middle Atlantic	**956,306**	**1,064,136**	**691,575**	**6.593**	**7.818**	**8.584**
New York	436,354	511,390	338,968	3.009	3.757	4.207
New Jersey	94,623	99,225	66,285	.652	.729	.823
Pennsylvania	425,329	453,521	286,322	2.932	3.332	3.554
East North Central	**2,728,328**	**2,656,333**	**1,475,875**	**18.811**	**19.517**	**18.319**
Ohio	567,483	558,409	297,186	3.913	4.103	3.689
Indiana	495,671	449,990	232,182	3.417	3.306	2.882
Illinois	857,311	746,126	386,265	5.911	5.482	4.794
Michigan	375,685	414,329	251,906	2.590	3.044	3.127
Wisconsin	432,178	487,479	308,336	2.980	3.582	3.827
West North Central	**3,553,990**	**3,046,171**	**1,684,909**	**24.503**	**22.381**	**20.913**
Minnesota	514,842	424,142	236,512	3.550	3.116	2.935
Iowa	851,172	674,746	403,622	5.868	4.957	5.010
Missouri	535,172	484,094	251,060	3.690	3.557	3.116
North Dakota	317,055	279,828	164,978	2.186	2.056	2.048
South Dakota	331,342	260,624	138,696	2.284	1.915	1.721
Nebraska	470,523	413,719	211,712	3.244	3.040	2.628
Kansas	533,884	509,018	278,329	3.681	3.740	3.455
South Atlantic	**2,176,449**	**1,904,744**	**1,103,005**	**15.005**	**13.994**	**13.690**
Delaware	24,018	24,061	13,829	.166	.177	.172
Maryland	116,264	113,837	63,655	.802	.836	.790
District of Columbia	829	880	648	.005	.006	.008
Virginia	303,200	304,324	175,012	2.090	2.236	2.172
West Virginia	113,573	121,070	77,585	.783	.889	.963
North Carolina	530,974	476,479	309,616	3.661	3.501	3.843
South Carolina	441,438	353,308	182,291	3.043	2.596	2.262
Georgia	558,425	426,519	221,451	3.850	3.134	2.749
Florida	87,728	84,266	58,918	.605	.619	.731
East South Central	**1,374,141**	**1,154,748**	**722,032**	**9.474**	**8.484**	**8.962**
Kentucky	368,500	326,382	187,719	2.541	2.398	2.330
Tennessee	325,774	308,866	193,988	2.246	2.269	2.408
Alabama	322,110	260,428	175,800	2.221	1.913	2.182
Mississippi	357,757	259,072	164,525	2.466	1.904	2.042
West South Central	**1,985,030**	**1,845,475**	**1,034,541**	**13.685**	**13.559**	**12.841**
Arkansas	341,736	300,193	185,962	2.356	2.206	2.308
Louisiana	228,669	183,005	116,872	1.577	1.344	1.451
Oklahoma	462,649	429,035	213,137	3.189	3.152	2.646
Texas	951,976	933,242	518,570	6.563	6.857	6.436
Mountain	**580,316**	**610,162**	**387,659**	**4.001**	**4.483**	**4.812**
Montana	92,515	103,352	78,804	.638	.759	.978
Idaho	121,668	124,441	79,466	.839	.914	.986
Wyoming	39,160	39,243	25,639	.270	.288	.318
Colorado	175,373	182,982	104,905	1.209	1.345	1.302
New Mexico	39,782	44,691	31,770	.274	.329	.395
Arizona	41,946	45,886	25,796	.289	.337	.320
Utah	55,781	56,360	32,376	.385	.414	.402
Nevada	14,091	13,207	8,903	.097	.097	.111
Pacific	**849,858**	**979,965**	**677,516**	**5.859**	**7.200**	**8.409**
Washington	202,029	223,161	168,305	1.393	1.640	2.089
Oregon	130,000	143,560	99,475	.896	1.055	1.235
California	517,829	613,244	409,736	3.570	4.505	5.085

gains are, of course, not real. They are only comparative, and indicate that other sections of the country lost more heavily than the New England and Middle Atlantic divisions. As a matter of fact, there actually was a drop in the total value of the crops in nearly all of these States in 1921 as compared with 1919. The value realized from all farm crops in New England in 1919 was $300,-158,000. In 1920 it rose to $348,942,000, but it dropped in 1921 to $279,615,000. The Middle Atlantic States sustained similar losses in the value of all crops, the reduction between 1919 and 1921 being from $956,306,000 to $691,575,000.

Passing to the East North Central States, it appears that this section of the country practically maintained its relative position in the value of all crops throughout the three years, the changes in their percentages of the total from year to year being very slight. However, the actual losses in this section of the country were significant. The gross income from all farm crops in 1919 was $2,728,-328,000, while in 1921 it was only $1,475,875,000.

The West North Central division was affected more than any other section of the country. In 1919 its total income from all farm crops was 24.5 per cent of the national total. In 1921 its share of the total amounted to not quite 21 per cent. Iowa apparently lost more than any other single State in the division. Its gross income from all crops, which in 1919 was $851,172,000, dropped in 1921 to $403,622,000, a reduction of about 53 per cent. Of the Southern States, South Carolina and Georgia seem to stand out prominently in the reduction of their income from all farm crops in 1921, as compared with 1919. The 1921 income of these two States from crops was only about 40 per cent of the 1919 receipts.

In the agricultural depression of 1921, the far West seems to have reacted in very much the same way as the New England and Middle Atlantic States, for while the total income of the Mountain and Pacific States from all crops was less in 1921 than in 1919, the decrease was relatively smaller than in most of the other States.

Dairy Products.

Of all the branches of agricultural enterprise, dairying is the most important stabilizing factor in the total income of farmers. The

continuous demand for practically the entire farm supply and the perishable nature of the original product prevents the accumulation of large stocks and, hence, also the disastrous effects that usually accompany such accumulations. The prices of dairy products are, consequently, unusually uniform from year to year, and although phenomenal profits cannot, under such circumstances, be made, the farmer does not run the risk of sustaining great losses, as in the case of other agricultural products.

Dairying, though common in all parts of the United States, follows in its relative importance definite geographic lines, determined to a large extent by climatic conditions, and also by the centers of population. The northeastern part of the United States seems to be favored in both these respects, and we find that the bulk of dairying operations is carried on in that part of the country.

In 1919 the gross agricultural income from the production of dairy products was nearly $1,900,000,000. This sum included, in addition to the value of products sold, the farm value of milk, butter, and cheese consumed by the farmers and their families. The above total representing the entire United States has been used in estimating the amount of income received from dairy products in each State, and the distribution has been made on the basis of the figures recorded in the 1920 *Census of Agriculture.*[1] For the intercensal years, i.e., 1920 and 1921, in this study, the estimates by States of the total gross farm income from dairy products have been made on the basis of indices taking into consideration the 1919 Census distribution and also changes in the number of dairy cows in each State. Dairying, in general, is subject only to slow growth, but since such changes in the amount of dairying operations as do take place are not uniform throughout the country, it has been thought advisable to introduce a factor accounting for the changes in the number of dairy cows in the different years.

