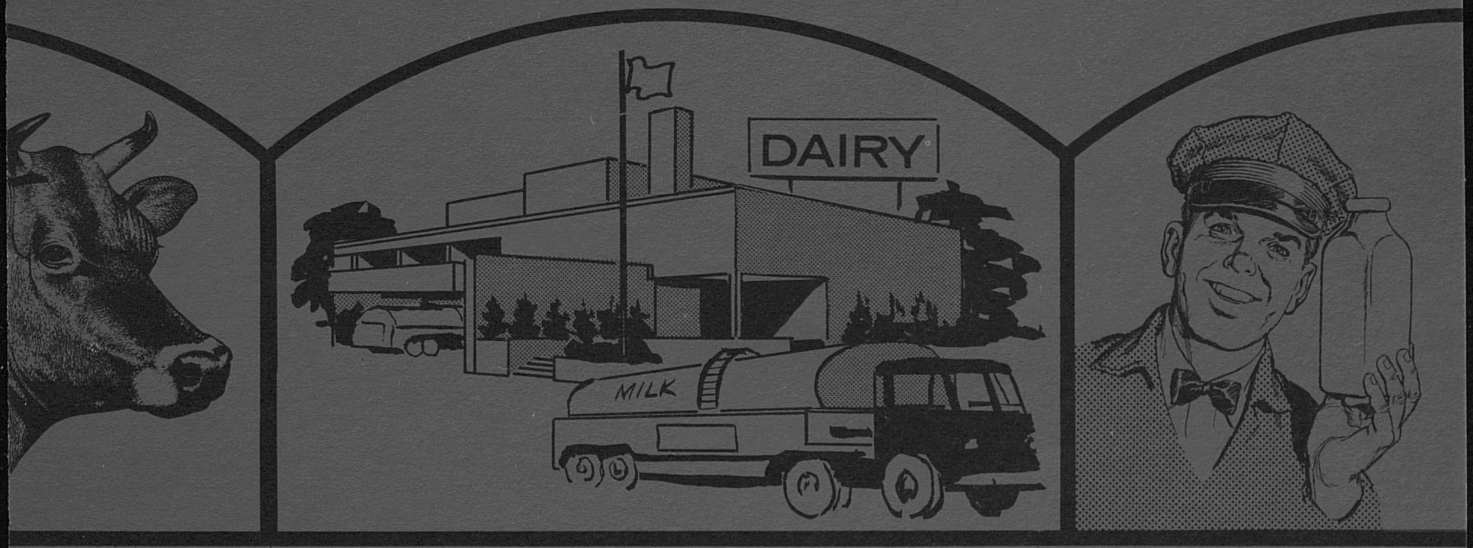
kentucky dairy industry facts

PROGRESS REPORT 156 BY JOHN B. ROBERTS



UNIVERSITY OF KENTUCKY AGRICULTURAL EXPERIMENT STATION

DEPARTMENT OF AGRICULTURAL ECONOMICS

LEXINGTON

KENTUCKY DAIRY INDUSTRY FACTS

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KENTUCKY DAIRY INDUSTRY FACTS[1]

By John B. Roberts
Department of Agricultural Economics

This report provides a quick reference to trends and selected production and market information on Kentucky's dairy industry. The brief commentaries and data are intended to help the reader understand the nature and importance of this great enterprise. Kentucky is essentially a state in which topography and rainfall call for extensive use of cover and forage crops to prevent soil depletion. The dairy enterprise is especially suited to Kentucky conditions and has made phenomenal growth during the last 30 years. From a business and farm investment point of view, the production, processing and distribution of milk and dairy products are major considerations in the economy of the state.

Business generated by the dairy enterprise is a primary consideration in many communities, and for the state as a whole it is a billion-dollar enterprise. In 1964 the number of milk cows and replacement dairy stock exceeded 800,000 head with a valuation of more than $130 million. The farm investment in buildings and equipment used in milk production was about $200 million, and the investment in land to support dairying had a value of more than $500 million. The total investment in plants and equipment used in processing and distribution probably exceeds $100 million. About 7,000 businesses are licensed to sell dairy products in the state, and Kentucky consumers spend about $200 million annually for the dairy products consumed.[2]

In spite of its growth and importance to the state, the farm production of milk is predominantly a small-scale operation in which farmers produce milk that is very much the same, county by county, and area by area. But there is less similarity beyond the farm gate. The buyers are concerned with processing fluid products and making cheese, evaporated milk, butter, powdered milk, ice milk, and ice cream. They are concerned with products in bottles, packages and branded containers. There is competition among the manufacturers, and different manufacturers may have varying product standards and requirements. But in the final analysis, the marketing agencies, the methods of collection, and the processing techniques are those suited to handling milk as it is now produced. The challenge to the industry is to grow and build on existing foundations. A vigorous, efficient industry that can compete successfully for markets within the state and for those outside is essential in maintaining and expanding the Kentucky dairy enterprise.

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[1]Much of the statistical material found in this report was taken from the latest available official publications of the U.S. Department of Agriculture and other governmental agencies. Special acknowledgment is due the Kentucky Crop and Livestock Reporting Service, 434 Federal Building, Louisville. This agency, sponsored jointly by the U.S.D.A. and the Kentucky Department of Agriculture, provides current and annual estimates by which part of the data in this report can be kept current.

[2]Estimates by the author are based on the available data and opinions of knowledgeable people in the industry. No official industry-wide data are published.

PART I

THE DAIRY SITUATION

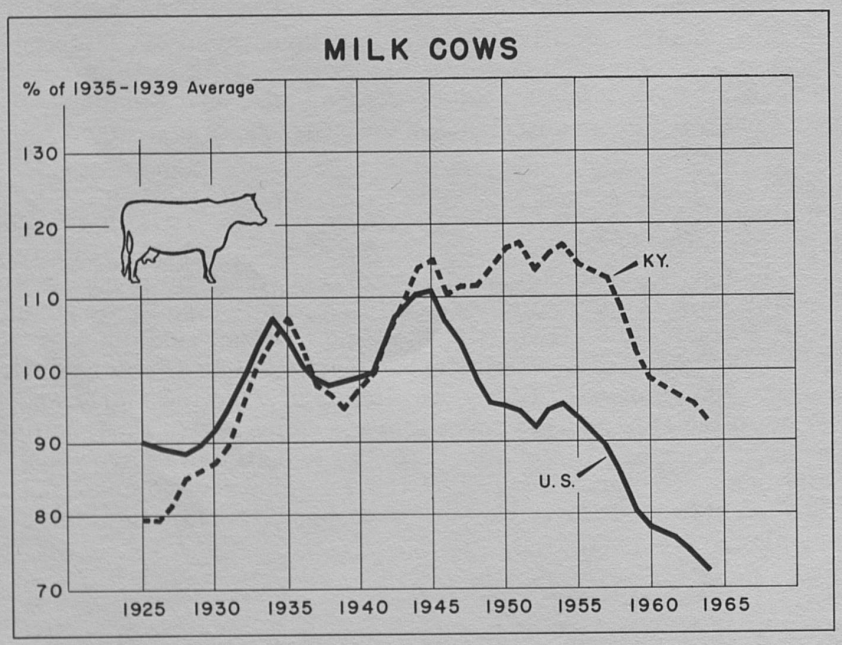
Background developments and related facts on the dairy situation are important as bench marks in planning the future. Changes in the nation as well as prospects for Kentucky must be taken into account.

1. The Number of Dairymen Is Becoming Fewer

In the United States the number of farms keeping milk cows has declined by more than 50 percent since 1950. The rate at which farmers leave dairying differs within regions, but generally milk production has given way fastest where it was a side-line enterprise. Shifts away from dairying have been notable in the North Central Region where there were more profitable farm enterprises. In other regions alternative enterprises, combined with off-farm employment opportunities strongly influence the emphasis given to dairying.

2. Trend Shows Smaller Numbers, Better Cows and Increased Production

The number of milk cows kept on farms has declined since 1945 in the United States and since 1950 in Kentucky (Fig. 1).

