



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

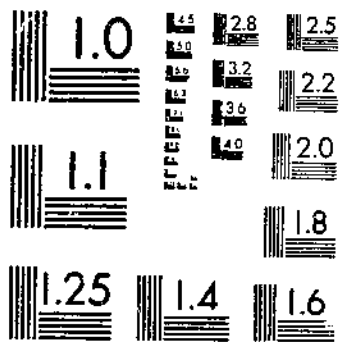
AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

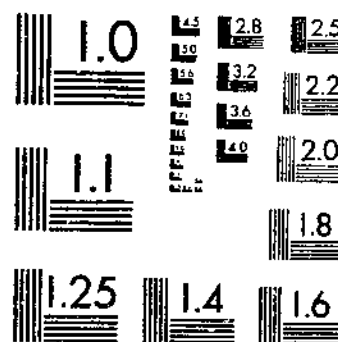
FB 25 (1941) USDA TECHNICAL BULLETINS
TRENDS IN DAIRYING BY MAJOR TYPE-OF-FARMING REGIONS
FINNER, N. F., NICHOLLS, R. L.

UPDATA
1 OF 1

START



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



**UNITED STATES
DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.**

Trends in Dairying by Major Type-of-Farming Regions¹

By W. F. FINNER, *associate agricultural economist*, and RONALD L. MIGHELL, *senior agricultural economist, Bureau of Agricultural Economics*

CONTENTS

	Page		Page
Introduction.....	1	Changes in production in selected areas.....	12
Trends in dairy-cow numbers and milk production by major type-of-farming regions.....	3	Cubot-Marshfield Area, Vt.....	14
Regional trends in manufactured dairy products.....	7	Dodge County, Wis.....	15
Butter production in factories.....	8	Three Selected Areas in the South.....	15
American cheese.....	10	Northeastern Texas.....	15
Eraporated milk.....	10	South Central Tennessee.....	16
Disposition of increases.....	11	East Central Mississippi.....	17
		Summary and conclusions.....	19
		Appendix.....	21

INTRODUCTION

For many years there has been a marked and fairly continuous upward trend in the number of dairy cows and milk production on farms in the United States (fig. 1). There has been little significant cyclical tendency in dairying, although an unusually large increase in numbers occurred from 1929 to 1934. This was followed by a decline for 4 years and then by a resumption of the upward movement.

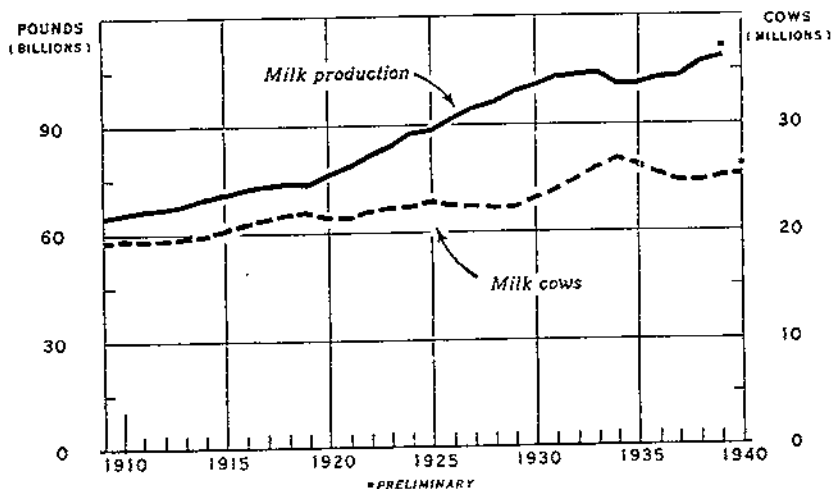
In the past the steady rise in milk production has been accompanied by a similar upward trend in total population. The per capita production of milk has, therefore, increased relatively little, although important consumption shifts have undoubtedly occurred between the various classes of dairy products and between different population groups.

Now that population growth in the United States is proceeding more slowly and has perhaps ceased entirely in certain age groups, it becomes important to inquire into the forces behind the upward trend in production. Are these forces so closely related to population changes that production would tend to diminish with the cessation of population growth? Or are they mainly due to changes that will continue operating even with a stationary population and lower dairy prices? Information on these matters will have a definite bearing on problems such as the effectiveness of stimulating milk consumption or

¹ Received for publication June 14, 1940.

of controlling milk production in order to promote economic stability at reasonable price levels.

Before these and similar questions can be answered, it is necessary to know more about long-time consumption responses on the one hand and dairy farmers' long-term production responses to prices and other factors on the other. The Bureau of Agricultural Economics in co-operation with several of the Agricultural Experiment Stations in the Lake States and New England is now carrying on a series of studies of farmers' long-term supply responses in dairying.² These studies of representative dairy areas are throwing new light on interregional competition in dairying by indicating the general influence of changes in prices and technology on production in past periods, and by suggesting probable future trends. In addition to these response studies,



BAE 38386

FIGURE 1.—TOTAL ANNUAL MILK PRODUCTION AND NUMBER OF MILK COWS ON JANUARY 1 ON FARMS IN THE UNITED STATES, 1909-40. (COWS AND HEIFERS 2 YEARS OLD AND OVER KEPT MAINLY FOR MILK.)

Since 1909 there has been a significant and fairly continuous upward trend in milk production and in the number of milk cows on farms.

other special investigations have been made of the probable effects of new factors such as the Agricultural Conservation Program.³

The preliminary findings from these studies suggest that the long-time upward trend in milk production in the northern dairy region is likely to continue even though prices of dairy products relative to prices of other farm products become somewhat less favorable.

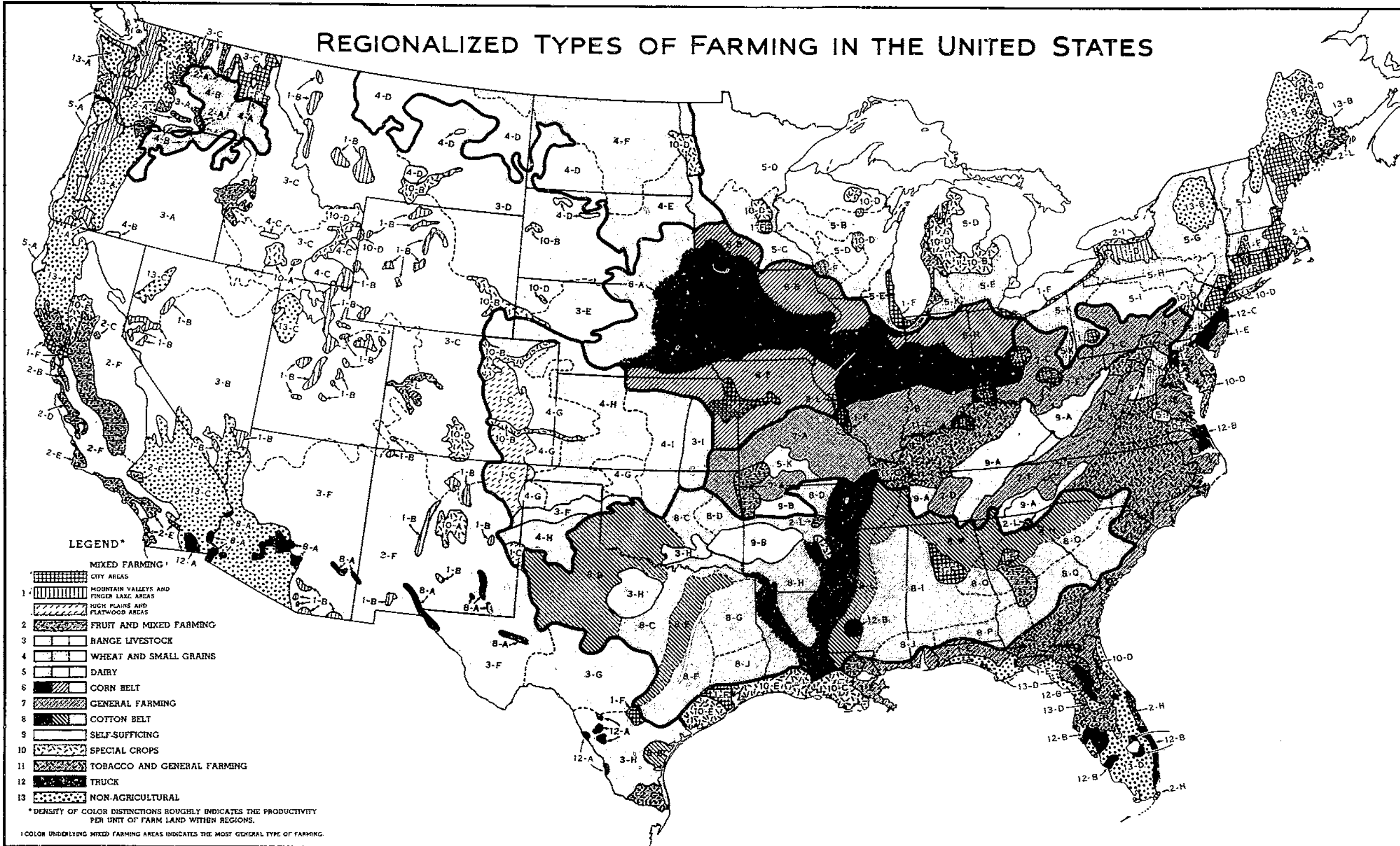
The principal purpose of the present report is to examine recent regional trends in dairying, not only in the northern Dairy Region but also in the other major type-of-farming regions in the United States. This may be considered an initial step in a more complete

² Allen, R. H., Hole, Erling, and Mitchell, R. L. SUPPLY RESPONSES IN MILK PRODUCTION IN THE CAROT MARSHFIELD AREA, VERMONT, U. S. Dept. Agr. Tech. Bul. 709, 59 pp. 1940.

Reports for other areas in Minnesota, Wisconsin, Michigan, Maine, Connecticut, and Massachusetts are now in preparation.

³ JOHNSON, SHERMAN E., MICHELL, RONALD L., and HADY, FRANK T. PROBABLE EFFECTS OF THE AGRICULTURAL CONSERVATION PROGRAM ON LIVESTOCK PRODUCTION IN THE MIDWEST DAIRY REGION. Parts 1-5. U. S. Bur. Agr. Econ. 1940. [mimeographed.]

