kentucky dairy industry

facts and issues

by John B. Roberts

Progress Report 198

UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE
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CONTENTS

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Facts and Economic Issues[1]

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INTRODUCTION

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PURPOSE

Purpose of this report is to: (1) provide a quick reference to information on the dairy situation in the U.S.; (2) review production and marketing trends in Kentucky; (3) show inter-area and inter-regional relationships as applied to marketing patterns; (4) comment briefly on the data to help the reader note important facts, and (5) consider the possible impact of the changes and point out how the dairy industry can meet the more critical problems of the future.

PART I

THE CHANGING DAIRY SITUATION

Technological advances in production, processing and distribution, which began during World War II, have been sharply accelerated in the years that followed. Looking back 25 years at only a few of many items is sufficient to dramatize the nature of change. Between 1945 and 1970, the population of the U.S. increased by over 65 million or 47 percent, while milk production declined 3 percent in the same period. On the average, per capita milk consumption declined by 29 percent.

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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 acknowledgement is due the Kentucky Crop and Livestock Reporting Service, 434 Federal Building, Louisville. This agency, sponsored jointly by the USDA and the Kentucky Department of Agriculture, provides current and annual estimates by which part of the data in this report can be kept current. (This report updates "Kentucky Dairy Industry Facts," Progress Report 156, published in 1965.)

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Table 1.---Changes in Selected Market Factors Affecting the Dairy Industry 1945 and 1970 Comparisons, U.S.[a/]

Item	Units of Measure	1945	1970	1970/1945 Change
1. Population numbers	(000)	139,583	205,400	+47%
2. Milk production	(000 lb.)	119,828	116,800	- 3%
3. Per capita consumption	Civilian use, lb	786	557	-29%
4. Milk cows on farms	Av. No. (000)	25,035	12,470	-50%
5. Milk production per cow	Lb. produced	4,786	9,370	+96%
6. Milk used on farms	(000 lb.)	20,530	4,100	-80%
7. Sales of whole milk	(000 lb.)	68,929	112,700	+64%
8. Whole milk share	% of marketings	58	95	+64%

[a/] Sources: USDA Dairy Situation, D.S. 333, Nov. 1970; USDA Agr. Statistics, 1956, 1967, 1969.

Also, the number of milk cows declined by 50 percent, but the production per cow increased 96 percent and the volume of milk used on farms where it was produced declined by 80 percent (Table 1, items 4, 5, 6). The amount of milk sold as whole milk increased, however, from 68.9 to 112.7 billion pounds, and the percentage marketed as whole milk increased from 58 to 95 percent of the total markets. These are startling changes, but equally important are some of the economic changes that occurred in the same period.

Between 1945 and 1970 the average farm price of milk for all uses rose from $3.19 to $5.65 per hundred pounds, an increase of 77 percent. The index of "Cost price for items used by farms in production" increased 84 percent, and the importance of dairying to total farm incomes declined slightly (Table 2, items 1, 2, 3).

The index of retail prices for dairy products based on the 1957-59 average was 67 in 1945 and 130 in 1970. If one uses the same base period, the index of prices for all foods was 68 in 1945 and 132 in 1970. The percentage change for each was 94 percent (Table 2, items 4, 5). The estimated cash income from milk production resulting from a combination of higher prices and increased volume of sales more than doubled in the 25-year period. The per capita disposable income increased 254% (Table 2, items 6, 7). Thus, historically, and especially since World War II, the dairy industry in the United States has been confronted by: (1) changes in demand for its products; (2) dramatic advances in production efficiency, and (3) a revolution in processing and

Table 2.---Selected Price and Income Items Associated with Dairy Income and Values, 1945 and 1970 Comparisons, U.S.[a/]

Item	Units of Measure	1945	1970	1970/1945 Change
1. Farm price wholesale	Av per cwt	$3.19	$5.65	+77%
2. Cost farm production	Index: 1957-59=100	73.0	134.0	+84%
3. Milk sales, importance	% farm income	13.9	13.2	- 5%
4. Retail price dairy product	Index: 1957-59=100	67.0	130.0	+94%
5. Retail price all food	Index: 1957-59=100	68.0	132.0	+94%
6. Cash income from dairying	Total sales	$3,021	$6,400	+112%
7. Income per capita		$1,074	$3,358	+312%

[a/] Sources: USDA Dairy Situation, D.S. 333, Nov. 1970; USDA Agr. Statistics, 1956, 1967, 1971.

distribution methods. The adjustments made by individual milk producers have been many and varied. Many have gone out of the dairy business, others have responded by becoming larger and more efficient, and for all the methods of production and marketing have been changed.

1. FEWER FARMS KEEP DAIRY COWS

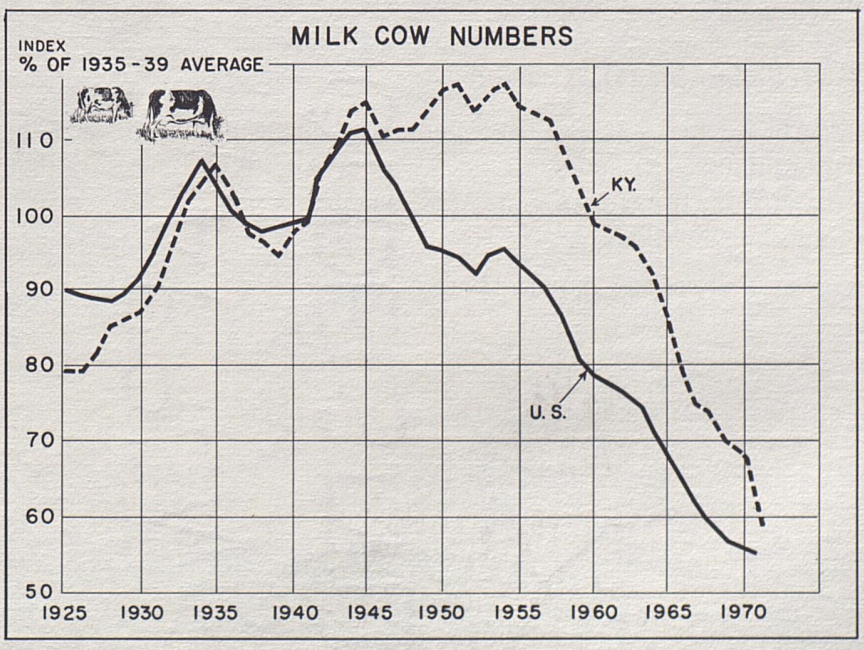
In the United States the number of farms keeping milk cows has declined by 75 percent in 30 years' time. In 1940 the number of farms reporting milk cows was 4,966,000, compared with an estimate of 710,000 in 1969. For the nation, the rate at which farmers quit keeping cows differed by regions. Generally, milk production declined fastest where it was a sideline enterprise. Shifts away from dairying have been noticeable in the Corn Belt, the Great Plains and in some of the Lake States. In other regions trends have varied, with the local market prices and off-farm employment opportunities strongly influencing the direction of change.

2. TRENDS SHOW FEWER MILK COWS, LARGER HERDS AND INCREASED PRODUCTIVITY

The number of milk cows kept on farms in the United States reached a peak in 1945 and in Kentucky in 1954. But in 1970 there were only about half as many on farms as in the peak years (Fig. 1).

Total milk production, however, increased steadily until 1963 for Kentucky and 1964 for the United States. Since those dates, the trend in production has been downward (Fig. 2).

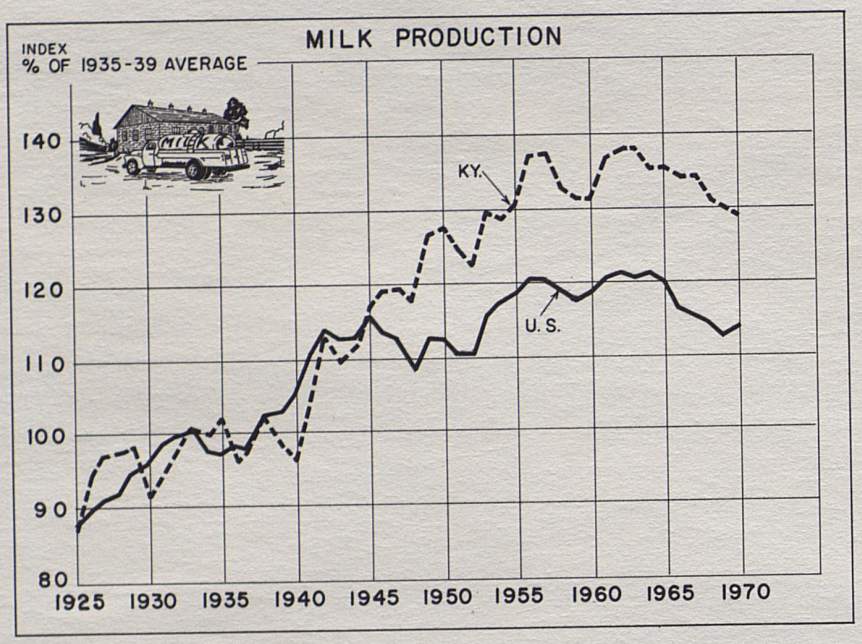
The expanded milk production resulted from a trend toward fewer and larger dairy herds and a remarkable increase in production per cow. In the United States the average number of milk cows kept per farm increased from 5.8 to 16.5 between 1950 and 1969. The number of farms keeping 30 cows or more was less than 2 percent in 1950 but was 24 percent in 1969. The trend toward fewer and larger herds is shown by size groups in Table 3.



MILK COW NUMBERS

Year	Kentucky (000)	U. S. (000)
1925	473	22,575
1926	465	22,410
1927	476	22,251
1928	496	22,231
1929	512	22,440
1930	498	23,032
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	27,136
1944	649	27,704
1945	655	27,770
1946	629	26,521
1947	635	25,842
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	20,132
1960	561	19,527
1961	555	19,271
1962	549	18,963
1963	544	18,379
1964	517	17,647
1965	486	16,981
1966	457	15,987
1967	430	15,198
1968	421	14,644
1969	400	14,152
1970	388	13,675

Fig. 1.—Trends in milk cow numbers in Kentucky and the United States. (The index measures each year's milk cow number as a percentage of the average number for the 1935-39 period.)



MILK PRODUCTION
(Million Pounds)

Year	Kentucky	U.S.
1925	1,666	90,699
1926	1,780	93,172
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	1,926	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	2,392	114,681
1952	2,313	114,671
1953	2,414	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	123,109
1961	2,605	125,707
1962	2,623	126,251
1963	2,632	125,202
1964	2,570	126,967
1965	2,568	124,173
1966	2,550	119,892
1967	2,550	118,769
1968	2,485	117,234
1969	2,465	116,200
1970	2,455	116,916

Fig. 2.—Milk production shows an upward trend since 1925. (The index measures each year's production as a percentage of average production for the 1935-39 period.)

Kentucky dairy farms, too, are becoming fewer and larger, yet new records in productivity are being set year by year. Production per cow in Kentucky has increased from an average of 3,500 pounds in 1940 to 7,137 pounds in 1970. This is a remarkable change. But for the United States the average was 4,600 pounds in 1940 and 9,338 pounds in 1970. The rate of change was almost identical for the 30-year period, but Kentucky production is low as compared with national averages and much lower than in many of the more important dairy states. In the adjoining states of Ohio and Indiana, production per cow exceeded 9,700, the New England states 10,000, and Arizona, California, and Washington 11,000 pounds annually in 1970. Clearly, 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 since that time has slowed down to less than half of the rate of population growth.

Table 3.---Distribution of Farms Keeping Milk Cows by Herd Size, U.S.[a/]

Size Group	1950		1969	
	No.(000)	Percent	No.(000)	Percent
1-9 Milk Cows	2,989	82	363	51
10-19 Milk Cows	477	13	89	13
20-29 Milk Cows	119	3	86	12
30-49 Milk Cows	47	1	109	15
50-over Milk Cows	16	—	63	9
Total:	3,648	100	710	100

[a/] Dairy Situation, Sept. 1969, Table 17.

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.
1940-1950 milk production *increased at one-half the rate* of population.
1950-1970 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. Furthermore, every year since 1945 less and less milk was used on farms; smaller amounts were delivered at retail by farmers; less and less was separated and sold as farm-separated cream, and more and more of the total supply was sold as whole milk to plants and dealers. The declining farm demand results from fewer people on farms, many fewer milk cows having calves to feed and changes in methods in dairy management. The decline in farm retailing and the shift from farm-separated cream to whole milk have put more of the milk, and especially, the non-fat solids on the commercial markets to be sold or manufactured. Table 4 shows these changes.

Table 4.---Milk Marketing by Farmers and Cash Receipts in the United States Selected Years 1945-1970[a/]

Year	Home Use On Farms Where Produced	Retailed By Farmers As Milk and Cream	Sold Wholesale		Total Volume Sold	Income Cash Received
			As Farm-separated Cream	As Whole Milk		
	(billion pounds)					-(mil dols)-
1945	21.1	5.5	23.9	68.9	98.3	4.0
1950	18.3	3.9	20.2	74.2	98.3	3.7
1955	14.6	2.7	14.7	91.0	108.3	4.2
1960	9.2	2.1	7.9	103.9	114.0	4.8
1965	6.1	1.8	3.6	112.7	118.2	5.0
1970	4.1	1.7	1.3	109.7	112.7	6.2

[a/] Source: USDA Dairy Situation, D.S. 333, Nov. 1970, Table 5; USDA Farm Production Disposition and Income, 1940-49, Revised Estimates, April 1952.