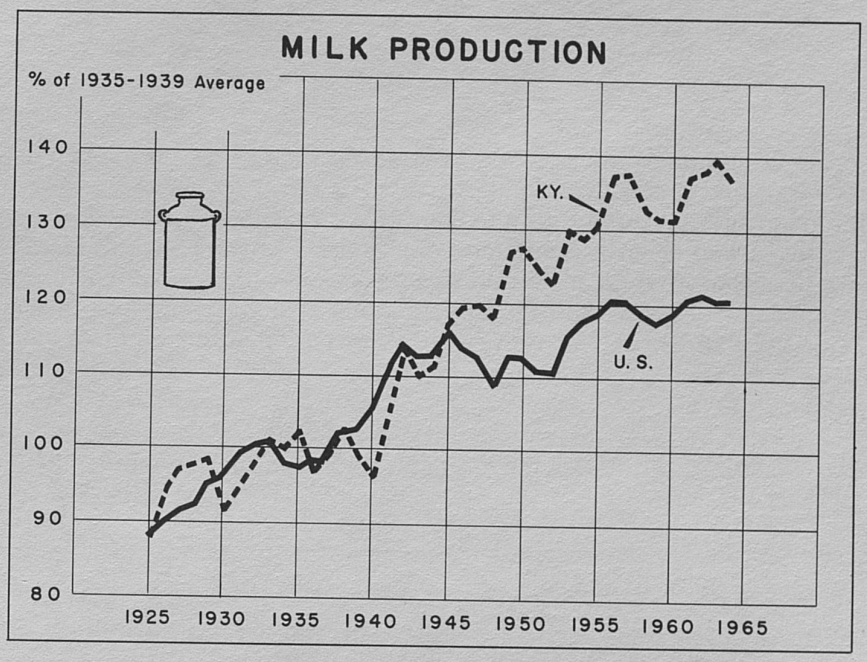


MILK COW NUMBERS

Year	Kentucky (000)	U. S. (000)
1925	454	22,575
1926	454	22,410
1927	464	22,251
1928	486	22,231
1929	490	22,440
1930	498	23,022
1931	511	23,820
1932	543	24,896
1933	575	25,936
1934	595	26,931
1935	610	26,082
1936	586	25,196
1937	557	24,649
1938	551	24,466
1939	540	24,600
1940	555	24,940
1941	566	25,453
1942	600	26,313
1943	624	27,138
1944	649	27,704
1945	655	27,770
1946	629	26,521
1947	635	25,642
1948	635	24,615
1949	649	23,862
1950	661	23,853
1951	668	23,568
1952	648	23,060
1953	661	23,549
1954	674	23,896
1955	654	23,462
1956	647	22,912
1957	641	22,325
1958	615	21,265
1959	585	20,122
1960	561	19,527
1961	555	19,361
1962	549	19,167
1963	544	18,679
1964	528	18,073

FIG. 1 - TRENDS IN NUMBERS OF MILK COWS IN KENTUCKY AND THE U.S. Index shows each year as a percentage of average numbers kept for 1935-39 period.

Total milk production, however, has increased steadily. Between 1925 and 1945 that of Kentucky and the United States increased at about the same rate. Since 1945 milk production in Kentucky has grown at a faster rate than that of the nation (Fig. 2).



MILK PRODUCTION
(Million Pounds)

Year	Kentucky	U.S.
1925	1,666	90,699
1926	1,780	93,325
1927	1,856	95,172
1928	1,866	95,843
1929	1,882	98,988
1930	1,748	100,158
1931	1,809	103,029
1932	1,868	103,810
1933	1,928	104,762
1934	1,904	101,621
1935	1,946	101,205
1936	1,845	102,410
1937	1,883	101,908
1938	1,955	105,807
1939	1,886	106,792
1940	1,841	109,412
1941	1,995	115,088
1942	2,163	118,533
1943	2,093	117,017
1944	2,121	117,023
1945	2,226	119,828
1946	2,272	117,697
1947	2,281	116,814
1948	2,243	112,671
1949	2,416	116,103
1950	2,428	116,602
1951	2,368	114,681
1952	2,332	114,671
1953	2,469	120,221
1954	2,444	122,094
1955	2,486	122,945
1956	2,613	124,860
1957	2,617	124,628
1958	2,521	123,220
1959	2,504	121,989
1960	2,495	122,951
1961	2,605	125,442
1962	2,623	126,021
1963	2,664	124,783
1964	2,639	126,598

FIG. 2 - MILK PRODUCTION SHOWS AN UPWARD TREND SINCE 1925. Index gives each year's production as a percentage of 1935-39 average. Declining cow numbers have been more than offset by increased production per cow.

Production per cow in Kentucky has lagged behind the average of the nation and is far below the levels of the leading dairy states. The average production per cow in Kentucky was 5,800 pounds of milk in 1964; the United States average was 7,880 pounds, or 36 percent more than the average for Kentucky. In the Atlantic, east, north central, and Pacific regions, the average annual production per cow exceeds 8,600 pounds. Higher production per cow in Kentucky is a practical goal.

3. Growth Rates Change Supply-Demand Relationships

Milk production in the United States, which increased at varying rates, was faster than population growth in the 1920's, increased at about the same rate in the 1930's, and in the last 20 years has slowed down to less than half the rate of population growth.

Summary of changing relationships in the United States:

1920-30 milk production increased at twice the rate of population
1930-40 milk production increased at the same rate as population
1940-50 milk production increased at one half the rate of population
1950-64 milk production increased at less than one half the rate of population

Differences in the rates of growth between population and milk production are reflected in per capita supplies. Between 1951 and 1964, milk production on farms increased 9 percent. In the same period, the population of the United States (including armed forces abroad) increased 22 percent, but milk production per capita fell 12 percent.

4. Consumer Preferences Change

Consumers have many choices among foods, including those that compete generally for the food budget and those that compete specifically with dairy items. Per capita consumption of milk and some dairy products is declining. Since 1940 the amount of butter and evaporated milk consumed per person in the United States has been cut nearly in half. Use of fluid milk and cream has declined by about 8 percent. However, consumption of cheese, cottage cheese, and frozen products—including ice cream, ice milk, and sherbets—has increased. Also, consumption of dried milk has expanded (Table 1).

Table 1.—Changes in Per Capita Consumption, U.S., in Pounds, by Type of Products, 1940-63

Period or Year	Fluid Milk—Whole, Skim Cream	Cottage Cheese	Ice Cream Frozen Desserts[a/]	Evap. Whole Milk	Butter	Cheese[b/]	Cond. Milk Products[c/]	Dry Milk Items[d/]
	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
1940-44	349.6	2.0	15.4	16.3	14.5	5.6	6.3	3.0
1945-49	361.6	2.5	20.9	17.6	10.6	6.9	8.8	3.8
1950-54	345.7	3.4	21.2	16.1	9.3	7.9	6.8	5.1
1955-59	339.2	4.5	24.4	13.0	8.4	7.9	6.8	6.6
1960	322.2	4.7	25.7	11.2	7.5	8.3	7.0	7.3
1961	312.2	4.6	25.8	10.7	7.4	8.6	7.4	7.3
1962	312.5	4.5	26.4	10.1	7.1	9.2	7.2	6.7
1963	312.5	4.4	27.0	9.4	6.8	9.3	6.8	6.4
1964	310.0	4.4*	27.2*	9.0	6.7	9.3	6.8	5.8

a/ Includes ice milk, sherbet, and melorine.
b/ Includes American, Swiss, Italian, cream, and other types, and whole or part skim cheese. Excludes cottage, pot, and bakers cheese.
c/ Condensed whole, sweetened and unsweetened, and evaporated and condensed skim.
d/ Nonfat dry milk, dry whole milk, dry buttermilk, dry whey, malted milk.
*Estimated

Increased consumption of selected dairy items has not offset the decline in the use of others. Accordingly, the supply of milk produced is running ahead of civilian purchases. To clear the market, governmental purchases at support levels have taken products when they exceeded other demands at the specified prices. The problem of disposing of acquired products without disrupting commercial channels has been a factor in national policy.

5. Government Price-Support Objectives

The Agricultural Marketing Act of 1949 directs the Secretary of Agriculture to support the price of milk and dairy products at between 75 and 90 percent of parity. The Act authorizes the purchases of products from processors at specified levels intended to fulfill the purpose of the Act. Prices established have averaged $3.28 per cwt. which was between 75 and 80 percent of parity. (Table 2)

Table 2.—Milk Price-support Levels and Percentage of Parity, Marketing Years, U.S. Average, 1950-64

Year	USDA Price-Support, Cwt.	Support Level of Parity Equivalent
1950	$3.07	77
1951	3.60	85
1952	3.85	91
1953	3.74	90
1954	3.15	80
1955	3.15	81
1956	3.25	83
1957	3.25	81
1958	3.06	75
1959	3.06	77
1960	3.23	76
1961	3.40	80
1962	3.11	75
1963	3.14	75
1964	3.15	75
1965	3.24	75

The decline in the demand for butter and the expansion of milk drying facilities have encouraged dairymen to sell whole milk. Large amounts of milk formerly fed to livestock on farms are now sold in market channels. Governmental programs have provided outlets for dairy products not purchased by other consumers. If one includes all governmental purchases, stocks acquired have ranged from less than half of a percent in the early 1950's to as much as 8.6 percent of the production of the milk fat and 12.8 percent of the solids-not-fat in 1962 (Table 3). It is not possible to predict what the exact price of butter, cheese, nonfat dry milk or other products would be had there been no government price-support program. Even with this support, the farm income to dairying has not been good. Return in terms of wages has been low compared with the average wages and income of industrial employees.