It should, however, be observed that while the adjustment just mentioned takes care of the increase or decrease in the volume of the dairy industry due to changes in the number of dairy cattle, it does not take into consideration the changes in the quality of the stock which naturally would materially affect the volume of dairy

[1] Volume VI, p. 63.

TABLE XVII.—GROSS AGRICULTURAL INCOME FROM DAIRY PRODUCTS, 1919–1920–1921.

State and Geographic Division	Dollars (000's Omitted)			Per Cent of Total		
	1919	1920	1921	1919	1920	1921
Continental United States.	**1,888,535**	**1,939,609**[a]	**1,393,329**	**100.000**	**100.000**	**100.000**
New England	**125,852**	**127,160**	**91,584**	**6.664**	**6.556**	**6.573**
Maine	22,662	23,159	16,636	1.200	1.194	1.194
New Hampshire	13,031	13,092	9,238	.690	.675	.663
Vermont	34,675	34,525	25,024	1.836	1.780	1.796
Massachusetts	31,557	31,887	22,823	1.671	1.644	1.638
Rhode Island	4,891	4,965	3,595	.259	.256	.258
Connecticut	19,036	19,532	14,268	1.008	1.007	1.024
Middle Atlantic	**380,539**	**389,532**	**279,627**	**20.150**	**20.083**	**20.069**
New York	229,079	235,313	168,816	12.130	12.132	12.116
New Jersey	24,475	25,060	18,169	1.296	1.292	1.304
Pennsylvania	126,985	129,159	92,642	6.724	6.659	6.649
East North Central	**571,869**	**592,996**	**422,638**	**30.281**	**30.573**	**30.333**
Ohio	103,454	105,224	74,724	5.478	5.425	5.363
Indiana	56,184	58,790	42,176	2.975	3.031	3.027
Illinois	91,783	93,353	65,598	4.860	4.813	4.708
Michigan	90,593	94,827	67,353	4.797	4.889	4.834
Wisconsin	229,855	240,802	172,787	12.171	12.415	12.401
West North Central	**335,366**	**338,753**	**241,185**	**17.758**	**17.465**	**17.310**
Minnesota	99,280	102,896	74,543	5.257	5.305	5.350
Iowa	70,631	67,169	47,206	3.740	3.463	3.388
Missouri	44,324	45,057	31,015	2.347	2.323	2.226
North Dakota	24,947	26,127	18,922	1.321	1.347	1.358
South Dakota	21,435	21,802	15,187	1.135	1.124	1.090
Nebraska	30,217	30,432	21,833	1.600	1.569	1.567
Kansas	44,532	45,270	32,479	2.358	2.334	2.331
South Atlantic	**112,972**	**117,482**	**85,663**	**5.982**	**6.057**	**6.148**
Delaware	3,248	3,375	2,452	.172	.174	.176
Maryland	17,091	17,689	12,819	.905	.912	.920
District of Columbia	94	97	70	.005	.005	.005
Virginia	24,438	25,079	18,169	1.294	1.293	1.304
West Virginia	14,523	14,877	10,784	.769	.767	.774
North Carolina	18,999	20,133	14,714	1.006	1.038	1.056
South Carolina	10,198	10,862	7,956	.540	.560	.571
Georgia	21,378	22,170	16,372	1.132	1.143	1.175
Florida	3,003	3,200	2,327	.159	.165	.167
East South Central	**89,403**	**92,869**	**67,660**	**4.734**	**4.788**	**4.856**
Kentucky	28,668	29,463	21,792	1.518	1.519	1.564
Tennessee	26,307	27,465	19,701	1.393	1.416	1.414
Alabama	19,414	20,075	14,672	1.028	1.035	1.053
Mississippi	15,014	15,866	11,495	.795	.818	.825
West South Central	**91,556**	**95,021**	**69,708**	**4.848**	**4.899**	**5.003**
Arkansas	17,129	17,437	12,498	.907	.899	.897
Louisiana	5,741	6,090	4,459	.304	.314	.320
Oklahoma	26,609	26,999	19,200	1.409	1.392	1.378
Texas	42,077	44,495	33,551	2.228	2.294	2.408
Mountain	**52,351**	**53,883**	**39,250**	**2.772**	**2.778**	**2.817**
Montana	9,613	9,776	7,078	.509	.504	.508
Idaho	10,274	10,435	7,635	.544	.538	.548
Wyoming	2,738	2,774	2,020	.145	.143	.145
Colorado	16,147	16,933	12,261	.855	.873	.880
New Mexico	2,719	2,871	2,174	.144	.148	.156
Arizona	3,494	3,549	2,550	.185	.183	.183
Utah	6,138	6,304	4,598	.325	.325	.330
Nevada	1,228	1,241	934	.065	.064	.067
Pacific	**128,627**	**131,913**	**96,014**	**6.811**	**6.801**	**6.891**
Washington	35,202	35,805	26,139	1.864	1.846	1.876
Oregon	22,492	22,655	16,135	1.191	1.168	1.158
California	70,933	73,453	53,740	3.756	3.787	3.857

[a] Since the computation of the 1920 State totals, Dr. King has revised his national total for this item to read $1,930,587.

production. It also does not take into account the relative changes in feeding practice which supposedly affect the milk supply per cow. However, such changes are very slow and, it is believed, cannot disturb our figures to any noticeable extent, particularly during the years immediately following the Census.

Detailed data of the farm income from dairy products by States for 1919, 1920, and 1921 are presented in Table XVII. It will be noticed that while the reduction in the total income from dairy products between 1919 and 1921 was significant, it was not as great as in the case of other agricultural products. The drop in the total value of dairy products was from $1,888,535,000 in 1919 to $1,393,-329,000 in 1921, or a little more than 26 per cent. During the same period, the income from meat products dropped about 50 per cent, and the income from all farm crops, exclusive of crops fed, dropped about 46 per cent. The relative stability of income from dairying operations accounts for the fact that in States like Wisconsin, New York, etc., where dairying constitutes an important part of agriculture, the farmers did not suffer from the 1921 depression as much as the farmers in other States.

Meat Products.

Next to the production of all farm crops, the production of meat animals constitutes the largest single item entering into the gross agricultural income of the country. In 1919 the total farm value of the larger meat animals sold and slaughtered was about $3,371,-000,000, or 16 per cent of the total gross agricultural income of the country. Unfortunately, owing to the complexity of the meat industry, it is very difficult to determine with great accuracy the farm income from meat products by States. Since there are no accurate production statistics by States, it becomes necessary to build up indices of the relative share of each State in the agricultural end of the meat industry from more or less imperfect data which only indirectly measure the meat supply. For convenience in handling the problem and in conformity with the existing material, the meat animals have been divided into two classes which are treated separately in our attempt to arrive at estimates of the total income from meat products. In the first class are included all cattle which contribute beef and veal, and in the second class are sheep, goats, and swine.

