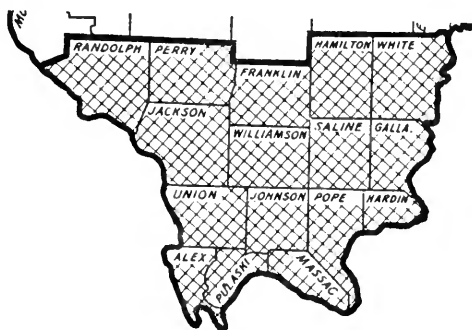


PRODUCTION AND UTILIZATION OF MILK in 16 Southern Illinois Counties

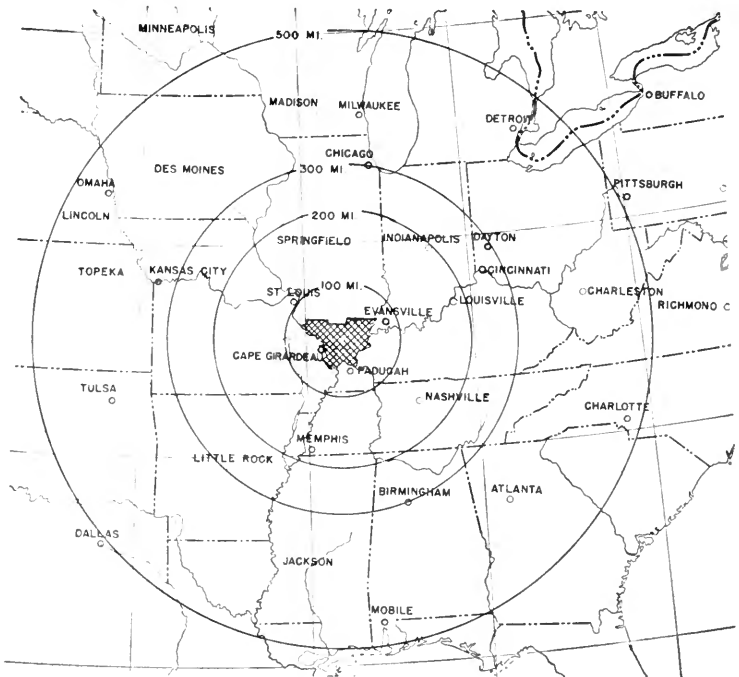
Historical Developments and
Future Possibilities

By Alex Reed
and R. W. Bartlett



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The 16-county region (shown in cross-hatch) is strategically located to potential milk markets. (Fig. 1)

Production and Utilization of Milk in Sixteen Southern Illinois Counties

By ALEX REED and R. W. BARTLETT^a

ESTIMATES ARE THAT BY 1975 the population of the United States will exceed 200 million people — an increase of about 35 million over the 1955 population. To satisfy the food needs of this rapidly increasing population, new areas of production will have to be developed and old areas expanded, particularly if per-capita consumption of livestock and livestock products increases as well. For this reason and since additional farm income is needed in southern Illinois, the possibility of expanding dairy farming in the sixteen southernmost counties in Illinois is explored in this bulletin.

Scope of Study and Source of Data

To review the historical and current developments in dairying in the region from 1899 to 1952, as well as the various factors affecting those developments, many reports were studied. Some of these are listed on page 24, others are cited in the footnotes. Data concerning seasonality of production, production per farm of Grade A and non-Grade A milk, and average size of herds producing Grade A milk were obtained from the Prairie Farms Creamery at Carbondale and from the fieldmen of that company. Data on per-capita consumption of fluid milk in Carbondale and Murphysboro were obtained from responses to a questionnaire sent to dairies distributing milk in those towns during April of 1951, 1952, and 1953, a representative month for fluid-milk consumption.^{3*}

Physical Characteristics of the Region

Location

The region studied in this bulletin consists of the sixteen southernmost counties in Illinois shown on the cover. This region comprises 6,160 square miles or about 11 percent of the territory in Illinois. Most of the region lies south of the thirty-eighth parallel, and is bounded on the east by the Wabash and Ohio rivers and on the west by the Mississippi river. The confluence of the Ohio and Mississippi rivers forms

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* Superior figures refer to literature cited on page 24.

the southern tip of the region. From east to west across the broadest portion, the region extends about 90 miles; north to south, about 70 miles. Marion in Williamson county is situated near the center of the area and is about 320 miles south of Chicago (Fig. 1, page 2).

Climate

The amount of rainfall in southern Illinois is conducive to an abundance of forage, essential for economical milk production. Rainfall averages 36 to 46 inches annually, and is fairly evenly distributed throughout the year, with very few months having less than 3 inches of rain. During some years and during certain months, rainfall is of course above or below the average. Carbondale in Jackson county, for example, had a total of 0.09 inch of rain in September, 1928, yet its lowest annual rainfall was 30.76 inches in 1934, its highest, 74.5 in 1945.⁵

Summer temperatures, however, are not favorable to milk production, particularly when large breeds are involved.⁶ The average July temperature is about 80° F., but maximum temperatures mount as high as 114° F. On the other hand, the rather mild winter is quite favorable to low-cost dairy building. January temperatures average about 35° F., and though occasionally temperatures as low as -26° F. have been recorded, at Cairo in Alexander county the temperature was zero or below in only about 25 years of a 75-year period.

Topography

The topography of the region is ideal for dairy farming. Except for the level plains of the Mississippi, Ohio, and Wabash rivers and the area at the northern tip of the Gulf Coastal Plain, much of the land is rolling to rough. Most of the region falls into two physiographic divisions—the Mt. Vernon Hill Country and the Shawnee Hills Section. The most extensive area of level land is in the southern half of Alexander, most of Pulaski, and the southern part of Massac counties. Even here, however, there are some hills. The elevation ranges from 310 feet above sea level in the southern tip of the region to 1,060 feet in Pope county.

The Illinoian glacier was the only ice mass that reached into the region. It did not cover the entire territory, however. The seven southernmost counties were not glaciated, and, with the exception of the flood plains of the Mississippi and Ohio rivers, they remained rough to hilly. To the nine more northern counties, the glacier, levelling hills and ridges and filling in valleys, gave a smoother relief.

Half the counties in the region have less than 30 percent of their surface in level land (land with less than a 2-percent slope, excluding

untillable bottomland). Perry and Gallatin are the only two counties with 50 percent or more of level land area.

Of the total land area in the region, only about 75 percent is classed as farmland, and of that farmland only about 70 percent is classed as cropland. Of the cropland, less than 35 percent is adapted to intertilled crops; the rest, therefore, can and should be planted to small grain or meadow (hay or pasture). Small grain may consist of winter oats, winter barley, winter rye, and wheat, which provide grazing and grain for dairy cows, and with a high percentage of cropland in meadow, there can be an abundance of hay and pasture essential to economical milk production.

Soils

The soils too are suitable for dairy farming. The vast quantities of water released by the melting glacier left large amounts of finely ground rock materials, or glacial drift, on the wide flood plains of the Mississippi and Ohio rivers. After the water receded, this material, known as loess, was carried by the wind and deposited at varying depths over the entire region. A narrow belt, comprising the high land bordering the Mississippi river, and traversing parts of Randolph, Jackson, Union, Alexander, Pulaski, and Massac counties, was covered with more than 100 inches of loess. Another area, consisting of the remainder of Randolph, Jackson, and Union counties, parts of Williamson, Saline, and Gallatin counties, and all of Johnson, Pope, and Hardin counties, was covered with 50 to 100 inches of loess. The rest of the region, with the exception of the flood plains, was covered with less than 50 inches of loess. From these parent materials the soils of the region developed.