REGIONALIZED TYPES OF FARMING IN THE UNITED STATES



REGIONAL AND SUB-REGIONAL CLASSIFICATION OF TYPES-OF-FARMING IN THE UNITED STATES

The following differentiation of the Agriculture of the United States is based upon variations in soil, climate and surface features; crop and livestock combinations; relative productivity; markets; relative income by source; and other minor factors. The Map has been designed to present a generalized picture of the nation's agriculture. The 13 regions and 100 sub-regions shown on the face of this map are classified as follows:

1. MIXED FARMING

- 1-a. Puget Sound, Willamette and Associated Valleys.
- 1-b. Intermountain Irrigated Valleys.
- 1-c. Colorado-New Mexico High Plain. 1-d. Finger Lakes.
- 1-e. Atlantic and Gulf Coast Flatwoods. 1-f. Miscellaneous City Areas.

2. FRUIT AND MIXED FARMING

- 2-a. Washington-Oregon Irrigated Valleys.
- 2-b. St. Helena, Santa Cruz, and Santa Clara Valleys.
- 2-c. Great Valley of California. 2-d. Salinas River Valley.
- 2-e. Southern California Valleys.
- 2-f. Sierra Nevada-Coast Range Timberland and Grazing.
- 2-g. Lower Rio Grande Valley. 2-h. Florida Fruit Region.
- 2-i. Lake Michigan-Lake Ontario. 2-j. Shenandoah-Cumberland-Albemarle.
- 2-k. Georgia Peach Area. 2-l. Miscellaneous Berry and Tree Fruit Areas.

3. RANGE LIVESTOCK

- 3-a. Harney Basin-Blue Mountains. 3-b. Utah-Nevada Basin.
- 3-c. Rocky Mountains and Associated Basins.
- 3-d. Northern Great Plains. 3-e. Sandhills of Nebraska.
- 3-f. Southwestern Woodlands, Grassland and Semi-Deserts.
- 3-g. Edwards Plateau. 3-h. Range Livestock and Cotton.
- 3-i. Flint Hills of Kansas.

4. WHEAT AND SMALL GRAINS

- 4-a. Columbia River Basin—Eastern Portion.
- 4-b. Columbia River Basin—Western Portion. 4-c. Southeastern Idaho.
- 4-d. Wheat and Range Livestock. 4-e. Wheat and General Farming.
- 4-f. Specialized Wheat and Small Grain. 4-g. Wheat and Range Livestock.
- 4-h. Specialized Wheat Farming. 4-i. Wheat and General Farming.

5. DAIRY

- 5-a. North Pacific Coast. 5-b. Lake States-Sub-region A.
- 5-c. Lake States-Sub-region B. 5-d. Lake States-Sub-region C.
- 5-e. Chicago-Milwaukee Milkshed. 5-f. Detroit-Lansing Milkshed.
- 5-g. New York-Sub-region A. 5-h. New York-Sub-region B.
- 5-i. New York-Sub-region C. 5-j. Boston Milkshed.
- 5-k. Miscellaneous Dairy Areas.

6. CORN BELT

- 6-a. Western Transition. 6-b. Northern Livestock-Dairy.
- 6-c. Cash Corn and Oats. 6-d. Cash Corn and Small Grain.
- 6-e. Central Intensive Feeding. 6-f. Southern Pasture and Feeding.
- 6-g. Cash Corn and Small Grain.
- 6-h. General Farming, Dairy and Crop Specialties.
- 6-i. Livestock and Soft Winter Wheat.

7. GENERAL FARMING

- 7-a. Ozark-Southeast Kansas-Oklahoma. 7-b. Southern Illinois and Indiana.
- 7-c. Eastern Ohio and Middle Atlantic States.
- 7-d. Central Basin of Tennessee. 7-e. Virginia-West Virginia Grazing Regions.
- 7-f. Tennessee-Shenandoah-Cumberland Limestone Valleys.

8. COTTON BELT

- 8-a. Southwestern Irrigated Valleys. 8-b. Large-scale Cotton Farming.
- 8-c. Oklahoma-Texas General Farming. 8-d. Arkansas River Valley and Uplands.
- 8-e. Black Waxy Prairie of Texas. 8-f. Post-Oak Strip-Upper Coastal Prairie.
- 8-g. Piney Woods of Northeast Texas.
- 8-h. Southwestern Arkansas and Northern Louisiana.
- 8-i. Mississippi-Alabama Clay Hills and Rolling Uplands.
- 8-j. Southeast Texas-Mississippi Piney Woods-Cotton and Self-sufficing.
- 8-k. Mississippi and Red River Deltas.
- 8-l. Mississippi-Tennessee Brown Loam Area.
- 8-m. Tennessee River and Limestone Valleys. 8-n. Northern Piedmont.
- 8-o. Southern Piedmont. 8-p. Gulf Coastal Plain—Cotton and Peanuts.
- 8-q. Eastern Coastal Plain and Sandhills.

9. SELF-SUFFICING

- 9-a. Southern Appalachian Region. 9-b. Ozark-Ouachita Mountains.

10. SPECIAL CROPS

- 10-a. Ripe Field Beans. 10-b. Sugar Beets. 10-c. Sugar Cane.
- 10-d. Potatoes. 10-e. Rice. 10-f. Peanuts.

11. TOBACCO AND GENERAL FARMING

- 11-a. Burley. 11-b. Flue-cured. 11-c. Fire-cured.
- 11-d. Dark Air-cured. 11-e. Southern Maryland. 11-f. Cigar Types.

12. TRUCK

- 12-a. Imperial Valley and Winter Garden of Texas.
- 12-b. Southeastern Truck Regions. 12-c. Baltimore-Philadelphia-New Jersey.

13. NON-AGRICULTURAL

- 13-a. Cascade Mountains and Associated Coast Ranges.
- 13-b. Adirondacks and Northern Maine. 13-c. Colorado-Mohave Desert.
- 13-d. Florida Flatwoods and Everglades.

analysis leading to careful estimates of probable long-time supply responses or trends for each region, under each of several possible sets of price relationships.

Before estimates of the most probable future trends of production can be finally developed, additional studies of consumers' long-time responses as well as the various interregional repercussions of supply and demand factors will of course need to be considered. The analytical approach to the interregional problems involved has been more fully discussed elsewhere.⁴

TRENDS IN DAIRY-COW NUMBERS AND MILK PRODUCTION BY MAJOR TYPE-OF-FARMING REGIONS

Most analyses of regional trends in dairying have followed the convenient regional classification of the Bureau of the Census, as data for civil divisions smaller than States are not usually available for the whole United States for intercensal years. Data on the number of milk cows by counties for the years 1928 to 1939 have recently been developed by the Agricultural Marketing Service, and although not published, have been used in this study in examining regional trends according to major type-of-farming regions. The type-of-farming regions on which much of the following discussion is based are shown in figure 2.

The short-time changes in dairy-cow numbers on farms in the United States from 1928 to 1939 have not been reflected by similar changes in milk production (fig. 1). The net change in numbers from 1928 to 1939, however, appears to closely parallel the upward trend in milk production. Therefore, comparisons of net changes in the number of milk cows between 1928 and 1939 give a reasonably correct picture of the trend in dairying for the United States during that period.

The 12 major type-of-farming regions shown in figure 2 differ considerably in many respects. Table 1 shows the number of milk cows and heifers 2 years old and over in each region. The dairy region, the Corn Belt, and the Cotton Belt are the regions of largest numbers in both 1928 and 1939.

From January 1, 1928 to January 1, 1939, the number of milk cows in the United States increased about 12.9 percent. Every type-of-farming region shared in this increase (fig. 3 and table 1). The rates of increase varied from 24.4 percent for the Cotton Belt to 3.2 percent for the wheat and small-grains region. The percentage increase in the self-sufficing region was the highest of the increases among regions of lesser importance.

Percentage rates of increase in the number of milk cows give some indication of the rapidity of the increase in each region and may have special value in connection with other evidence in gauging probable future trends (table 1). The percentage increases were higher than average in the Cotton Belt, the self-sufficing areas, the general-farming

⁴ JOHNSON, SHERMAN E., HADY, FRANK T., MIGHELL, RONALD L., ALLEN, R. H., and HOLE, ERLING. ANALYSIS OF INTERREGIONAL COMPETITION IN AGRICULTURE. 74 pp., illus. U. S. Bur. Agr. Econ. 1939. [Mimeographed.]

FIGURE 2.—REGIONALIZED TYPES OF FARMING IN THE UNITED STATES.

U. S. Department of Agriculture, Bureau of Agricultural Economics.

region, and the tobacco and general-farming region. The percentage increases in the Corn Belt, the mixed-farming region, and truck areas, the range-livestock region, and the wheat and small-grains regions were less than average.

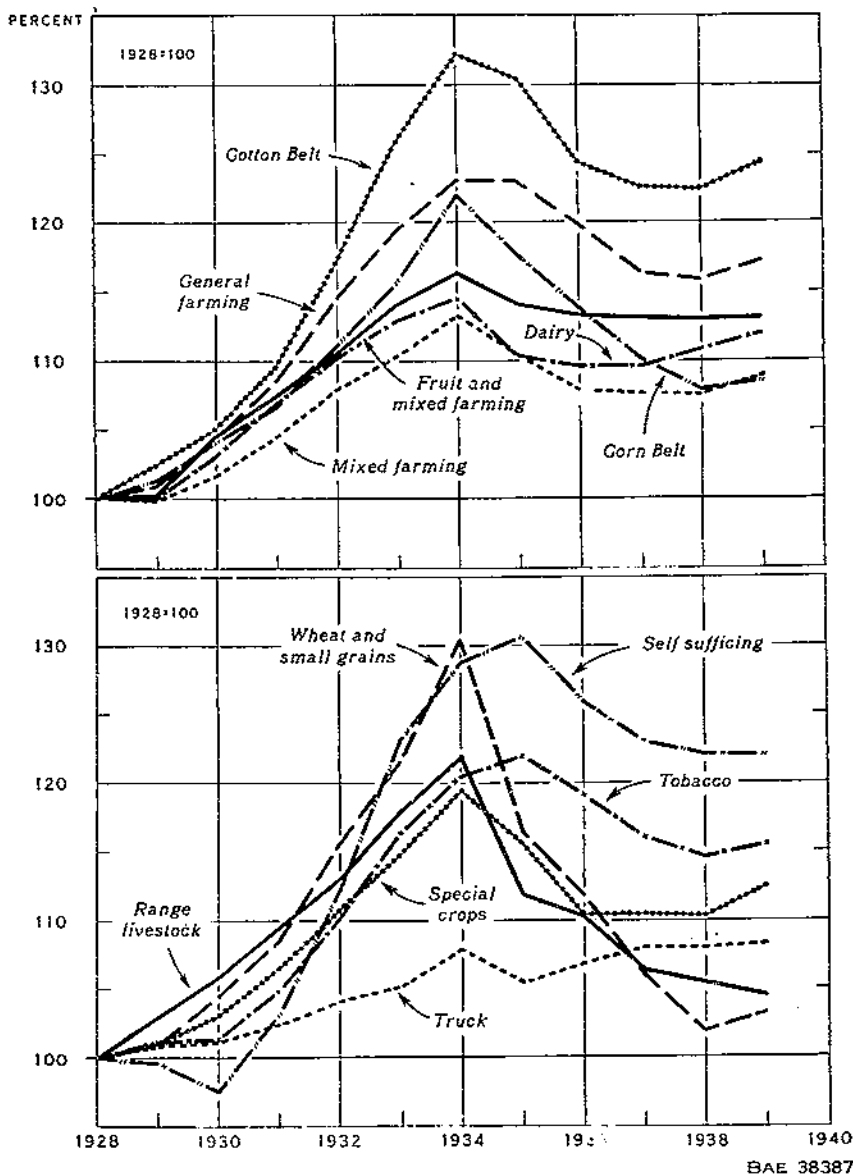


FIGURE 3.—NUMBER OF MILK COWS BY TYPE-OF-FARMING REGIONS IN THE UNITED STATES 1928-39.
(1928=100)

The largest percentage increases in the number of dairy cows have occurred in the Cotton Belt, the self-sufficing region, and the general-farming region.