As already noted, there are no accurate statistics pertaining to the amount of beef and veal produced in each State. Without such statistics, it is only possible to make very rough estimates of the share of each State in the agricultural income from the production of these products. Such figures are shown in the first three columns of Table XVIII. The indices used in apportioning by States the total agricultural income derived from the production of beef and veal are based on the value of all beef cattle and the imputed value, at average beef cattle prices, of all dairy cows on the farm. In this index dairy cattle are given the weight of approximately one-fourth, which corresponds with the estimates of the Department of Agriculture showing that dairy cattle together with veal calves from dairy herds furnish about one-fourth of the beef and veal supply of the country. The figures entering into the construction of the indices are derived from the *Census of Agriculture* and the reports of the Department of Agriculture. Since changes in the relative importance of different States in the beef supply of the country take place at a slow rate, the same index, based on values as of January 1, 1920, has been used for all the three years covered in this study. The indices expressed as percentages of the United States total are recorded in the third from the last column of Table XVIII.

As in the case of beef and veal, the only available data that may practically be utilized in apportioning the total value of sheep, goats, and swine products are the values of these animals on the farm on January 1, 1920, as given in the 1920 *Census of Agriculture*. In order to use one index to apportion the total value of the three kinds of meat animals, it is necessary to make an adjustment for the differences in the period in which the three types of animals reach maturity and become ready for slaughter. It is known, for instance, that swine reach maturity sooner than sheep, and, consequently, in a given period, say a year, probably a larger proportion of swine will be slaughtered than of sheep. Another consideration that makes the adjustment necessary is that while swine are produced primarily for their meat products, sheep and goats are raised for their wool and mohair, which makes the turnover of swine a great deal larger than that of either sheep or goats.

On the basis of statistics covering a period of eleven years (1910

to 1920 inclusive), it is estimated that the ratios between the number of animals slaughtered during the year and the number of animals on hand at the end of the year are as follows:

Sheep	.375
Goats	.101
Swine	1.009

The significance of the above ratios is obvious. We may say that a thousand sheep found on the farm at the end of the year indicate a total number slaughtered during the year of about 375; a thousand goats imply a slaughter for the year of 101 and a thousand swine, a slaughter of 1,009. In other words, for the same number on the farm at the end of the year, ten times as many swine are slaughtered during the year as goats. These ratios multiplied by the values of sheep, goats, and swine on the farm on January 1, 1920, in each State furnish approximations of the value of these animals slaughtered during 1919. These approximate values have been added together for each State and used in apportioning the estimated national income from the sale and slaughter of these animals in each of the three years. The final estimates, as well as the percentages of the total, are recorded in Table XVIII.

An examination of the section of the table dealing with the income from sheep, goats, and swine will show that the West North Central States lead with an aggregate amount of nearly 41 per cent of the national total. The East North Central division follows with 24 per cent of the total value, thus giving the Middle West about 65 per cent of the total value of the product. This is, of course, accounted for by the fact that 87 per cent of the total income under consideration is due to the production of swine which are raised chiefly in the corn belt.

It is interesting to study the share of the national total contributed by each State to the production of all meat and meat products. The combined totals for each State for 1919, 1920, and 1921, as well as the percentages of the totals for 1919, are given in Table XVIII. It will be observed that the West North Central States produce over 37 per cent of the total meat products. The East North Central States produce about 21 per cent, the West South Central about 10 per cent, and the Mountain States about 9.4 per cent. These figures are very significant in measuring the

TABLE XVIII. — GROSS AGRICULTURAL INCOME IN EACH STATE

1919—1920—1921

State and Geographic Division	Dollars				
	Beef and Veal Animals			Sheep, Goats, and	
	1919	1920	1921	1919	1920
Continental United States	**1,328,941**	**1,204,286**	**738,457**	**2,042,442**	**1,518,916**
New England	**19,600**	**17,763**	**10,891**	**16,749**	**12,456**
Maine	3,760	3,408	2,090	4,269	3,175
New Hampshire	2,365	2,144	1,314	1,818	1,352
Vermont	5,940	5,383	3,301	3,002	2,233
Massachusetts	3,841	3,480	2,134	4,371	3,250
Rhode Island	598	542	332	613	456
Connecticut	3,096	2,806	1,720	2,676	1,990
Middle Atlantic	**73,306**	**65,898**	**40,956**	**74,099**	**55,106**
New York	40,708	36,984	23,065	26,143	19,442
New Jersey	4,199	3,804	2,333	4,779	3,554
Pennsylvania	28,399	25,110	15,558	43,177	32,110
East North Central	**213,420**	**194,700**	**119,978**	**488,224**	**362,338**
Ohio	38,728	35,565	21,742	100,773	74,199
Indiana	34,344	30,950	19,139	118,421	88,067
Illinois	67,430	61,356	38,024	167,317	124,430
Michigan	26,754	24,714	15,088	44,382	33,006
Wisconsin	46,164	42,115	25,985	57,331	42,636
West North Central	**428,338**	**387,179**	**237,180**	**835,626**	**621,435**
Minnesota	39,486	35,250	22,163	97,670	72,635
Iowa	106,888	97,458	57,949	325,158	241,812
Missouri	63,452	57,422	35,758	121,158	90,102
North Dakota	24,140	21,063	13,303	18,341	13,640
South Dakota	52,558	47,005	28,983	84,312	62,701
Nebraska	72,580	65,959	40,219	133,392	99,200
Kansas	69,234	63,022	38,805	55,595	41,345
South Atlantic	**80,140**	**72,186**	**44,198**	**138,641**	**103,103**
Delaware	877	795	487	1,103	820
Maryland	6,183	5,697	2,880	8,333	6,197
District of Columbia	13	12	7	41	30
Virginia	20,366	19,019	11,982	22,181	16,495
West Virginia	14,911	12,887	8,063	10,641	7,914
North Carolina	8,730	7,912	4,852	29,289	21,781
South Carolina	6,538	5,925	3,633	19,322	14,369
Georgia	13,057	11,643	7,367	37,172	27,644
Florida	9,465	8,296	4,927	10,559	7,853