With the exception of the bottomland, these soils are characterized by low inherent fertility. However, given proper treatment and used for certain purposes such as grassland farming, they are quite productive. Although much of the land should not be planted to corn, data on corn yields are indicative of the great responsiveness of these soils to proper treatment (Table 1). According to the Dixon Springs Experiment Station at Robbs in Pope county, "Grass farming on land similar to that of the Dixon Springs Station is not only sound . . . but there is reason to believe that it will bring larger financial returns than any other system of farming that can be widely used on this kind of land." The truth of this statement is demonstrated by the yields of meat per acre on pasture at the Station (Table 2). Since the dairy cow is the most efficient converter of roughage to food, yields of as much as 6 tons of dry matter per acre would produce a substantial quantity of milk.

Table 1. — Corn Yields and Crop Values on Treated and Untreated Soils, Southern Illinois Experimental Fields, Average of 1947-1950^a

| Field | County | Corn yields per acre | | Average annual acre crop values | |
|---------------|----------|----------------------|-------------------|---------------------------------|----------------------|
| | | Untreated (bushels) | Treated (bushels) | Untreated | Treated ^b |
| Brownstown | Fayette | 24 | 75 | \$20.68 | \$53.00 |
| Ewing | Franklin | 11 | 82 | 8.51 | 62.16 |
| Newton | Jasper | 6 | 80 | 6.46 | 63.25 |
| Oblong | Crawford | 23 | 90 | 21.46 | 69.64 |
| Elizabethtown | Hardin | 12 | 64 | 9.76 | 56.45 |
| Raleigh | Saline | 9 | 54 | 6.58 | 35.65 |
| Enfield | White | 9 | 55 | 7.25 | 48.40 |
| Sparta | Randolph | 10 | 62 | 7.20 | 49.64 |

^a Source: Committee on productive capacity. Productive capacity of Illinois agriculture. Univ. Ill. Col. Agr. Mimeo. AE2803e, page 17, 1951.

^b Gross average annual crop values per acre after allowing for cost of fertilizers and their application.

Size of farms

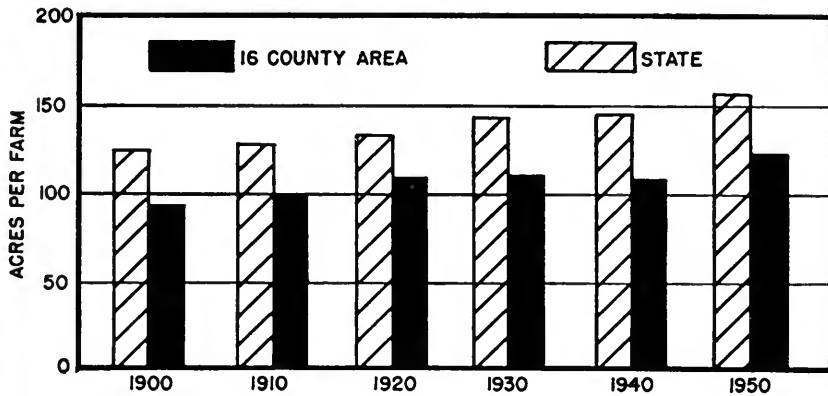
Farms in the region are and have been on the whole smaller than those in the rest of the state (Fig. 2). Many are too small for profitable operation except with the more intensive enterprises such as dairying, poultry production, or the growing of fruits and vegetables. In 1954, 61 percent of the farms were less than 140 acres, and only 21 percent were more than 219 acres (Table 3). Wide variation in average farm size exists among counties. In Randolph county, 43 percent of the farms were less than 140 acres, whereas in Williamson and Franklin counties, 75 percent or more were less than 140 acres.

Eighty to 160 acres are sufficient for an economically operated family dairy farm.¹ To raise beef cattle in combination with swine or sheep requires larger acreages, usually more than 200 acres. Only 21 percent of the farms in the region comprised more than 219 acres in 1954. Thirty-two percent of the farms in Gallatin, Randolph, and White counties and less than 13 percent of the farms in Saline, Franklin, and Williamson counties were in this group. Since the opportunities

Table 2. — Gains by Steers and Forage Yields per Acre at Dixon Springs Experiment Station, Average of 1949-1951^a

| Field | Days pastured | Gains per acre | Forage yields, dry matter per acre |
|--------|---------------|----------------|------------------------------------|
| | | <i>lb.</i> | <i>lb.</i> |
| 1..... | 206 | 374 | 11,776 |
| 2..... | 225 | 410 | 12,788 |
| 3..... | 206 | 366 | 11,385 |
| 4..... | 225 | 414 | 12,533 |
| 5..... | 206 | 375 | 11,635 |
| 6..... | 206 | 362 | 11,582 |

^a Source: Dixon Springs Experiment Station. Grazing value of mixed legumes and grasses. Ill. Agr. Exp. Sta. Mimeo. DS30 (3rd rev.), page 4, 1952.



On the average, farms in the region are and have been smaller than those in the rest of the state, and would be more successful with such intensive enterprises as poultry, fruit-and-vegetable, or dairy production. (Fig. 2)

in many counties for operating beef cattle farms profitably are limited by the size of the farms (particularly in Hamilton, Saline, Franklin, and Williamson, which have a large percentage of farms under 140 acres), those that have been producing beef cattle will probably shift to a more intensive enterprise such as dairying, or combine into larger units.

The counties bordering the Mississippi and Ohio rivers that have a large acreage of bottomland will probably continue to have a larger number of crop and grain farms than other counties. The farms in

Table 3. Distribution of Farms by Size in 16 Southern Illinois Counties, 1954^a

| County | Under 30 acres | 30-69 acres | 70-139 acres | 140-219 acres | 220-499 acres | 500-999 acres | 1,000 acres and over | Total farms |
|---------------------------|----------------|-------------|--------------|---------------|---------------|---------------|----------------------|-------------|
| Alexander..... | 110 | 140 | 126 | 92 | 97 | 23 | 6 | 594 |
| Franklin..... | 370 | 421 | 441 | 207 | 158 | 26 | 4 | 1,627 |
| Gallatin..... | 83 | 81 | 124 | 141 | 188 | 45 | 11 | 673 |
| Hamilton..... | 234 | 275 | 388 | 294 | 262 | 24 | 4 | 1,481 |
| Hardin..... | 72 | 131 | 145 | 91 | 74 | 12 | 2 | 527 |
| Jackson..... | 266 | 262 | 425 | 367 | 345 | 56 | 5 | 1,726 |
| Johnson..... | 120 | 179 | 363 | 216 | 166 | 33 | 9 | 1,086 |
| Massac..... | 124 | 175 | 286 | 159 | 102 | 25 | 2 | 873 |
| Perry..... | 179 | 184 | 339 | 250 | 313 | 33 | 3 | 1,301 |
| Pope..... | 97 | 127 | 235 | 150 | 125 | 18 | 5 | 757 |
| Pulaski..... | 195 | 165 | 176 | 115 | 126 | 16 | 1 | 794 |
| Randolph..... | 199 | 155 | 390 | 481 | 474 | 40 | 4 | 1,743 |
| Saline..... | 477 | 342 | 328 | 187 | 202 | 25 | 2 | 1,563 |
| Union..... | 144 | 249 | 380 | 246 | 201 | 24 | 1 | 1,245 |
| White..... | 244 | 188 | 277 | 246 | 392 | 87 | 12 | 1,446 |
| Williamson..... | 258 | 328 | 404 | 176 | 132 | 19 | 2 | 1,319 |
| Total..... | 3,172 | 3,402 | 4,827 | 3,418 | 3,357 | 506 | 73 | 18,755 |
| Percent of all farms..... | 16.91 | 18.14 | 25.74 | 18.22 | 17.90 | 2.70 | .39 | |

^a Source: U.S. Census of Agriculture.

Johnson, Pope, Hardin, and Massac counties that have sufficient acreage of pastureland to support beef cattle economically will probably continue to raise beef cattle. The relative value of various farm products, of course, will tend to determine the choice of enterprise within the limitations imposed by the size of the farm.

Farming-type areas

Illinois has been divided into nine major areas according to the type of farming followed in each area.² These areas have been determined by soil characteristics and sources of income, without regard to county lines.