TABLE 1.—Number and increase of milk cows and heifers 2 years old and over on farms by major type-of-farming regions in the United States, 1928-39¹

Region	Milk cows			
	1928	1939	Increase	
	Thousands	Thousands	Thousands	Percent
Mixed farming	1,703	1,950	157	8.8
Fruit and mixed farming	1,001	1,133	132	13.2
Range livestock	988	1,031	43	4.4
Wheat and small grains	1,687	1,741	54	3.2
Dairy	5,572	6,253	681	12.2
Corn Belt	4,752	5,158	406	8.6
General farming	1,992	2,337	345	17.3
Cotton Belt	2,604	3,612	708	27.1
Self-sufficing	375	457	82	21.9
Special crops	840	955	109	12.5
Tobacco and general farming	74	894	120	15.5
Truck	139	151	12	8.6
United States ²	22,231	25,088	2,857	12.9

¹ Computed from data from U. S. Department of Agriculture, Agricultural Marketing Service.

² The regional numbers add to a slightly different total due to some overlapping of regional boundaries.

There is considerable similarity from region to region in the direction of change in the number of milk cows, yet an examination of the factors associated with the changes in numbers indicates that in certain regions special factors that may not continue to operate in the same way were significant during the period. Thus, the increases in the number of cows in the range-livestock region and the wheat and small-grains region from 1928 to 1939 were curtailed by the drought. The large reduction of cotton acreage in the South, and the increase in the number of self-sufficing farms during the depression are also factors that may not be as important in forthcoming periods. Hence, estimates of further developments must be based largely on considerations other than the percentage changes in the number of milk cows.

As in the case of the total increase for the United States, the regional increases in milk-cow numbers during this period did not proceed at a uniform rate. An unusually large increase occurred from 1928 to 1934 and in some regions to 1935. This was followed by a considerable decline and then a further rise toward the end of the period. The level reached by 1939 was below 1934 or 1935, but in every region it was higher than in 1928.

However, principal attention will be given to the 1928-39 period and the significance of regional trends during that period. Percentage increases in the number of cows may not reflect the true importance of the regional changes that have taken place. A measure of greater value from the standpoint of interregional competition is the absolute increase in the number of milk cows in each region, and the percentage that this is of the total increase in the United States. In some regions in which the increase in the number of milk cows has been small, the percentage rate of increase has been large because of the small number of cows in the region in the base year.

The absolute changes in numbers of dairy cows by regions from 1928 to 1939 have been arranged in order of importance in table 2, and the increases are expressed as percentages of the total increase in the United States. The first four regions—the Cotton Belt, the dairy region, the Corn Belt, and the general-farming region—accounted for

75 percent of the total increase in the number of milk cows in the United States during this period.

TABLE 2.—Increase in the number of milk cows and percentage of the total increase in the United States by type-of-farming regions, 1928-39¹

Region	Increase	
	Thousands	Percent
Cotton Belt.....	708	24.9
Dairy.....	681	23.9
Corn Belt.....	406	14.3
General farming.....	345	12.1
Mixed farming.....	157	5.5
Fruit and mixed farming.....	132	4.6
Tobacco and general farming.....	120	4.2
Special crops.....	106	3.8
Self-sufficing.....	82	2.9
Wheat and small grains.....	54	1.9
Range livestock.....	43	1.5
Truck.....	12	.4
United States ²	2,857	100.0

¹ Computed from data from U. S. Department of Agriculture, Agricultural Marketing Service.

² The regional numbers add to a slightly different total due to some overlapping of regional boundaries.

The Cotton Belt shows the largest absolute increase in the number of milk cows, although the increase in this region is only slightly above that in the dairy region. Each accounted for about one-fourth of the total United States increase in milk cows. The Corn Belt and the general-farming region registered fairly large increases during the period, while increases in each of the other eight regions were in each case less than 6 percent of the total.

Absolute changes in milk-cow numbers may not always indicate corresponding changes in milk production if there are considerable differences between regions in production per cow or in rates of change in production per cow. Milk production per cow in Alabama, for example, is much lower than in Wisconsin, and a similar absolute change in cow numbers would not mean nearly so much additional milk in Alabama as in Wisconsin.

Data showing total milk production or production per cow are not available by counties except for census years. Hence, regional totals cannot be prepared on the same basis as for cow numbers. Reasonably accurate estimates of milk production can be made, however, by estimating production per cow for each type-of-farming region from production data for States falling mainly within each region. These regional estimates of milk production per cow can then be applied to the milk-cow numbers for each region. The result is an estimate of milk production for each type-of-farming region that takes account of changes in the production of milk per cow, as well as changes in the number of milk cows.

Table 3 shows estimates of the increases in total milk production on farms from 1928 to 1938 for each of five type-of-farming regions, the increase in each region being expressed as a percentage of the total increase in the United States during this period.⁵ This compari-

⁵ Estimates of milk production have been made for only five regions, as the other regions were so widely scattered as to make difficult the selection of States sufficiently representative.

son shows that the dairy region contributed most to the rise in milk production during this period, accounting for more than 23 percent of the total increase. It is followed closely, however, by the Cotton Belt and the Corn Belt.

The three regions of largest production show increases in production from 1928 to 1938 of approximately equal magnitude. Although the percentage rate of increase in milk production was highest in the Cotton Belt, the absolute increase was slightly smaller than that in the dairy region and only a little above that in the Corn Belt. These three regions accounted for 65 percent of the total increase in milk production on farms from 1928 to 1938.

TABLE 3.—Increase in milk production in the United States from 1928 to 1938 and percentage of total increase supplied by 5 of the 12 type-of-farming regions¹

Region	Milk production			
	1928	1938	Increase	Percentage of total United States increase
	<i>Million pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>	<i>Percent</i>
Dairy	28,983	32,070	3,117	23.6
Corn	19,085	21,624	2,539	19.2
Cotton	7,778	10,651	2,873	21.8
Wheat and small grains	6,235	6,662	427	3.2
Range livestock	4,637	4,993	356	2.7
United States ²	95,910	107,255	11,345	100.0

¹ Computed from data from U. S. Department of Agriculture, Bureau of Agricultural Economics and Agricultural Marketing Service. The States selected as being representative of the five type-of-farming regions, and upon which the estimates of total production in each region are based, are: (1) Cotton Belt—South Carolina, Georgia, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas; (2) Corn Belt—Iowa, Missouri, Illinois, and Indiana; (3) dairy region—New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Michigan, Wisconsin, and Minnesota; (4) wheat and small-grains region—Kansas and North Dakota; and (5) range-livestock region—Idaho, Utah, Wyoming, New Mexico, Arizona, and Nevada.

² Production figures shown for the United States are the latest revisions. As State data, revised in accord with the latest revision of United States production, are not yet available for 1928, the estimates of production by regions are based on a United States production of 95,951 million pounds in 1928 and of 107,155 million pounds in 1938.

REGIONAL TRENDS IN MANUFACTURED DAIRY PRODUCTS

Up to this point consideration has been given to trends in total milk production. Attention may now be directed to national and regional trends in the production of some of the more important dairy products. Complete information for 1939 is not yet available (June 1940), so the following discussion will be based mainly on changes from 1928 to 1938. The year 1928 may be considered as a representative base year. The quantities of the various dairy products manufactured in 1928 appear to have been nearly the same as the average yearly production for the period 1924-29. The production of milk in both 1928 and 1938 was fairly close to that indicated by the trend in production from 1928 to 1939.

From 1928 to 1938, total milk production on farms in the United States increased about 12 percent. In table 4 are shown the percentage rates of increase in the production of butter, cheese, evaporated milk, and in the amount of milk and cream used for fluid consumption. These products in 1938 accounted for more than 95 percent

of the total milk production on farms. Milk and cream for fluid consumption with an apparent increase of 6.5 percent and butter with an increase of nearly 11 percent have not increased so rapidly as has total milk production. Cheese and evaporated milk, on the other hand, show high percentage rates of increase, being much above that for total milk production. The production of some less important products has expanded at still higher rates.

The estimates for fluid milk and cream are somewhat uncertain as information concerning consumption is not entirely adequate. It may be that the percentage increase shown in table 4 should be somewhat higher. Even so, however, the rate of increase in fluid milk and cream consumption has been considerably lower than the percentage increase in milk production on farms.

TABLE 4.—Quantities of milk used in the United States in the production of 4 selected products in 1928, and percentage increase in production in these products, 1928-38

Product	Production 1928 ¹ (milk-equivalent)	Production increase 1928-38
	Billion pounds	Percent
Butter, farm and factory	45.8	19.5
Cheese (total) ²	7.2	65.8
Evaporated milk (case)	4.5	57.4
Fluid milk and cream ³	45.1	6.5

¹ U. S. Agricultural Marketing Service, Production of Manufactured Dairy Products 1938 [processed].

² Data for 1928 from U. S. Bureau of Agricultural Economics, Butter: Supply, distribution, and per capita consumption in the United States (November 1937) [processed].

³ Exclusive of cottage, pot, and bakers' cheese.

⁴ Data for 1928 from U. S. Bureau of Agricultural Economics, Dairy Products Manufactured, 1928, By Months [processed].

⁵ Fluid consumption both on farms and in cities and villages.

⁶ Consumption in cities and villages in 1928 from U. S. Department of Agriculture, Agricultural Statistics 1939, p. 382. Consumption on farms from U. S. Bureau of Agricultural Economics, Farm Value, Gross Income, and Cash Income from Farm Production, pt. 1, sec. 2, p. 336 [reincorporated].