FROM THE SALE AND SLAUGHTER OF THE LARGER MEAT ANIMALS

1919—1920—1921

(000's Omitted)				Per Cent of Total[a]		
Swine	All Larger Meat Animals			Beef and Veal Animals	Sheep, Goats, and Swine	All Larger Meat Animals
1921	1919	1920	1921			
957,698	**3,371,383**	**2,723,202**	**1,696,155**	**100.000**	**100.000**	**100.000**
7,853	**36,349**	**30,219**	**18,744**	**1.475**	**.820**	**1.078**
2,002	8,029	6,583	4,092	.283	.209	.238
852	4,183	3,496	2,166	.178	.089	.124
1,408	8,942	7,616	4,709	.447	.147	.265
2,049	8,212	6,730	4,183	.289	.214	.244
287	1,211	998	619	.045	.030	.036
1,255	5,772	4,796	2,975	.233	.131	.171
34,746	**147,405**	**121,004**	**75,702**	**5.514**	**3.628**	**4.372**
12,259	66,851	56,426	35,324	3.062	1.280	1.983
2,241	8,978	7,358	4,574	.316	.234	.266
20,246	71,576	57,220	35,804	2.136	2.114	2.123
228,460	**701,644**	**755,038**	**348,438**	**16.054**	**23.855**	**20.812**
46,784	139,501	109,764	68,526	2.913	4.885	4.138
55,527	152,765	119,017	74,666	2.583	5.798	4.531
78,455	234,747	185,786	116,479	5.073	8.192	6.963
20,811	71,136	57,720	35,899	2.012	2.173	2.110
26,883	103,495	84,751	52,868	3.473	2.807	3.070
391,822	**1,263,964**	**1,008,614**	**629,002**	**32.224**	**40.913**	**37.491**
45,797	137,156	107,885	67,960	2.970	4.782	4.068
152,465	432,046	339,270	210,414	8.042	15.920	12.815
56,811	184,610	147,524	92,569	4.774	5.932	5.476
8,600	42,481	34,703	21,903	1.815	.893	1.260
39,534	136,870	109,706	68,517	3.954	4.128	4.060
62,547	205,972	165,159	102,766	5.460	6.531	6.109
26,068	124,829	104,367	64,873	5.209	2.722	3.703
65,008	**218,781**	**175,289**	**109,206**	**6.022**	**6.788**	**6.491**
517	1,980	1,615	1,004	.065	.054	.059
3,907	14,516	11,894	6,787	.464	.408	.431
19	54	42	26	.001	.002	.002
10,401	42,547	35,514	22,383	1.531	1.086	1.262
4,990	25,552	20,801	13,053	1.121	.521	.758
13,733	38,019	29,693	18,585	.656	1.434	1.128
9,060	25,860	20,294	12,693	.491	.946	.767
17,430	50,229	39,287	24,797	.982	1.820	1.490
4,951	20,024	16,149	9,878	.711	.517	.594

TABLE XVIII. — GROSS AGRICULTURAL INCOME IN EACH STATE FROM 1919—1920—1921

STATE AND GEOGRAPHIC DIVISION	DOLLARS				
	Beef and Veal Animals			Sheep, Goats, and	
	1919	1920	1921	1919	1920
East South Central	**60,702**	**56,039**	**33,617**	**125,753**	**93,519**
Kentucky	19,911	18,512	11,285	33,088	24,606
Tennessee	16,252	15,102	8,808	37,703	28,039
Alabama	9,502	8,611	5,280	27,920	20,764
Mississippi	15,037	13,814	8,244	27,042	20,110
West South Central	**190,794**	**172,049**	**104,800**	**150,505**	**111,696**
Arkansas	10,073	9,128	5,597	23,651	17,589
Louisiana	10,592	9,723	6,108	14,032	10,435
Oklahoma	39,832	35,814	21,800	34,331	25,300
Texas	130,297	117,384	71,295	78,491	58,372
Mountain	**184,444**	**166,891**	**102,717**	**131,454**	**98,734**
Montana	32,999	30,263	18,170	22,385	16,647
Idaho	15,894	14,403	8,832	25,939	19,290
Wyoming	24,143	21,785	13,972	18,280	13,594
Colorado	43,624	39,343	24,351	26,960	20,050
New Mexico	32,224	28,607	16,352	13,112	9,751
Arizona	18,937	17,536	11,191	4,495	3,830
Utah	10,399	9,236	5,890	15,073	11,210
Nevada	6,224	5,718	3,959	5,210	4,362
Pacific	**78,197**	**71,581**	**44,120**	**81,391**	**60,529**
Washington	9,600	9,152	5,612	14,256	10,602
Oregon	19,103	17,124	10,727	24,775	18,424
California	49,494	45,305	27,781	42,360	31,503

1919—1920—1921

(000's Omitted)				Per Cent of Total[a]		
Swine	All Larger Meat Animals			Beef and Veal Animals	Sheep, Goats, and Swine	All Larger Meat Animals
1921	1919	1920	1921			
58,966	**186,455**	**149,558**	**92,583**	**4.565**	**6.157**	**5.530**
15,515	52,999	43,118	26,800	1.497	1.620	1.572
17,679	53,955	43,141	26,487	1.222	1.846	1.600
13,092	37,422	29,375	18,372	.715	1.367	1.110
12,680	42,079	33,924	20,924	1.131	1.324	1.248
69,164	**341,299**	**283,745**	**173,964**	**14.354**	**7.222**	**10.123**
11,090	33,724	26,717	16,687	.758	1.158	1.000
6,579	24,624	20,158	12,687	.796	.687	.730
14,691	74,163	61,114	36,491	2.996	1.534	2.200
36,804	208,788	175,756	108,099	9.804	3.843	6.193
63,514	**315,898**	**265,625**	**166,231**	**13.873**	**6.632**	**9.370**
10,496	55,384	46,910	28,666	2.482	1.096	1.643
12,163	41,833	33,693	20,995	1.196	1.270	1.241
8,571	42,423	35,379	22,543	1.816	.895	1.258
12,642	70,584	59,393	36,993	3.282	1.320	2.094
6,148	45,336	38,358	22,500	2.424	.642	1.345
3,045	23,432	21,366	14,236	1.424	.318	.695
7,068	25,472	20,446	12,958	.782	.738	.755
3,381	11,434	10,080	7,340	.467	.353	.339
38,165	**159,588**	**132,110**	**82,285**	**5.919**	**3.985**	**4.733**
6,685	23,856	19,754	12,297	.760	.698	.708
11,617	43,878	35,548	22,344	1.436	1.213	1.301
19,863	91,854	76,808	47,644	3.723	2.074	2.724

[a] Based on 1919 Values.

effect of falling prices of meat animals on the farm income in different sections of the country. Thus, in the West North Central division, the shrinkage in the farm income from this item alone was from $1,264,000,000 in 1919 to $629,000,000 in 1921.

Poultry and Eggs.

The national gross agricultural income from the production of poultry and eggs was over $1,000,000,000 in 1919. Of this amount, nearly 26 per cent went to the West North Central States, and about 24 per cent to the East North Central States, thus giving the Middle West nearly 50 per cent of the total. Table XIX gives the percentages of the total value of the product in each geographic division for the years 1899 to 1909, 1919, 1920, and 1921. A general geographic shifting in the production of poultry and eggs is distinctly noticeable. The East seems to be gradually losing ground to the West and the South. While maintaining their rank with respect to population, the New England States, which in 1899 contributed about 5 per cent of the total value of the product, produced scarcely 3 per cent of the total in 1921. The reduction in the Middle Atlantic States was from 12.5 per cent to 10.1 per cent, while in the East North Central States it was from 26.3 per cent in 1899 to 23.8 per cent of the total in 1921. The largest growth in the industry has apparently taken place in the Pacific States, which show an increase from 3.7 per cent in 1899 to 6.2 per cent in 1921. In the same period the population in the last division increased from 3.2 per cent of the total to 5.3 per cent of the total.

The percentages of the total value of poultry and eggs in 1920 and 1921 for each State were estimated on the basis of the corresponding percentages computed from the figures recorded for the three preceding Census years, namely, 1899, 1909, and 1919. By plotting the three points representing the three Census years for each State, the general tendency of growth or decline is clearly discernible, and the projection of the curve drawn through the three points in each case consequently affords fairly accurate estimates for the years succeeding the last Census. The percentages thus estimated for each State were adjusted on the basis of 100, which represents the total for the entire country.