Table 3.—USDA Dairy Price-Support Purchases, 1949-63

Year	Milk Fat	Solids Not Fat	As a Percentage of Production	
			Milk Fat	Solids Not Fat
	Million Pounds		Percent	
1949	102.5	321.1	2.2	3.1
1950	140.5	378.1	3.0	3.7
1951	0.9	64.4	*	0.6
1952	14.3	60.3	0.3	0.6
1953	392.2	670.6	8.4	6.4
1954	350.7	710.0	7.4	6.7
1955	182.8	561.9	3.9	5.3
1956	198.2	754.5	4.2	7.0
1957	223.2	867.9	4.7	8.0
1958	180.0	876.6	3.9	8.2
1959	123.8	815.6	2.7	7.7
1960	123.1	819.8	2.7	7.7
1961	305.1	1,075.3	6.5	9.9
1962	403.2	1,391.3	8.6	12.8
1963	291.3	1,015.4	6.3	9.4
1964	316.9	1,164.4	7.1	11.6

*Nominal.

6. Price-Support Operations Vary; Many People Benefit

A review of the disposal of stocks of dairy products shows that little has gone into commercial channels since the mid-1950's. Instead, large amounts were given to needy families, to public welfare agencies, and to schools and domestic institutions. Various quantities were transferred for commercial export and the foreign aid program. The bulk of the nonfat dry milk has been to foreign accounts. From a practical standpoint, most of the dairy products have been used for public benefit domestically or exported to countries for humanitarian reasons and/or to bolster international relations.

7. The Adjustment Problem and Future Growth

Much of the shift in production and marketing has resulted from changes in technology. With the shifts from farm-separated cream to whole milk, there has been a corresponding increase in milk fat and nonfat solids processed by plants. Also, supplies increased in the market place as a result of producers selling more and using less on the farms. The shift from farm use to commercial outlets still did not provide enough income. During the 1950's, milk prices fell faster than costs and many farmers found dairying to be unprofitable. Sharp declines in the number of farms milking cows resulted. Other farmers were able to increase their herd size, increase production per cow, adopt new techniques, and maintain dairy production through increased efficiency. Accordingly, consumers have continued to have a plentiful supply of fluid milk and manufactured products at relatively low cost. Prospects for continued abundance will depend on how future adjustments are to be made. Kentucky has an important concern in what these adjustments are to be.

PART II

KENTUCKY'S STAKE IN DAIRYING

The challenge to the Kentucky dairy industry is to build on what it has, keep abreast of technological change, and maintain a vigorous and efficient industry that can compete successfully for the markets within the state and for growing markets elsewhere. Kentucky has benefited, as have other states, in the spread of technology and in mechanization that makes processing and production less difficult.

1. Kentucky Is Important in the Nation's Dairy Industry

Kentucky is a growing dairy state. In three decades it has moved from 28th to 13th place among the states in total milk production. In 1964, nationally, Kentucky ranked 3rd in the production of American cheese, 2nd in evaporated milk, and 18th in butter production. It has shared in a growing market in bottled and fresh milk products, too. The sales of milk from Kentucky farms to fluid milk packaging plants have increased from 400 million to over a billion pounds annually between 1940 and 1964.

The importance of dairying in Kentucky comes from widespread ownership of small herds (Table 4).

Table 4.—Farms with Milk Cows by Size of Herd, Kentucky, 1950, 1959

Size of Herd, Cows	1950 Farms Reporting	1950 Percentage Distribution	1959 Farms Reporting	1959 Percentage Distribution
1-4	113,404	74.3	61,482	67.8
5-19	33,994	24.1	24,869	27.4
20-29	1,782	1.1	2,751	3.0
30 and over	847	.5	1,631	1.8
Totals	150,027	100.0	90,733	100.0

Between 1930 and 1945, large numbers of farms kept one or two milk cows to produce milk for use on the farm. In the postwar period, many farms no longer kept milk cows. Shifts in dairy farming are reflected in changes in the number of farms reporting dairy cows, in the value of the cows, and in the average numbers kept. Trends are significant.

Year	Number of Farms Reporting	Number of Cows 2 Years and Over	Number of Cows per Farm (average)
1940	201,709	555,000	2.8
1950	166,027	661,000	4.0
1959	88,293	584,000	6.6
1964	60,000*	528,000	8.8

*Preliminary estimate.

Even after tripling the number of milk cows kept per farm, the dairy farm operation is still a small-scale enterprise on many farms.[3] Yet, in total, it is a major industry and of growing importance.

2. Industry Growth Patterns

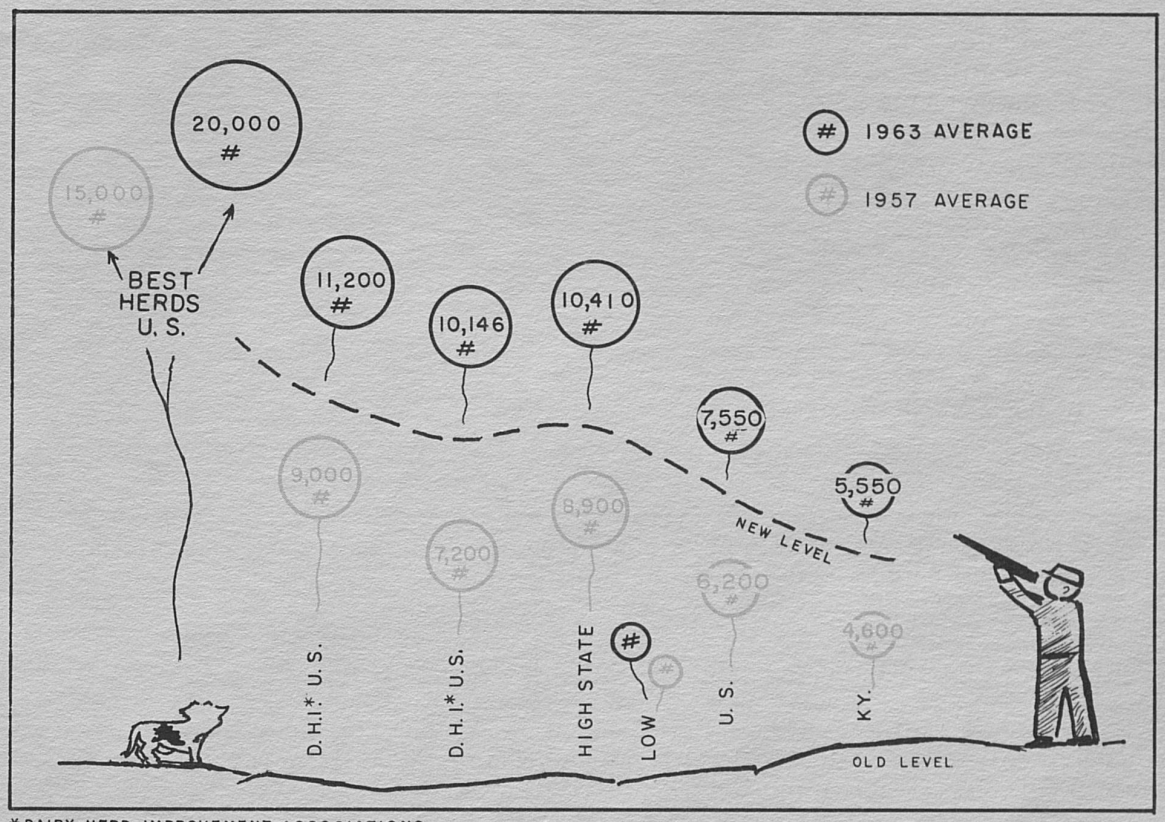
Kentucky's dairy industry has shown a steady consistent growth for more than three decades. Since 1930, production has increased by over 50 percent, cash income by over 600 percent, and the gross farm value of milk has more than tripled (Table 5).

Table 5.—Trends in Production and Income by Periods

Dates Included	Number of Milk Cows (thousands)	Annual Production per Cow (lb)	Total Milk Production (million lb)	Total Value of Milk		
				Cash Income	Home Use	Gross Income
				(million dollars)		
1930-34	539	2,997	1,851	14.4	13.8	28.2
1935-39	542	3,514	1,903	16.5	15.1	31.6
1940-44	564	3,588	2,042	27.2	18.8	48.8
1945-49	584	3,918	2,287	57.7	28.4	86.1
1950-54	597	4,014	2,398	70.0	25.7	95.7
1955-59	555	4,486	2,548	79.1	17.8	96.9
1963	480	5,550	2,664	93.3	10.9	104.2
1964	455	5,800	2,639	93.8	9.8	105.0

Milk production per cow increased from an average of 2,997 to 5,800 pounds between 1930 and 1964, but this still leaves much room for improvement. Figure 3 shows that rapid advancement in production is being made at all levels of output. It shows that, between 1957 and 1965, production per cow in the United States increased 1,350 pounds; in the high individual state, 1,510; and in Kentucky, 950 pounds. Levels of production for a few individual herds in Kentucky rank with the best in the nation. Records of the Kentucky Dairy Herd Improvement Associations show an increase of 2,940 pounds per cow, as compared with 2,200 pounds for the nation. For most dairymen, a program of better feeding, breeding, and management to increase production per cow is a worthwhile goal. Production per cow would need to double to equal the production average in California, the leading individual state. It would need to nearly double to equal the average production of herds of the Kentucky Dairy Herd Improvement Associations.