Randolph county and a very small part of Perry county are in Area 6, which is designated a wheat-dairy-poultry area, but since they are borderline counties, they do not conform strictly to the average for the entire area. In 1945 general farming was the predominant type in Randolph county, with about 43 percent of its farms in that classification; but in 1949 only 26 percent of the farms in that county were classed as general farming. In contrast, the proportion of dairy farms increased from 9.3 percent in 1945 to 15.6 percent in 1949.

Most of Jackson, Perry, Franklin, Williamson, Saline, and Hamilton counties are in Area 7c, a general farming area. The farms are small, and on many of them more than half the total income was accounted for by products used by the operator and his family. In 1949, a large percentage of the farms in this area had less than \$250 income from products sold, yet had other income greater than that received from the farm. In Franklin and Williamson counties about 63 percent of the farms were in this category. The fact that these counties represent the most important coal-mining section of the area probably explains this situation.

Gallatin and White counties are in Area 8, characterized as a grain and livestock area. In 1949 about 61 percent of the farms in these counties were classified as either livestock or field-crop farms.

All of Area 9 falls within the 16-county region and includes the seven southernmost counties and parts of Jackson and Randolph counties. This area is somewhat inaccurately characterized as a fruit-and-vegetable area. Most of the fruit-and-vegetable production is confined to Union, the southern part of Jackson, and the western part of Johnson counties, but the eastern part can better be characterized as a livestock area. In 1949 about 30 percent of the farms were classified as livestock farms, and less than 1 percent as fruit and vegetable farms. In 1949 about 40 percent of the farms in the eastern half of Area 9

were classified as subsistence farms — farms from which less than \$250 was derived from the sale of farm products.

Dairying could well expand in Jackson, Perry, Saline, and Hamilton counties, and, were it not for a large number of part-time farmers, expansion could take place in Franklin and Williamson counties too.

Economic Characteristics of the Region

Income from dairy products

The sale of dairy products in 1949 represented 8.5 percent of the total income from the sale of farm products in the region (Table 4). It should be remembered, however, that this figure does not include the sale of surplus dairy cows and calves since these sales are reported as sales of livestock. If such sales were included, they would equal about 25 percent of the value of other dairy products⁸ and would add another million dollars to the value of dairy products.

Randolph county with 17.1 percent of its income derived from the sale of dairy products was the leading dairy county in the region. Gallatin county with only 1.6 percent of its income derived from the sale of dairy products was the lowest.

Types of farm operators

Because a large percentage of the farms in the region are operated by owners or part-owners, it is difficult to increase the size of farms

Table 4.— Value of Agricultural Products Sold and Percent of Total Sales Derived From Various Products in 16 Southern Illinois Counties, 1949^a

| County | Sale of agricultural products | Percent of sale derived from— | | | | | |
|-----------------|-------------------------------|-------------------------------|----------------------|----------------|------------------|--------------------|-------------------|
| | | Field crops | Fruit and vegetables | Dairy products | Poultry products | Livestock products | Forestry products |
| Alexander..... | \$1,806,325 | 66.0 | 3.3 | 2.3 | 3.2 | 24.6 | 0.6 |
| Franklin..... | 3,231,687 | 36.7 | 5.6 | 7.2 | 9.6 | 40.5 | 0.3 |
| Gallatin..... | 3,988,765 | 49.2 | 0.5 | 1.6 | 6.1 | 42.5 | 0.1 |
| Hamilton..... | 3,219,195 | 34.6 | 0.2 | 5.0 | 19.3 | 40.8 | 0.1 |
| Hardin..... | 760,435 | 13.6 | 0.1 | 2.7 | 11.7 | 71.3 | 0.5 |
| Jackson..... | 5,554,376 | 36.4 | 12.9 | 12.3 | 6.7 | 31.2 | 0.5 |
| Johnson..... | 2,111,950 | 11.6 | 20.5 | 7.4 | 8.3 | 51.1 | 1.1 |
| Massac..... | 2,702,908 | 26.7 | 8.9 | 6.2 | 8.7 | 49.1 | 0.4 |
| Perry..... | 3,366,761 | 32.6 | 1.3 | 14.7 | 11.6 | 39.5 | 0.3 |
| Pope..... | 1,729,652 | 27.1 | 2.7 | 3.5 | 8.1 | 57.8 | 0.8 |
| Pulaski..... | 2,433,581 | 35.2 | 6.8 | 6.2 | 5.1 | 46.0 | 0.6 |
| Randolph..... | 8,453,143 | 34.8 | 1.3 | 17.1 | 9.0 | 37.5 | 0.3 |
| Saline..... | 3,628,350 | 46.4 | 2.0 | 5.4 | 7.5 | 38.6 | 0.1 |
| Union..... | 4,491,861 | 21.6 | 34.2 | 9.5 | 4.4 | 29.7 | 0.6 |
| White..... | 6,170,501 | 53.1 | 0.8 | 2.1 | 5.6 | 37.7 | 0.7 |
| Williamson..... | 2,003,668 | 18.6 | 9.0 | 14.8 | 10.5 | 46.8 | 0.3 |
| Total..... | \$55,653,158 | 36.3 | 6.9 | 8.5 | 8.2 | 39.7 | 0.4 |

^a Source: U.S. Census of Agriculture.

by the purchase of additional land. On the other hand, this situation is favorable for the expansion of dairying since an owner-operator is more apt to make the investment necessary for dairying than an absentee landlord or tenant. In 1950 about 61 percent of the farms were operated by owners, 22 percent by part-owners, and only 17 percent by farm managers. Tenancy decreased from 33 percent in 1935 to 16.7 percent in 1950. Alexander county had the highest percentage of tenancy in 1950 (27.4 percent), while Williamson, Johnson, and Franklin counties had the smallest (less than 10 percent).

Labor supply

The labor supply is sufficient to permit expansion of dairying in the region. In 1950 the total civilian labor force was 120,991, with employment in agriculture representing the largest number of any industrial group (Table 5). A summary of the labor force in the Herrin-Murphysboro-West Frankfort area, which comprises the counties of Franklin, Jackson, Johnson, Perry, Union, and Williamson, indicates that total employment has decreased since 1951, but that employment in agriculture has increased (Table 6).

Credit

Credit should not be a limiting factor in the expansion of the dairy enterprise. The 74 banks operating in the region on December 30, 1950, had total deposits of \$176,692,000 (Table 7). Aside from necessary

Table 5.—The Total Civilian Labor Force, Number Employed, and Employment by Main Industry Groups, in 16 Southern Illinois Counties, April, 1950*

| County | Labor force | Employed force | Industry groups | | |
|-----------------|-------------|----------------|-----------------|--------|---------------|
| | | | Agriculture | Mining | Manufacturing |
| Alexander..... | 6,877 | 6,074 | 755 | 38 | 873 * |
| Franklin..... | 16,257 | 14,969 | 1,340 | 5,680 | 845 |
| Gallatin..... | 3,103 | 2,871 | 1,246 | 206 | 142 |
| Hamilton..... | 4,243 | 4,062 | 1,670 | 310 | 421 |
| Hardin..... | 2,198 | 2,124 | 505 | 805 | 382 |
| Jackson..... | 13,958 | 13,546 | 2,171 | 725 | 1,814 |
| Johnson..... | 2,856 | 2,788 | 1,328 | 55 | 206 |
| Massac..... | 4,909 | 4,565 | 1,129 | 6 | 1,042 |
| Perry..... | 7,841 | 7,450 | 1,398 | 1,693 | 946 |
| Pope..... | 1,930 | 1,859 | 988 | 61 | 45 |
| Pulaski..... | 4,097 | 3,683 | 1,202 | 22 | 624 |
| Randolph..... | 11,279 | 10,793 | 2,511 | 693 | 2,475 |
| Saline..... | 10,846 | 10,273 | 1,329 | 2,467 | 583 |
| Union..... | 6,564 | 6,278 | 2,056 | 68 | 741 |
| White..... | 7,417 | 7,156 | 1,864 | 1,174 | 549 |
| Williamson..... | 16,616 | 15,339 | 1,373 | 3,690 | 2,392 |
| Total..... | 120,991 | 113,830 | 22,865 | 17,693 | 14,080 |

* Source: U.S. Census of Population.