In 1945 about 21 billion pounds of milk was used on the farm where produced, 5.5 billion was retailed by the farmer, 23.9 billion was marketed as farm-separated cream, and 68.9 billion was sold as whole milk to plants and dealers. By contrast in 1970, the farmers used only about 4 billion, retailed less than 2 billion, and sold only 1.3 billion pounds as farm-separated cream. They marketed 109.7 billion (about 95 percent of production) as whole milk in commerical channels. By selling both the skim and fat portions at higher prices and by increasing the total volume of marketings, dairymen increased their cash receipts. But sales have not kept abreast with growing population.

4. PER CAPITA CONSUMPTION

Between 1945 and 1970 the total population of the United States grew from 140 to 205 million persons, an increase of 65 million or 47 percent. During the same period milk marketing increased from 98.3 to 113 billion pounds, an increase of 15 percent. Estimates of the per capita consumption on a milk equivalent in all fluid and dairy product uses show 786 pounds in 1945 and 550 pounds in 1970. The decline in pounds per person was 236, or 30 percent, since the end of World War II.

5. 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. Besides a growing number of substitutes that compete with dairy items, fewer meals are eaten in the home and more are being eaten out. These and many other factors influence milk sales in general. Let's look at the changing use patterns.

Per capita consumption of whole milk, cream and some dairy products is declining, despite the fact that prices remain low as compared with the rising incomes and purchasing power among consumers. The largest declines occurred in fluid whole milk, evaporated whole and skim milk, and in butter. Increases have occurred in low fat fluid milk, cheese products, dried milk and frozen products—including ice cream, ice milk, sherbets, frozen desserts and specialties. The trends are shown in Table 5.

Yet, the fact remains that the milk requirements for items that have increased in consumption were not enough to offset those declining. Furthermore, the supply of milk produced consistently ran ahead of civilian purchases.

During World War II, to meet war-time needs, milk producers were encouraged to expand production and to shift from selling farm-separated cream to the delivery of whole milk. The trend was accelerated, yet in the post-war years and the decades that followed there were sharp declines in the demand for milk. Butter and evaporated milk were especially depressed, and producers generally were dissatisfied with the dairy markets situation. Problems compounded. To clear the market, government purchases at support levels have taken products when they exceeded other demands at the specified prices. The problem of disposing of the acquired products without disrupting commercial channels has been a factor in national policy. The problem has not yet been solved.

6. 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.[2] The act authorizes the purchase of products from processors at specified levels intended to fulfill the purpose of the act. Prices established have ranged from $3.07 per hundredweight to $4.93 between 1950 and 1971, at levels between 72 and 91 percent parity equivalent (Table 6).

A history of the different dairy products removed and the percentage of marketings shows the government acquired very little in 1951 and sold some of its previous purchases. Subsequent acquisitions were nominal in 1952, but in 1962 they amounted to 9 percent of the milk fat and 14 percent of the solids-not-fat. Products purchased have been butter, and nonfat dry milk and American cheese to a lesser extent. The influence of purchases in terms of production varies with the year-by-year changes in demand (Table 7).

Moreover, a review of the disposal of stocks of dairy products acquired under price supports shows very little has gone into commercial channels. Instead, large amounts have been given to needy families, to public welfare agencies, and to schools and domestic institutions. Various quantities were used for foreign aid and for special purposes. From a practical point of view, most dairy products bought under the governmental supports were used for public benefit and to bolster international relations.

It is not possible to predict what would be the exact price of butter, cheese, nonfat dry milk or other products without the influence of the government price support program. Even

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[2]Federal legislation passed in 1970 makes the support levels based on parity optional in the case of butter fat.

Table 5.--U.S. Milk Production and Per Capita Consumption, Specific Years, 1930-1970[a]

Year	Total Milk Production (bil.lb)	Total Per Capita Civilian Consumption: Milk Equivalent (lb)	Per Capita Consumption, Principal Dairy Products[b]						
			Fluid Milk (lb)	Fluid Cream (lb)	Low-fat Milk (lb)	Butter (lb)	Evap. Milk (lb)	Cheese (lb)	Ice Cream (gal)	Ice Milk (gal)
1930	103	819	270	10.8	---	17.6	11.3	4.7	2.1[c]	---
1935	104	801	261	10.4	---	17.6	14.7	5.3	1.7[c]	---[d]
1940	112	819	265	10.6	---	17.0	17.5	6.0	2.4[c]	0.1[d]
1945	121	786	335	12.8	---	10.9	16.3	6.7	3.3[c]	0.1[d]
1950	117	740	278	11.1	---	10.7	18.5	7.7	3.7	0.2
1955	123	706	291	9.7	---	9.0	14.2	7.9	3.8	0.5
1960	123	653	278	9.1	---	7.5	11.2	8.3	3.9	0.8
1964	127	631	268	7.9	---	6.8	9.0	9.4	3.9	1.1
1965	124	618	264	7.6	33.9	6.4	8.4	9.5	3.9	1.3
1966	120	602	260	7.2	37.8	5.7	7.7	9.8	3.8	1.3
1967	119	580	249	6.7	42.0	5.5	7.1	10.1	3.8	1.3
1968	117	576	244	6.4	48.0	5.6	6.8	10.6	3.9	1.4
1969	116	568	236	6.0	53.6	5.4	6.3	10.9	3.8	1.4
1970	117	550	227	5.6	57.7	4.5	5.8	11.0	3.9	1.9
Changes from high yr of period	from 127 high in 1964, down 9.1%	from 838 high in 1931, down 34.1%	from 335 high in 1945, down 32.3%	from 13.6 high in 1946, down 58.2%	from 33.9 low in 1965, up 70.1%	from 18.6 high in 1934, down 74.4%	from 18.5 high in 1950, down 68.6%	from 4.4 low in 1932 up 200%	from 1.3 low in 1933, up 200%	from 0.1 low in 1940, up 1,900%

a/USDA Dairy Statistics through 1960, Stat. Bul. 303, p. 380-81; Dairy Situation, USDA, Nov. 1970
b/Civilian consumption only.
c/Computed from figures given both in gallons and pounds, 1950-60, producing an average volume of one gallon per 4.71 pounds of ice cream.
d/Computed as above, with an average volume of one gallon per 5.19 pounds of ice milk.

with this support earnings in dairy farming have lagged behind changes in wages and income of industrial employees during the 1960's.

PART II

THE ADJUSTMENT PROBLEMS

Milk production is an important source of income to individual farmers in each of the 48 states in the United States. But no two states are alike in either production or market potentials. Even where milk is a major source of farm income there are contrasts. For example, New Hampshire reported marketing 342 million pounds of milk in 1970. Of this amount, only 16

Table 6.---Milk Price Support Levels and Percentage of Parity, Marketing Years, U.S. Average, 1950-1971

Year	USDA Price Support, cwt	Support Level of Parity Equivalent	Year	USDA Price Support, cwt	Support Level of Parity Equivalent
1950	$3.07	77	1961	$3.40	80
1951	3.60	85	1962	3.11	75
1952	3.85	91	1963	3.14	75
1953	3.74	90	1964	3.15	75
1954	3.15	80	1965	3.24	75
1955	3.15	81	1966	3.27	73
1956	3.25	83	1967	3.34	72
1957	3.25	81	1968	4.00	84
1958	3.06	75	1969	4.28	83
1959	3.06	77	1970	4.66	85
1960	3.23	76	1971	4.93	85

million (or 5 percent) was manufactured into products in the state. Minnesota, the third largest milk-producing state marketed 9,473 million pounds and manufactured 8,968 million. The manufactured output used the equivalent of 95 percent of the state's marketing. Kentucky farmers in the same year marketed 2,275 million pounds and the manufacturing industry in the state used an equivalent of 60 percent of it. Wisconsin marketed 17,752 million pounds and manufactured 12,919 million (or 73 percent) into products. In Wyoming, where milk production was only 131 million pounds, more than half (56 percent) was manufactured. A state by state comparison clearly shows that individual states have dairy problems of different magnitudes. Similar, though less dramatic differences occur between separate geographic areas. A further

Table 7.---USDA Dairy Price Support Purchases 1949-1970

Year	Milk Fat	Solids Not Fat	As a Percentage of Production	
			Milk Fat	Solids Not Fat
	(million pounds)		(percent)	
1949	100.4	321.1	2.6	4.6
1950	40.9	339.9	1.1	4.9
1951	-24.0[b/]	31.5	[b/]	0.5
1952	13.8	41.2	0.4	0.6
1953	387.5	668.9	9.7	8.6
1954	328.2	695.5	8.0	8.7
1955	179.6	558.0	4.3	6.8
1956	197.6	753.0	4.7	8.7
1957	222.1	867.5	5.2	9.8
1958	178.2	875.0	4.2	9.8
1959	123.8	815.6	2.9	9.1
1960	122.6	819.8	2.9	8.9
1961	305.0	1,075.3	6.9	11.2
1962	402.4	1,399.0	9.1	14.3
1963	291.8	1,210.1	6.7	12.3
1964	287.6	1,166.9	6.5	11.6
1965	217.4	1,074.0	5.0	10.8
1966	26.2	355.5	0.6	3.7
1967	276.3	719.1	6.6	7.5
1968	193.2	575.4	4.7	6.0
1969	171.6	421.5	4.2	4.4
1970	221.3[a/]	460.6[a/]	5.3	4.8

Source: USDA Dairy Situation, March 1971, Table 19.

[a/] Preliminary. [b/] Domestic sales exceeded purchases.

analysis of marketings and use patterns based on Farm Production Regions will help put these differences in perspective.[3] (For individual states, see Appendix Table A.)

1. REGIONAL COMPARISONS[4]

The Northeast, Lake States, Corn Belt and Pacific regions stand out in both the total marketings and in production of milk eligible for fluid use. The western portions of the Corn Belt, the Lake States and the Northern Plains region produce large volumes of milk that can be used only for manufacturing products. Most states in the Northeast, southern and south Mountain regions produce only grade A quality milk. Reference is made to the individual states in each of the Farm Production Regions in Fig. 3 and to summary data in Table 8.

Table 8 is a consolidation of individual state data with respect to total marketing, the grade A eligible supplies, estimates on how milk was used and, in the same table, the percentages represented.

Summaries show that the Northeast marketed more than 23 billion pounds of milk in 1968 and that 22.5 billion (or 97 percent) was of grade A quality. The region consumed about 16 billion pounds (or 71 percent) of the grade A supply in fluid form. The surplus that amounted to 6.5 billion pounds of grade and 646 million pounds of ungraded milk was used in manufacturing. This substantial surplus of grade A milk occurred despite the fact the Northeast had 26.9 percent of the U.S. population and only 21 percent of all milk marketings. The Lake States, Minnesota, Wisconsin, and Michigan, produced 31.9 billion pounds of milk, of which 23.9 billion (or 74.9 percent) was manufactured. These states contained only 8.3 percent of the population and marketed 28 percent of the nation's milk.

A further analysis shows that in 1968 the supply of grade A milk in each region was greater than the estimated fluid use (Table 8, Cols. 2 and 6). The percentage of grade A milk used for fluid purposes ranged from 57.5 percent in the Lake States to 83.6 percent in the Southeast (Col. 7). The surplus of grade A production in each of the Northeast, Lake States and Corn Belt Regions was substantially in excess to the total fluid uses in most all of the other regions (Cols. 8 and 6). Data from Table 8 establish the fact that on a regional basis there are wide variations in the characteristics of the supply and in the relative importance of the fluid market outlets. Differences as between individual state are much greater than as between the regions. The summary for individual states given in Appendix Table A shows the percentage of milk used for manufacturing ranged from 19 in the Southeast to 75 in the Lake States region. The table also shows the comparable figures for individual states. These are given in Fig. 4.

For the individual states percentages for manufacturing were lowest, 5 and 7 for Vermont and Maryland; they were 14 and 19 percent respectively in Georgia and Florida, as contrasted to 90 percent in North Dakota and 95 percent in Minnesota.

2. REGIONAL CHANGES IN DAIRY MANUFACTURING

Historically the dairy manufacturing industries have developed and have had their greatest impact in the North and Central portions of the United States. In the Lake States, the Northern

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[3]See "Regional Changes in Dairy Manufacturing," USDA, Dairy Situation DS-328, Nov. 1969, p. 34.

[4]The regional comparisons are based on 10 Farm Production Regions made up of states where data on farm production, production inputs, and efficiency have broad similarities. See USDA Statistical Bulletin 233, 1970 for details.