[3] Kentucky Dairy Supply and Market Statistics, Crop and Livestock Service, USDA, August 1963.



*DAIRY HERD IMPROVEMENT ASSOCIATIONS

FIG. 3 - PRODUCTION LEVELS SET BY INDIVIDUAL DAIRYMEN. Cow testing associations and leading states are practical targets for Kentucky. New records have been set in each year for more than a decade.

3. Importance of Dairy Income in Kentucky

Sales of milk, cream, cull dairy stock, and veal calves, plus the value of milk used on farms, have exceeded $100 million in Kentucky every year since 1950.[4] In 1963, the farm income from dairying exceeded $130 million. Milk sales amounted to $93.3 million; that used on farms had a value of $10.9 million; and sales of veal and dairy stock amounted to over $26 million.

Sales of milk and cream are the third most important source of cash income. Table 6 shows that the leading sources of cash income in 1963 were tobacco—39.2 percent, cattle and calves including dairy stock—19.8 percent, and dairy products—14.2 percent. Other sources of importance included other crops, hogs, poultry, and sheep and wool.

[4]Estimates based on culling rates, dairy veal production, and sales of surplus breeding stock indicate that dairy farmers received from $25 to $35 million annually from animal sales. Changes in beef prices were largely responsible for income variations.

Table 6.—Sources of Cash Income

Source	Dollars (000)	Percent
Tobacco	258,867	39.2
Cattle and calves (including dairy stock)[a]	128,496	19.8
Dairy products	93,304	14.2
Crops (other than tobacco)	62,859	9.7
Hogs	59,599	9.2
Poultry	32,168	5.0
Sheep and wool	4,632	0.7
Miscellaneous (specialties)	7,687	2.1
All crops	328,941	50.4
All livestock	318,671	49.2

[a] No data are available to show how much of this income was from cull dairy stock and veal calves from dairy herds.

4. Farmers Use Less and Sell More of the Milk They Produce

In 1940, 50 percent of the milk produced on Kentucky farms was fed to livestock or used by the farm family. In 1964 home use was less than 11 percent and sales were 89 percent, as shown in Table 7.

Table 7.—Farm Disposal of Milk

	1940	1950	1964
		(percent)	
Milk consumed or fed on farms	50	37	11
Milk sold from farms	50	73	89
Total Milk	100	100	100

Since 1940 the sale of farm-made butter has been almost completely discontinued, and the amount of milk marketed as farm-separated cream to butter manufacturers has declined from 43 to less than 1 percent. Milk delivered as whole milk for bottling and for manufacturing provided about 95 percent of the cash income from milk in 1964 (Table 8).

Whole milk sales have become dominant and a major factor in expanding market outlets and sustained dairy incomes.

The opening of new processing facilities and increased marketing opportunities are closely reflected in the changing volume of milk uses as can be seen from data in Table 9.

Table 8.—Sources of Cash Income From Milk

Source	1940	1950	1964
		(percentage of cash)	
Milk sold as farm butter	4	1	*
Milk sold as cream for butter making	43	27	2
Milk sold as whole milk (fluid form)	37	83	95
Milk sold by farmers retailed	16	10	3

*Nominal

Table 9.—Volume of Milk Through Primary Outlets

Year Specified	Farm Production	Used in Manufacturing	Processed by Bottling Plants	Used on the Farm
		(million pounds)		
1940	1,841	577	388	876
1950	2,428	1,099	516	813
1960	2,495	1,146	994	355
1963	2,664	1,355	997	312

Both manufacturing plants and fluid milk processors have more than doubled their volume of receipts since 1940. Farm use has decreased sharply.

One can gain an idea of the current demands for milk from the way Kentucky milk is now being used. Data for 1964 show it was divided among these five general categories:

Bottling Plants	39%
Cheese (all types)	25%
Evaporated and Condensed	18%
Butter Manufacturers	14%
Ice Cream and Other Use	4%
	100%

In terms of income, producers selling graded milk to fluid milk plants received well over half the total cash receipt from milk sales.

5. Changing Marketing Opportunities

In 1925 there were no cheese plants and no evaporated milk processors in the state, and the number of milk and ice cream plants licensed was small. A rapid expansion in the number and kinds of marketing organizations occurred during the 1930's. By 1940 the number of licensed milk and cream buying places had reached a record level of 1,430.

Table 10.—Number of Licenses Issued to Buying Places

Year	Creameries	Cheese Plants	Evaporated Milk Operations	Milk and Ice Cream Plants	Cream Stations	Total
1925	3	0	0	9	570	592
1930	12	4	6	24	1,113	1,159
1940	10	14	7	66	1,113	1,430
1950	6	15	10	104	805	940
1960	6	18	13	73	269	379
1964	1	24	12	58	53	148

Table 10 shows that since 1940 the number of creameries licensed has declined from 10 to 1 and cream-buying stations have declined from 1,100 to only 53 in 1964. During the same period cheese plants increased, the number of concentration points and the geographic coverage by evaporated milk outlets expanded, and the trend toward fewer and larger milk and ice cream plants occurred.

PART III

MARKETING AND PROCESSING

In marketing, Kentucky dairy farmers have a choice of outlets among firms that process and distribute a wide variety of dairy products. Competition among local, area and national distributors varies, but the primary concern of the management of each is to build a sound and growing business. Because of specialization in operations, geographic dispersion, and scale and scope of operations, marketing programs of multi-plant firms differ from those of single independent operations.

Strategic plant location is important to managers in their current operations and in building for the future. Interstate road systems, location of consumers, mass distribution techniques, and price-cost structures play a part in this. In the process of plant growth, new techniques will possibly focus more attention on total plant and management efficiency including procurement and distribution. A bench mark from which to appraise such developments is of concern to producers and businessmen alike.

1. Population and Market Potentials

Milk and dairy products are highly mobile and find their way into the cities and into hundreds of smaller places that make up the crisscross of marketing operations. Both the concentration of population and its relationship to limited access and rapid transit highways in Kentucky and in surrounding areas are of concern at this point. These, in rough approximations, are given in Figure 4.

The relationship between the consuming markets, processing plants and farm production areas is an important consideration in setting out the dairy potentials of the state. From a competitive standpoint, Kentucky's dairy industry is not confined to state lines. Surrounding states provide markets for Kentucky milk. Producers in