TABLE XIX. — PERCENTAGES OF TOTAL VALUE OF POULTRY AND EGGS PRODUCED IN EACH GEOGRAPHIC DIVISION IN 1899, 1909, 1919, 1920, AND 1921 AND PER CENTS OF TOTAL POPULATION IN THESE DIVISIONS IN 1900 AND 1920

Geographic Division	Per Cent of Total						
	Value of Poultry and Eggs					Population[c]	
	1899[a]	1909[a]	1919[a]	1920[b]	1921[b]	1900	1920
Continental United States	100.000	100.000	100.000	100.000	100.000	100.0	100.0
New England	4.984	4.422	3.114	2.970	2.800	7.4	7.0
Middle Atlantic	12.532	11.592	10.385	10.250	10.120	20.3	21.1
East North Central	26.297	24.198	23.850	23.840	23.825	21.0	20.3
West North Central	24.951	25.498	25.795	25.845	25.885	13.6	11.9
South Atlantic	9.692	10.008	10.564	10.620	10.685	13.7	13.2
East South Central	8.601	8.133	8.134	8.140	8.150	9.9	8.4
West South Central	7.492	8.656	9.264	9.320	9.365	8.6	9.7
Mountain	1.732	2.544	2.866	2.900	2.925	2.2	3.2
Pacific	3.719	4.949	6.028	6.115	6.245	3.2	5.3

[a] Computed from Census figures.
[b] Estimated on the basis of 1899, 1909, and 1919.
[c] *Census of Population*, 1920, Vol. I, p. 16.

Comparative figures of income from poultry and eggs for 1919, 1920, and 1921 are given in Table XX. The first three columns show State estimates in thousands of dollars for each of the three years; the fourth column shows for 1921 the per cent of total income from poultry and eggs in each State; while the fifth and last column of the table offers a percentage comparison between 1921 and 1919. It will be noticed that the national farm income from poultry and eggs in 1921 was about 79 per cent of that in 1919. This is a higher percentage than in the case of other agricultural products. In the case of meat products, it will be recalled that the 1921 income was only about half of that in 1919, while for wool and mohair it was only about one-third of the 1919 income from that item. In this respect, the production of poultry and eggs is like dairying. Both of these industries seem to afford a steady income to the farmers.

Farm Income from Wool.

The production of wool contributes considerably to the agricultural income, particularly in the Mountain States. In 1919 the total value of wool, according to Census figures, was $120,418,000.[1] Of this amount about $47,500,000, or nearly 40 per cent was the share of the Mountain States. Other sections of the country where income from wool is significant are the East North Central States with a little better than 17 per cent of the total, the Pacific States with 14 per cent, and the West North Central States with nearly 13 per cent of the total.

The depression of 1921 affected the producers of wool more than any other class of farmers. In 1921 the gross agricultural income from wool amounted to only about $36,000,000, a drop of 70 per cent from the 1919 mark. Obviously, the Mountain States sustained the greatest losses. Their income from wool in 1921 was barely 29.6 per cent of the amount received in 1919. In dollars, the reduction in the income from wool in the Mountain States was from $47,500,000 to about $14,000,000, a loss of over $33,000,000. Reference to Tables XXXI, XXXII, and XXXIII will show the significance of the wool industry in the Western States. In Nevada, for instance, in 1919 wool contributed about $3,000,000 to the

[1] Includes about $4,000,000 reported for mohair.

TABLE XX.—FARM INCOME FROM POULTRY AND EGGS IN EACH STATE 1919—1920—1921

State and Geographic Division	Dollars (000's Omitted)			1921	
	1919	1920	1921	Per Cent of Total in Each State	Per Cent of 1919
Continental United States	**1,027,392**	**1,025,033**	**810,540**	**100.000**	**78.9**
New England	**31,994**	**30,443**	**22,695**	**2.800**	**70.9**
Maine	7,675	7,175	5,350	.660	69.7
New Hampshire	4,264	4,100	2,958	.365	69.4
Vermont	3,955	3,844	2,958	.365	74.7
Massachusetts	8,836	8,354	6,160	.760	69.7
Rhode Island	1,500	1,435	1,054	.130	70.2
Connecticut	5,764	5,535	4,215	.520	73.1
Middle Atlantic	**106,685**	**105,066**	**82,026**	**10.120**	**76.9**
New York	42,020	40,745	31,854	3.930	75.8
New Jersey	11,969	11,532	8,024	.990	67.0
Pennsylvania	52,696	52,789	42,148	5.200	79.9
East North Central	**245,053**	**244,368**	**193,112**	**23.825**	**78.8**
Ohio	62,887	63,040	50,172	6.190	79.8
Indiana	51,760	51,662	40,812	5.035	78.8
Illinois	66,400	66,422	52,685	6.500	79.3
Michigan	34,294	32,801	24,316	3.000	71.1
Wisconsin	29,712	30,443	25,127	3.100	84.6
West North Central	**265,025**	**264,920**	**209,808**	**25.885**	**79.1**
Minnesota	32,805	32,904	26,140	3.225	79.7
Iowa	68,876	68,985	54,712	6.750	79.4
Missouri	65,013	64,577	50,902	6.280	78.2
North Dakota	10,294	10,763	8,673	1.070	84.3
South Dakota	15,750	15,888	12,725	1.570	80.8
Nebraska	28,931	28,957	23,019	2.840	79.6
Kansas	43,356	42,846	33,637	4.150	77.6
South Atlantic	**108,524**	**108,858**	**86,606**	**10.685**	**79.8**
Delaware	3,144	3,075	2,391	.295	76.0
Maryland	11,517	11,480	9,038	1.115	78.5
District of Columbia	31	21	16	.002	51.6
Virginia	25,387	25,113	19,696	2.430	77.6
West Virginia	12,791	12,895	10,334	1.275	80.8
North Carolina	20,024	20,347	16,373	2.020	81.7
South Carolina	11,979	12,095	9,726	1.200	81.2
Georgia	18,853	19,066	15,279	1.885	81.0
Florida	4,798	4,766	3,753	.463	78.2
East South Central	**83,568**	**83,438**	**66,059**	**8.150**	**79.0**
Kentucky	25,716	25,421	19,939	2.460	77.5
Tennessee	28,510	28,702	22,898	2.825	80.3
Alabama	14,496	14,760	11,874	1.465	81.9
Mississippi	14,846	14,555	11,348	1.400	76.4
West South Central	**95,168**	**95,533**	**75,908**	**9.365**	**79.8**
Arkansas	15,935	16,042	12,807	1.580	80.3
Louisiana	8,661	8,610	6,768	.835	78.1
Oklahoma	28,089	28,240	22,452	2.770	79.9
Texas	42,483	42,641	33,881	4.180	79.7
Mountain	**29,444**	**29,726**	**23,707**	**2.925**	**80.5**
Montana	6,750	6,919	5,568	.687	82.5
Idaho	4,962	4,971	3,955	.488	79.7
Wyoming	1,983	1,999	1,597	.197	80.5
Colorado	8,610	8,713	6,954	.858	80.8
New Mexico	2,065	2,050	1,621	.200	78.4
Arizona	1,664	1,691	1,337	.165	80.3
Utah	2,835	2,819	2,229	.275	78.6
Nevada	575	564	446	.055	77.5
Pacific	**61,931**	**62,681**	**50,619**	**6.245**	**81.7**
Washington	13,520	13,582	10,821	1.335	80.0
Oregon	8,846	8,836	6,995	.863	79.1
California	39,565	40,263	32,803	4.047	82.9

total income of the State. This amount, small as it may appear in the light of the large totals familiarly dealt with throughout this study, formed one-fourth of the total net current agricultural income of the State. Manifestly, changes affecting the wool market have enormous influence upon the agricultural income of Nevada. The reduction in the current agricultural income of that State between 1919 and 1921 was about $7,000,000, of which amount 30 per cent was due to the drop in the price of wool.