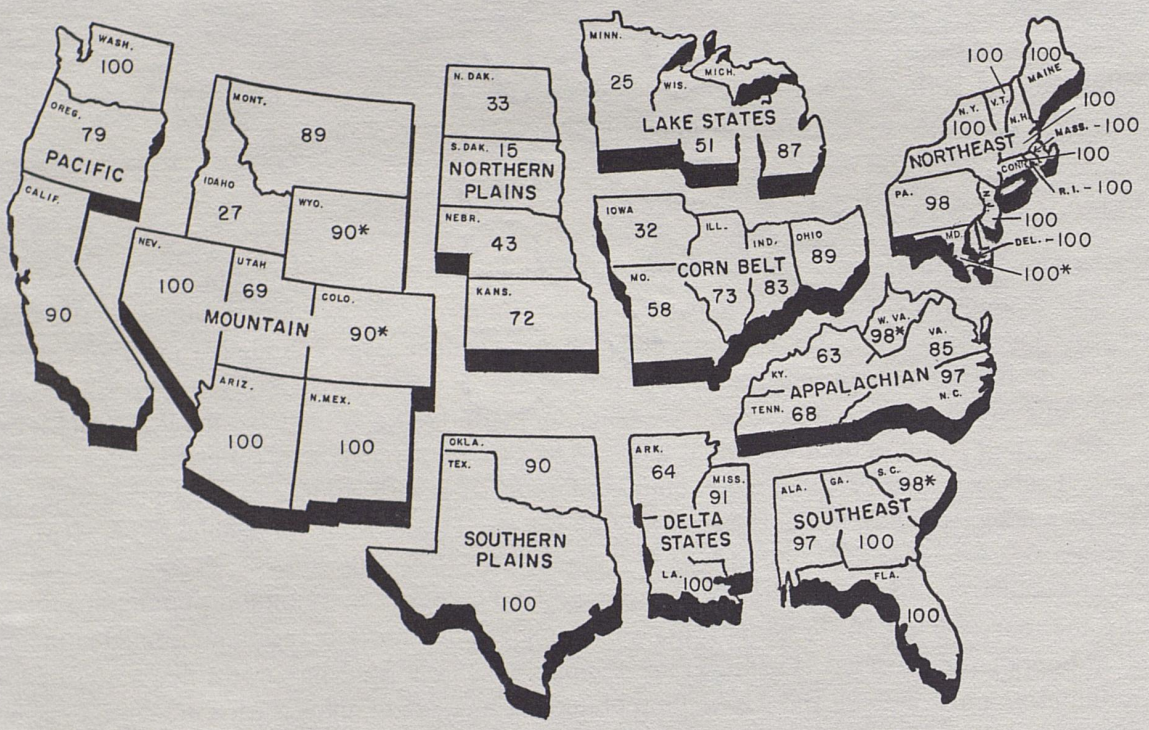

Fig. 3.—Percentage of milk eligible for fluid use marketed by farmers in 1970, by U. S. Farm Production Regions. In all regions the percentage of milk eligible for fluid use has increased sharply. Some predictions are for "one grade" of milk by the 1980's. [Neg. ERS 1399-62 (8), USDA]

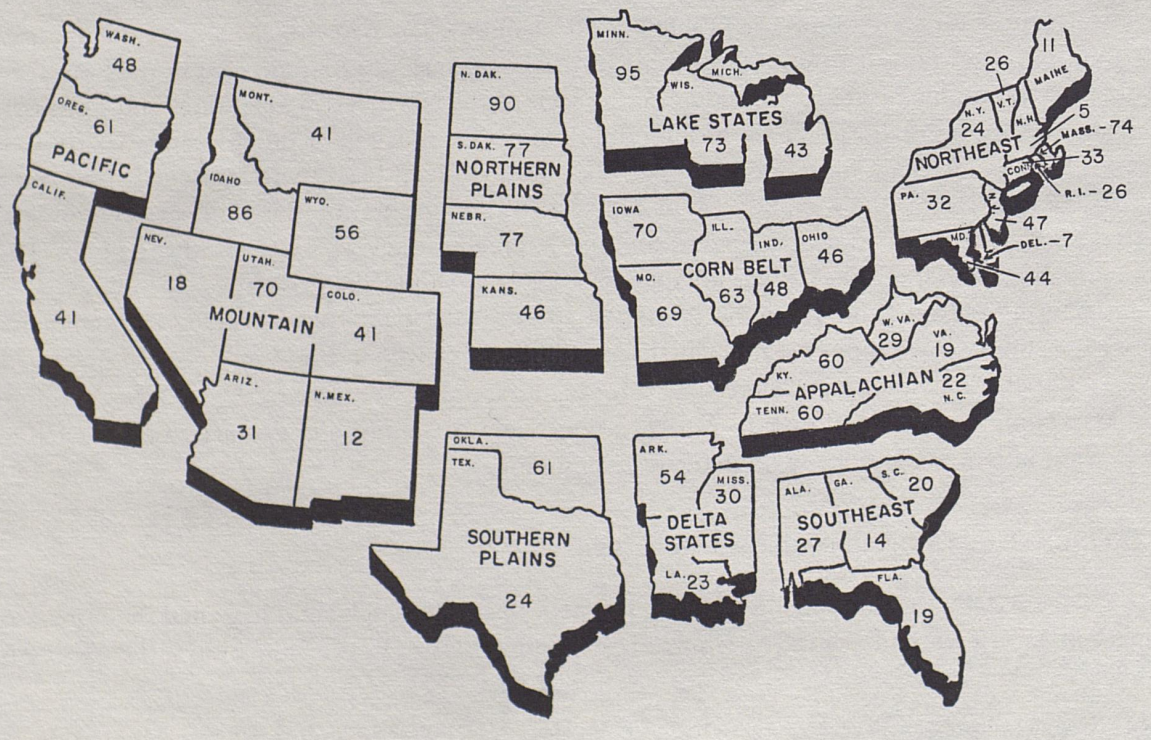

Fig. 4.—Percentage of milk marketed for manufactured products, 1970, by U. S. Farm Production Regions. [Neg. ERS 1399-62 (8), USDA]

Plains, the Corn Belt, and in more localized areas elsewhere, manufactured products have dominated the markets. But the patterns are being changed somewhat. The following statements summarize some of the regional changes:

Table 8.---Milk Marketed for Fluid and Manufacturing Purposes by Grade, Farm Production Regions

Region	Mktg Total [a/]	Grade A Eligible [b/]	% Gr. A Eligible (Col.2÷ Col.1)	Mfd. Prod. (mil. lb)	% Mfd. Prod. of Total (Col.4÷ Col. 1)	Fluid Milk Uses (mil.lb)	% Fluid Milk Uses (Col.6÷ Col.2)	Surplus Gr. A Over Fluid Use (mil.lb)	Milk From Ungraded (mil.lb) (Col.1- Col.2)	1968 Percentages [c/]	
	----(mil.lb)-----									Population	Marketings
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		
Northeast	23,245	22,599	97.2	7,140	30.7	16,106	71.2	6,493	646	26.9	20.7
Lake States	31,945	13,896	43.4	23,944	74.9	8,001	57.5	5,895	18,049	8.3	28.4
Corn Belt	17,421	10,399	59.6	10,833	62.1	6,580	63.2	3,819	7,022	17.0	15.6
Northern Plains	5,931	2,014	33.9	4,365	73.5	1,567	77.8	447	3,917	2.5	5.2
Appalachian	7,535	5,441	72.2	3,153	41.8	4,383	80.5	1,058	2,094	9.4	6.7
Southeast	3,728	3,532	94.7	774	20.7	2,954	83.6	578	196	8.5	3.3
Delta States	2,556	2,186	85.5	878	34.3	1,678	76.7	508	370	4.1	2.3
Southern Plains	4,066	3,871	95.2	1,300	31.9	2,766	71.4	1,105	195	6.8	3.6
Mountain	4,345	2,687	61.8	2,403	55.3	1,942	72.2	745	1,658	4.0	3.8
Pacific	11,608	9,941	85.6	4,525	38.9	7,083	71.2	2,858	1,667	12.3	10.3
U.S. Totals	112,380	76,566	68.1	59,315	52.7	53,060	69.2	23,506	35,814	99.4	99.9

[a/] USDA Milk Production Disposition and Income 1968-69, Table 8.

[b/] USDA Milk Production Disposition and Income 1968-69, Table 7.

[c/] USDA Dairy Situation, November 1969, Table 21.

"Regional Changes in Dairy Manufacturing[5]

"The pattern of U.S. dairy product manufacturing has changed substantially in the 2 decades since World War II, both in terms of the products made and in the location of manufacturing.

"Changes in the national dairy product mix are occurring chiefly in response to changes in demand. The location of dairy product manufacturing has changed largely because population has grown and shifted. In some areas the growth of urban and suburban population has increased the proportion of milk output used for fluid milk products. In other areas, decreasing milk production has made less milk available for use in manufactured dairy products.

"Sources of Milk for Manufacturing

"The basic sources of milk for manufacturing dairy products currently are: (1) the 30 percent of milk sold to plants and dealers as manufacturing grade milk; (2) supplies of grade A milk in excess of the amount needed for bottling; (3) the small proportion of marketings sold as farm-separated cream; and (4) a relatively small amount of imported milk solids used as ingredients for dairy products.

"Manufacturing grade milk is a declining portion of the milk marketed by farmers. In 1949, it amounted to 41 percent of milk sold to plants and dealers; in 1968 it was 30 percent. Most manufacturing grade milk is produced in the Lake, Corn Belt, and Northern Plains States, which account for two-thirds of U.S. manufactured dairy products."[6]

The gross effect of changes in both population and marketing is shown in Table 9. Between 1949 and 1968 the Corn Belt and Northern Plains have become relatively less important in both their marketings and milk used. The Northeast, Southeast and Pacific regions have shown very substantial gains in both.

Yet, the basic pattern of the manufacturing milk industries has not been changed. The Lake States, the Corn Belt and the Northern Plains dominate. Their combined production represents 79 percent of the butter, 80 percent of the cheese, and 76 percent of the non-fat dry milk. These regions have 28 percent of the U.S. population and market 49 percent of the milk. In contrast, the Northeast has 27 percent of the population and 21 percent of the milk production in the U.S. The region has 12 percent of the supply of manufacturing with strong emphasis on ice cream and cottage cheese (Table 10).

In the Southern segment of the United States, i.e., the Appalachian, Delta, and the Southeastern regions, the population is 22 percent, the milk marketed 12 percent, and manufacturing is 8 percent of the U.S. totals. The South Plains that adjoin the Delta region on the west have a supply-demand balance more like that of the Delta and Southeast than like the other regions. Patterns of manufacturing use in the Pacific regions resemble those of the Northeast, i.e., cottage cheese and ice cream are relatively important. The Mountain states are sparsely settled and form a buffer between the midwest and Pacific Coast markets.

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[5]Prepared by Robert R. Miller, Agricultural Economist, Economic and Statistical Analysis Division, Economic Research Service, USDA.

[6]See Figs. 3 and 4 for states included in each region.

Table 9.---Population, Marketings and Manufactured Dairy Products Output: Changes from 1949 to 1968[a/]

Region	1949-68 Percent Change			As A Percentage of U.S. Total					
	Population[b/]	Marketings[c/]	Milk Used[d/]	Population[b/]		Marketings[c/]		Milk Used[d/]	
				1949	1968	1949	1968	1949	1968
	(Percent)								
Northeast	+24	+20	+39	28.9	26.7	19.7	20.7	9.4	12.2
Lake States	+31	+21	+21	8.5	8.3	26.9	28.4	35.7	40.3
Corn Belt	+26	-18	-27	18.2	17.0	21.9	15.6	26.6	18.2
Northern Plains	+13	- 8	- 6	3.0	2.5	6.4	5.2	8.3	7.3
Appalachian	+23	+31	+ 8	10.2	9.4	5.8	6.7	5.3	5.3
Southeast	+54	+103	+196	7.4	8.5	1.9	3.3	.5	1.3
Delta States	+23	+34	+16	4.4	4.1	2.0	2.3	1.4	1.5
Southern Plains	+39	+12	- 5	6.5	6.8	3.7	3.6	2.5	2.2
Mountain	+62	+27	+15	3.3	4.0	3.5	3.8	3.8	4.0
Pacific	+75	+43	+26	9.5	12.3	8.2	10.3	6.5	7.6
Alaska and Hawaii	---	---	---	---	.6	---	.1	---	.1
United States	+34	+15	+ 7	100.0	100.0	100.0	100.0	100.0	100.0

[a/] Source: USDA Dairy Situation, D.S. 328, November 1969, p. 39.

[b/] Resident

[c/] Milk and cream, milk equivalent

[d/] Milk equivalent used in manufactured dairy products

Table 10.---Population, Marketings and Manufactured Dairy Products Output: Regional Distribution 1968[a/]

Region	1968 As A Percentage of U.S. Total								
			Production						
	Population	Marketings	Milk Used	Butter	American Cheese	Other Cheese	Cottage Cheese	Non-fat Dry Milk	Ice Cream
	(Percent)								
Northeast	26.7	20.7	12.2	5.2	3.7	21.5	22.9	10.8	33.6
Lake States	8.3	28.4	40.3	49.9	54.4	44.1	14.8	53.4	10.9
Corn Belt	17.0	15.6	18.2	18.1	16.5	21.4	23.6	14.2	18.6
Northern Plains	2.5	5.2	7.3	10.7	8.8	1.9	3.7	8.3	2.7
Appalachian	9.4	6.7	5.3	2.5	7.9	2.0	4.1	1.2	6.8
Southeast	8.5	3.3	1.3	0.1	----	----	2.2	----	5.8
Delta States	4.1	2.3	1.5	0.5	1.5	1.3	1.5	----	2.0
Southern Plains	6.8	3.6	2.2	2.0	1.4	----	3.5	1.8	4.4
Mountain	4.0	3.8	4.0	3.9	3.9	5.0	5.1	3.6	3.2
Pacific	12.3	10.3	7.6	7.1	1.6	2.8	18.3	6.2	11.7
Alaska and Hawaii	0.6	0.1	0.1	----	----	----	0.3	----	0.3
United States	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a/] USDA Dairy Situation, D.S. 328, Nov. 1969, p. 39.