Table 6. — Labor Force Summary for Herrin-Murphysboro-West Frankfort Area, December, 1952^a

| Item | Dec., 1952 | Oct., 1952 | Nov., 1951 |
|--|------------|------------|------------|
| Labor force (civilian)..... | 61,000 | 61,700 | 62,275 |
| Unemployment..... | 9,850 | 9,350 | 8,525 |
| Employment, total..... | 51,150 | 52,350 | 53,750 |
| Nonagricultural wage and salary workers..... | 38,650 | 39,850 | 41,650 |
| All other nonagriculture..... | 5,100 | 5,100 | 5,075 |
| Agriculture..... | 7,400 | 7,400 | 7,025 |

^a Source: Personal letter from Elizabeth J. Slotkin, Illinois State Employment Service, dated Jan. 16, 1953.

reserves, these funds were available for loans and investment. Credit was also available through National Farm Loan Associations and Production Credit Associations.

Population

The population of the region never exceeded the 1920 high of 396,293, and by 1950 had dropped to 355,303 (Table 8). Every county except Hardin, Jackson, and White had a decrease in population between 1940 and 1950. This decrease, contrasting with large population increases for the state and the nation, was largely due to lack of employment opportunities, a situation that expansion of dairying should tend to correct.

Table 7. — Bank Deposits in 16 Southern Illinois Counties, December 30, 1950^a

(In thousands of dollars)

| County | Number of banks | Total deposits (including interbank and governmental deposits) | Deposits of individuals, partnerships, and corporations | |
|-----------------|-----------------|--|---|--------|
| | | | Demand | Time |
| Alexander..... | 2 | 10,950 | 6,885 | 2,270 |
| Franklin..... | 7 | 18,831 | 11,719 | 3,649 |
| Gallatin..... | 2 | 3,650 | 2,805 | 326 |
| Hamilton..... | 3 | 4,350 | 3,267 | 224 |
| Hardin..... | 3 | 3,414 | 1,902 | 953 |
| Jackson..... | 11 | 21,650 | 13,930 | 4,099 |
| Johnson..... | 2 | 2,671 | 1,838 | 440 |
| Massac..... | 4 | 8,997 | 4,201 | 3,350 |
| Perry..... | 4 | 12,158 | 7,236 | 3,204 |
| Pope..... | 1 | 1,552 | 847 | 348 |
| Pulaski..... | 3 | 2,742 | 1,870 | 442 |
| Randolph..... | 10 | 22,033 | 10,549 | 8,101 |
| Saline..... | 5 | 18,128 | 13,540 | 3,013 |
| Union..... | 6 | 10,065 | 6,117 | 2,004 |
| White..... | 7 | 19,855 | 12,539 | 3,970 |
| Williamson..... | 4 | 15,646 | 10,417 | 2,112 |
| Total..... | 74 | 176,692 | 109,662 | 38,505 |

^a Source: Personal letter from Donald L. Henry, Economist, Federal Reserve Bank of St. Louis, Missouri, dated Feb. 4, 1952.

Table 8. — Population in 16 Southern Illinois Counties by 10-Year Periods, 1900-1950.*

| County | 1900 | 1910 | 1920 | 1930 | 1940 | 1950 |
|-----------------|---------|---------|---------|---------|---------|---------|
| Alexander..... | 19,348 | 22,741 | 23,980 | 22,542 | 25,496 | 20,316 |
| Franklin..... | 19,675 | 25,943 | 57,293 | 59,442 | 53,137 | 48,685 |
| Gallatin..... | 15,836 | 14,628 | 12,856 | 10,091 | 11,414 | 9,818 |
| Hamilton..... | 20,197 | 18,227 | 15,920 | 12,995 | 13,454 | 12,256 |
| Hardin..... | 7,448 | 7,015 | 7,533 | 6,955 | 4,317 | 7,530 |
| Jackson..... | 33,871 | 35,143 | 37,091 | 35,680 | 37,920 | 38,124 |
| Johnson..... | 15,667 | 14,331 | 12,022 | 10,203 | 10,727 | 8,729 |
| Massac..... | 13,110 | 14,200 | 13,559 | 14,081 | 14,937 | 13,594 |
| Perry..... | 19,830 | 22,088 | 22,901 | 22,767 | 23,438 | 21,684 |
| Pope..... | 13,585 | 11,215 | 9,625 | 7,996 | 7,999 | 5,779 |
| Pulaski..... | 14,554 | 15,650 | 14,629 | 14,834 | 15,875 | 13,639 |
| Randolph..... | 28,001 | 29,120 | 29,109 | 29,313 | 33,608 | 31,673 |
| Saline..... | 21,685 | 30,204 | 38,353 | 37,100 | 38,066 | 33,420 |
| Union..... | 22,610 | 21,856 | 20,249 | 19,883 | 21,528 | 20,500 |
| White..... | 25,386 | 23,052 | 20,081 | 18,149 | 20,027 | 20,935 |
| Williamson..... | 27,796 | 45,098 | 61,092 | 53,880 | 51,424 | 48,621 |
| Total..... | 318,599 | 350,511 | 396,293 | 375,911 | 385,367 | 355,303 |

* Source: U.S. Census of Population.

Milk Production and Marketing

Number of cows

Although the region has the physical and economic characteristics essential to becoming a leading dairy center, the dairy enterprise has developed relatively slowly. From 1920 to 1950 the number of cows decreased from 76,004 to 62,121, or 18.3 percent, whereas during the same period the number of cows in Illinois decreased only 5 percent.

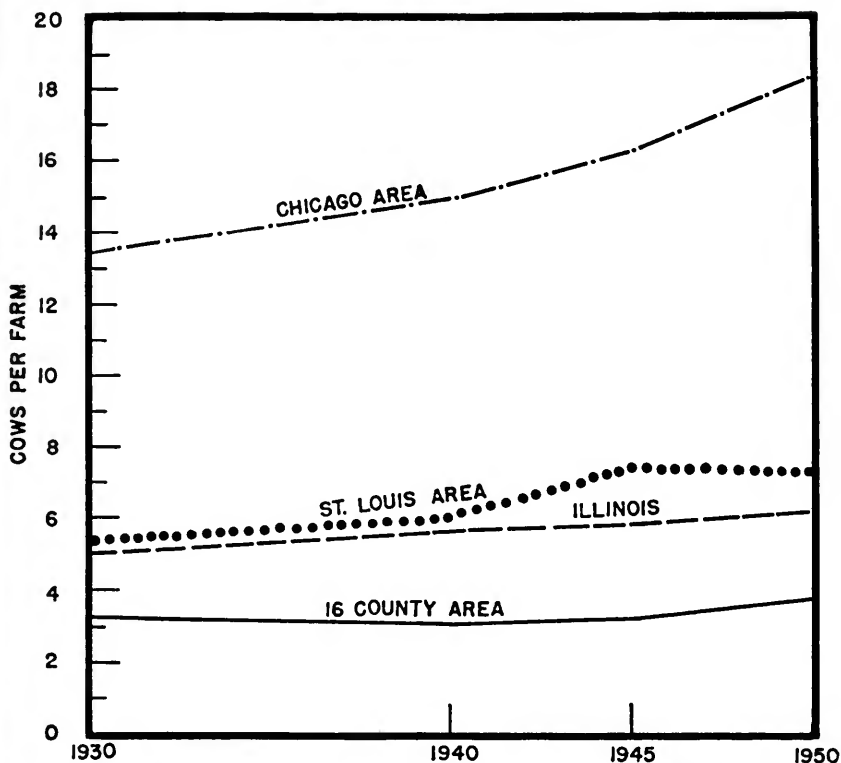
The changes in cow numbers per farm in the St. Louis and Chicago areas, the two areas selected as representative dairy areas of Illinois, indicate that from 1930 to 1950 the responses there were more nearly like the state average than that of the 16-county region (Fig. 3).