The gross agricultural income from the production of wool is recorded by States in the Agricultural Summary, Tables XXXI, XXXII and XXXIII, pp. 192–209. The derivation of the figures is as follows: for 1919, the amounts are as recorded by the 1920 Census of Agriculture; the estimates for 1920 and 1921 are based on production and price figures published in the *Year Books* of the Department of Agriculture.

Income from Honey and Wax.

The method used in estimating the gross income from honey and wax in the intercensal years is the same as that followed in the case of poultry and eggs, — that is, percentages of the total value of the product in the years covered by the last three Censuses, 1899, 1909, and 1919, were calculated and plotted for each State. The percentages for 1920 and 1921 were then estimated on the basis of the projected curves. The figures thus obtained were used as indices for the distribution by States of the estimated totals for the entire United States. The State estimates for the three years will be found in Tables XXXI, XXXII, and XXXIII.

Sale of Dairy Cows for City and Village Use.

Another item contributing to the agricultural income of the country is the sale of dairy cows for use in cities and villages. On January 1, 1920, there were about 1,220,000 dairy cows not on the farm. It is presumed that very few cows are raised off the farm, and, consequently, the yearly replacements of cows kept in cities and villages are supplied from the country. This small item of income, which in 1919 was only about $15,000,000, was distributed by States on the basis of the value of dairy cows off the farm in each State. This, of course, involved the hypothesis that cows in the villages and cities are supplied from the farms within the

same States. This, to be sure, is only roughly true, but any possible error would be quite negligible as compared with the total agricultural income.

The number of dairy cows not on farms is reported by States in the *Census of Agriculture*, 1920. The number of cows not on farms in 1920 and 1921 was estimated from the projection of straight lines drawn between the points plotted from the figures of the two Census years 1910 and 1920. To obtain the values of cows off the farm in each State, the estimated aggregates were multiplied by average prices of dairy cows, as reported by the United States Department of Agriculture.

It may be of interest to note that, while the aggregate number of dairy cows off the farm in the United States was maintained practically at the same level between 1910 and 1920, some States show a gain and others a loss, in the period covered by the present study. The New England States, for instance, show an increase from 4.6 per cent of the national total in 1919 to 5.4 per cent of the total in 1921. On the other hand, the Middle Atlantic States, the East North Central States, and particularly the West North Central States, show a decided drop in the number and value of dairy cows found off the farm. The other sections of the country indicate a tendency toward increase.

The final estimates of income derived from this item are to be found in the Agricultural Summaries, Tables XXXI, XXXII, and XXXIII.

Horses and Mules.

It is estimated that the United States produces annually about 1,500,000 horses and about 400,000 mules for replacements and exports abroad. At farm prices of 1919 the farm value of these animals would amount to about $180,000,000 for horses, and about $64,000,000 for mules, or a total of nearly $250,000,000 a year. In a general way, this whole sum constitutes a part of the agricultural income of the country. However, most of the horses and mules raised (about 85 per cent of the total) either remain on the home farm or are sold to other farmers,[1] and the addition to the

[1] Of the total annual production of horses, about 86 per cent are used as replacements on the farm, the other 14 per cent are supplied to cities or are exported abroad. Of the 400,000 mules produced annually, about 64,000, or nearly 16 per cent are destined for city use or exports abroad, leaving 84 per cent on the farm.

agricultural income from animals supplied for city use and exports abroad cannot be very large, especially if we consider the costs, such as selling, transportation, and feeding, involved in trading in horses and mules between farmers. As a matter of fact, in the income of the country as a whole, this item would prove to be nearly negligible and would not materially affect the total one way or another.

However, in studying individual States, the income derived from the sale of horses and mules may be significant. It is, for instance, conceivable that the farmers of one single stock-raising State derive a greater net income from trading in horses and mules than do all the farmers of the country put together. It is also reasonable to assume that, in the case of some States, the result of trading in horses and mules will appear as an expense item rather than an item of income.

There are no statistics giving in direct form the number of animals raised and sold by farmers in each State. For the Census years, we have reliable figures of the total number of horses and mules on the farm. Similar figures for other years are made available by the Department of Agriculture. This Department also publishes yearly figures of exports abroad as well as statistics giving receipts at the principal markets of the country. However, no data are to be found which indicate definitely the geographic sources of the horses and mules recorded. Fortunately, the *Census of Agriculture* gives a detailed classification by age of the animals found on the farm at the time of the last Census. This enables us to compute with a fair degree of accuracy the number of animals raised in each State and, consequently, also the number of animals available for sale, or the number that must be purchased from the outside.

As the basis for estimating the total number of animals raised in each State, we have taken the relative number of colts one year of age and under. From the Census figures for the entire United States, it appears that, on the average, the ratio between the total number of animals and the number of colts one year and under is about 18.5 for horses, and 15.75 for mules, — or that normally we would expect a total of 18.5 horses or 15.75 mules for every colt one year of age and under. Hence, to estimate the total number

of horses and mules to be expected in each State under *normal* conditions, if no exports or imports were to have taken place, the corresponding number of colts of the age specified reported for each State has been multiplied by the above ratios. From the hypothetical totals thus obtained, the total number of horses and mules actually found on the farm in the different States has then been subtracted. The differences presumably give approximations of the number of animals taken out of each State. In many States these differences are, of course, negative quantities, as the numbers acquired by farmers from the outside are in excess of those sold. Thus, we find that while the South has the greatest number of mules on hand, it raises a very small proportion of its requirements. For instance, judging from the number of young animals, the number of mules one would expect to find in the South Atlantic States is about 189,000. However, the Census of 1920 gives the number as 1,079,033, which indicates that about 890,000 have, presumably, been brought in from other sections of the country.

Obviously, the difference between the number of horses and mules raised, as estimated from the number of colts one year of age and under, and the actual number of horses and mules on the farm represents an accumulation of more than one year. It is estimated that the average useful life of a horse or mule is about eleven years, which roughly gives a yearly turnover of one-eleventh of the number on hand. Consequently, the accumulation due to the sales or purchases divided by eleven should give approximately the net number sold or purchased during one year. Apparently, then, of the 890,000 mules in the South Atlantic States on January 1, 1920, which supposedly were not raised in that section of the country, only one-eleventh, or about 81,000, were replaced from States outside of this division in one year.