Information pertaining to manufactured dairy products is not readily available for areas smaller than States and therefore cannot be presented for type-of-farming regions. An attempt has been made, however, to group the States into seven regional groups corresponding as closely as possible to the principal type-of-farming regions. The regional grouping used is indicated in figure 4. The dairy region, the Corn Belt, the range-livestock region, and the Cotton Belt correspond fairly closely to the type-of-farming regions with the same designations. The following discussion is based on changes in these seven groups of States.

BUTTER PRODUCTION IN FACTORIES

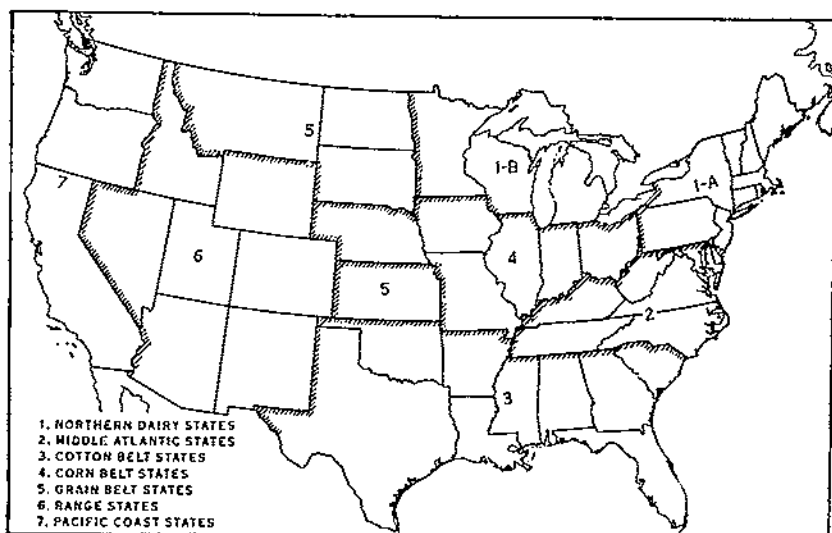
The production of butter in factories in the United States increased 20 percent during the period 1928-38. Part of the increase was reported in each region. Production in the Corn-Belt States rose 11, in the dairy region 20, and in the Cotton Belt 91 percent. Increases in the other four regions were between 11 percent and 37 percent.

An indication of the interregional importance of the changes in butter production may be obtained from an examination of the proportion of the total national increase contributed by each region (tables 6 and 7, pp. 21-22). More than one-third of the total increase was in

the dairy region, with practically all of this in Michigan, Wisconsin, and Minnesota. The Corn Belt States accounted for 21.6 percent of the total increase, and the Cotton Belt States for 17.5 percent. Increases in the wheat and small-grain States constituted 10.9 percent of the total, while changes in the three other regions were somewhat smaller.

Although the percentage increase in factory-butter production was highest in the Cotton Belt, the absolute increase was less than in the dairy region or the Corn Belt. This, together with the total production in each of these regions as shown in table 7, p. 22, indicates that the Cotton Belt was less important competitively than either the Corn Belt or the dairy region.⁶

Increases in factory-butter production were accompanied by decreases in farm-butter production in most regions. In the Corn Belt



BAE 38388

FIGURE 4.—REGIONS USED IN ANALYSIS OF TRENDS IN MANUFACTURED DAIRY PRODUCTS.

These regions coincide in a general way with the type-of-farming regions with corresponding titles.

total butter production (both on farms and in factories) increased only 1.3 million pounds, or less than 1 percent, from 1929 to 1938, and in the dairy region total butter production increased 56.5 million pounds, or 9 percent.⁷ On the other hand, both farm- and factory-

⁶ A comparison of the quantities of butterfat sold from farms in 1920, as reported by the 1930 Census of Agriculture, with the quantities of butterfat processed in plants in the same States indicates that in 1920 some of the butterfat produced in several of the southern States was processed elsewhere.

⁷ Computed from information in the following publications:
SHEPARD, JOHN B. and SMITH, RICHARD E. MILK PRODUCTION IN THE UNITED STATES, UTILIZATION ON FARMS AND VALUE WITH DETAILS BY STATES, 1929-1932. U. S. Bur. Agr. Econ., Milk Production Trends, Stats. Sup. 2, 52 pp. 1933. [Mimeographed.]
U. S. AGRICULTURAL MARKETING SERVICE. DISPOSITION AND VALUE OF MILK PRODUCED ON FARMS 1937 AND 1938. 151 pp. [Mimeographed.]
U. S. BUREAU OF AGRICULTURAL ECONOMICS. DAIRY PRODUCTS MANUFACTURED, 1929, BY MONTHS. [1] p. 1930 [Mimeographed.]

butter production increased in the Cotton Belt, and total production was 45.3 million pounds, or 17 percent, larger in 1938 than in 1929.

It should be pointed out that the inclusion of farm-butter production overemphasizes the commercial importance of the increase in the Cotton Belt, as the Census of Agriculture of 1930 indicated that less than one-fifth of the farm butter is sold from farms in that region. Although little additional information is available on the subject, it appears fairly certain that the decrease from 1929 to 1938 in butter sold from farms in the dairy region and in the Corn Belt did not exceed 10,000,000 pounds in either case. The increase in sales of butter from farms in the Cotton Belt during this period was probably less than 5,000,000 pounds.

AMERICAN CHEESE

Percentage changes in the production of full-cream American cheese from 1931 to 1938 were somewhat larger than in the case of butter during this period, although it may be noted that the production of this type of cheese is much less important than the production of butter from the standpoint of the volume of milk used in its manufacture.⁸ The major increases occurred in the dairy region, Corn Belt, and Cotton Belt. In millions of pounds the increases in the production of this type of cheese were 53, 62, and 33 respectively. Altogether these three regions supplied nearly 80 percent of the total increase in the production of this type of cheese, with the Corn Belt alone accounting for almost one-third of the total increase in the United States (tables 6 and 8, pp. 21-23). As in the case of butter, the percentage increase in production was larger in the Cotton Belt than in either the dairy region or the Corn Belt. The production of this type of cheese in the Middle Atlantic States increased more than 300 percent during this period. Production in the base year was very small, however, and this region accounted for less than 4 percent of the total production in 1938.

EVAPORATED MILK

Regional changes in the production of unskimmed evaporated milk packed in cases have been somewhat similar to those in the production of cheese (table 9, p. 24). The dairy region accounted for 27.5 percent of the national increase during the period from 1928 to 1938, while the increased production in the Corn Belt constituted an additional 40.6 percent of the total. The Middle Atlantic States contributed approximately 15 percent of the total increase, and the Cotton Belt and the Pacific Coast States accounted for only about 8 percent each.

A partial offset to the increase in evaporated milk is represented by a decrease during the period of 49 million pounds in the manufacture of condensed whole milk. This compares with the increase of 767 million pounds for evaporated milk.

In summary, the production of each of the three products discussed has increased in each of the seven regional groups of States during the period considered. The percentage rates of increase during the period have been largest in the Cotton Belt and in the Middle Atlantic States.

⁸ Separate production data for many States were not available for each year from 1928 to 1930.

When translated into absolute terms, however, these increases are found to be fairly small as compared with those in the dairy region and the Corn Belt. The dairy region has increased butter production by a larger absolute quantity than has any other region, while the Corn Belt has accounted for the largest absolute increases in the production of American cheese and evaporated milk.

DISPOSITION OF INCREASES

The foregoing discussion suggests that during the period under consideration not all of the increased milk production entered inter-regionally competitive commercial channels. This is particularly true of production in the South and other newer areas of production. The very considerable expansion in the number of milk cows and milk production is not reflected to the same extent in the output of the important manufactured dairy products—butter, cheese, and evaporated milk. Not only is this true, but shipments from the South to the large receiving centers of the Midwest and Northeast do not appear to have increased greatly. For example, receipts of cheese from the Cotton Belt at the four markets, New York, Chicago, Philadelphia, and Boston, increased only about 60,000 pounds from 1932 to 1938. In each of these years, the Cotton Belt supplied less than 0.1 percent of the total cheese receipts from all States at these markets. Similarly, butter shipments from the Cotton Belt to these four cities increased only about 15 million pounds from 1932 to 1938, advancing from 3.5 to 5.0 percent of the market receipts from all States. The receipts of butter at these four markets from all States constituted about 40 percent of the total United States factory-butter production in 1932 and about 43 percent in 1938 (table 10, p. 24). Fluid cream shipments from the South to these four markets were negligible, being less than 1 percent of total receipts in both 1932 and 1938.

It is probable that southern butter and cheese have moved in greater quantity to smaller markets in other regions and in the South itself. The mere absence of shipments out of the Cotton Belt does not imply a lack of interregional competition in the case of commodities like butter and cheese as it may only mean that imports from other States have been reduced. Yet it may well be that the increased local production of these products in the South and other newer dairy areas has in some degree stimulated local consumption. To this extent it may be said that some of the additional output has not entered into interregional competition.

The consumption of dairy products in many parts of the United States is somewhat below recommended dietary standards, but the deficiency in the South is particularly marked. Considerably larger quantities of milk would be required to meet minimum dietary standards. A recent study indicates that to provide the farm population of the South "with the dairy products needed for a minimum adequate diet would require approximately 3.1 million cows * * * or * * * 31 percent more cows than were used for this purpose in 1937."⁹

⁹ STEANSON, OSCAR, and LANGSFORD, E. L. FOOD, FEED, AND SOUTHERN FARMS. A STUDY OF PRODUCTION IN RELATION TO FARM NEEDS IN THE SOUTH. U. S. Bur. Agr. Econ., Farm Managt. Rpt. 1, 25 pp. 1939. [mimeographed.]

For an explanation of the difference between the increase in total milk production and the lesser increase in production of manufactured products in the South and also in other newer dairy areas, evidence of the change in the consumption of fluid milk and cream both on farms and in cities and villages may be examined. A very considerable part of the increase in the number of milk cows in the South has undoubtedly occurred on new farms or farms that did not have cows at the beginning of the period. A comparison of the number of farms reporting cows milked in 1929 and 1934 according to the United States Census indicates that this is very important (even after allowing for more complete coverage by the 1935 Census). On such farms a comparatively large proportion of the milk is used for home consumption.