Production per cow

Although the number of cows decreased, the amount of milk produced in the region became greater, rising from slightly over 220 million pounds in 1899 to over 265 million pounds in 1949. This was due to increased production per cow. In 1919 the average production of milk per cow was only 2,412 pounds per year; in 1949, 4,267 (Fig. 4). In five counties — Hamilton, Hardin, Massac, Pope, and White — average production of milk per cow decreased from 1944 to 1949, but in the other eleven counties it increased (Table 9).

Production per capita

The per-capita production of milk decreased from 1899 to 1909, from 691 pounds to 434 pounds, but increased slightly by 1919 to 463

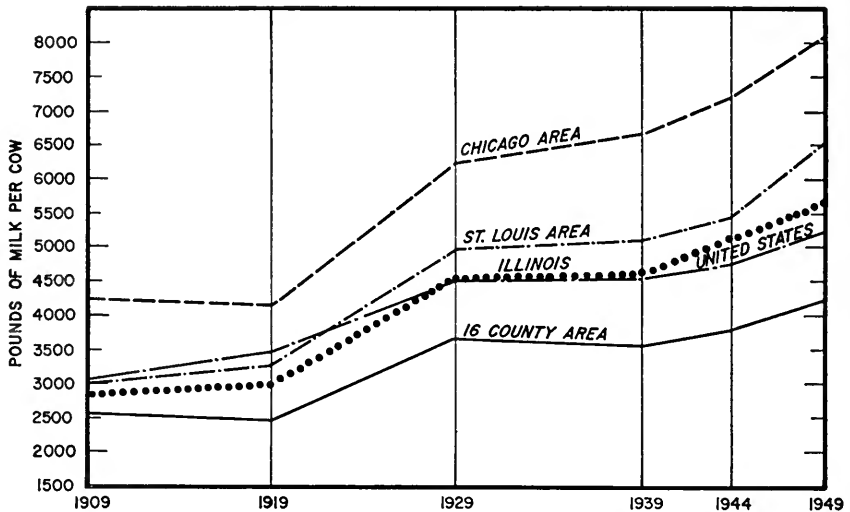


The region has fewer cows per farm on the average than the state as a whole or the selected areas shown. Moreover, cow numbers increased less in the region than in the Chicago and St. Louis areas. (Fig. 3)

pounds. By 1929, because production of milk had increased and the population had decreased, the per-capita production of milk was 686 pounds. From 1929 to 1949, population continued to decrease while milk production continued to increase, so that per-capita production in 1949 was 746 pounds. Though this was below the national average of 792 pounds, it was higher than the state average of 608 pounds (Table 10).

Seasonal variation in supply and demand

One of the problems of many milk markets is getting a sufficient supply of fluid milk to meet the demands during October, November, and December without having a large surplus during April, May, and June. Although no data are available on the monthly *demand* for fluid milk in southern Illinois, it is assumed that the pattern in the region is



Although, on the average, production per cow was lower in the region than in the Chicago and St. Louis areas, the rising trend was strikingly similar. (Fig. 4)

Table 9. — Average Production of Milk per Cow in 16 Southern Illinois Counties and Other Selected Areas, 1909-1949^a

| Area | 1909 | 1919 | 1929 | 1939 | 1944 | 1949 |
|---------------------|-------|-------|-------|-------|-------|-------|
| Alexander..... | 2,954 | 2,564 | 4,160 | 3,357 | 3,383 | 3,727 |
| Franklin..... | 2,853 | 2,380 | 3,846 | 3,413 | 3,414 | 3,732 |
| Gallatin..... | 2,214 | 2,149 | 3,517 | 3,902 | 3,345 | 3,526 |
| Hamilton..... | 2,478 | 2,048 | 3,021 | 2,883 | 3,805 | 3,268 |
| Hardin..... | 2,880 | 3,461 | 2,709 | 2,626 | 3,210 | 2,722 |
| Jackson..... | 2,889 | 2,505 | 3,944 | 4,084 | 4,130 | 4,920 |
| Johnson..... | 2,557 | 2,409 | 3,070 | 3,313 | 2,944 | 4,029 |
| Massac..... | 2,708 | 2,579 | 3,407 | 3,896 | 3,696 | 3,481 |
| Perry..... | 2,218 | 2,320 | 3,686 | 3,518 | 3,757 | 4,351 |
| Pope..... | 2,197 | 2,537 | 2,934 | 3,375 | 3,152 | 2,870 |
| Pulaski..... | 3,206 | 2,648 | 3,715 | 3,678 | 3,587 | 4,042 |
| Randolph..... | 2,115 | 2,126 | 4,306 | 4,230 | 4,997 | 5,240 |
| Saline..... | 2,704 | 2,826 | 4,052 | 3,503 | 3,601 | 3,743 |
| Union..... | 3,214 | 2,865 | 3,624 | 3,338 | 3,150 | 4,444 |
| White..... | 2,185 | 2,344 | 3,398 | 3,289 | 3,917 | 3,636 |
| Williamson..... | 2,959 | 2,425 | 4,016 | 3,447 | 3,550 | 3,721 |
| Average..... | 2,587 | 2,412 | 3,678 | 3,569 | 3,802 | 4,267 |
| Illinois..... | 2,839 | 2,994 | 4,518 | 4,615 | 5,117 | 5,660 |
| United States..... | 3,030 | 3,412 | 4,499 | 4,512 | 4,794 | 5,243 |
| St. Louis area..... | 2,991 | 3,278 | 4,979 | 5,080 | 5,455 | 6,496 |
| Chicago area..... | 4,226 | 4,149 | 6,229 | 6,657 | 7,234 | 8,104 |

^a Source: Data for 1909-1944 taken from U.S. Census of Agriculture; 1949 data for Illinois and the 16 counties taken from Illinois Cooperative Crop Reporting Service; 1949 data for St. Louis and Chicago areas calculated from data taken from Illinois Cooperative Crop Reporting Service.

similar to that of the St. Louis market, nearly uniform from month to month (Fig. 5). For this reason herds with uniform production throughout the year are usually more profitable than those whose production varies widely.

Data on the monthly *supply* of milk are not available either, but information furnished by one firm which handled 60 percent of the fluid milk sold by farmers in the region indicates that variation in supply has become less since 1950 and that a higher percentage of milk was supplied in September, October, and November of 1952 than during the same months of any previous year.

There was greater seasonal variation in Grade C deliveries than in deliveries of Grade A during the two years for which this information was available, 1951 and 1952 (Fig. 6). The average delivery per producer per day was considerably higher for the shippers of Grade A than for the shippers of Grade C (Fig. 7). This was to be expected, since herds producing Grade A milk in the region are larger on the average than herds producing Grade C milk. The average daily delivery per shipper of Grade A in 1952 was 290 pounds; for Grade C, 104 pounds. In the St. Louis area, the average daily delivery per producer was 305 pounds in 1950.⁴

Daily volume of milk

How to increase the volume of milk per producer is one of the key problems in the improvement of dairying in the region. Though the daily volume of Grade A milk produced in the sixteen counties compared favorably with that of the St. Louis area, the daily production of Grade C milk was lower. There were about four times as many producers of Grade C as producers of Grade A milk in the region in 1952.