A glance at Table XXI will show that most of the horses raised in the United States come from the Mountain States. The West North Central States, except Minnesota, also raise horses for sale, while, with very few exceptions, the other States do not raise enough horses to supply their own farm needs.

It is curious to observe that, contrary to expectations, there is an excess of purchases over sales of horses in the State of Kentucky. Kentucky, which in the popular mind is a horse-breeding State,

TABLE XXI.—NET NUMBER OF HORSES AND MULES BOUGHT OR SOLD BY FARMERS IN EACH STATE IN 1919 (Thousands).

State	Horses		Mules	
	Sold	Bought	Sold	Bought
All Farms in United States	218.5	....	63.6	....
New England	....	....	....	0.1
Maine	....	5.7	....	....
New Hampshire	....	2.0	....	....
Vermont	....	3.2	....	....
Massachusetts	....	2.7	....	....
Rhode Island	....	0.4	....	....
Connecticut	....	2.5	....	....
Middle Atlantic	....	....	....	....
New York	....	27.0	....	0.3
New Jersey	....	5.0	....	0.4
Pennsylvania	....	22.7	....	2.3
East North Central	....	....	....	....
Ohio	....	24.5	1.1	....
Indiana	....	11.5	11.7	....
Illinois	1.5	....	26.5	....
Michigan	....	25.6	....	0.1
Wisconsin	....	22.0	....	....
West North Central	....	....	....	....
Minnesota	....	6.4	0.6	....
Iowa	7.8	....	16.7	....
Missouri	11.5	....	62.7	....
North Dakota	38.7	....	0.4	....
South Dakota	48.7	....	1.4	....
Nebraska	30.5	....	13.5	....
Kansas	39.4	....	42.4	....
South Atlantic	....	....	....	....
Delaware	....	1.4	....	0.6
Maryland	....	4.3	....	1.7
District of Columbia	....	....	....	....
Virginia	....	6.6	....	3.9
West Virginia	....	4.7	....	0.5
North Carolina	....	9.7	....	18.4
South Carolina	....	3.9	....	18.5
Georgia	....	5.2	....	33.9
Florida	....	0.8	....	3.4
East South Central	....	....	....	....
Kentucky	....	3.6	6.9	....
Tennessee	....	1.4	15.5	....
Alabama	....	1.2	....	20.4
Mississippi	1.5	....	....	13.6
West South Central	....	....	....	....
Arkansas	....	1.4	....	8.4
Louisiana	1.1	....	....	11.7
Oklahoma	29.6	....	20.0	....
Texas	....	1.9	....	26.4
Mountain	....	....	....	....
Montana	83.0	....	0.2	....
Idaho	20.5	....	0.8	....
Wyoming	28.3	....	0.3	....
Colorado	31.4	....	3.2	....
New Mexico	8.8	....	1.0	....
Arizona	13.4	....	....	0.4
Utah	10.4	....	0.6	....
Nevada	4.9	....	0.3	....
Pacific	....	....	....	....
Washington	5.9	....	0.6	....
Oregon	14.8	....	1.0	....
California	....	5.9	1.2	....
Totals	431.7	213.2	228.6	165.0

apparently specializes in pure bred racing stock and imports most of its draft animals.

Another feature worthy of note is the competition which Missouri seems to encounter in the production of mules. While it still leads in the export of mules, it furnishes only about 27 per cent of the total farm exports. Kansas is apparently coming to the front in the production of mules for sale. Its annual sales are approximately 42,000 as compared with about 63,000 from Missouri and 26,000 from Illinois, which is the third ranking State in the production of mules for sale.

Now that the net number of horses and mules purchased or sold by farmers in each State has been estimated, it is necessary to obtain the amounts of money received or spent by farmers for these animals. If all sales and purchases were made on one date, and at one place, this would be a simple matter. All that would be necessary would be to obtain average prices of horses and mules prevalent on that date at the given market and multiply them by the total number traded. However, it is obvious that the sales and purchases of horses and mules are distributed throughout the year, and are consequently made at different prices. The Department of Agriculture furnishes data on the following three items, which, together with the data appearing in the *Census of Agriculture*, 1920, make it possible to compute an average price for each State at which horses and mules were bought or sold:

1. Average price per head of horses and mules on farm on January 1, given for each year and each State.
2. Farm price per head for horses as of the 15th of each month, given for the country as a whole.
3. Number of horses and mules received at the principal livestock markets during each month of the year.

Thus, item 1 gives us an index of the price level of horses and mules in each State, item 2 shows the variation in prices from month to month, and item 3 shows the approximate distribution of sales throughout the year.

Before the Department of Agriculture figures of average prices of horses and mules on the farm on January 1 of each year can be

used as an index of the price level of horses and mules sold in each State, they must be adjusted for age distribution of animals in each State. Only mature animals are as a rule traded in, and the prices of animals sold and purchased must therefore be put on the basis of mature animals. This has been done by the use of the formula:

$$X = \frac{ED}{AF + BG + C}$$

where X is the price of mature animals,

E is the price of the aggregate on the farm on January 1, as reported by the Department of Agriculture,

D the aggregate number of horses (or mules) on the farm on January 1,

A the number of colts one year of age and under,

F the ratio of the price of colts one year and under to that of mature animals,

B the number of colts under two years and above one year,

G the ratio of colts under two years and over one year to that of mature animals, and

C is the number of mature animals.

The next step is to measure for each year the relationship between average-for-the-year prices and the January 1 prices. The average-for-the-year prices of horses in the Continental United States for each of the three years have been obtained by weighting the average monthly prices by the monthly receipts of horses at the principal markets. The ratios between these average-for-the-year farm prices and the average farm prices of horses in the United States on January 1 of each year are as follows:

1919	1.218
1920	1.291
1921	1.107

By multiplying the January 1 prices of mature animals in each State by the above ratios, we arrive at the yearly prices for each State used to compute the value of horses and mules sold or purchased by farmers. The complete formula used in computing the

average farm prices of mature horses and mules in each State is given in the footnote below.[1]

In computing the values of horses and mules sold or purchased during 1920 and 1921, the numbers of animals sold were adjusted only in so far as sales to cities and villages were concerned. Purchases by, and sales to, other farmers were deemed to be approximately the same as in 1919, and changes in value were accounted for only through changes in price. The number of horses and mules on farms is not being reduced as rapidly as in cities and villages, and consequently a yearly adjustment for purchases by farmers is not essential.

Price Changes and Agricultural Income.

An analysis of the farm value of net sales and purchases of horses and mules by States for the years 1919, 1920, and 1921 throws an interesting side light on the effect of changing prices on agricultural income. It would seem off-hand that, for a given product,

[1] *Formulae Used in Computing Average Farm Prices of Mature Horses and Mules in Each State*

Explanation of Terms.

- a Number of Colts under 1 year of age in the State on Jan. 1.
- b Number of Colts from 1 to 2 years of age in the State on Jan. 1.
- c Number of Mature Animals (above 2 years of age) in the State on Jan. 1.
- d Aggregate Number of Horses or Mules in the State on Jan. 1.
- e Average Price of Aggregate Number of Animals on Jan. 1.
- f Ratio of Price of "a" to Price of "c."
- g Ratio of Price of "b" to Price of "c."
- R Ratio of Average Price of Horses for the year to Average Price of Horses on Jan. 1.
- P Average Price of Mature Animals for the year.
- x Average Price of Grown Animals in the given State on Jan. 1.