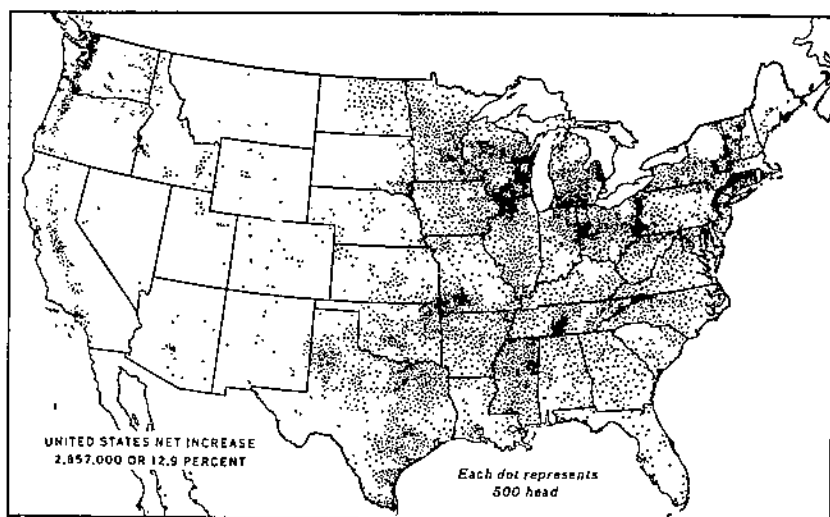
It is estimated that the consumption of fluid milk and cream on farms in the Cotton Belt States increased about 500 million pounds from 1928 to 1938,¹⁰ accounting for about 13 percent of the increase in milk production in these States. About 565 million pounds, or 15 percent of the increase in milk production, was used in making farm butter, a large part of which was consumed on farms.¹⁰ Preliminary information pertaining to the consumption of fluid milk and cream in cities and villages in the South Atlantic and South Central States indicates a somewhat larger percentage increase during this period in the Cotton Belt than in the United States. Perhaps a further 5 to 10 percent of the increased milk production in the Cotton Belt can be accounted for in this way.

Thus, it may be concluded that increases in the quantities of milk used to make farm butter and to supply milk and cream for fluid consumption on farms and in cities and villages accounted for roughly 35 percent of the increase in milk production in the Cotton Belt from 1928 to 1938. In the Corn Belt and the dairy region, on the other hand, a much smaller percentage of the increase in milk production was so used. In the dairy region the increase in the consumption of fluid milk and cream on farms and in cities and villages was only slightly larger than the decrease in the quantity of milk used to make farm butter. Consequently, somewhat less than 5 percent of the increased milk production in the dairy region was needed to supply the net increase in these two uses. In the Corn Belt the consumption of fluid milk and cream on farms increased, but fluid consumption in cities and villages appears to have declined slightly, and the quantity of milk used to make farm butter decreased considerably. It is evident that the quantity of milk used for the production of manufactured dairy products in plants in the Corn Belt increased by a larger absolute amount than did the production of milk.

CHANGES IN PRODUCTION IN SELECTED AREAS

The discussion to this point has been based on regional changes. Certain observations may be made also regarding changes within each of these regions. Absolute changes in the number of milk cows within each region are shown in figures 5 and 6. An examination of these changes indicates clearly that the expansion in dairying during the

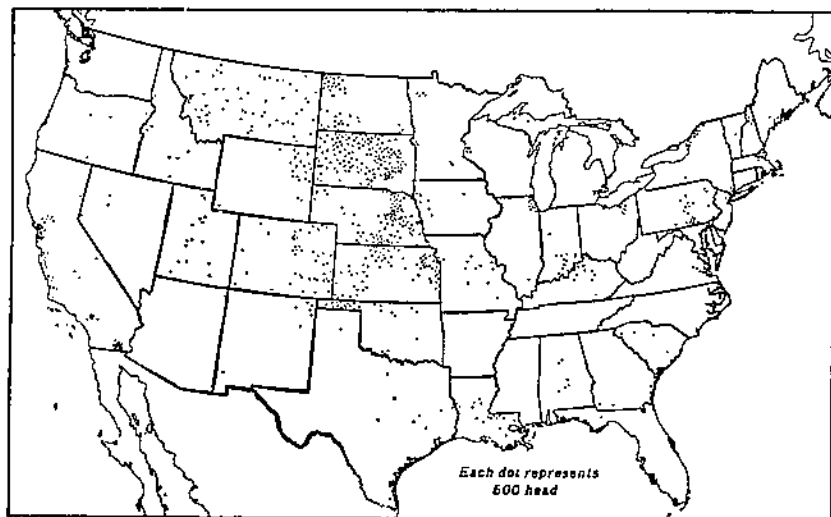
¹⁰ Computed from information in the following publications:
 U. S. BUREAU OF ECONOMICS. FARM VALUE, GROSS INCOME, AND CASH INCOME FROM FARM PRODUCTION. PART I. ESTIMATES BY COMMODITIES AND BY STATES, TOGETHER WITH PRODUCTION, DISPOSITION, AND PRICE DATA 1928, 1929-1930. 192 pp. 1931. [Micrographed.]
 U. S. AGRICULTURAL MARKETING SERVICE. PRODUCTION OF MANUFACTURED DAIRY PRODUCTS 1938 AND MISCELLANEOUS DAIRY STATISTICS 1939. 82 pp., illus. 1940. [Micrographed.]



BAE 38389

FIGURE 5.—INCREASE IN NUMBER OF MILK COWS AND HEIFERS 2 YEARS OLD AND OVER ON FARMS FROM 1928 TO 1939 IN COUNTIES IN THE UNITED STATES REPORTING INCREASES.

An increase in the number of milk cows was reported in most counties from 1928 to 1939, and particularly large changes were recorded in several areas in the dairy region, Corn Belt, and Cotton Belt.



BAE 38390

FIGURE 6.—DECREASE IN NUMBER OF MILK COWS AND HEIFERS 2 YEARS OLD AND OVER ON FARMS FROM 1928 TO 1939 IN COUNTIES IN THE UNITED STATES REPORTING DECREASES.

Most of the decreases in the number of milk cows during the period occurred in counties in the wheat and small-grains region, the range-livestock region, or near certain large cities.

period 1928-39 is a widespread phenomenon, not confined to any one part of the nation. The increases are perhaps more uniformly spread in the northern dairy region and in the Corn Belt. Elsewhere the pattern is more uneven. Decreases have occurred mainly in the drought-affected areas of the Great Plains and around the urban centers of the Northeast.

In many regions, a significant part of the absolute increases in milk-cow numbers appears to be concentrated in certain areas. This is quite noticeable in the South. A study of the history of these areas of concentration usually reveals that dairying has been established for many years and is not an entirely new enterprise. This is one of the reasons these areas have been able to expand more rapidly than others in the same region. Expansion in dairying is often stimulated by the location of dairy manufacturing plants. As there is some tendency for plants to be established in areas where a supply of milk is already available, areas with an early start may sometimes gain a permanent advantage.

Now that certain trends and changes in dairying have been examined, attention may be directed to the reasons for these developments. Farmers respond to many forces in changing their production plans. New price relationships, technological improvements, new institutions like the various government programs for agriculture, all are of importance.

Perhaps it will be helpful in understanding why production in general has expanded if we examine the way in which expansion has occurred in certain selected areas. For this purpose one area in Vermont, one in Wisconsin, and a group of three areas in the South have been chosen.

CABOT-MARSHFIELD AREA, VT.

The Cabot-Marshfield area is a specialized dairy area representative of conditions in northern Vermont. It has recently been studied in detail.¹¹ In this area milk production increased about 6 percent during the period 1926-36. For 120 identical farms in the area, production increased 11.5 percent, but because some farm abandonment is occurring, the net-area increase was only 6 percent. The increase was obtained through greater numbers of cows and by a higher rate of production per cow. Roughage feed to maintain the increased number of cows was obtained by the release of feed formerly used by horses that were replaced by motor trucks and tractors, by an increased production of roughage brought about by a moderate increase in the use of lime and fertilizer, and by an increase in the proportion of the crop acreage planted to annual crops like silage corn and millet. The quality of the roughage as well as the yield was probably improved. Some increase in the rate of grain feeding also occurred. On the basis of careful budget estimates, it is believed that even though milk prices should become somewhat less favorable relative to other prices, milk production in this area will continue to increase during the next decade mainly as a result of improved cropping and fertilizer practices that will still further improve the quality and increase the quantity of available roughage.

¹¹ See footnote 2, p. 2.

DODGE COUNTY, WIS.

Dodge County has also been studied in detail.¹² During the period 1926-36 there was an upward trend in milk production of about 18 percent in this county. This increase is not explained to any extent by a shift of feed resources, as the number of other classes of stock did not change materially. However, feed-producing capacity (excluding pasture) increased nearly 20 percent during the period. This has come about in part through an expansion in total crop acreage, and in part by a rapid increase in the acreage of higher yielding legume hays, particularly alfalfa. Alfalfa in Dodge County, for example, increased from about 10 thousand acres in 1926 to 37 thousand acres in 1936. Budget estimates looking forward another 10 years indicate that even with slightly less favorable prices for dairy products, Dodge County may continue the upward trend in dairy production. Further increases in roughage production and perhaps some release of feed from other livestock seem quite probable. Unless existing price relationships are considerably modified to the disadvantage of dairy products, other alternative classes of livestock cannot compete profitably with dairy cows for the additional feed anticipated.

THREE SELECTED AREAS IN THE SOUTH

In the South, as has been noted, there are certain areas in which especially large increases in the numbers of milk cows have taken place. Information for three of these areas is used in the following discussion. These three areas are in (1) northeastern Texas, (2) south central Tennessee, and (3) east central Mississippi. From 1928 to 1939 the number of milk cows in the three areas increased about 96,000 head. This is about 14 percent of the increase in the entire Cotton Belt during the period.

Several general factors such as the relatively favorable prices of dairy products as compared with the prices of many other agricultural products have been of major importance in bringing about this change. Other factors of local significance in particular areas have also facilitated developments in dairying. The principal changes in these areas appear to have been (1) an increase in land in farms, (2) a transfer of cropland from cotton to hay and forage crops, (3) a release of feed supplies as a result of a reduction in the number of horses, mules, and, in some instances, other types of livestock, and (4) an increase in the number of farms on which cows were milked (table 11, p. 25).

NORTHEASTERN TEXAS

The area in northeastern Texas¹³ is one in which the production of cotton has been a major farm enterprise, the cotton acreage in 1929, for example, making up more than 40 percent of the land available for crops (table 11, p. 25). The natural factors in this area, however, are also suitable for dairying,¹⁴ and in both 1929 and 1934 cows were milked on more than 70 percent of the farms.