3. THE ADJUSTMENT PROBLEM

When all of the data just presented are reviewed in the light of national trends, the alternatives between market outlets must be recognized. Besides the fluid markets, butter is the most important of the alternatives. It still absorbs about 20 percent of total production. Demand for evaporated milk has declined and, while markets for non-fat solids have improved, much of the supply is diverted to price support programs. Generally, the manufacturing milk markets have become less and less attractive to milk producers. In response, producers who formerly found manufacturing outlets satisfactory have qualified their milk for fluid markets, in many cases, in marketing areas where no additional supplies were needed.

Under pressure of mounting surpluses of grade A milk, a new era of competition was begun. Many small processors either closed their plants or merged and consolidated them into larger operating units. Most fluid milk processors found it necessary to share local accounts and to compete for customers over ever-widening marketing areas. Increasingly, the larger processors and organizations of producers became involved in inter-area and inter-regional shipments of milk. High mobility of milk, price differentials between fluid and manufacturing uses, and unstructured competition were involved. Competitors have been able to exercise significant price and market leverage without finding local fluid milk outlets. Thus, there still remains a very major number of frustrated milk producers who would like to find a fluid milk market or at least find a way to share the returns from such markets on some sort of basis. The cooperative consolidation or merger route has been pointed out as one possibility. Producers in some cases advocate inter-regional pooling. The point of view toward such a proposition is strongly influenced by the supply-demand balance, the economics, and by prices and traditions within and between regions.

PART III

KENTUCKY'S STAKE IN DAIRYING

The dairy enterprise is especially suited to Kentucky where topography, rainfall, and climate favor the extensive use of forage and cover crops. From a business stantpoint the investments in farm production and in the processing, transportation and distribution of milk and other dairy products are major considerations in the commerce of the state.

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. DAIRYING: A MULTI-MILLION DOLLAR INDUSTRY

Business generated by the dairy enterprise is the major Agricultural income in many communities, and for the state as a whole it is a multi-million dollar enterprise. In 1970 about 20,000 farms were producing milk on a regular basis for sale. Farmers' investments in milk cows and dairy stock, land, building and equipment in support of their dairy enterprise exceeded $820 million. In 1970, 77 Kentucky establishments were licensed to buy milk and cream. Total investments in these marketing and processing facilities are not known, but the value of their

shipments is estimated to be well in excess of $200 million. The value added in manufacturing and retail services is more than $60 million and payrolls exceed $25 million annually.[7]

In addition to the money invested by farmers and in dairy plants, there are millions invested in supporting industries such as warehousing, transportation, retailing and consumer services, and in the businesses supplying feed, machinery, equipment and supplies used by dairymen. The stake of dairying in Kentucky is well over a billion dollars.[8]

2. IMPORTANCE OF DAIRY FARMING IN KENTUCKY

Milk production is one of the major sources of cash income to Kentucky farmers. The gross value of production from dairy farms exceeded $165 million in 1970. Of this total milk sales amounted to $122.6 million; that used on farms $8 million; and the sale of milk cows, cull dairy stock and dairy veal amounted to more than $35 million.

Sales of milk and cream are the third most important source of cash income. Table 11 shows that the leading sources of cash income in 1970 were tobacco—33 percent, cattle and calves (including dairy stock)—28 percent, and dairy products (milk)—13 percent. Other sources of importance included other crops, hogs, poultry, and sheep and wool.

Table 11.---Sources of Cash Income in 1970

	Dollars (000)	% of Totals
Tobacco	302,904	32.8 (33)
Cattle and calves (including dairy)	258,039	27.9 (28)
Dairy products (milk)	122,612	13.3 (13)
Crops other than tobacco	105,125	11.5 (12)
Hogs	91,819	10.0 (10)
Miscellaneous (all other sources)	41,284	4.5 (4)
All crops	408,039	44.3 (44)
All livestock	513,744	55.7 (56)
	921,783	100.0 (100)

Kentucky farmers have taken advantage of new and growing markets for whole milk and shifted away from home use, farm separated cream, and farm retailing. Cash income from whole milk has multiplied many times since 1940 (Table 12).

Since 1940 the rank of Kentucky among all states of the nation has changed from 20th to 12th in total milk production and from 22nd to 5th in american cheese. The state is also near the top in evaporated case goods and ranks 11th in all manufactured products (Table 13).

The decline in demand for butter, the enlargements of whole milk routes for manufacturing and the expansion of markets for grade A or fluid milk have diversified Kentucky marketing opportunities.

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[7] Based on Census of Manufacturing 1967, Dairy Products, U.S. Dept. of Commerce.

[8] 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. Does not include plants outside of Kentucky buying Kentucky milk.

Table 12.---Value and Disposition of Kentucky's Milk

Sales	1940	1970
	----(000 dollars)------	
Retailed as farm produced butter	450	--
Farm separated cream, centralizers	4,123	72
Retailed by farmers, bottled milk	6,528	1,898
As whole milk to plants and dealers	6,138	120,642
Total sales	17,239	122,612
Consumed on farms	15,054	7,977
Total value	32,293	130,589

Table 13.---National Ranking of Kentucky's Dairy Production[a/]

	1940 Rank	1970 Rank
Butter production	21st	18th
American cheese	22nd	5th
Evaporated (case goods)	12th	**
All manufactured products	20th	11th
Total milk produced	20th	12th

a/ Source: Production of Manufactured Dairy Products -- Statistical Reporting Services, USDA.

**Volume not published -- estimated to be in the top 4 by the author.

Table 14.---Volume of Milk Through Primary Outlets, Kentucky, 1940-1970

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
1965	2,633	1,423	956	254
1969	2,465	1,318	954	193
1970	2,455	1,364	911	180

Sustained growth of both the manufacturing and fluid milk markets is shown by the volume of milk utilized by each since 1940 (Table 14).

Both manufacturing plants and fluid milk processors have more than doubled their volume of receipts since 1940. Farm use has been reduced by three-fourths.

3. CHANGES IN DAIRY FARMING

The family cow and the very small sideline dairy operator who once retailed milk, marketed farm-separated cream and fed skim milk on the farm have gone. In 1970 there were

one-seventh as many farms and 70 percent as many cows were being milked as in 1940. But production per cow had doubled and average size of herd had quadrupled as shown by the following statistics (Table 15).

Table 15.---Dairy Production Changes, Kentucky, 1940-1969

Year	Farms (Reporting)	No. Milk Cows (2 yr & over)	No. Cows (av.)	Production (per cow)	Total Milk (mil.lb)
1940	201,709	555,000	2.8	3,500	1,841
1959	88,293	584,000	6.6	4,540	2,495
1969	-30,000*	388,000	12.9	6,963	2,465

*Estimated.

There are other revolutionary changes that show the growing commercial importance of dairy farming.

4. PRODUCTION PER COW IMPROVING

Milk production per cow is on the rise and is well above the levels maintained in the 1930's. Figure 5 shows the averages prevailing in 1957 and 1970. The Kentucky average is low compared with the U.S. even though a few of the individual herds in the state rank with the best in the nation. Records kept for members of the Kentucky Dairy Herd Improvement Association showed 28,500 cows on test in Kentucky in 1970. The average production per cow was 11,670 pounds of milk; a number of herds produced over 15,000 pounds; the highest individual cow produced more than 30,000 pounds of milk and 1,200 pounds of fat.

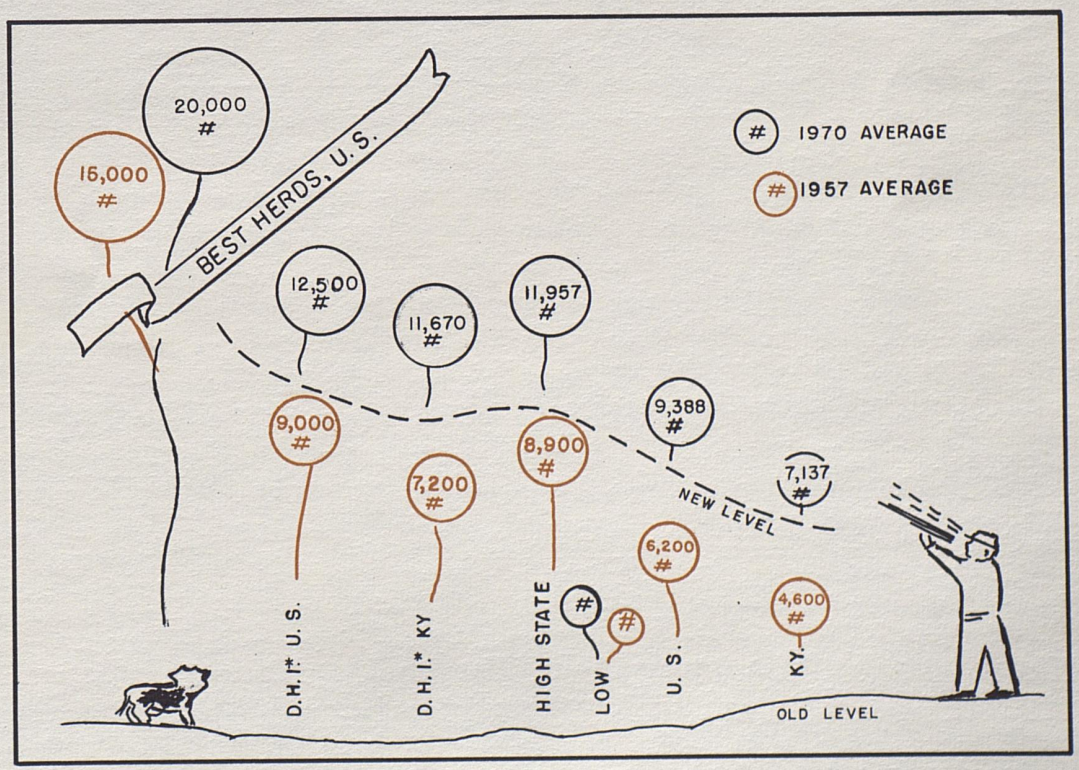

Fig. 5.—New records in average production per cow have been set each year for more than 20 years. (The averages for Dairy Herd Improvement Associations in Kentucky and the U. S. are practical goals for most dairymen.)

By record keeping and a program of better feeding, breeding and management, herd averages could be greatly improved. Production per cow would need to nearly double for it to equal the average production of herds in the Kentucky Dairy Herd Improvement Associations. It would have to more than triple to match that of the most productive animals.

5. CHANGING MARKET STRUCTURES

In 1925 there were no cheese plants and no evaporated milk processors in Kentucky, 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 in the state had reached a record level of 1,269 (Table 16).

Table 16.---Trends in Outlets[a/]

Year	Fluid Milk	Cheese Plants	Evap Milk Operations	Butter Plants	Cream Stations	Totals
1940	123	14	7	12	1,113	1,269
1950	104	15	10	6	805	940
1960	73	18	13	6	269	379
1971	38	24	8	1	--	71

[a/] Licenses issued to buying places in Kentucky. It does not include any outlets beyond the state boundaries.

Since 1940, however, the number of butter manufacturing plants declined from 12 to 1 and cream buying stations from 1,113 to zero. Only one specialized butter plant remained in operation in 1971, and this plant no longer depended on cream buying stations. During the same period, the cheese operations increased in both number and importance; the number of concentration points and the production of evaporated milk expanded into the 1960's, then contracted in the face of declining demand.

Year by year the dairy industry has adjusted to change. Processors have become fewer and more specialized, with emphasis on mechanization and efficiency in plant operations and functions. Farmers have had to come to the buyers and pay to have their milk moved from the farm to the buyer locations. Markets have changed. In the post-war years, many farms no longer milked cows, the sour cream markets disappeared and the cows were subsequently counted as beef animals. Yet, milk production continues to rank high as a source of Kentucky's farm income because of its market growth patterns.

6. THE NATURE OF KENTUCKY MARKETS

The importance of the diversified markets accordingly is best measured by changes in the relative importance of different uses. Trends since 1940 emphasize: (1) the growing importance of total milk production, (2) the decline in proportions used on the farms and, (3) the dramatic expansion in bottled and fluid products (Table 17).