Formulae.

$$e = x\frac{af + bg + c}{d} \quad \text{or} \quad x = \frac{ed}{af + bg + c}$$

$$P = Rx = \frac{R\,ed}{af + bg + c}$$

Sources of Above Data.

a, b, c, and d—*Census of Agriculture*, 1920, p. 52.

e — *Year Books* of the Department of Agriculture for corresponding years.

Ratios.

f — Horses, 0.37; Mules, 0.41
g — Horses, 0.63; Mules, 0.65
} Based on comparable data given in the *Census of Agriculture*, 1900—*Abstract of Census*, 1910, p. 321.

R — 1919 — 121.8; 1920 — 129.1; 1921 — 110.7. See Table LIII.

rising or falling prices should affect the consumer and the producer to the same degree. That is, if the price of an article goes up twenty per cent, the producer would receive twenty per cent more while the purchaser would pay twenty per cent more. This, however, does not seem to work out in the case of farmers as a class, — at least, in so far as their trading operations in horses and mules are concerned.

Expressed in terms of 1919, as 100 per cent, the net income to the farmers in 1920 from the same number of animals as in 1919 was only 61.4 per cent for horses and 64.8 per cent for mules. In 1921 these percentages dropped to 34 per cent and 52.7 per cent, respectively. Did the farmer sustain these losses merely as a producer, through the fall of the price of his product, or were there at the same time other factors operating against him? Obviously, farmers as a class are producers as well as consumers, and in the case of horses and mules, we have an example where the farmer produces 100 per cent of the product, and consumes about 85 per cent of it. Part of this 85 per cent he has to purchase in the open market.

It is, of course, understood that the price to the consumer should be somewhat higher than the producer's price, to cover the handling and selling costs.

Assuming that in 1919 the ratio between the consumer's price and that of the producer was normal, let us examine what happened during 1920 and 1921. It will be recalled that we have taken the aggregates of horses and mules traded in annually by farmers to be the same in each of the three years under observation; consequently, changes in value merely reflect changes in price. The amounts paid out by all farmers of the country for horses and mules in 1919, 1920, and 1921, with their corresponding percentages on the basis of 1919, are shown in Table I. Table J shows similar figures for farmers' receipts.

What does the comparison between the two sets of transactions show?

In 1920 the purchasing price to the farmer for horses was 6 per cent greater than in 1919, while the selling price was about 10 per cent below that of 1919. In 1921 the purchasing price fell to 85 per cent of the 1919 level, while the selling price dropped to 67

per cent. The very same tendency appears in the case of mules. When prices advance, they advance a great deal more rapidly for the farmer as a consumer than as a producer. When prices fall, the reverse seems to be the case, i.e., they fall more rapidly for the farmer as a producer than a consumer. They react sharply at the source, and their decline is greatly retarded by the time they reach the consumer.

TABLE I—AMOUNTS PAID BY FARMERS FOR HORSES AND MULES

Animal	Year	Amount (Thousands of Dollars)	Per Cent of 1919
Horses	1919	32,207	100
	1920	34,112	105.9
	1921	27,402	85
Mules	1919	33,144	100
	1920	38,824	117.1
	1921	25,843	80

TABLE J—AMOUNTS RECEIVED BY FARMERS FOR HORSES AND MULES

Animal	Year	Amount (Thousands of Dollars)	Per Cent of 1919
Horses	1919	49,752	100
	1920	44,884	90.2
	1921	33,374	67.1
Mules	1919	39,598	100
	1920	43,012	108.6
	1921	29,245	74.5

Taking 1919 as a point of departure, it appears that in 1920 and 1921 the farmer "caught it going and coming." He lost both as a producer and as a consumer. Why these divergences in the movement of producers' and consumers' prices? Is it a coincidence of circumstances peculiar to the trading in horses and mules during the period stated, is it a phenomenon more universal and also holding true of other farm commodities, or is it merely a reflection of the difference in movement of wholesale and retail prices? It is

evidently unsafe to generalize from the scant data presented here. To answer these questions with any degree of certainty would require a far more detailed study of farm prices and the movement of farm commodities than lies within the scope of the present work. A partial clue to the discrepancy between the selling and buying prices of horses and mules may be discovered by referring to Table XXI, p. 156, which gives a picture of the geographic distribution of sales and purchases. It will be noticed that the excess production of horses and mules is highly centralized. The bulk of these animals seems to come from the West North Central and Mountain States. Is it possible that the general price level in these sections fell more rapidly in the given period than elsewhere, and that prices of horses and mules merely followed the general tendency, the cause of which may have been only accidental? This would, of course, imply that the phenomenon under discussion, though very interesting in its effects on agricultural income for the years 1919 to 1921, is merely fortuitous, and has no permanent significance in agricultural economics. At any rate, this would present an interesting problem for further study and investigation.

Farm Income from the Sale of Land for Urban Use.

An item which is ordinarily left out of consideration in discussing farm income is that of agricultural land sold for non-agricultural purposes. The growth of cities makes it necessary to increase the urban land areas of the country, and agricultural land is practically the only supply to draw upon. As a city expands, farm lands immediately bordering the city become very valuable; this naturally makes their use for agricultural purposes too expensive to be profitable.

During the decade of 1910 to 1920, the urban population of the United States increased from 42,166,000 to 54,314,000, a net gain of 12,148,000 in ten years, or an average of 1,215,000 per year. It is evident that an addition of a million and a quarter people to the population of the country would necessitate a considerable addition to urban land. On the basis of figures published by the United States Bureau of the Census in its report on *Financial Statistics of Cities,* it is estimated that from 110 to 115 acres of land

are required for every thousand of urban population. At this rate, the total yearly requirements are at least 150,000 acres, most of which must be yielded by agriculture. It should be borne in mind that urban expansion is not taking place at the same rate throughout the country, and, consequently, the bulk of the 150,000 acres of land transferred annually from agriculture to cities and villages is distributed among a comparatively few States, and therefore, presents in some cases items of considerable magnitude.

The estimated total farm income from the sale of land to cities and villages for 1919, 1920, and 1921, as calculated by W. I. King, has been apportioned by States in accordance with an index based on:

1. The increase in population between 1910 and 1920.
2. The volume of construction in each year.
3. Agricultural land values as indicated by the value of plough land.

It is, of course, true that there elapses a period of years between the time land is purchased from the farmer, and the time it goes into actual use for urban building. It is, however, believed that the amount of land purchased from farmers each year for city plotting will vary with the amount of new land used in urban construction — that is, when construction is at its height, there is a tendency to extend urban land development projects, even though the land taken out from farming will not be built upon until some future year. Consequently, the volume of construction and growth in urban population may be considered as good indices of the sale of farm lands for urban use each year.

The final estimates of income from this source by States are shown in Tables XXXI, XXXII, and XXXIII.