¹² CHRISTENSEN, RAYMOND P., and MICHELL, RONALD L. SUPPLY RESPONSES IN MILK PRODUCTION IN DOBGE AND BARRON COUNTIES, WISCONSIN. U. S. Dept. Agr. Tech. Bul. 750. 1941.

¹³ Includes the following counties: Collin, Dallas, Denton, Fannin, Graysen, Hunt, Johnson, and Tarrant.

¹⁴ BUECHEL, F. A., and JOHNSON, ELMER H. MANUFACTURE OF DAIRY PRODUCTS IN TEXAS. Univ. Tex. 1938. [Processed.]

Dairying developed rapidly in this area in the period 1928-39. Much of the increase in milk production appears to have been used to supply the expanding demand for milk and cream for nearby fluid consumption, or for other uses off the farm. The number of milk cows increased approximately 39,000 head or 39 percent, from 1928 to 1939, and the number of farms reporting cows milked increased only about 3,000 from 1929 to 1934. These changes suggest that a large part of the increase in the number of milk cows represented additions to existing herds, and the development of production on many farms beyond that required to supply farm needs.

Notwithstanding a small decrease in land available for crops in this area in northeastern Texas, the acreage of the important feed crops has increased. From 1924 to 1934, as table 11 shows, there were increases in the land in corn, hay, and pasture amounting to about 591,000 acres. Land for this expansion was made available by an increase of about 385,000 acres in land in farms, and by a decrease of about 801,000 acres in the area in cotton. About 45 percent of this decrease in cotton acreage occurred from 1924 to 1929. A considerable part of the remaining decrease occurred in 1934 following the inauguration of the Agricultural Adjustment Administration program.

Additional feed was also made available as a result of a decrease from 1925 to 1935 of 41,000 head, or 29 percent, in the number of horses and mules on farms in the area. During this period the numbers of hogs and sheep increased by 11,000 and 57,000 head respectively, and the Census of Agriculture also shows that there were about 1,400 more beef cows in the area in 1930 than in 1925.

Both Dallas and Fort Worth are in this area, and a considerable part of the increased milk production appears to have been used to supply these 2 markets, as the population of both cities has increased rapidly.¹⁵ This factor is probably of considerable importance in explaining increases in dairying around other large southern cities. The population of the 10 largest cities in the South, for example, has increased markedly in recent years, and this has been accompanied in each instance by a fairly large increase in the number of milk cows in the adjacent counties.

SOUTH CENTRAL TENNESSEE

The area in south central Tennessee¹⁶ is characterized by general-livestock farming with several kinds of livestock and crops.¹⁷ Some cotton is produced, but as a result of certain natural factors and low cotton prices, there has been a gradual reduction in the cotton acreage and its relative importance in the area (table 11, p. 25). Dairying is of considerable importance as is indicated by the fact that in both 1929 and 1934 cows were milked on approximately 80 percent of the farms. From 1928 to 1939 the number of milk cows in the area increased about 27,000 head, or 43 percent, and from 1929 to 1934 the number of farms reporting cows milked increased 1,000. This indicates, as in the Texas area, that much of the increased milk production was used off

¹⁵ Data from the U. S. Bureau of the Census show that from April 1920 to July 1933, the population of Dallas increased about 119,000, or 75 percent, and the population of Fort Worth increased about 63,000, or 59 percent. Population in the United States during this period increased 19 percent.

¹⁶ Includes the following counties: Bedford, Giles, Lincoln, Marshall, Maury, and Rutherford.

¹⁷ LUBKE, B. H., ATKINS, S. W., ALLEN, C. E., and ROHL, W. J. TYPES OF FARMING IN TENNESSEE. Tenn. Agr. Expt. Sta. Bul. 169, 91 pp. illus. 1936.

farms. However, with a cow population of about 92,000 in 1939 and with 19,000 farms reporting cows milked in 1934, it is probable that there are many herds of less than 3 cows in the area.

Despite a decrease of 55,000 acres in corn from 1924 to 1934, feed supplies in the area were probably larger in 1934 as a result of an increase of 154,000 acres in hay and pasture during the period. Furthermore, the Census of Agriculture shows decreases from 1925 to 1935 of 24,000 and 35,000 head in the number of horses and mules, and hogs respectively, and of approximately 12,000 head, or two-thirds, from 1925 to 1930 in the number of beef cows. Part of the feed made available by these decreases was used in feeding sheep, the number of which increased by 39,000 head from 1925 to 1935, but it is probable that the bulk of it was used in feeding milk cows.

EAST CENTRAL MISSISSIPPI

Dairying has developed quite rapidly in east central Mississippi,¹⁸ and information is available regarding other changes in the agriculture of this area.¹⁹

The topography, elevation, and soil fertility of this area, much of which lies in the Black Prairie Belt of Alabama and Mississippi, are well suited for the production of forage and other crops needed for dairying. General farming with cotton as the principal crop has been the major type of farming for many years in this area in east central Mississippi. However, between 1909 and 1919 cotton acreage and production declined considerably, this decrease being due in part to boll weevil and weed infestation. The reduction in cotton acreage developed much more rapidly in this area than in Mississippi as a whole. In the east central area land in cotton declined from 457,000 acres in 1909 to 250,000 acres in 1919 or approximately 45 percent. The decrease in the State as a whole during this period was from about 3,400,000 acres to 2,948,000 acres or about 13 percent. The eradication of the Texas-fever tick and the introduction of legume hay during this period facilitated a shift to cattle raising.

By 1930 dairying was the most important commercial livestock enterprise and its development has continued since then. From 1929 to 1934 the number of farms reporting cows milked increased by 3,000 or 15 percent. The number of milk cows on farms was about 32,600, or 49 percent, higher in 1939 than in 1928.

The feed supply for the additional milk cows came principally from land not previously used in cotton production. From 1924 to 1934 there was an increase of 338,000 acres, or 53 percent, in land in hay, pasture, and corn, whereas there was a decrease of only 42,000 acres, or about 16 percent, in the cotton acreage. Both the number of farms and the acreage of cropland per farm increased during this period with the result that the acreage of land available for crops was about 23 percent larger in 1934 than in 1924.

Comparisons for these areas based on 1925 and 1935 census data need to be qualified because of differences in the census enumerations.

¹⁸ Includes the following counties: Attala, Clay, Lowndes, Monroe, Noxubee, Oktibbeha, Webster, and Winston.

¹⁹ CROSBY, M. A. and JENNINGS, R. D. SYSTEMS OF LIVESTOCK FARMING IN THE BLACK PRAIRIE BELT OF ALABAMA AND MISSISSIPPI. U. S. Dept. Agr. Farmers' Bul. 1546. 1927. CROSBY, M. A. TYPES OF FARMING IN MISSISSIPPI. 128 pp., illus. U. S. Bur. Agr. Econ. in cooperation with Miss. Agr. Expt. Sta. 1940. [Mimeographed.]

It is probable, for example, that considerable areas in Johnson grass and unused in 1925 were reported as in farms and used for hay and pasture in 1935. Despite these qualifications, it seems clear that there were significant increases in feed supplies during the period.

Additional supplies of feed were made available for other uses as a result of a decline from 1925 to 1935 of 6,000 in the number of horses and mules on farms, and from 1925 to 1930 of about 3,500 in the number of beef cows on farms. Changes in the number of hogs and sheep were fairly small (table 11, p. 25).

An important factor contributing to the development of milk production in this area has been the establishment of several dairy-products plants during the past 15 years. In addition, some fluid milk and cream has been shipped to local markets outside the area.

There is considerable similarity in the direction of the changes in these three areas and in the entire Cotton Belt, although certain important differences may be noted. The numbers of milk cows and of farms reporting cows milked increased in the three areas and in the Cotton Belt. But it is probable that a larger percentage of the increased milk production in the three areas was used off the farm than was the case for the entire region. From 1929 to 1934 there was an increase of 240,000 in the number of farms in the Cotton Belt States reporting cows milked (fig. 4 and table 13, p. 26). During this period the number of milk cows in the Cotton Belt type-of-farming region (fig. 2) increased 865,000.²⁰ While there is some difference between the area included in the regions to which the respective data apply, it is clear that a large part of the increase in milk cows is accounted for by the establishment of herds of 3 cows or less. This is in contrast to the situation found in the three selected areas where it appears that much of the increase in the numbers of milk cows resulted from additions to herds already established.

Table 13, p. 26, indicates a large increase from 1924 to 1934 in the acreage in hay, pasture, and corn both in the three selected areas and the Cotton Belt. Furthermore, the expansion in these crops was accompanied in both cases by a reduction in cotton acreage, although in neither case was the decrease in cotton as large as the increase in the acreage of feed crops and pasture. However, the shift out of cotton and into dairying appears to have begun earlier and to have proceeded farther in the three selected areas. Perhaps these areas, being better established in dairying than many other sections of the Cotton Belt, were able to make the transition more easily. Furthermore, these areas have a soil well-adapted to the growth of hay and pasture, and also have had greater difficulty in controlling the boll weevil than has been the case in many other areas in the Cotton Belt.

Additional feed supplies were made available for other uses by a decline both in the three areas and the Cotton Belt in the number of horses and mules on farms (table 12, p. 25). The Census of Agriculture also shows that the number of cows and heifers kept mainly for beef decreased 1,722,000, or 40 percent, from 1925 to 1930 in the Cotton Belt, and 13,500, or 33 percent, in the three selected areas. There was a fairly large increase in the number of sheep in both cases, while the number of hogs increased in the Cotton Belt and decreased slightly in the selected areas.

²⁰ Computed from data from U. S. Department of Agriculture, Agricultural Marketing Service.

SUMMARY AND CONCLUSIONS

For many years there has been a marked and fairly continuous upward trend in milk production and the number of milk cows in the United States. This report examines the changes in production and number since 1928 by major type-of-farming regions. The net change in the number of milk cows from 1928 to 1939 for the United States as a whole closely parallels the upward trend in milk production.

On the basis of percentage changes, it appears that among the more important regions the Cotton Belt experienced the highest rate of increase in the number of milk cows from 1928 to 1939. The increases in the general-farming region, tobacco and general-farming region, and the self-sufficing areas also were above the average rate for the Nation. The increases in the Corn-Belt, truck, range-livestock, and wheat and small-grains regions were somewhat below the average rate.

An examination of the absolute changes in the number of milk cows shows that four regions—the Cotton Belt, dairy, Corn Belt, and general farming—accounted for about 75 percent of the total increase during the period.

In terms of additional milk production it appears that three regions—the dairy region, the Cotton Belt, and the Corn Belt—produced about 65 percent of the total United States increase in production. Their relative contributions to the total were in the above order, although all three were close together.