Among the manufactured products, cheese has gained consistently since 1940. In 1970 it ranked second behind fluid milk in importance among uses. During the period butter became less important; evaporated milk expanded to a peak in the 1950's and has declined since. Ice cream

Table 17.---Use and Multi-Product Markets, Selected Years

	1940	1960	1970
1. Total production (billion pounds)	1,841	2,460	2,455
2. Use allocations and products[a/]			
Used on farms where produced	47%	16%	7%
Purchased for bottling and fluid products	21%	40%	38%
Butter (manufacturing)	20%	10%	16%
Cheese (American - chedder)	3%	18%	24%
Evaporated (whole milk)	8%	17%	11%
Ice cream and frozen products	2%	3%	4%
Other miscellaneous uses	--	--	1%

[a/] Approximations based on whole milk equivalents; does not add to 100% because of duplications.

and other products show constant growth since 1940, but their combined output in 1970 was less than 6 percent of the total dairy production.

7. THE 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, 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. The dairy manufacturing and distribution firms that provide the market outlets are equally concerned with the future.

PART IV

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 operation.

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 benchmark from which to appraise such developments is of concern to producers and businessmen alike.

All of the companies that now buy Kentucky's milk are independent or proprietary companies. These companies, in striving to improve their operations, coordinate their marketing functions, and consolidate their activities have tended to centralize the control for maximizing processing and distribution efficiency. In doing so, the job of assembling, transportation and procurement of raw materials is set over against the advantages of being able to lower the cost of manufacturing and reaching the consumers.

The situation in milk production and marketing has reached a stage where economies of scale, multi-plant ownerships, private label requirements, and variable competitive forces are strongly felt in Kentucky's markets. It is no longer valid to say that milk problems can be localized. They must be viewed in broad perspective.

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 of concern at this point. These, in rough approximations, are given in Fig. 6.

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 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 are other localized areas, such as the one south of Paducah and Hopkinsville. Outside the state, important competing production areas are 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. 7).

Producers who supply grade A milk to fluid markets and producers who sell to manufacturing plants are intermingled in production areas. Fluid milk markets universally require their suppliers to meet the production standards set by health officials, and in general, the larger and more specialized farms have responded. In 1970 the average daily delivery of grade A milk to fluid markets exceeded 1,000 pounds, as compared with less than 200 for the farms selling to manufacturing plants. But progressively higher quality standards are being set for milk used in manufacturing. To meet these standards requires additional investment. Any realistic projection for the future for Kentucky's dairy industry must consider how new quality standards will effect the size and numbers of dairy farming operation. Their impacts on both the fluid and manufacturing industries of the state are potentially great.

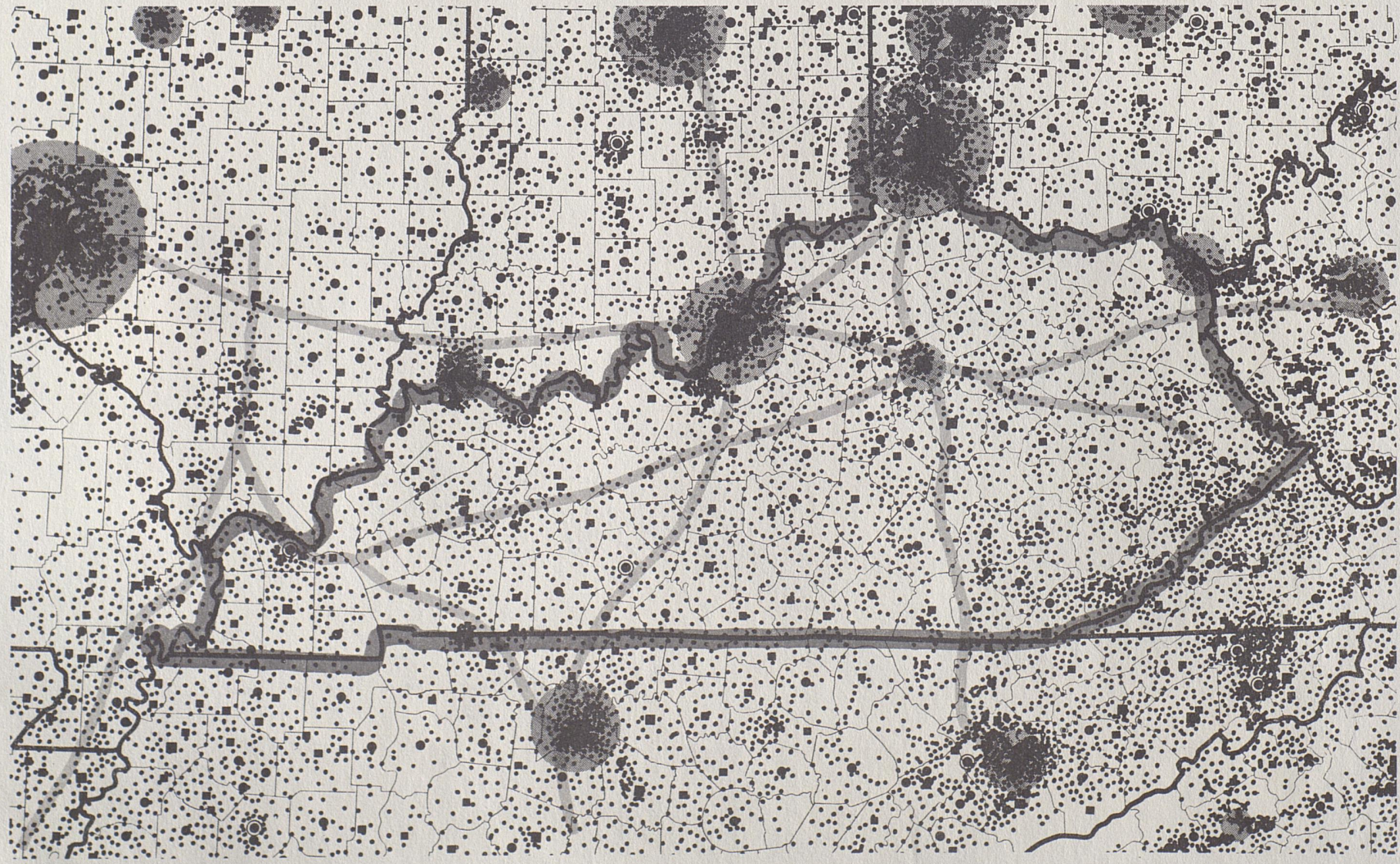

Fig. 6.—Population distribution in Kentucky and adjacent areas, based on the 1960 Census of Population. (Between 1960 and 1970 the total population of Kentucky increased by 6%. Urban population increased 24%, while rural population decreased 9%. Most all of the growth occurred in the larger towns and cities and in areas adjacent. Limited-access heavy-duty highways (shown approximately on the map) have been of increasing importance in both procurement and distribution of products.)

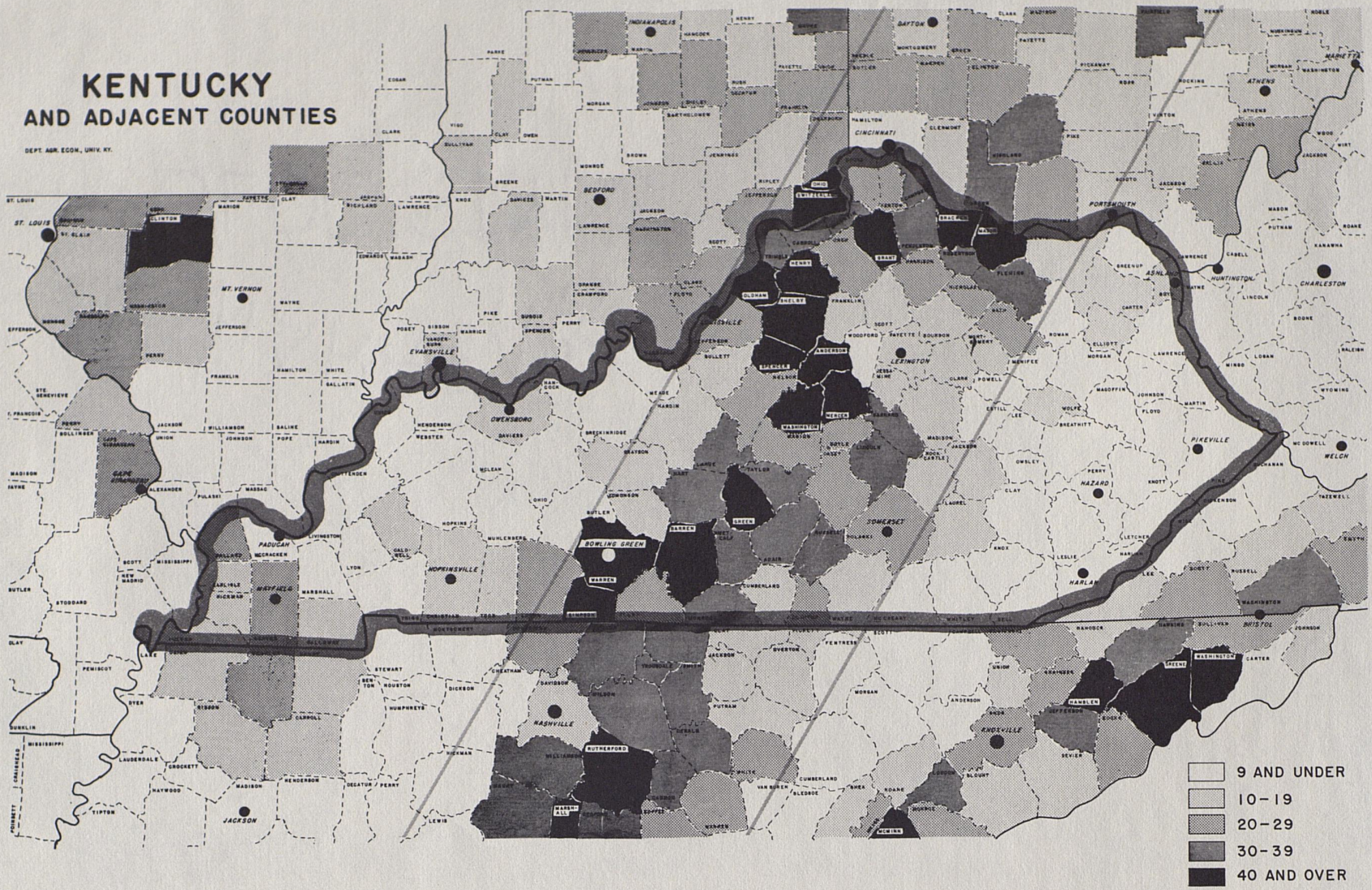

Fig. 7.—Numbers of milk cows per 1,000 acres of land, 1960. (In 1970 the geographic distribution of milk production followed the pattern of cow numbers, as shown. But on a county-by-county basis the density of cow numbers became less and in some cases declined more than 50%. Much of this decline was offset by specialization and increased production per cow. Thus, total supplies by geographic areas have changed relatively less than the cow numbers.)

3. MANUFACTURING PLANTS ARE NEAR PRODUCTION IN KENTUCKY

The Kentucky plants manufacturing dairy products are, by industry standards, relatively large, fairly advanced in technology, generally well financed, and well situated with respect to supply and marketing areas. All are located in the geographic areas where milk production is relatively heavy in terms of production areas within the state (Fig. 8). This is clearly apparent from a comparison between Figs. 7 and 8. Despite their being located in production areas, most plants face serious problems in achieving maximum efficiency. To operate near their capacity and capability, much more milk is needed than is produced nearby. But most of the manufacturing milk suppliers are small. For all manufacturing milk plants combined the average daily receipt of milk was about 160 pounds per producer. In 1970 during the peak summer months the volume of milk received from producers was more than doubled that in the winter low months. Procurement costs are correspondingly high and variable seasonally.[9]

To maintain volume, manufacturing plants have extended procurement route which overlap with competitors. They also buy supplemental supplies from fluid milk processors. Yet the combined manufacturing plant capacity is well above the volumes now received. There is room for further growth of this segment of the dairy industry.

4. FLUID MILK MARKETING IN KENTUCKY

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.

During 1970 there were approximately 5,200 producers of grade A milk. About 85 percent were members of fluid milk marketing cooperatives, and these organizations were supplying handlers in eight federal order markets.[10] The longer time records from these federal order markets show that the average amount of milk shipped per producer has more than tripled since 1947. In some markets the rate of growth has been greater than in others, as the comparisons in Table 18 show. Generally, producers of grade A milk are consistent shippers to a specified market, but because of price differentials and changing needs, the pattern varies. The use of large over-the-road tank trucks have made the fluid milk supply highly mobile. A system which permits both shipment and assembly of grade A milk from widely dispersed production points.

5. FLUID MILK PROCESSORS BECOME FEWER, LARGER

Between 1950 and 1970, 88 fluid milk bottling operations, most of the smaller size range, closed their plants. They either quit business, sold their routes, or merged and became outlets for

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[9]Approximations by the author, based on both published and unpublished sources. When comparable data in 1970 are compared with those in 1965 the records show that in the five year period the average daily shipment per producer had increased by 25%, but the total number of producers involved had declined by about 37% and the volume of all manufacturing producer deliveries was down by 23 percent. No information on the distribution of volume or herd sizes was available for either period.

[10]In respect to volume of shipments the order markets were: (1) Louisville-Lexington-Evansville order 46; (2) [Cincinnati] Ohio Valley market order 33; (3) Paducah order 99; (4) Nashville order 98; (4) [Bristol, Va.] Tri-state order 11; (6) Memphis order 97; (7) [Ashland-Huntington] Appalachian order 11; (8) Southern Illinois order 32.