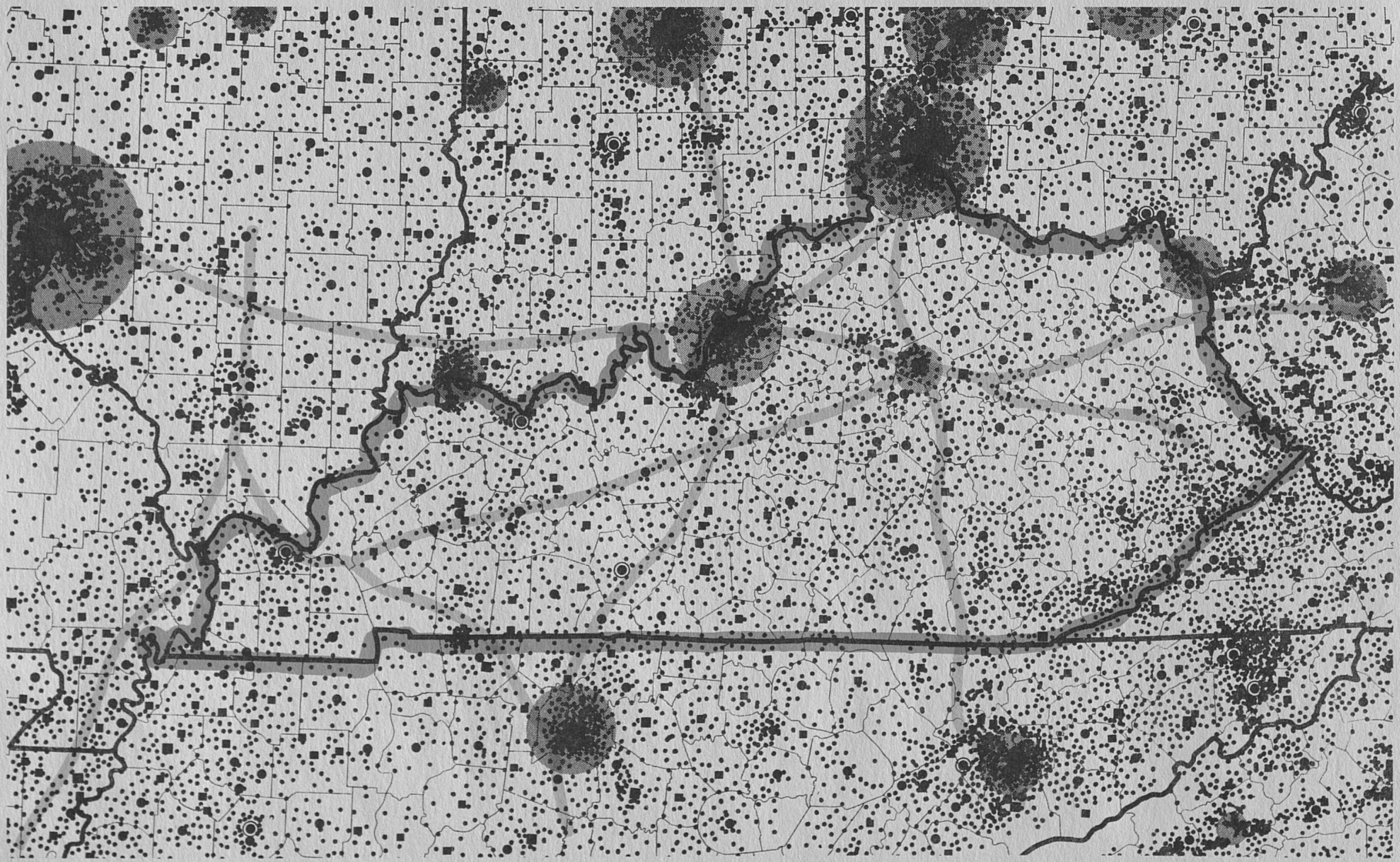


FIG. 4 - POPULATION DISTRIBUTION, KENTUCKY AND ADJACENT AREAS, 1960.
Both the number of places and their size are measures of the market potentials of an area. The emerging limited-access heavy-duty highways (shown approximately on the map) are increasingly important in procurement and distribution of products.

these other states also sell milk to handlers who compete with Kentucky processors for business within the state. The nature of these interlocking relationships follows.

2. Major Production Areas Are Related to Cow Numbers

Milk production in Kentucky and surrounding areas is most developed in a band of counties extending through Central Kentucky on a line between Dayton, Ohio, and Marshall county, Tennessee, (south of Nashville). In Kentucky there are other localized areas, such as the one south of Paducah and Hopkinsville. Outside the state there are important competing production areas in east Tennessee and Virginia and in portions of Ohio, Indiana and Illinois. These areas are outlined by the concentrations of milk-cow numbers (Fig. 5).

Market outlets are well developed in all major producing areas but are more limited in areas of sparse production, such as Eastern Kentucky and the western coal fields south of Evansville, Ind.

3. Whole-Milk Buyers Are of Prime Importance

In 1964 there were 87 fluid milk bottling firms, 58 of them in Kentucky, which buy milk from about 4,850 inspected farms in the state. There are 36 places where whole milk is bought from more than 26,700 producers as manufacturing milk. In addition, there are 8 retailers who sell milk direct from their own farm herds and also, 53 cream-buying stations. An approximation of the state and individual average farm incomes generated by the different kinds of outlets in 1964 is given in Table 11.

The data in Table 11 were derived from various sources by the author. Although incomplete, they help one to gain an understanding of situations. The calculated cash income from dairying for the state (col. 5) was $91.68 million. This figure divided by the 32,812 patrons shows that the average dairy farm income was $2,792 (col. 9). The calculation shows also that for the cream-station patron the gross yearly income was $284; for the manufacturing-milk patron, $1,313; for the fluid-milk patron, $10,568; and for the farm that sold its own milk direct, $45,603. Based on 5,000 pounds annual production, the cream shipper would have needed 3 cows and the manufactured-milk shipper, 8. If the graded producer got 7,200 pounds per cow, his herd would need to average 28 cows, and the farm retailer would be handling the output of 124 cows. For all farmers selling milk, the average was 11.8 cows. In order to maintain these herds, farmers would need to keep one additional animal for replacement purposes.

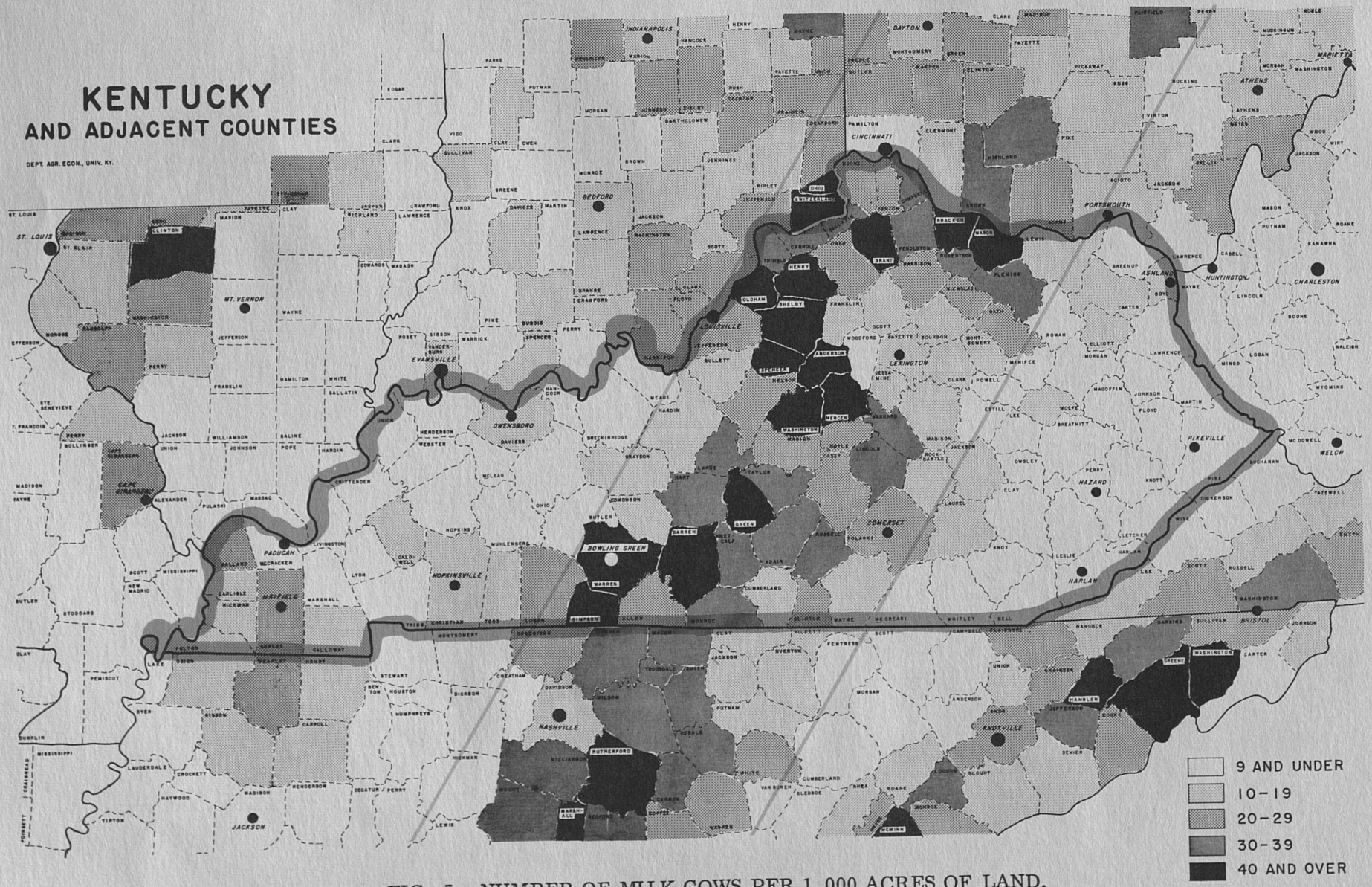


FIG. 5 - NUMBER OF MILK COWS PER 1,000 ACRES OF LAND.

Milk production is relatively heavy where cow population is concentrated - in a belt of counties extending southwest from Ohio to Middle Tennessee. Concentrations are also shown in the valley of East Tennessee and Virginia, in southwest Kentucky and around St. Louis.

Table 11.—Importance of Market Outlets and Patronage—1964 Estimates[a]

Destination or Outlet	Receiving Plants Involved[b]	State Totals			Per Patron Average Year			
		Patrons Selling	Volume of Milk	Value Computed	Price per Cwt.	Volume per Patron	Cows to Produce	Gross Farm Return
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	No.	No.	000 lb	000 dol	dol	lb	No.	dol
Cream Station	53	1,200	17,750	341	1.92	14,790	3	284
Retailed by Farm	8	62	55,200	4,991	5.14[d] (9.04)[c]	890,320	124	45,603 (80,490)[c]
Fluid	87	4,850	997,200	51,256	5.14[d]	201,490	27.9	10,568
Manufacturing	36	26,700	1,084,990	35,080	3.23[e]	40,640	7.8	1,313
Totals	184	32,812	2,155,140	91,668	4.25	65,650	11.9	2,790

[a] Approximations by author, based on computations from both published and unpublished sources.

[b] Includes licensed cream stations, processing plants, and receiving stations.

[c] Includes value from retailing.

[d] State average price of fluid milk was $4.50 for 3.5% B.F. adjusted to 4% test.

[e] Milk testing 4%.

A review of the contribution of the 60,000 Kentucky farms having milk cows follows in Table 12.