From 1928 to 1938, total milk production on farms in the United States increased about 12 percent. Production of cheese, evaporated milk, and a number of minor dairy products increased at much higher percentage rates. The production of butter (including both farm and factory production) and the utilization of milk and cream for fluid consumption increased at less than average rates.

Regional trends in the production of major dairy products do not parallel the regional changes in total milk production. Percentage rates of increase in the production of butter, cheese, and evaporated milk were highest in the Cotton Belt and the Middle Atlantic States. But a smaller proportion of the additional milk production in the Cotton Belt, for example, went into these manufactured products than was the case in the dairy region and the Corn Belt.

It is evident that much of the additional milk production in the Cotton Belt and in some of the other regions has been consumed locally. In the Cotton Belt it appears that the percentage increase in the consumption of fluid milk and cream in cities and villages and on farms has been higher than the average increase in the United States in recent years. There has also been an increase in the production of butter on farms in the South in recent years, in contrast to decreases in farm-butter production in the dairy region and the Corn Belt.

The increase in the production of milk on farms with small herds—frequently three cows or less—accounts for a considerable part of the total increase in milk production in the Cotton Belt from 1928 to 1938. This is a major factor in the increased production of farm butter and the increased consumption of fluid milk and cream on farms in this region. The increase in the production of milk to supply commercial markets seems to have been largely limited to localities in which dairying has been established for some time. This early establishment has been associated in many cases with certain natural factors

favorable to dairying, and others unfavorable to cotton production. In other instances the nearness of growing city markets has been the principal factor.

Changes in the agriculture in selected areas in the Northeast, Great Lakes States, and the South have been examined for an explanation of the changes in dairying. In northern Vermont, increases in production have been explained on the basis of increases in available feed, and it seems probable that further increases in feed production in Vermont and other areas of the Northeast may be anticipated as a result of improved fertilizer practices on grass and hay land. Dodge County, Wis., also has increased dairy production largely through the production of more feed on additional cropland and as a result of the growing of more legumes.

For the future it appears that the possibility of still further increases in feed production through the additional production of alfalfa and other roughage feeds may be a real factor throughout the dairy region and the Corn Belt. There is good reason to believe that the continued development of the Agricultural Conservation Program and the increased production of hybrid corn will result in further increases in milk production in established dairy areas, even though prices of dairy products become somewhat less favorable.

In the South it appears that increased dairy production is related to shifts out of cotton and into feed crops and pasture, the reduction in the number of horses and mules, the use of cropland not previously in production, and the establishment of dairy manufacturing plants. Although the possibilities of expansion in dairying are by no means exhausted, further expansion may be at a somewhat lower rate than prevailed during the period of 1928-38. It appears that a major part of the shift from cotton to feed and other crops has been completed. Furthermore, milk production per cow (which increased approximately 325 pounds from 1928 to 1938 in the Cotton Belt) may not continue to rise as rapidly, although some increase may be expected as a result of better-quality feed.

It is altogether possible that increased local consumption of dairy products in the South may proceed rapidly enough to absorb a major portion of the further increases in milk production. Studies of dietary needs of both rural and urban families in the South show that, even on the basis of minimum adequate diets, greatly increased quantities of dairy products should be consumed locally. The extent to which such increased consumption will develop will depend upon a variety of factors, such as consumer income in southern cities and villages, education concerning dietary needs, and the retail prices of dairy products. It must be recognized, of course, that part of any increased consumption of locally produced dairy products in the South will tend to replace products formerly shipped in from the North and will, therefore have some effect on the national situation.

APPENDIX

TABLE 5.—Number of cows and heifers 2 years old and older kept for milk by type-of-farming regions January 1, 1928-39

Region	1928	1929	1930	1931	1932	1933
	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
Mixed farming.....	1,793	1,790	1,825	1,870	1,933	1,977
Fruit and mixed farming.....	1,001	1,021	1,045	1,075	1,105	1,142
Range livestock.....	988	1,017	1,045	1,082	1,117	1,165
Wheat and small grain.....	1,687	1,705	1,762	1,832	1,950	2,052
Dairy.....	5,572	5,572	5,746	5,960	6,141	6,290
Corn Belt.....	4,752	4,814	4,948	5,069	5,281	5,403
General farming.....	1,592	2,011	2,080	2,164	2,284	2,360
Cotton Belt.....	2,604	2,977	3,019	3,183	3,403	3,652
Self-sufficing.....	375	373	360	396	420	451
Special crops.....	819	856	875	904	940	974
Tobacco.....	774	782	781	812	853	901
Trucks.....	130	140	141	142	145	146
United States ¹	22,231	22,440	23,032	23,820	24,806	25,506

Region	1934	1935	1936	1937	1938	1939
	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
Mixed farming.....	2,031	1,982	1,937	1,932	1,929	1,950
Fruit and mixed farming.....	1,104	1,142	1,134	1,132	1,131	1,133
Range livestock.....	1,204	1,105	1,090	1,051	1,037	1,031
Wheat and small grain.....	2,202	1,995	1,889	1,791	1,720	1,741
Dairy.....	6,385	6,150	6,112	6,116	6,172	6,282
Corn Belt.....	5,798	5,503	5,406	5,237	5,122	5,158
General farming.....	2,455	2,448	2,388	2,315	2,310	2,337
Cotton Belt.....	3,612	3,730	3,412	3,504	3,558	3,612
Self-sufficing.....	482	490	472	461	458	457
Special crops.....	1,014	981	936	938	936	955
Tobacco.....	932	914	922	898	886	894
Trucks.....	150	147	149	150	150	151
United States ¹	26,031	26,069	25,439	24,993	24,834	25,088

¹ The regional numbers add to a slightly different total due to some overlapping of regional boundaries. Computed from U. S. Department of Agriculture, Agricultural Marketing Service data.

TABLE 6.—Increase in production of specified dairy products by regions and percentage of the United States increase accounted for by each region, 1928-38¹

Region	Production increase, 1928-38			Percentage of total United States increase		
	Butter ²	Cheese ³	Evaporated milk ⁴	Butter ²	Cheese ³	Evaporated milk ⁴
Northern dairy States:						
Subregion A.....	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Subregion B.....	0.4	1.2	34.3	0.1	0.2	5.4
Total.....	21.4	20.5	27.3	34.2	28.5	22.1
Middle Atlantic States.....	20.1	18.6	28.4	34.3	28.7	27.5
Middle Atlantic States.....	36.6	338.4	221.0	5.4	8.7	14.5
Cotton Belt States.....	90.7	296.8	544.6	17.5	17.7	8.3
Corn Belt States.....	11.5	241.2	158.5	21.0	33.2	40.6
Grain States.....	23.7	61.1	17.8	10.9	2.3	.5
Range States.....	30.7	51.0	1.7	6.0	3.2	.2
Pacific Coast States.....	10.6	40.7	20.7	4.3	0.2	8.4
United States.....	20.0	49.6	57.4	100.0	100.0	100.0

¹ States included in each region are shown in figure 4.

² Creamery butter.

³ Full-cream American. The increase shown is from 1931 to 1938.

⁴ Unskimmed packed in cases.

Computed from data in U. S. Bureau of Agricultural Economics, Dairy Products Manufactured [processed], and U. S. Agricultural Marketing Service, Production of Manufactured Dairy Products [processed].

TABLE 7.—Production of creamery butter by regions, 1928-38¹

Region	1928	1929	1930	1931	1932	1933
Northern dairy States:	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>
Subregion A.....	31,588	26,445	24,683	25,481	24,940	29,742
Subregion B.....	475,335	502,755	522,037	535,902	530,607	537,442
Total.....	507,223	529,200	548,720	562,443	555,613	567,184
Middle Atlantic States.....	43,650	46,045	41,203	41,583	45,808	49,543
Cotton Belt States.....	57,453	68,124	63,646	75,142	92,215	97,870
Corn Belt States.....	569,700	600,738	567,147	601,735	613,373	645,314
Grain States.....	137,863	157,901	155,149	176,353	177,865	190,956
Range States.....	58,783	64,196	68,371	70,491	70,755	73,167
Pacific Coast States.....	122,474	125,444	133,441	139,705	137,963	137,618
United States.....	1,488,146	1,568,248	1,507,747	1,667,452	1,604,132	1,762,088

Region	1934	1935	1936	1937	1938
Northern dairy States:	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>	<i>1,000</i>
Subregion A.....	30,706	30,455	29,288	32,204	32,005
Subregion B.....	514,166	509,932	543,392	533,037	577,294
Total.....	544,872	540,387	572,680	565,301	609,299
Middle Atlantic States.....	46,907	48,281	47,347	50,596	59,642
Cotton Belt States.....	83,766	82,347	85,131	97,062	102,578
Corn Belt States.....	644,430	609,583	569,900	553,140	624,948
Grain States.....	173,233	157,973	156,704	155,552	170,498
Range States.....	67,162	62,215	68,973	71,590	76,811
Pacific Coast States.....	134,248	131,594	128,582	130,730	135,396
United States.....	1,694,708	1,632,380	1,620,407	1,623,971	1,786,172

¹ States included in each region are shown in figure 4.

Data for 1928-37 are from U. S. Bureau of Agricultural Economics, Dairy Products Manufactured [processed], and for 1938 are from U. S. Agricultural Marketing Service, Production of Manufactured Dairy Products (processed).

TABLE 8.—Production of American cheese by regions, 1928-38¹

Region	1928 ²	1929 ²	1930 ²	1931	1932	1933
Northern dairy States:	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Subregion A.....				28,305	24,095	28,550
Subregion B.....				253,203	241,824	250,516
Total.....				286,508	265,919	285,076
Middle Atlantic States.....						
Cotton Belt States.....				4,833	5,879	6,703
Corn Belt States.....				11,070	17,238	23,221
Grain States.....				25,564	30,245	35,551
Range States.....				6,678	7,089	9,817
Pacific Coast States.....				11,817	12,028	13,252
United States.....	20,154	20,091	22,610	28,178	31,445	34,711
Total.....	335,253	370,314	378,810	374,648	370,743	408,631

Region	1934	1935	1936	1937	1938
Northern dairy States:	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Subregion A.....	27,948	22,813	24,480	32,126	28,633
Subregion B.....	271,574	292,025	294,207	268,040	311,190
Total.....	299,522	314,838	318,796	301,006	339,823
Middle Atlantic States.....					
Cotton Belt States.....	7,571	12,571	13,301	15,190	21,080
Corn Belt States.....	22,073	25,402	31,620	38,406	43,031
Grain States.....	47,507	57,141	65,255	77,057	87,255
Range States.....	10,205	10,357	9,019	8,540	10,959
Pacific Coast States.....	14,351	13,332	15,371	14,007	17,840
United States.....	34,082	35,389	34,205	37,115	39,650
Total.....	435,401	468,999	487,576	492,041	560,542

¹ States included in each region are shown in figure 4.² Data for most regions are not available prior to 1931.