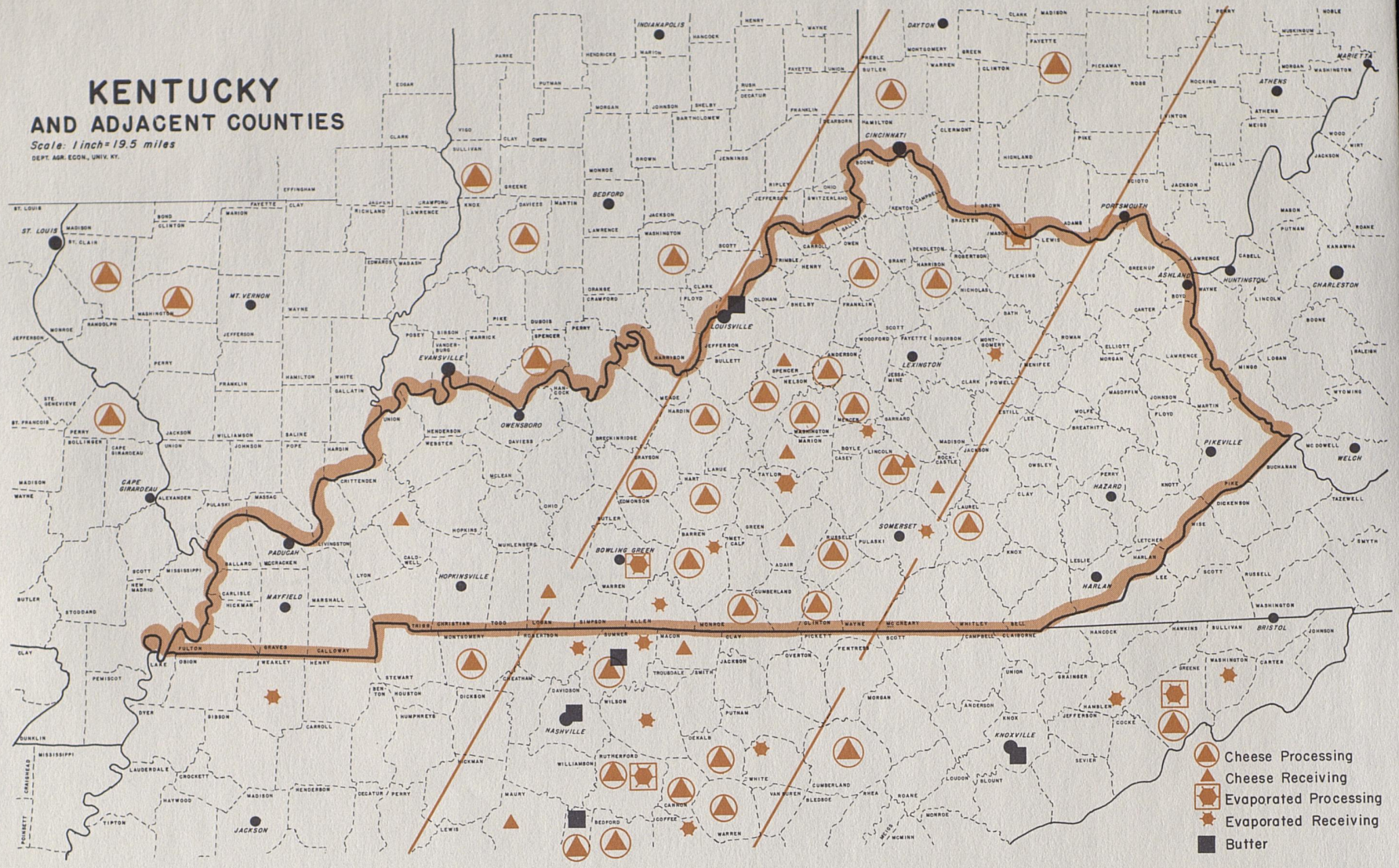

Fig. 8.—County location of dairy manufacturing outlets, 1971. The coverage in adjacent areas is less complete but enough to emphasize the important links between production areas and the location of manufacturing plant facilities.

Table 18.---Trends in Daily Shipments of Milk to Specified Markets 1947-1970

Years	Market Area[a/]				
	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
1960-64	477	572	666	587	674
1965	603	689	806	754	863
1966	669	731	812	839	930
1967	677	742	908	930	992
1968	710	735	899	1,013	1,055
1969	755	783	937	1,001	1,151
1970	769	844	997	1,017	1,234

[a/] Federal Milk Order Marketing Statistics, USDA Dairy Division, Annual Summary.

other bottlers. This shift in business is reflected in the receipts of the firms remaining in business and in the rate of disappearance of plants given in Table 19.

Table 19.---Number of Fluid Milk Plants in Kentucky and the Proportions of Receipts by Size Groupings, 1950-1970[a/]

Size Grouping (000,000)	1950		1960		1970	
	No.	% Share of Receipts	No.	% Share of Receipts	No.	% Share of Receipts
Under 2.5	70	12	19	2	5	1
2.5 - 4.99	26	15	12	5	2	1
5.0 - 9.99	18	21	17	18	4	4
10.0-17.99	6	16	14	24	6	6
18.0-35.99	**	14	7	25	14	38
36.0 -	**	22	**	26	7	50
	126	100	69	100	38	100

[a/] Does not include plants outside the state. **Three or less.

In 1970 there were 17 plants with receipts of less than 18 million pounds. The combined volume of these plants represented 12 percent of Kentucky plant receipts. The rest (88 percent) was handled by 21 plants with receipts of more than 18 million pounds. The seven largest plants handled half of the total volume of business.

Plants of all sizes in Kentucky have faced increased competition from outside sources. Among the important competitors are the large retail food chain processors and other large concerns that distribute directly and make supply and service arrangements with distributors and other quantity buyers. Contracts may cover large blocks of business and negotiations for private labeling as well as proprietary brands. Small plants have not shared such growth, at least partly because the capital requirements for modernization and expansion could not be readily secured by individuals and partnerships.

A breakdown of the types of ownership that occurred over the past two decades is revealing. Records surveyed show that plants operated by individuals and/or partnerships have declined in both numbers and importance (Table 20). The single-plant corporations have declined

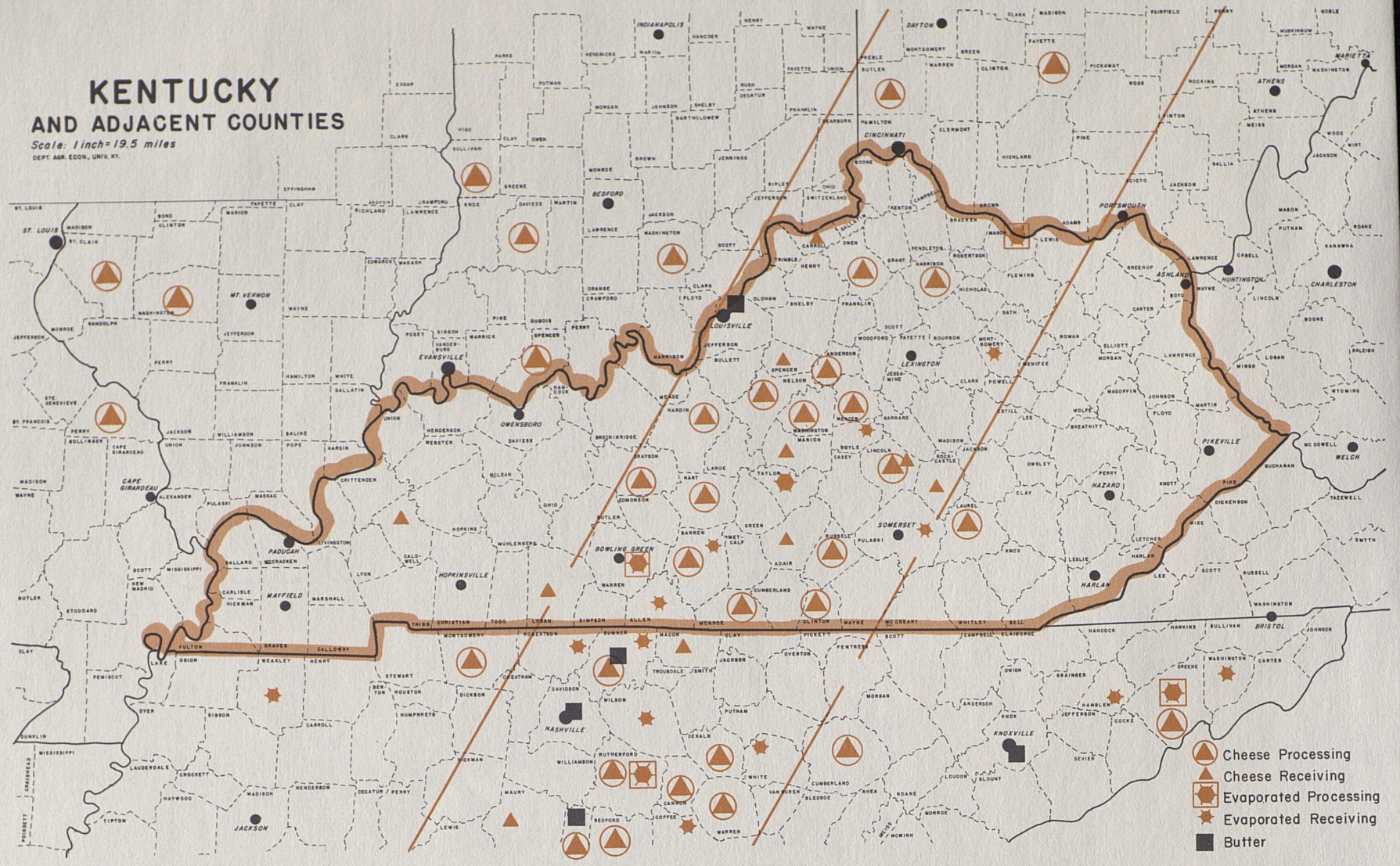

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Table 20.---Changes in Dairy Ownership and Business Done by Selected Years[a/]

Type of Business	Kentucky Plants						Out of State Plants[b/]	
	1952		1964		1969		1969	
	No.	% Business	No.	% Business	No.	% Business	No.	% Business
Individual and Partners	71	22	30	14	13	4	3	1
Single Plant Owners	43	41	43	37	20	41	10	8
Multi-Plant Owners	9	37	14	39	10	54	28	91
Totals:	123	100	87	100	43	100	41	100

[a/] Estimated by the author from survey data.

[b/] Data for one year only; 15 multi-plant companies delivered to Kentucky from 28 plant locations outside the state.

in numbers by over half, without changing their relative importance so far as volume of business is concerned. While the proportions and volume handled by multi-plant corporations have become progressively higher irrespective of type of ownership.

Further, the facts show that most, but not all, of the larger plants are located in metropolitan and urban centers. Most, but not all, had one or more competitors of a similar size in their marketing area. Many had outside competition from multi-plant and independent operators who catered to large accounts that could be serviced directly or through sub-dealers and/or contract procedures.

6. CHANGING MARKET OUTLETS AND SERVICES

An important trend in the distribution pattern is the decline in retail delivery routes. In 1971 approximately 20 percent of fluid milk was destined for home delivery. In some areas, however, this figure decreased to less than 5 percent. Retail food stores represent a high proportion of wholesale accounts. Large supermarkets handle most of the volume. This situation was apparent from a survey of 247 grocery stores in south-central Kentucky in 1964. 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 21. Many of the stores covered in the 1964 survey have grown in size, and the relative shares of milk distribution found in the large retail groups has

Table 21.---Characteristics of 247 Kentucky Grocery Stores Selling Milk, 1964

Size Group (Customers) (Daily av.)	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

increased. Most of the largest and many of the middle-sized groups are now chain affiliated or affiliated with central buying agencies, or are members of cooperative groups that operate large blocks of business and provide member stores with private label as well as proprietary brands of milk and other dairy products.

Furthermore, the trend in all food stores is toward the sale of fewer brands, usually that of the store and one other choice. In a 13-state study which included Kentucky retailers it was found that most of the largest and many of the middle-sized food chains had some kind of centralized milk procurement program.[11] Some of the national chains owned and operated their own processing plants and sold their own brands along side of others. But it was found that 70 percent of the chains who did not own processing plants were offering their customers milk under a private label. Of all of the chains surveyed well over 50 percent of total milk sales were private labels.[12]

7. FLUID MILK SUPPLY AREAS

After World War II, distance in miles and local inspections were no longer major factors and supply areas spread. Inter-area and inter-market shipments were added and/or superimposed over what had previously been well defined local milk supply sources. Yet in 1970, the primary source of grade A milk for processing plants was the individual producer shipment. The pattern of relationships between the Kentucky processing centers and the location of shippers selling direct to plants is shown in Fig. 9.

Producers located 150 miles or more apart may ship to the same processing centers on a regular basis. Bulk milk is transported in large tankers between primary processing centers and for great distances both into and out of Kentucky as special circumstances warrant. With present competitive market structures, shipping distances of from 400 to 600 miles are not uncommon.