Milk sold in fluid form

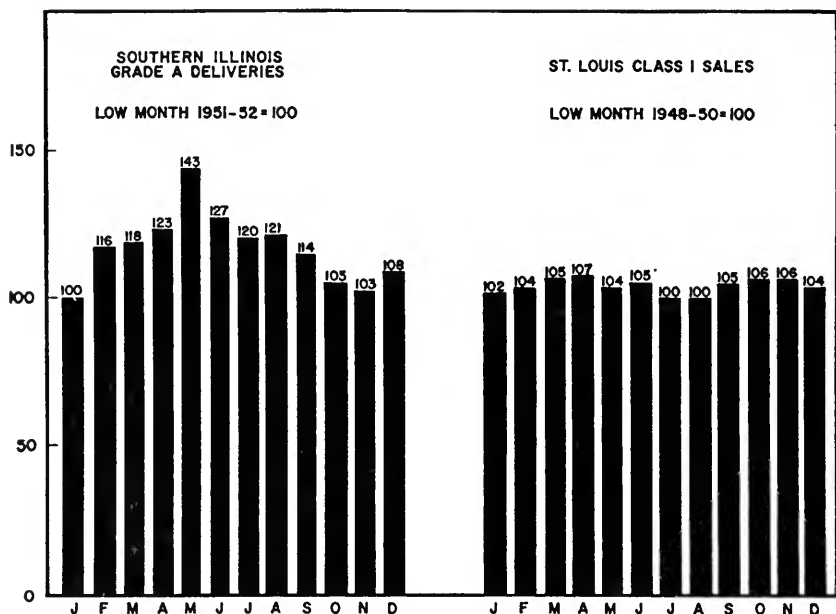
Although the trend of marketing milk as fluid milk is general throughout the country, the change has only gradually affected the

Table 10.—Per-Capita Production of Milk in 16 Southern Illinois Counties, Illinois, and United States

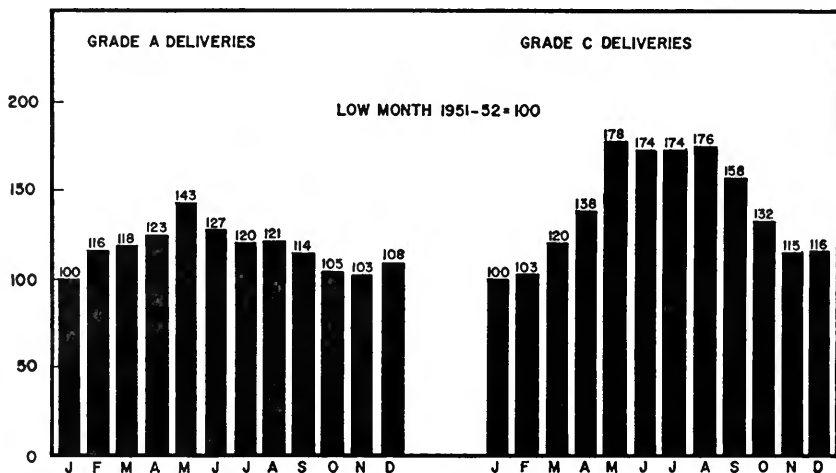
(In pounds)

| | 1899 | 1909 | 1919 | 1929 | 1939 | 1949 |
|---------------------|------|------|------|--------------------|--------------------|------|
| 16 counties..... | 691 | 434 | 463 | 686 | 622 | 746 |
| | | | | (Aug. 25, 1929) | (Aug. 25, 1939) | |
| Illinois*..... | ... | ... | ... | 585 | 628 | 608 |
| United States*..... | ... | ... | ... | 799 | 799 | 792 |

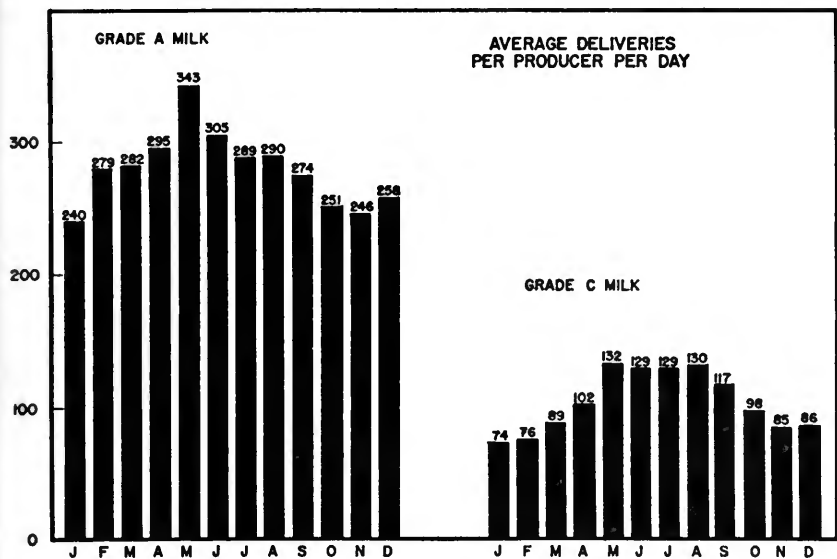
* Source: U.S. Department of Agriculture, Agricultural Marketing Service. The dairy situation Oct., 1951.



People in most markets consume nearly as much milk in one month as in another. Seasonal variation in supply is much wider than in consumption. (Fig. 5)



Seasonal variation for Grade A deliveries was much less than for Grade C deliveries in the region during 1951 and 1952—the two years for which this information was available. (Fig. 6)

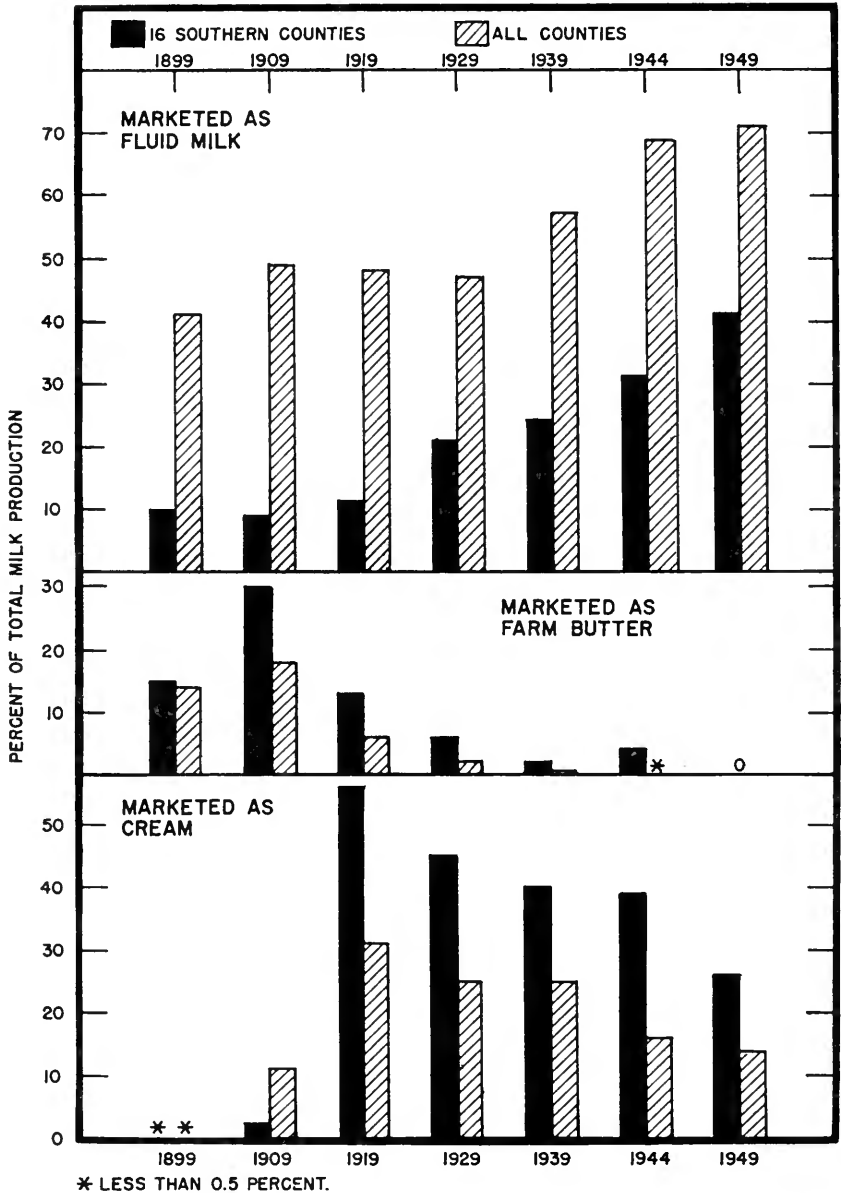


Producers of Grade A milk in southern Illinois had a daily production per herd nearly three times that of producers of Grade C milk. Production is shown in pounds. (Fig. 7)

region. In 1899, only 10 percent of the milk produced in the sixteen counties was marketed as fluid milk, whereas the state average for that year was 41 percent. By 1949 the volume of milk marketed in fluid form increased to 41 percent in the region, whereas the state average rose to 71 percent (Fig. 8). The chief reason for the change being so gradual is that until recent years no adequate market for fluid milk existed in the region. One plant, for example, that annually handled more than 55 million pounds of fluid milk did not begin to buy fluid milk until 1945.