Data for 1928-37 are from U. S. Bureau of Agricultural Economics, Dairy Products Manufactured (processed), and for 1938 are from U. S. Agricultural Marketing Service, Production of Manufactured Dairy Products (processed).

TABLE 9.—Production of evaporated milk by regions, 1928-38¹

Region	1928	1929	1930	1931	1932	1933
Northern dairy States:	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Subregion A.....	119,870	105,601	107,431	109,702	129,651	116,834
Subregion B.....	620,378	692,018	629,985	615,510	692,044	783,722
Total.....	740,248	797,679	737,426	725,221	821,695	900,556
Middle Atlantic States.....	50,375	84,880	80,586	75,823	86,096	93,135
Cotton Belt States.....	11,612	10,630	22,816	33,007	39,025	33,908
Corn Belt States.....	166,161	245,003	242,978	234,318	255,243	282,305
Grain States.....	23,210	24,454	26,611	23,802	21,904	25,601
Range States.....	94,723	94,351	97,900	95,470	79,059	93,626
Pacific Coast States.....	217,692	233,047	240,726	241,346	297,590	287,599
United States.....	1,337,022	1,499,644	1,449,149	1,428,983	1,570,612	1,716,700

Region	1934	1935	1936	1937	1938
Northern dairy States:	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
Subregion A.....	105,845	145,749	202,960	153,413	180,968
Subregion B.....	774,680	808,953	880,492	752,905	789,785
Total.....	880,525	954,702	1,083,452	906,378	950,753
Middle Atlantic States.....	101,633	120,597	115,067	125,479	101,706
Cotton Belt States.....	30,899	31,595	47,036	62,431	74,946
Corn Belt States.....	315,759	352,815	410,067	442,202	510,865
Grain States.....	20,351	23,250	15,423	21,443	27,342
Range States.....	86,795	53,269	57,845	89,922	86,315
Pacific Coast States.....	269,578	272,672	281,839	254,680	232,368
United States.....	1,711,570	1,838,890	2,043,759	1,902,545	2,104,198

¹ States included in each region are shown in figure 4.

Data for 1928-37 are from U. S. Bureau of Agricultural Economics, Dairy Products Manufactured (processed), and for 1938 are from U. S. Agricultural Marketing Service, Production of Manufactured Dairy Products (processed).

TABLE 10.—Receipts of butter and cheese at 4 markets, by State of origin, 1932 and 1938¹

State	Butter		Cheese	
	1932	1938	1932	1938
	Pounds	Pounds	Pounds	Pounds
Alabama.....	233,769	53,288	440	
Arkansas.....	1,019,281	3,232,029		
Georgia.....	204,185	3,440	3,596	75,000
Mississippi.....	2,122,734	2,575,408	9,931	32,377
Oklahoma.....	12,212,499	25,481,674	2,225	34,118
South Carolina.....	33,188	13,920		
Louisiana.....	14,140		12,480	
Texas.....	7,871,935	7,230,547	56,018	2,061
Total.....	23,711,797	38,590,306	84,702	143,556
United States.....	680,091,289	764,435,359	142,441,458	147,664,786

¹ New York, Chicago, Philadelphia, and Boston.

Data are from U. S. Bureau of Agricultural Economics, Dairy and Poultry Market Statistics, Annual Summaries, 1932 and 1938 [processed].

TABLE 11.—Number of farms, land in farms, land available for crops, acreages of specified crops, and numbers of specified types of livestock, in selected areas in Mississippi, Texas, and Tennessee by census years, 1925, 1930, and 1935¹

Item	East-Central Mississippi			Northeastern Texas			South-Central Tennessee		
	1925	1930	1935	1925	1930	1935	1925	1930	1935
	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
Total farms..... number	24	30	31	41	39	40	24	22	21
Land in farms..... acre	1,781	1,947	2,265	3,522	3,761	3,907	1,807	1,846	1,916
Land available for crops ² acre	961	1,038	1,178	2,797	2,859	2,716	1,121	1,140	1,161
Pasture ³ do	313	442	519	572	778	1,005	415	463	501
Hay ⁴ do	51	66	124	141	134	246	148	157	213
Cotton lint..... do	255	359	213	1,581	1,221	780	85	72	58
Corn..... do	241	243	338	374	416	427	371	365	316
Horses and mules, all ages..... number	51	52	45	146	124	104	72	57	48
Hogs, all ages..... do	64	64	86	68	94	79	146	155	111
Sheep, all ages..... do	3	6	4	36	79	93	82	172	121
Farms reporting cows milked..... number	(5)	20	23	(4)	28	31	(6)	18	19

¹ The 3 areas and counties included in each are: East-Central Mississippi—Attala, Clay, Lowndes, Monroe, Neshoba, Oktibbeha, Webster, and Winston; Northeastern Texas—Collin, Dallas, Denton, Fannin, Grayson, Hunt, Johnson, and Tarrant; and South-Central Tennessee—Bedford, Giles, Lincoln, Marshall, Maury, and Rutherford. Data from U. S. Census.

² Data for land available for crops, pasture, selected crops, and for farms reporting cows milked are for the years preceding the dates shown.

³ Includes harvested, fallow, idle, fallow, and plowable pasture land.

⁴ All pasture except plowable.

⁵ Includes sorghum for forage.

⁶ Data not available.

TABLE 12.—Number of farms, land in farms, and numbers of specified types of livestock in three selected areas and the Cotton Belt by census years, 1925, 1930, and 1935

Item	1925		1930		1935	
	Three areas ¹	Cotton Belt ²	Three areas ¹	Cotton Belt ²	Three areas ¹	Cotton Belt ²
	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
Total farms..... number	89	1,993	91	2,146	95	2,212
Land in farms..... acre	7,110	236,255	7,557	256,292	8,088	281,109
Horses and mules, all ages..... number	269	5,219	233	4,950	197	4,418
Hogs, all ages..... do	273	7,308	313	8,108	276	7,874
Sheep, all ages..... do	121	3,653	257	7,795	218	7,828

¹ Counties included in these areas are shown in table 11, footnote 1. Data from U. S. Census.

² States included in the Cotton Belt are shown in figure 4.

TABLE 13.—Land available for crops, acreage in specified crops, and farms reporting cows milked in three selected areas and the Cotton Belt by census years, 1924, 1929, and 1934

Item	1924		1929		1934	
	Three areas ¹	Cotton Belt ²	Three areas ¹	Cotton Belt ²	Three areas ¹	Cotton Belt ²
	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>	<i>Thousands</i>
Land available for crops ³ acre	4,879	112,122	5,037	118,676	5,055	117,344
Pasture ⁴ do	1,305	84,509	1,683	103,990	2,025	126,719
Hay ⁵ do	370	8,342	357	6,462	550	10,671
Cotton lint do	1,921	35,463	1,632	30,433	1,651	24,180
Corn do	596	20,547	1,025	20,482	1,051	23,727
Farms reporting cows milked number	67	(*)	66	1,333	73	1,573

¹ Counties included in these areas are shown in table 11, footnote 1. Data from U. S. Census.

² States included in the Cotton Belt are shown in figure 4.

³ Includes harvested, failure, idle, fallow, and plowable pasture land.

⁴ All pasture except plowable.

⁵ Includes sorghum for forage.

⁶ Data not available.

**ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE
WHEN THIS PUBLICATION WAS LAST PRINTED**

<i>Secretary of Agriculture</i>	CLAUDE R. WICKARD.
<i>Under Secretary</i>	PAUL H. APPLEBY.
<i>Assistant Secretary</i>	GROVER B. HILL.
<i>Director of Information</i>	M. S. EISENHOWER.
<i>Director of Extension Work</i>	M. L. WILSON.
<i>Director of Finance</i>	W. A. JUMP.
<i>Director of Personnel</i>	ROY F. HENDRICKSON.
<i>Director of Research</i>	JAMES T. JARDINE.
<i>Director of Marketing</i>	MILO R. PERKINS.
<i>Solicitor</i>	MASTIN G. WHITE.
<i>Land Use Coordinator</i>	M. S. EISENHOWER.
<i>Office of Plant and Operations</i>	ARTHUR B. THATCHER, <i>Chief</i> .
<i>Office of C. C. C. Activities</i>	FRED W. MORRELL, <i>Chief</i> .
<i>Office of Experiment Stations</i>	JAMES T. JARDINE, <i>Chief</i> .
<i>Office of Foreign Agricultural Relations</i>	LESLIE A. WHEELER, <i>Director</i> .
<i>Agricultural Adjustment Administration</i>	R. M. EVANS, <i>Administrator</i> .
<i>Bureau of Agricultural Chemistry and En- gineering.</i>	HENRY G. KNIGHT, <i>Chief</i> .
<i>Bureau of Agricultural Economics</i>	H. R. TOLLEY, <i>Chief</i> .
<i>Agricultural Marketing Service</i>	C. W. KITCHEN, <i>Chief</i> .
<i>Bureau of Animal Industry</i>	JOHN R. MOHLER, <i>Chief</i> .
<i>Commodity Credit Corporation</i>	CARL B. ROBBINS, <i>President</i> .
<i>Commodity Exchange Administration</i>	JOSEPH M. MEHL, <i>Chief</i> .
<i>Bureau of Dairy Industry</i>	O. E. REED, <i>Chief</i> .
<i>Bureau of Entomology and Plant Quarantine</i>	LEE A. STRONG, <i>Chief</i> .
<i>Farm Credit Administration</i>	A. G. BLACK, <i>Governor</i> .
<i>Farm Security Administration</i>	C. B. BALDWIN, <i>Administrator</i> .
<i>Federal Crop Insurance Corporation</i>	LEROY K. SMITH, <i>Manager</i> .
<i>Forest Service</i>	EARLE H. CLAPP, <i>Acting Chief</i> .
<i>Bureau of Home Economics</i>	LOUISE STANLEY, <i>Chief</i> .
<i>Library</i>	CLARIBEL R. BARNETT, <i>Librarian</i> .
<i>Bureau of Plant Industry</i>	E. C. AUCHTER, <i>Chief</i> .
<i>Rural Electrification Administration</i>	HARRY SLATTERY, <i>Administrator</i> .
<i>Soil Conservation Service</i>	H. H. BENNETT, <i>Chief</i> .
<i>Surplus Marketing Administration</i>	MILO R. PERKINS, <i>Administrator</i> .

This bulletin is a contribution from

Bureau of Agricultural Economics..... H. R. TOLLEY, *Chief*.

END