8. BOTTLED MILK DISTRIBUTION IS NO LONGER LOCAL

Prior to World War II numerous small milk bottling plants and a large number of producer-distributors provided milk for small towns and rural areas from nearby sources of inspected milk. The larger cities depended on milk that was locally processed, and the routes of the city processors did not extend much beyond their urban fringes. In the 1950's, and with the appearance of non-returnable paper packages, market areas began to spread. Milk that had been processed in the larger plants in the cities along the Ohio River and in other favored locations spread to override the many secondary markets and smaller towns. During the 1960's and especially since 1965, multi-plant firms such as National Dairies, Borden, Beatrice, Kroger Company, and others expanded their operations so as to bring milk into Kentucky from even more distant points in Missouri, Illinois, Indiana, Ohio and elsewhere. The overall patterns of distribution resulting are shown in Fig. 10. While the data do not show the volume of milk and no attempt has been made to complete marketing patterns, the figure does emphasize that Kentucky plants and outside suppliers are direct competitors in the same areas.

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[11] Faller, F. Richard, "A survey of the Central Milk Programs in Midwest Food Chains. North Central Regional Publication 221, USDA, ERS Report No. 944.

[12] Private label is a term used to define milk packaged under a name other than that of processor. Labels may be custom packaged or contracted sales.

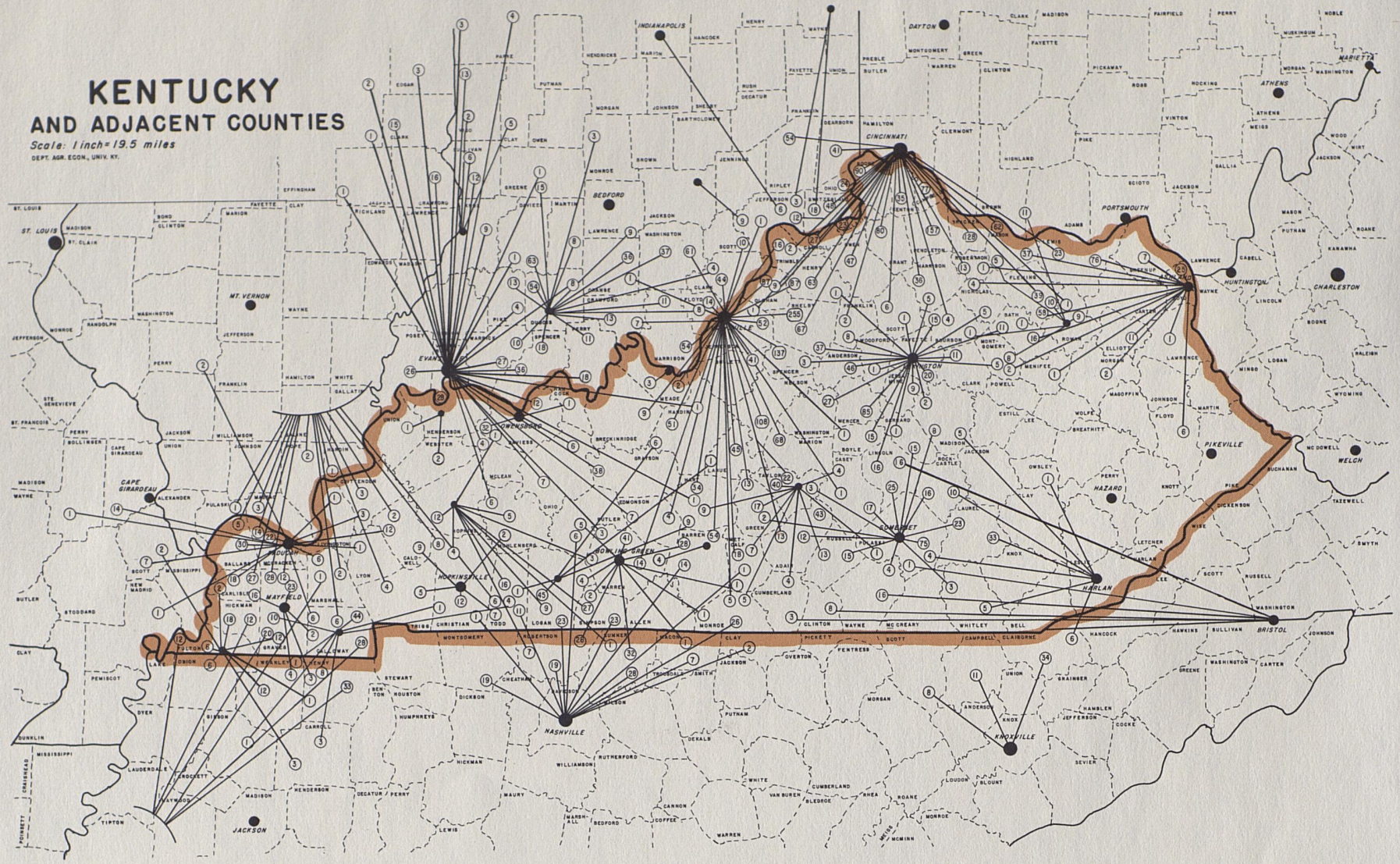

Fig. 9.—Sources of milk for bottling plant operations, 1970. The county location and approximate numbers of inspected farms that supply graded milk to handlers are given.

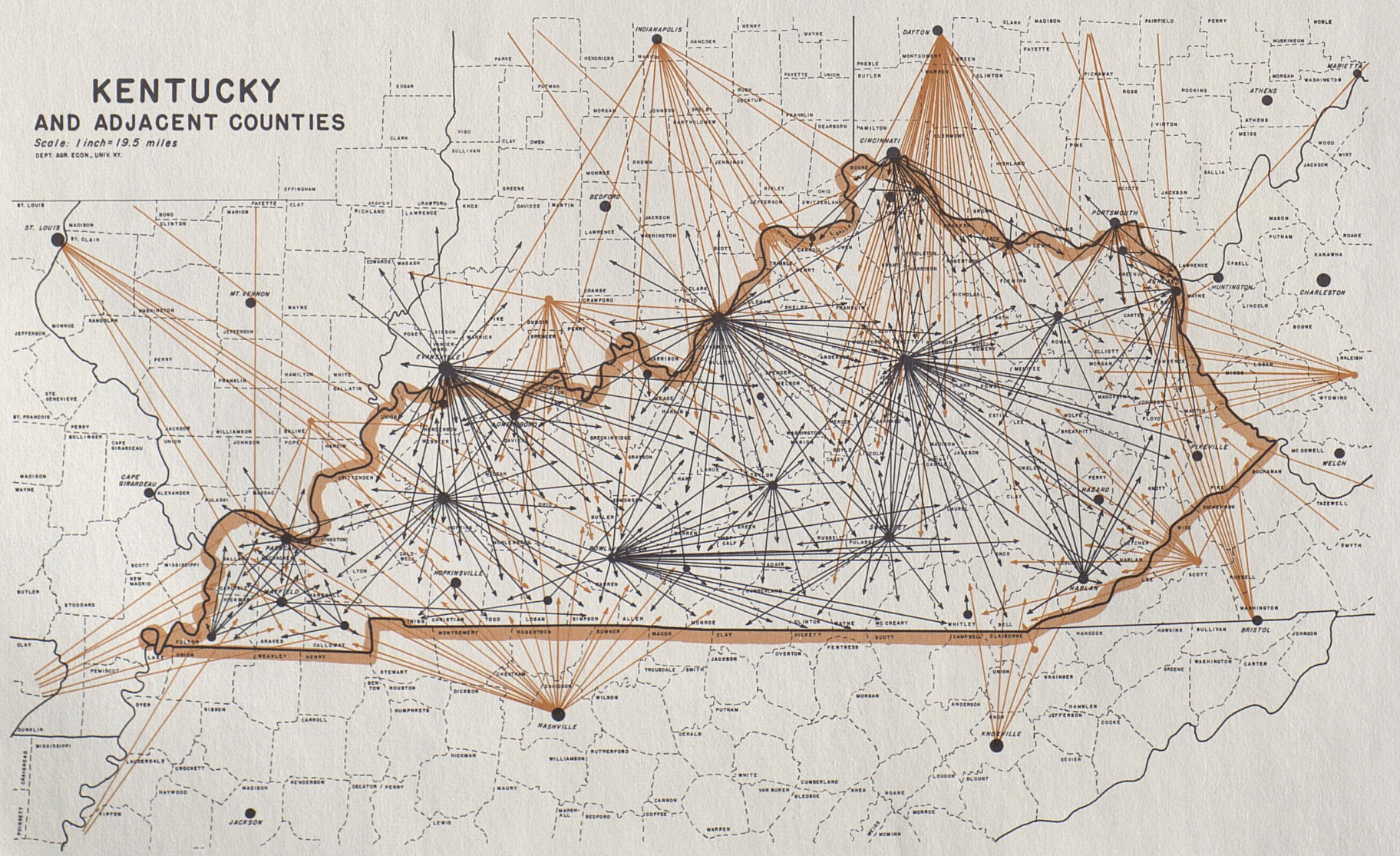

Fig. 10.—Fluid milk processing centers selling milk in Kentucky, 1970. Major cities and strategic locations in population centers dominate the distribution patterns. Widespread coverage is achieved through company-owned routes and independent distributorships.

Among the reasons for this complex market structure is centralized control of marketings, the high mobility in supplies, and institutional arrangements which involve direct ownership of processing and retailing establishments, as well as an interlocking relationship between independent processors and their subdealers, local distributor, direct selling, and chain store contracting. Furthermore, there has been a trend away from home delivery and an expansion of wholesale and institutional markets.

9. TECHNOLOGY AND SPREADING MARKETING AREAS

The changes in technology which brought about the spreading of fluid milk distribution appear to be partly institutional and partly cost related. It has been demonstrated that plants capable of processing and packaging well in excess of a million pounds a day are feasible and that such plants when operated at near capacity have unit costs well below those in smaller size categories. Most of the plants in Kentucky could not compete with such supersized plants on the basis of processing cost alone. Smaller plants may compete for specialized markets and home deliveries and cater to smaller accounts on a local rather than extended basis. The economics of survival are complex for the disadvantaged, irrespective of their size. Heavy capital investments in a highly competitive industry are among the barriers to super-plant development.

Among the companies that have developed new, modern, and very large milk processing plants have been the national dairy companies, the retail food chains and a few others. Those expanding most into Kentucky are located in or near large cities. Their plants are situated where they can receive milk from local and more distant points in the quantities and on terms consistent with their requirements. The capacity of the plants is such as to supply large volumes of milk for local distribution and have additional capacity to supply other cities and towns when the circumstances warrant. By operating large plants at near capacity the potential savings of 2 or more cents per quart can be realized in processing and packaging such savings can extend quality deliveries to distant outside markets before transport cost offset the plant savings.[13] It is also possible to move milk into higher priced zones and still compete with smaller processors. Large plants under multi-plant ownership have still further advantages in allocating sales territories on the basis of overall costs and management. The following points are noteworthy:[14]

1. Economies from large-scale processing can amount to 2 cents per quart; i.e., about 96 cents per cwt.
2. Package milk can move 100 miles for 22 cents and 600 miles for 17 cents under favorable conditions.
3. Deliveries through contractual arrangement or through integration in food retailing can result in other cost savings.
4. Sub-dealers and independent dealers in outlying areas support large-volume processing centers and expanded distribution areas.

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[13]See Manchester, Alden C., Pricing Milk and Dairy Products, Proceedings, NCR-70 Seminar. "Imperfections and Possible Solutions in the Pricing and Marketing of Milk," p. 117. Department of Agricultural Economics, Ohio State University, Columbus, March, 1971.

[14]Jacobson, Robert E., "Today and Tomorrow in Relationships Among Ohio's Cooperatives." Ohio State University Seminar on Mergers and Bargaining Power in Relation to Milk Marketing Cooperatives, October 1967, Proceedings, pp. 4-5.

It may pay a firm to process and ship milk from one or from several points. It may pay to operate as an integrated or as an independent system. Differences in cost of doing business between firms and the channels through which distribution is made are important. Firms that make home deliveries and service a clientele of small independent stores have a different cost than firms engaged entirely in wholesaling and servicing large chain and affiliated stores. A still different cost structure applies to fully integrated concerns whose products are processed and distributed through company owned and controlled stores.[15] There is no reason to believe that the price within a given market or that the price between different markets within present marketing structures will become highly standardized. Yet, as processors become fewer and larger, their operations will be more standardized. They will tend to specialize and buy only the milk required for their needs. Miscellaneous accounts will be left to the smaller firms, and the producer cooperatives will tend to bear disproportionately the burden of surplus and market stability. The competition resulting will make it more difficult for the farmer to find and maintain orderly marketing.

10. CHANGING ROLE OF COOPERATIVES

The job of assembling, transporting and organizing the total milk supply to provide the best possible markets has been complicated by changes in consumer demands, competition between uses and the forced reorganization of markets to correspond. The butter, cheese and evaporated milk manufacturers in Kentucky have ceased buying, closed plants and made necessary adjustments on a plant-by-plant and farm-by-farm basis. In the fluid markets the cooperative milk marketing associations have assumed major responsibility for members' milk. Through consolidation of local cooperatives into larger units, the cooperatives have been able to re-define markets, shift supplies from one processor to another, secure supplemental milk or dispose of the excess of members' milk as the occasion required.