Table 12.—Kentucky Milk Cow Inventory, 1964

	Number of Farms	Milk Cows per Farm	Total Cows	Other Dairy Stock	All Cows Total Inventory
Home Use	27,388	1.7	46,560	9,312	55,872
Selling	32,612	11.5	375,038	75,007	450,045
	60,000	8.4	421,589	84,319	505,917

Speaking generally, the areas where milk cows are kept mainly for home use are not likely to attract whole-milk buyers. Cream shippers already have outlets, through cream buying station and, in some cases, a choice of markets. All major production areas are now covered by farm collection routes from one or more competing whole-milk buyers.

4. Manufacturing Plants Are Near Production in Kentucky

All plants buying whole milk for manufacturing purposes are in or near concentrations of production. Most of the 50 cream-buying stations are in or near the same area. The geographic location of manufacturing milk outlets in Kentucky and adjoining states shown in Fig. 4 and the production map (Fig. 6) illustrate how closely production and outlets are linked.

Of the 24 plants buying whole milk for American cheese production, 18 are year-round manufacturing plants and 6 are primarily receiving operations. There are 12 outlets for whole milk used in evaporated case goods production. Three of the outlets are processing plants producing canned goods; nine are receiving and/or condensing units servicing the canning operations. Besides these manufacturers, Kyana Milk Producers, Inc. is a cooperative with a receiving plant and standby facilities for manufacturing butter and powder. The 53 cream stations are service points distributed in such a way as to offer a convenient market for the few remaining shippers of farm-separated cream.[5] There is one centralized creamery, and some butter churns are operated by fluid milk processors.

5. Kentucky Plants Can Expand Operations

The Kentucky plants manufacturing dairy products are, by industry standards, relatively large, fairly advanced technologically, generally well financed, and well situated in respect to marketing. Plants well located in production areas have the capability and capacity to handle larger volumes to advantage. Most plants face serious problems in achieving maximum efficiency because of high costs in serving

[5]Source: Creamery License Division, University of Kentucky, Annual Reports. In 1943 there were 33 companies buying cream through 970 stations in 104 counties. In 1963 there was a single centralized butter plant and only 50 cream-buying stations remained open. In 1940 cream sales amounted to 43 percent of the dairy income. In 1963 it was less than 1 percent.

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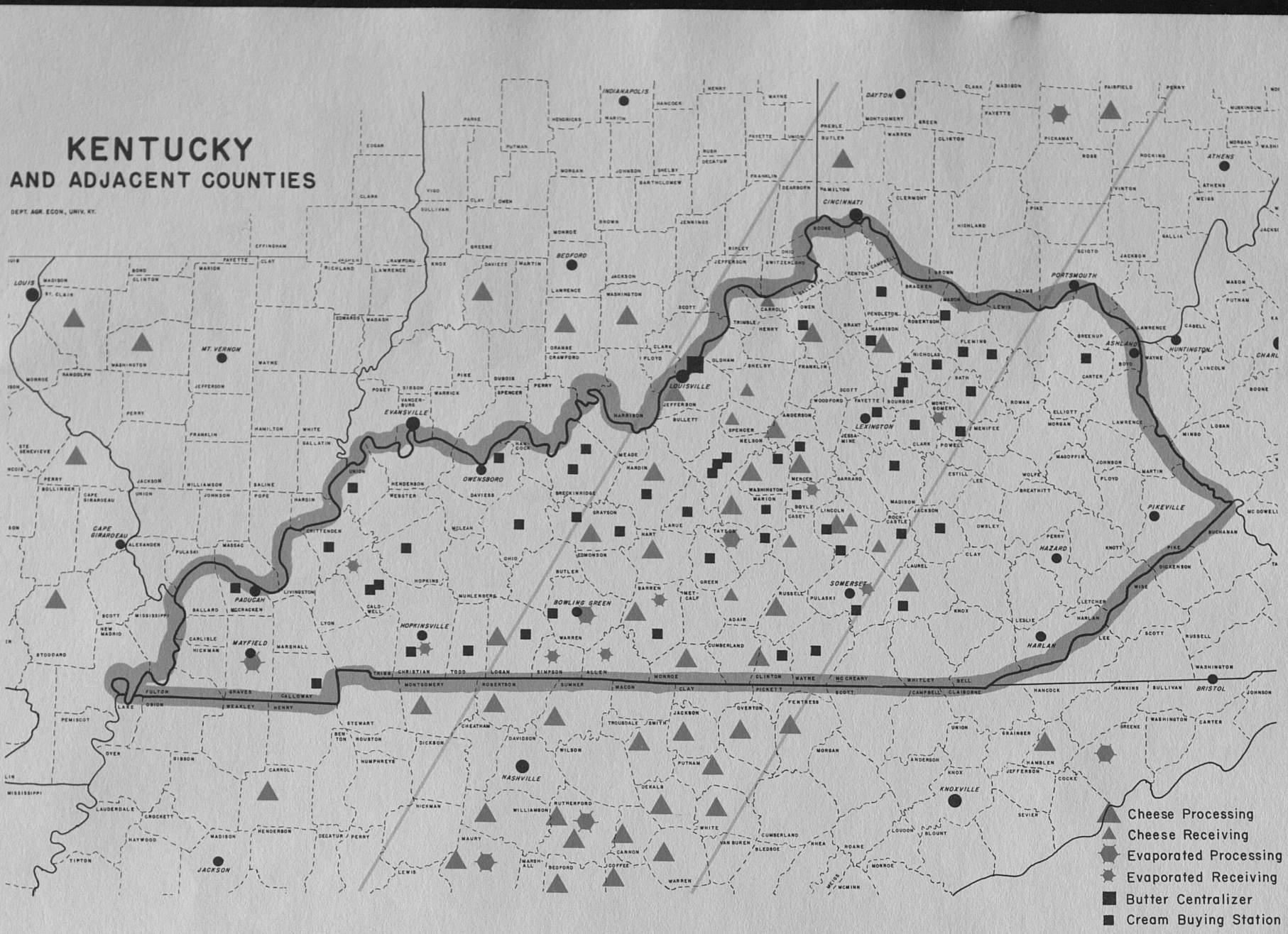

FIG. 6 - COUNTY LOCATION OF MANUFACTURING OUTLETS, 1964.
The coverage in adjacent areas is less complete, but enough to emphasize the important links between production areas and the location of manufacturing plant facilities.

small producers (approximately a daily average of 110 pounds) whose production is variable and highly seasonal. To maintain volume, procurement routes are extensive and often overlap in production areas. At their busiest seasons, Kentucky manufacturing plants report a capacity to handle an additional 3.8 million pounds daily.[6] For the year the combined plant facilities could handle double the volume now received for manufacturing.

6. Fluid Processors Go to Population Centers

Fluid-milk bottling operations are located near consumers. These plants are specialized and attract primarily the output of the larger, more specialized dairy farms. Universally, the collections are made from farm bulk tank coolers and transported in insulated tank trucks.

Price differentials make it possible to haul milk longer distances and, through a process of selection, provide outlets for a relatively small number of preferred shippers. The pattern of relationship between processing plant locations and shippers selling to bottling plants is shown in Fig. 7.

The daily average amount of milk shipped per producer has tripled between 1950 and 1964 for the Cincinnati, Tri-State, and Paducah market areas. It has more than doubled for producers selling in the Louisville and Nashville markets during the same period (Table 13).

Table 13.—Trends in Daily Shipments of Milk to Specified Markets 1947-64

Years	Market Area*				
	Cincinnati	Tri-State	Louisville	Paducah	Nashville
			(pounds)		
1947-49	172	213	313	199	350
1950-54	204	222	326	237	351
1955-59	304	305	482	394	423
1960	385	411	579	501	538
1961	438	467	632	556	638
1962	484	489	655	551	701
1963	523	558	707	651	733
1964	558	636	758	675	758

*Federal milk marketing order statistics

It is highly significant that producers located 150 miles or more apart may sell to the same processing center. Production areas have lost their local focus. Once the milk is processed and packaged the products may be sold in localities well over 200 miles from the originating points.

[6]See Wallace L. King, "Manufactured Milk Facts," Memo to Agricultural Leaders, University of Kentucky Cooperative Extension Service, Nov. 9, 1964.