Milk equivalent sold as cream

In 1899 the sale of milk in the form of cream was of little importance in Illinois or the United States, and of even less importance in the region. Only 3 percent of the national milk production was marketed as cream in that year, and only 0.03 for the region and 0.2 for Illinois. By 1919, however, these sales had increased rapidly in the region, rising to 56 percent. Since that year the percentage for the region has gradually declined, as it has in Illinois and in the United States generally (Fig. 8).



The trend of marketing milk as fluid milk, as farm butter, and as cream has followed that of Illinois and the United States (not shown) as a whole. (Fig. 8)

Milk sold as farm butter

Farm butter has been of little importance since 1929, although in 1899, 14 percent of the milk produced in Illinois and 15 percent of that produced in the region was marketed in this form. In 1909 the percentage for the region became much higher than that for Illinois, 30 percent as compared with 18 percent. But after 1944 both the region and the state marketed less than one-half of 1 percent of the milk as farm butter. Nationally, in 1949, less than 1 percent of the milk produced was marketed as farm butter (Fig. 8).

Milk sold as farm cheese

Even in 1899 farm cheese was of little importance either in the region or in the state. In that year the region marketed only 38,000 pounds of milk in that form; Illinois, about 3 million pounds. Since 1910 the Census has not listed farm-cheese production in Illinois.

Dealers

In 1950 eleven plants in the region bought fluid milk from producers. Two of these plants also bought cream and eight of them distributed fluid milk. Some of these distributors purchased milk from another plant that bought directly from farmers. Since 1950, one plant which had bought milk from farmers closed its receiving line and purchased its supply of milk from another receiver. This plant also manufactured cottage cheese and ice cream. Another plant closed its receiving line and brought the fluid milk it sold within the region from its own plant located outside the region.

In 1951 only seven plants reported buying fluid milk from farmers. These purchases amounted to about 79 million pounds of milk, or about 80 percent of the milk reportedly sold as whole milk in the region in 1949. No data are available on how much milk was brought into the region nor how much of the milk was shipped outside the region.

Consumer income and price of milk

Of all factors influencing the per-capita sales of milk, income and milk prices appear most important.^a Table 11 shows the effective buying

^a With per-capita sales as the dependent variable and milk prices and disposable incomes as independent variables, the coefficient of multiple correlation was 0.989 with a standard error of estimate of 0.003. See "Increased incomes and low store prices: the key to higher per-capita milk sales in the Chicago market," by R. W. Bartlett, in *Illinois Farm Economics* (June, 1953, pages 1484-1487).

Table 11.—Effective Buying Income per Family in 16 Southern Illinois Counties, 1939,^a 1945,^a 1949,^b and 1950^b

| County | 1939 | 1945 | 1949 | 1950 |
|--------------------|---------|---------|--------------------|---------|
| Alexander..... | \$1,822 | \$2,436 | \$3,847 | \$3,650 |
| Franklin..... | 1,693 | 2,132 | 3,621 | 3,472 |
| Gallatin..... | 1,060 | 1,576 | 2,426 | 2,345 |
| Hamilton..... | 714 | 1,113 | 1,700 | 1,602 |
| Hardin..... | 878 | 1,022 | 2,077 | 1,980 |
| Jackson..... | 1,549 | 2,609 | 4,131 | 3,930 |
| Johnson..... | 1,114 | 1,578 | 2,286 | 2,229 |
| Massac..... | 893 | 1,619 | 2,167 | 2,055 |
| Perry..... | 1,562 | 2,388 | 3,598 | 3,414 |
| Pope..... | 860 | 1,298 | 1,897 | 1,773 |
| Pulaski..... | 878 | 1,275 | 2,032 | 1,989 |
| Randolph..... | 1,471 | 2,143 | 2,948 | 2,837 |
| Saline..... | 1,464 | 2,464 | 3,802 | 3,664 |
| Union..... | 1,313 | 2,108 | 2,830 | 2,721 |
| White..... | 1,094 | 1,669 | 2,785 | 2,703 |
| Williamson..... | 1,368 | 2,139 | 3,457 | 3,309 |
| State average..... | | | 5,420 ^b | |

^a Reed, Alex, Dietz, Frederick, Judson, P. Mason. Some economic factors affecting dairy farming in southern Illinois. Southern Illinois University Special Service Bulletin No. 1. 1950.

^b Sales Management, Inc. Survey of buying power. May, 1950, and May, 1951.

income per family in the region for certain intervals from 1939 to 1950. (Data on milk prices for these intervals were not available.)

Consumption of fluid milk in the United States increased from 265 pounds per person in 1940 to a high of 335 pounds per person in 1945 (Table 12). This rapid increase during the war years may be explained by the large increase in consumer income, wartime controls that prevented rapid increases in consumer prices, and the relative abundance of milk available. Following the war, however, price controls were dropped and consumer milk prices rose sharply with the consequence that milk sales declined. By 1954 per-capita sales were 299 pounds—11 percent less than they were in 1945. This amount, however, was 13 percent above the 1940 level when consumer income was much lower than in 1954.

To determine whether average daily per-capita sales of fluid milk increased or decreased in the region, a study was made in Carbondale and Murphysboro—two cities in the region—during April of 1951, 1952, and 1953. In Carbondale, per-capita sales increased from 0.60 pint per day in April, 1951, to 0.73 pint per day in April, 1953, or 22 percent. Per-capita sales in Murphysboro also increased during that period, but only by 9 percent, from 0.65 pint a day to 0.71 pint a day. The reasons for the larger increase in Carbondale may be that Murphysboro had no Grade A ordinance or quantity discount, whereas Carbondale had such an ordinance and gave a quantity discount of 3 cents per half-gallon.