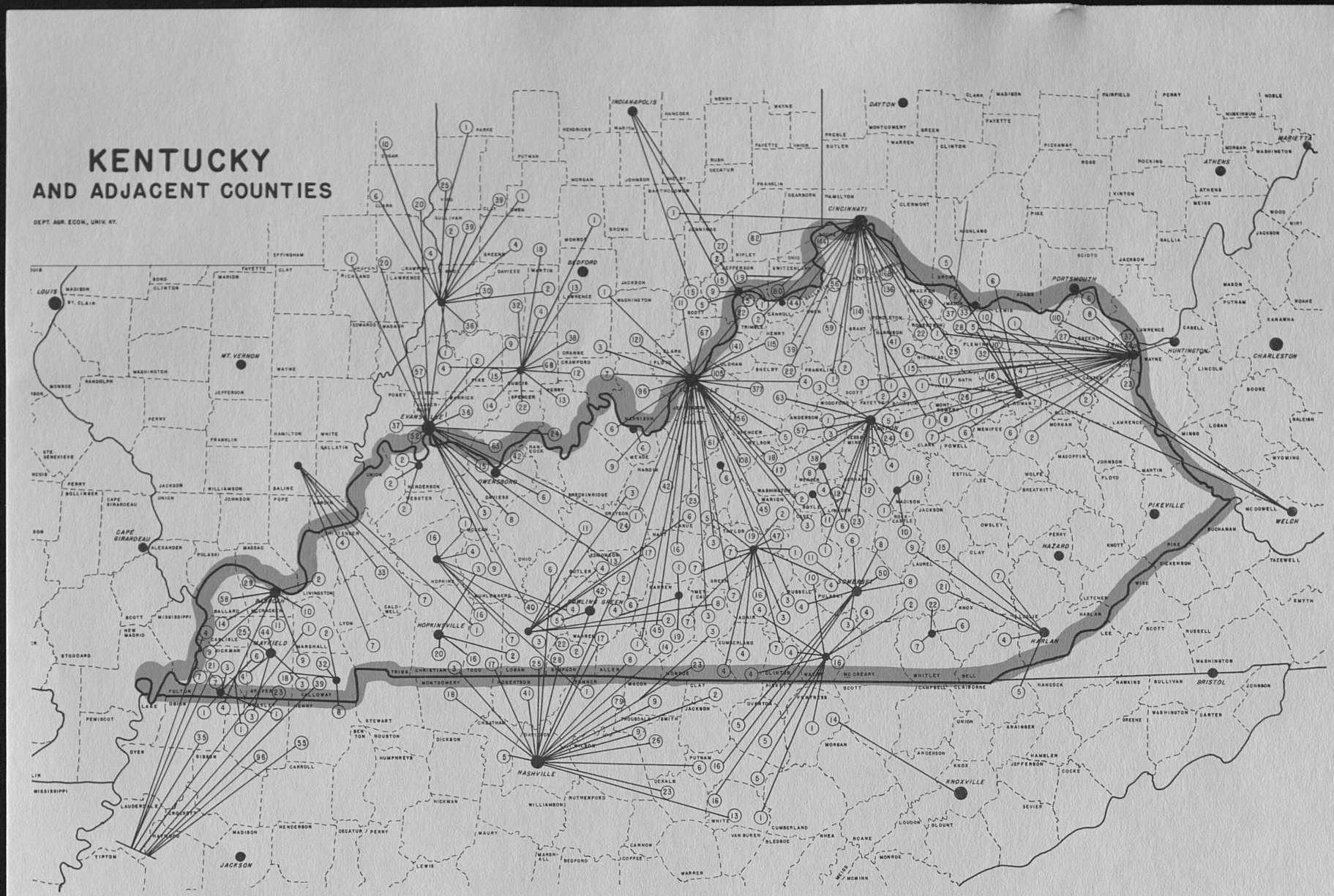

FIG. 7 - SOURCES OF MILK FOR BOTTLING PLANT OPERATIONS, 1964.
The county location and approximate numbers of inspected farms that supply graded milk to handlers is given.

7. Bottled Milk Distribution Is No Longer Local

Year by year fluid milk bottling plants have become fewer and more specialized as new technology and competitive conditions brought change. Between 1952 and 1964, 45 fluid milk bottling operations in the smaller size grouping closed their plants. They either quit business, sold their routes, or merged and became outlets for other bottlers. This shift in business is reflected in the distribution of sales for the firms remaining in business as can be seen from Table 14.

Table 14.—Amounts of Fluid Milk Represented in Kentucky Sales[a]

Amount of Kentucky Business per Day (qt. equivalent)	1952		1964	
	No.	% Business	No.	% Business
000- 5,000	85	22.8	40	8.1
5,000-10,000	19	18.4	16	12.5
10,000-20,000	10	20.0	16	21.1
20,000 and over	8	38.0	15	58.3
Totals	123	100.0	87	100.0

[a]This represents volume of business done and not size of firm.

It is significant that firms doing more than equivalent of 10,000-quart units daily increased in both number and importance. But the smaller groups remaining in business about doubled in size.[7]

Speaking generally, increased capital requirements to modernize and grow were greater than could be readily supplied by individuals and many partnerships. As a consequence, this category of ownership of fluid milk plant has declined both in number and importance. The growing importance of incorporated single plant operations as well as business operating more than one plant is given in Table 15.

Table 15.—Changing Type of Ownership of Fluid Milk Plants Serving Kentucky

Type of Ownership	1952		1964	
	No.	% Business	No.	% Business
Individual and Partners	71	22.2	30	14.1
Single Plant Corporation	43	40.7	43	36.6
Multi-plant Corporation	9	37.1	14	49.3
Totals	123	100.0	87	100.0

[7]Data from both primary and secondary sources include firms that sold milk in the state. The quantity classification does not necessarily express the size of the parent plant but is generally associated. All fluid products were converted to quart volumes as a matter of convenience.

Fluid milk plants located in Kentucky have grown and now share markets with plants on the outside as well as with others within the state. While the number of plants in Kentucky declined from 100 to 57 between 1952 and 1964, the volume of milk they processed increased from about 650 million to over a billion pounds annually. Roughly 50 percent of the milk was processed by 10 percent of all plants. Most but not all of these plants were in metropolitan population centers. Most but not all had one or more competitors in the same size bracket.

Among the reasons for large-scale competitor relationships is the high mobility of packaged products, the extensive intermarket and interarea shipments, and the extensive complex of marketing through subdealers, local distributors and chain-store contracting. The overall pattern of the relationship of primary processing centers to market outlets is shown in Fig. 8.

An important trend in the distribution pattern is the decline in retail delivery routes. Approximately 30 percent of fluid milk is destined for home delivery. In some areas, however, this figure decreases to less than 5 percent. Retail food stores represent a high proportion of wholesale accounts. Large supermarkets handle most of the volume. This situation is apparent in a survey of 247 grocery stores in south central Kentucky. The estimated weekly volume of sales by these stores was a little over a million pounds. A breakdown of the store sample is revealed in Table 16.

Table 16.—Characteristics of 247 Kentucky Grocery Stores Selling Milk

Size Group (Customers) (Daily Avg.)	No. of Stores	Percent in Size Group	Percent of Sales	Average Pounds Per Store Weekly
Under 200	143	58	18	1,300
200-700	81	33	45	6,000
Over 700	23	9	37	17,000

All of the largest- and many of the middle-size group were chain operations or affiliated with a centralized buying organization. Contracts covered, in some cases, large blocks of stores and required private labeling under company brands.

New and better roads, coupled with mass merchandising through stores, suggest new competitive problems. Increased responsibility for handling and marketing the excess of graded milk over what is required for bottling has been assumed by farmer-owned cooperative associations.