Table 12.—Pounds of Dairy Products Consumed per Civilian, Milk Equivalent, United States Averages of 1925-1929 and 1935-1939 and Annual Average, 1940-1954^a

| Year | Fluid milk | Fluid cream ^b | Butter | All cheese | Evaporated and condensed milk | Ice cream | Other ^c | Total milk |
|---------------------------------|------------|--------------------------|--------|------------|-------------------------------|-----------|--------------------|------------|
| Average | | | | | | | | |
| 1925-29..... | 270 | 68 | 358 | 46 | 26 | 24 | 6 | 798 |
| 1935-39..... | 264 | 66 | 337 | 55 | 36 | 25 | 8 | 791 |
| 1940..... | 265 | 66 | 336 | 59 | 41 | 29 | 11 | 807 |
| 1941..... | 267 | 67 | 317 | 58 | 40 | 34 | 8 | 791 |
| 1942..... | 290 | 64 | 313 | 63 | 40 | 39 | 12 | 821 |
| 1943..... | 315 | 56 | 235 | 48 | 40 | 31 | 15 | 740 |
| 1944..... | 328 | 53 | 236 | 48 | 34 | 33 | 20 | 752 |
| 1945..... | 335 | 64 | 216 | 65 | 39 | 37 | 21 | 777 |
| 1946..... | 323 | 66 | 207 | 66 | 40 | 57 | 16 | 775 |
| 1947..... | 306 | 63 | 221 | 68 | 44 | 51 | 5 | 758 |
| 1948..... | 295 | 60 | 197 | 68 | 43 | 45 | 6 | 714 |
| 1949..... | 296 | 56 | 207 | 72 | 42 | 45 | 6 | 724 |
| 1950..... | 293 | 56 | 212 | 75 | 43 | 44 | 8 | 731 |
| 1951..... | 299 | 53 | 190 | 71 | 39 | 44 | 11 | 707 |
| 1952..... | 299 | 53 | 170 | 75 | 38 | 47 | 12 | 694 |
| 1953 ^d | 298 | 52 | 171 | 70 | 37 | 48 | 12 | 688 |
| 1954 ^e | 299 | 53 | 177 | 76 | 36 | 46 | 10 | 697 |
| Percentage of Total Milk | | | | | | | | |
| Average | | | | | | | | |
| 1925-29..... | 33.8 | 8.5 | 44.9 | 5.8 | 3.3 | 3.0 | 0.7 | 100.0 |
| 1935-39..... | 33.4 | 8.3 | 42.6 | 7.0 | 4.6 | 3.2 | .9 | 100.0 |
| 1945..... | 43.1 | 8.2 | 27.8 | 8.4 | 5.0 | 4.8 | 2.7 | 100.0 |
| 1950..... | 40.1 | 7.7 | 29.0 | 10.3 | 5.9 | 6.0 | 1.0 | 100.0 |
| 1954 ^e | 42.9 | 7.6 | 25.4 | 10.9 | 5.2 | 6.6 | 1.4 | 100.0 |

^a Source: U.S. Department of Agriculture, Agricultural Marketing Service. The dairy situation, Oct., 1954.

^b Prior to 1942 cream was estimated at 20 percent of total fluid milk and cream consumption; beginning in 1942, the proportion was varied largely on the basis of information obtained from markets having federal milk-marketing orders.

^c Includes dry whole milk, malted milk, dry ice cream mix, and cottage cheese, as well as other minor products and an adjustment allowance.

^d Preliminary.

^e Partly forecast.

Sales of fluid cream

Sales of fluid cream have fallen off substantially since the late 'twenties. In 1954 the equivalent of milk used in cream averaged 53 pounds per person, or 22 percent less than the 1925-1929 annual average of 68 pounds (Table 12). No data on the sales of fresh cream were available for the region.

Butter sales

Following the national trend (Table 12), butter production in the region decreased. Both in the region and in the state this decrease was accompanied by a sharp drop in the volume of cream marketed (Fig. 8).

Though Illinois in 1950 ranked sixth in the United States in the production of creamery butter with a total of 63,109,000 pounds manufactured in that year (21 million pounds less than the amount

manufactured in 1941), only two counties in the region reported manufacturing creamery butter. These counties, Jackson and Perry, produced one and three-quarter million pounds of butter in 1949, and slightly more than one million pounds in 1951.

Cheese sales

Only one county in the region reported manufacturing American cheese in 1951 (a total of 30,000 pounds), although from 1938 to 1948 Illinois ranked second in the United States in the production of American cheese and fourth in 1950. This trend contrasted with national cheese sales, which have risen considerably in the last 25 years (Table 12).

Sales of evaporated and condensed milk

In the region more than 7 million pounds of all types of concentrated milk were produced in 1949, and only slightly more than 4 million pounds in 1951. This trend was somewhat consistent with national sales, which in 1954 were 16 percent less than in 1948.

Sales of ice cream, frozen milk products, and dry whole milk

Only four of the sixteen counties — Gallatin, Hardin, Johnson, and Pope — did not report manufacturing ice cream in 1944. In 1951 two additional counties — Hamilton and Pulaski — did not report manufacturing ice cream. In 1949 the region produced 995,224 gallons; in 1951, 670,480 gallons.

This decrease in production was not consistent with that of the United States (Table 12) and of Illinois, which yearly has ranked either fourth or fifth among the states in the production of ice cream.

The production of frozen milk products other than ice cream increased tremendously in the region from 1949 to 1951, rising from 23,693 gallons to 216,464 gallons. Most of this increase was accounted for by ice milk, of which 211,559 gallons were produced. In 1949 only two firms reported manufacturing ice milk — a sharp contrast to the 60 firms that produced ice milk in 1951. Only Gallatin, Johnson, and Pope counties did not report manufacturing ice milk in 1951.

Though nationally the production of dry whole milk increased substantially during World War II, that production returned to its prewar level by 1954.

Sales of fresh concentrated milk

The region sells substantial quantities of cream, evaporated milk, ice-cream mix, and other fluid dairy products to markets outside Illi-

nois, but it neither manufactures nor markets fresh concentrated milk, although this has possibilities worth exploring. A study made in the fall of 1953 showed that the usual price in the San Francisco-Oakland area for fresh concentrated milk was 18 cents a quart (reconstituted) — 3 cents less than the price of regular milk — and that sales of this product amounted to about 21 percent of those of regular milk. In other areas, the difference in price between fresh concentrated milk and regular milk was less, $2\frac{1}{3}$ cents in the Los Angeles area, and only $\frac{1}{2}$ cent in central California near Hanford. Since sales of concentrated milk in Los Angeles were about 12 percent of those of fresh milk, and near Hanford sales of the concentrate were negligible, it can be assumed that the wider the price differential between these two products, the greater will be the sales of the concentrate. While present commercial sales of this product are very low, the likelihood is that they will increase substantially in the next decade.

New dairy products other than fresh concentrated milk that have been marketed in recent years include dry, nonfat milk solids and low-fat, high-solids milk.

Recommendations and Conclusions

With population in the United States increasing and the possibility of per-capita consumption of livestock products increasing, there is a growing need to increase the production of food, including milk and milk products. For this purpose, the sixteen southernmost counties in Illinois were studied, since they represent a region where dairying is underdeveloped and where there is a need to increase farm income. An examination of the physical and economic characteristics of these counties show two important things: (1) that in the main all features are favorable to an expansion of the dairy enterprise, and (2) that an intensive type of agriculture such as dairying is necessary to most of these counties if an adequate farm income is to be realized.

To these ends, the following recommendations are made:

1. **Increase the milk production per cow.** A program to achieve greater production per cow should include the expanded use of improved feeding, breeding practices, and culling of low producers. Among the things to be considered are the expanded uses of improved pastures, grass silage, and artificial insemination.

2. **Increase the number of cows per herd.** In most milksheds of the United States, the production per herd has increased in recent years as the result of both higher production per cow and more cows per

herd. Various studies have shown that unit costs of production tend to decrease with larger volume. Since dairy farms in the sixteen counties must compete with those in areas having modern equipment, farms in the region must have enough cows to permit the efficient use of such equipment.

3. Develop markets for Grade A milk. These sixteen counties are strategically located to potential milk markets. Much of the region is situated less than 100 miles from St. Louis; the most distant part, within 150 miles. Moreover, per-capita sales of milk within the counties themselves can be increased, and such southern markets as Florida and Texas can be developed for fresh concentrated milk, which has proved its commercial possibilities in California.

4. Increase the production of Grade A milk as markets for this grade are opened up. The annual growth in population in the United States of more than 2,500,000 people will require continued expansion in the production of milk. Grade A milk sold in Grade A markets gives producers a higher price than milk utilized in manufactured products. Dairy farmers in these counties who wish to increase their farm incomes should adjust their farm practices so that they can benefit by this expansion in markets and by the higher price paid for the United States, the production per herd has increased in recent years Grade A milk. Milk production in the region can be expected to expand substantially, however, only as the markets for Grade A milk expand.

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