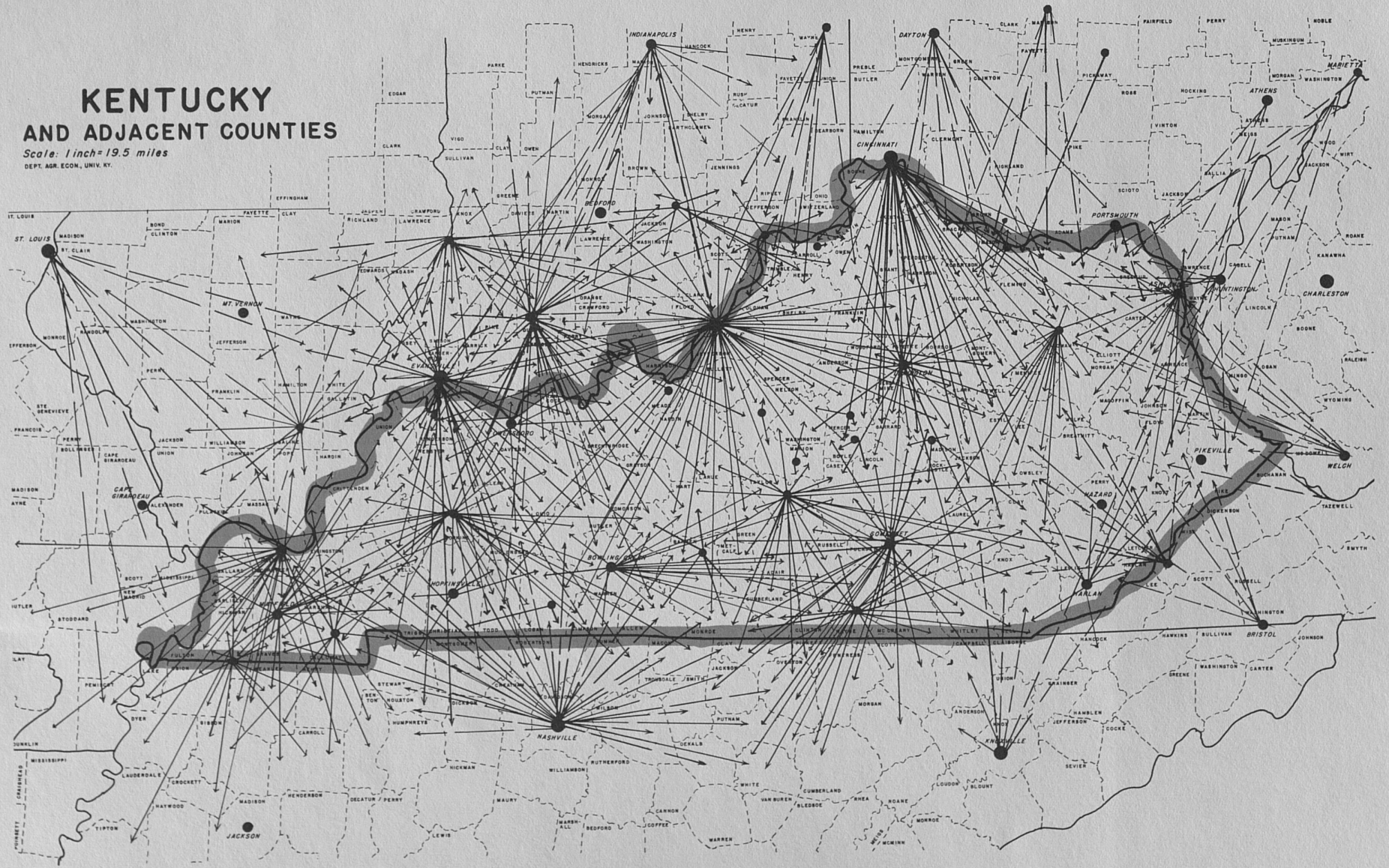

FIG. 8 - FLUID MILK PROCESSING PLANTS SELLING MILK IN KENTUCKY.

Major cities and strategic locations in population centers outside dominate the distribution patterns. Widespread coverage is achieved through company-owned routes and independent distributorships.

8. Relationship of Graded to Manufacturing Outlets

All the manufacturing plants covered by this report are potential outlets for surplus graded milk. The decision as to whether or not milk from graded sources is actually used depends on the economic and price situation as well as other factors such as the volume, transportation cost and competitive structures. The selling of surplus graded milk is a matter of negotiation. On the other hand, ungraded or manufacturing-milk producers do not have the opportunity of selling for bottling purposes. Yet, as a practical matter, expansion of milk production and the kinds of marketing opportunities are interrelated.

BLUEPRINT FOR PROGRESS

Kentucky has increased in importance as a producer of milk for fluid-milk bottling plants, American cheese and evaporated milk. The state has declined as a producer of farm-separated cream and in butter manufacturing. Processing plants generally are operated below their potential. Their quality requirements are becoming more strict, and both production and processing are more costly. In the future more dairy products will be needed to supply growing populations in Kentucky and in the nation. The question of who will produce these products depends on future progress.

Competition between Kentucky and more distant areas having different costs, marketing and pricing structures will intensify. Technological progress in production, processing and distribution must equal or exceed that of other areas if the Kentucky dairy industry is to grow and prosper.

Kentucky is well situated in respect to climate, feed resources, market location and diversification in marketing opportunities. Technical information and assistance can be secured by individual dairymen at little or no cost as compared with their benefits.

Many types of programs are available. A committee of dairy and industry leaders who were to study the question of expanding the dairy industry outlined the kinds of things that would produce results.[8] Though incomplete, the general areas worthy of farm and industry support included:

I. Improved Feeding and Management Programs. The purpose of these is to spread knowledge and encourage generally the adoption of practices that take advantage of the best known technology. Action should include plans:

1. To provide "know-how" with stress on good management in feeding, breeding and care of dairy livestock,

2. To give timely information on production, harvesting and storage of the kinds and quality of feed suited to dairying, and

3. To encourage herd improvement and production testing. In addition to general information, steps should provide necessary aids, including:

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[8]Dairy Committee, Governor's Commission on Agriculture, Committee Report, Governors Conference, February 3-4, 1964.

a. Record keeping and detailed knowledge about what cows now do. Encouragement to programs of simple records, "weigh a day," and "Dairy Herd Improvement Associations," and a special or stepped-up program of testing for small dairymen. Coordinated programs for educational and industry activities are to be implemented where feasible.

b. Knowledge of and use of breeding programs to improve herd potentials. Artificial Breeding Associations and other alternatives are available and essential to longer-time success.

c. Active support of programs of disease control. Successful elimination of Bang's disease, T.B. and other diseases or environmental health losses require both individual and general support.

II. Product Improvement and Quality Maintenance Problems. Consumers demand both quality and safety. Programs to assist all segments with education on quality, sanitation and health are needed. Some areas of public concern originate on the farm and cannot be ignored either by dairymen or the processing industries. Among important programs where preventive rather than corrective measures are needed, the problems center in:

1. Elimination of objectionable flavors and odors—this involves the identification, origin, source and prevention. Correction may involve feed, equipment use, sanitation and handling practices.

2. Education in livestock diseases and the use of chemicals that represent health hazards and/or contamination—this involves the use of antibiotics, insecticides, disinfectants and disease control. In some areas feed sources are involved. Both education and continued support of public agencies concerned with public health must be recognized as important to protecting the dairyman and his markets.

3. Recognition of consumer need and preference. Grades and standards for weights, tests, labels, and market quality need to be understood. Failure to recognize market requirements and standards jeopardize markets and destroy public trust.

III. Maintaining and Expanding Markets. Consumption of milk and dairy products is not automatic. The dairy farmer and the industry need to encourage use of dairy products in all its forms. To further these ends, support should be given:

1. To education, teaching and nutritional efforts and projects so that knowledge of the dietary and nutritional values of dairy food can be presented.

2. To school milk, school lunch and related programs that use milk and dairy products in the interest of good health and nutrition.

3. To promotional and advertising efforts. Farmers and farm and industry support the American Dairy Association, the National Dairy Council, and other programs of education and advertising. Such programs are national in scope and should be supplemented by local efforts. Sponsorship of local nutritional clinics, June Dairy Month, 4-H clubs, community appreciation and similar efforts are justified by dairy farmers interested in their own welfare.

IV. Financial and Business Support. Milk sales are sources of regular and consistent cash income that, in turn, generates other forms of business. Transportation, power consumption, feed purchasing, supply and equipment sales are part of the overall business generated at the local level. Agencies responsible for loans, credits, and financing of dairy processors, cooperatives and independent borrowers have found dairy loans sound. These groups should make known their support and encourage and assist in implementing sound programs to increase efficiency on the farm and in the business community.

V. Extension, research, and teaching programs and the use of training facilities are essential to dairying in the state. Education, recruitment, and retention of informed, agressive leadership go hand in hand with research, student and adult education in the fields where technology can contribute. Both industry and individual farm operators must be served well if maximum progress is to be made.

PROBLEM AREAS

Both the dairy farm and processing industry income could be greatly increased by doing a better job with what is already known. Dairy farm production, like plant capacity, is far below the maximum potential. Without new investment net farm income could be greatly expanded if existing herds were better fed, properly managed and records kept upon which intelligent decisions could be made. Besides the public agencies, milk processing companies, feed manufacturers and local people have or can get facts and give technical aids. Action programs, where change is required, must be adopted by individuals and communities who want to see something done. A major obstacle is indifference and failure of interest of farm and industry groups to work together toward a common goal of higher net dairy income. The future of the dairy enterprise in Kentucky depends on how rapidly and how well individual dairymen adapt to changes. Higher production per cow, more uniform seasonal marketings, better business records, larger herds and high standards of excellence in handling, sanitation and management are reasonable goals.

The dairy industry is not a single-product interest (as cotton or tobacco). Dairy farmers are not united on what programs should be. Seemingly, the government will play some role since farmers as individuals can exercise practically no control over production and marketing. The Kentucky dairy industry is a small part of the national picture. In its expansion efforts, it is confronted by both a problem and a challenge. Growing populations will require expanding the dairy industry, but the presence of small surpluses depresses prices so long as they exist. At current prices, strict attention to efficiency and cost-reducing practices are a feasible and profitable goal for many Kentucky dairymen.

Returns from labor have been relatively low for at least 10 years, but the industry is well stabilized and the outlook for efficient producers is reasonably good. The state can compete successfully with firmly established dairy states if small herds are well managed and if efforts by farmers are paralleled by effective and efficient processing and marketing. More than anything else, emphasis on increased production per cow, rather than more low-producing cows, will help, but there still remain unsolved problems over which the individual producer has no direct control.

Among the important unresolved issues are: (1) serious problems in expanding markets—especially those for butter and nonfat dry milk; (2) difficulties in managing surplus stocks; (3) lack of uniform constructive program proposals among segments of agriculture and the dairy industry itself; and (4) lack of understanding of the alternatives and of the true farm situation by both urban and nonfarm rural people.

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