But the responsibility for organizing and holding reserves and finding continuous markets without disruption has become progressively more difficult as the processors become larger and the markets more dispersed.

11. COOPERATIVES GROW IN SIZE

Cooperatives now recognize that their organizations must be large to be effective in marketing. The extensive inter-area and inter-regional market movements cannot be adequately managed by individuals or small and competing locals. It will require coordination through federations and regional cooperatives to cope with the ever growing complexity of the competitive marketing system.

Since 1960 numerous dairy marketing cooperatives have formed federations to help coordinate the marketing activities of member cooperatives. No two federations are alike in membership, and their geographic coverage is either localized or widely dispersed. Generally, the federations deal with broad issues of policy and make recommendations to member cooperatives but have no powers of enforcement. Federations now represent significant numbers of producers, as shown in Table 22.

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[15]Conner, M. C., and H. M. Harris, "Effect of Processing and Distribution Costs in Outside Markets on Marketing of Fluid Milk." Virginia Agricultural Economics, No. 227, Virginia Polytechnic Institute, Blacksburg, Va. October, 1971.

Table 22.---Dairy Marketing Federations

	Year Formed	1970 Producers
Great Lakes-Southern Federation	1960	34,000
Associated Dairymen, Inc.	1964	34,000+
New York-New England Coop. Coordinating Com.	1966	25,000
Central Milk Producers Cooperative	1968	15,000
Federated Milk Producers	1968	10,000
Penn-Marvia Dairy Coop. Federation	1968	5,000
Mountain Milk, Inc.	1968	2,400
Florida Dairy Farmers Federation	1969	500

Besides the federations, there have been important consolidations and mergers which combined the operations and assets of widely separated cooperatives into a single organization. Since 1965 more than 100 cooperatives have been consolidated and merged into the six regional associations.[16] Among the notable examples are those listed in Table 23.

Table 23.---Regional Cooperatives, 1970

	Year Formed	1970 Producers
American Milk Producers, Inc.	1969	46,500
Mid-American Dairymen	1968	21,200
Dairymen, Inc.	1968	9,800
Milk, Inc.	1970	8,000
Northwest Dairymen's Association	1968	6,000
Consolidated Milk Producers	1967	2,000

Dairymen, Incorporated of Louisville, Ky., is an example of a consolidation. This organization was organized in 1968 by combining 8 cooperatives. In 1970 the organization was made up of 11 divisions located in 8 different states. The total assets of the organization exceeded $52 million and sales were in excess of $240 million.[17] The goals of this association and others like it are to market milk for its individual members to the best possible advantage, to promote sales, and organize procurement, processing, and marketing so as to avoid unnecessary waste and lower overall marketing costs.

PART V

EVALUATION AND IMPLICATIONS

The purpose of this section is to review the dairy situation and to focus on the marketing and competition forces that confront the Kentucky dairy industry. The aim is to go beyond the factual background and project meaning into the future.

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[16]See Ortego, Albert J., "Current and Prospective Programs and Policies in the Future United States." Proceedings of NCR-70 Seminar, Imperfections and Possible Solutions in Pricing and Marketing of Milk, p. 13. Ohio State University, Department of Agricultural Economics, Columbus, Ohio, March 1971.

[17]Second annual report, Dairymen, Incorporated, August 1970.

Techniques for bringing farm milk production to high levels of efficiency are already fairly well understood, and the related production practices can be controlled by the individuals concerned. But the techniques, markets, price and farm income are less well understood. The forces are dynamic and complex. They involve illusive issues of public policy, health, safety and market competition. But in looking ahead, such matters are clouded by uncertainty. No realistic time table of events can be forecast. Yet, dairy industry leaders, dairy farmers, and cooperative organizations face problems and issues where knowledge about changes of the past will help make the "right decisions for the future." In the remainder of this section some of the basic issues will be discussed. None of the issues are strictly local or problems of Kentucky's dairy industry alone, but they all affect individuals and firms who are part of the future of Kentucky's dairy industry.

A Resume

DAIRY FARMS

The stability of the dairy enterprise is apparent from the fact that it has been the third most important source of farm income for more than three decades. The production of milk and the sale of veal calves and surplus dairy stock have balanced income, provided farm employment, and made efficient use of forage and pasture in a favorable climate. The soundness of the dairy farm enterprise for many Kentucky farms is not debated.

For the individual milk producers, the requirements for efficient production will be outlined in Part VI, "A Blueprint for Progress." For the future, fewer, larger, and more efficient farm units are projected for the years ahead. To compete, most Kentucky dairymen will have to expand their herds, keep more productive animals, make additional capital investments and give strict attention of operational efficiencies. Producers of manufacturing milk will find increasing emphasis on quality and farm sanitation.[18] Faced with higher production costs and changing market situations, they will devote more attention to marketing opportunities and factors related to dairy farm price and income factors.

While the trends suggest reduced numbers and larger herds, dairying will continue to be among the best alternatives for many smaller farms in Kentucky. Production efficiency remains an important factor in which small farmers may have a special advantage provided they develop small herds to their highest potential.

THE PROCESSING INDUSTRIES

It has been pointed out that markets have changed to meet consumer demands and competitive situations. Improved transportation, communications and technology have resulted in the consolidation and/or closing of many of the smaller, obsolete plants and poorly located plants. A trend toward large, efficient, specialized and strategically located processing operations is evident from the record and discussion (Part IV). For the future, local and independent firms must compete with multi-plant ownerships and with plants owned and operated by retail food chains. Few strictly local markets now exist, and increasingly buyer-seller attitudes will reflect tougher, more formal competition.

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[18]Reference is made to various proposals including those purposed "Minimum Standards for Milk for Manufacturing Purposes and its Production and Porcessing Recommendations for Adoption by State Regulatory Agencies." USDA, Dairy Division, Washington, D.C. and the State Dept. of Health, Commonwealth of Kentucky, Frankfort, Ky.

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The stability of the dairy enterprise is apparent from the fact that it has been the third most important source of farm income for more than three decades. The production of milk and the sale of veal calves and surplus dairy stock have balanced income, provided farm employment, and made efficient use of forage and pasture in a favorable climate. The soundness of the dairy farm enterprise for many Kentucky farms is not debated.

For the individual milk producers, the requirements for efficient production will be outlined in Part VI, "A Blueprint for Progress." For the future, fewer, larger, and more efficient farm units are projected for the years ahead. To compete, most Kentucky dairymen will have to expand their herds, keep more productive animals, make additional capital investments and give strict attention of operational efficiencies. Producers of manufacturing milk will find increasing emphasis on quality and farm sanitation.[18] Faced with higher production costs and changing market situations, they will devote more attention to marketing opportunities and factors related to dairy farm price and income factors.

While the trends suggest reduced numbers and larger herds, dairying will continue to be among the best alternatives for many smaller farms in Kentucky. Production efficiency remains an important factor in which small farmers may have a special advantage provided they develop small herds to their highest potential.

THE PROCESSING INDUSTRIES

It has been pointed out that markets have changed to meet consumer demands and competitive situations. Improved transportation, communications and technology have resulted in the consolidation and/or closing of many of the smaller, obsolete plants and poorly located plants. A trend toward large, efficient, specialized and strategically located processing operations is evident from the record and discussion (Part IV). For the future, local and independent firms must compete with multi-plant ownerships and with plants owned and operated by retail food chains. Few strictly local markets now exist, and increasingly buyer-seller attitudes will reflect tougher, more formal competition.

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[18]Reference is made to various proposals including those purposed "Minimum Standards for Milk for Manufacturing Purposes and its Production and Porcessing Recommendations for Adoption by State Regulatory Agencies." USDA, Dairy Division, Washington, D.C. and the State Dept. of Health, Commonwealth of Kentucky, Frankfort, Ky.

The structure of markets, too, has changes toward centralized control. Especially important has been the growth of retail food chains and quick service food service establishments. Both do business through central purchasing offices which negotiate the terms of trade for their membership. The central accounts represent large blocks of wholesale business, and the terms may include delivery schedules, wide geographic coverage and varying amounts of private label and special customer services. Some food chains operate in a duel role, i.e., process and distribute their own products in some areas and negotiate contracts for parallel services in others. The significant point is that generally only the large processors and those with multi-plant locations are in a position to cater to the requirements set by centralized purchase, unless they are willing to risk an entire loss of identity and independence.

Data for the large fluid milk processors show that, in order to compete, many processors who formerly delivered milk direct to chains, stores and other wholesale accounts have developed an extensive system of sub-dealers and venders. Such arrangements extend their geographic coverage and maintain both volume and flexibility. Both are essential to large-scale and efficient plant operations. Smaller plants, too, continue to operate retail routes and special service categories, but from a processing cost standpoint they cannot compete and are not in a position to service widespread markets. As small and intermediate size processing plants become obsolete, they can be expected to close and their business to be consolidated. As a consequence, fewer, larger and more widely separated processing plants will continue trends of the past already noted. The procurement and management decisions concerning business operations will be a factor remaining largely outside the jurisdiction of the local contacts. Thus problems of prices and conditions of sale are largely outside the production areas.

Economics of Marketing

This section concerns economic problems, issues and adjustment problems that confront dairymen and dairy leaders. The analysis is based on the available data and the author's evaluations. The purpose is to identify present or emerging problems and to provide some interpretations for considering timely adjustments to make possible a more efficient and orderly marketing system.

SUPPLY-DEMAND RELATIONSHIPS

For nearly three decades the supply of milk and milk products has consistently exceeded civilian purchases. As for the individual products, the largest declines have occurred in butter, evaporated milk and whole fluid milk. Increases have occurred in low-fat fluid milk, cheese, ice cream and frozen products and specialties. Increased population has helped sustain dairy market growth, but on the basis of all products consumption per capita has declined sharply. In response to competition and changing patterns of food distribution, the major dairy companies have diversified. Accordingly, they have become less concerned with, and may be less active in, dairy products promotion in the future. Programs of government and dairymen themselves may have a greater role.

There is no dilemma about the need for dairy products promotion. There should be no hesitancy about dairymen themselves asking consumers to use their products. There is no question about the mutual interest of milk producers, processors and distributors. These groups jointly and/or separately need to support research, development and education designed to maintain and expand the market for dairy products. For the future, a growing number of

substitutes and changing food patterns will continue to influence food choices. More than ever before, dairy farmers will be made aware of any supply-demand imbalances and may have to decide how to handle this question. The problem has not yet been solved.

Among the foremost considerations confronting producers are those of supply management and production controls. To stabilize markets and prices, renewed efforts involving production quotas and/or other limitations on supply are in prospect. They are likely to be initiated unless some reasonable balance between supply and demand is achieved without them.

EXPANDING FLUID MILK MARKETS

It is no longer practical to consider fluid milk marketing as being local in character. An analysis of the sources of supply and a study of distribution patterns show extended routes and widely dispersed and overlapping marketing areas. Extensive inter-area shipments and, to a lesser extent, long distance inter-regional shipments occur. Consumers in the cities and small towns in Kentucky and elsewhere no longer depend on the local dairies or on local processors alone. They are, instead, supplied primarily by large, well-organized and well-financed corporations with multiple plant operation. These plants are well-managed plants that use up-to-date methods in business and accounting. They are concerned with creating demand and a favorable image of their brand and products in local, state and regional markets. They may deal with several cooperatives, depending on the scope of their operation.

The information on fluid milk processing plants shows most of the small plants and many of the larger obsolete or poorly located ones, have been closed and/or consolidated. The fluid plants remaining in operation tend to be large, highly mechanized, and located in or near population centers. They also tend to be strategically located with respect to transportation and communications. From an efficiency standpoint, the combination of size, location and centralized management makes it possible to coordinate both procurement and distribution practices. For example, a multi-plant concern selling in the national market can buy supplies to match local requirements, allocate distribution from its various plants to secure desired coverage at minimum cost and, at the same time, promote quality, brand and product advertising.

Included in the multi-plant firms are the growing number of plants owned and operated by large regional and national retail food chains. From a competitive standpoint, all large processors have lower unit costs, are able to spread market risks, and can maintain contracts and market options not open to the smaller firms.

Besides the problems of higher costs, the smaller milk processing firms have found it difficult to compete for the large blocks of business from a growing number of "chain linkages" among retail food stores, restaurants and institutional buyers. Central purchasing offices have largely replaced individual negotiations, and contract arrangements have largely replaced the day-to-day delivery and order system. The specifications in buyer-seller negotiations generally relate price, quality, labels with options for deliveries ranging from the dock and loading platform of the processor to servicing individual customer accounts in widely separated geographic locations.

Without going into other details it is important to note that centralized purchasing of milk by and for chains of food distributors has had a profound effect on the structure of fluid milk markets. Since the chain organizations operate in many markets, both the source of supply and the final destination in delivery can directly influence marketing patterns.

It is difficult for producers especially to realize that local and isolated markets of the past are gone. Compared with the past, price negotiations will reflect tougher and more formal

competition covering wider geographic and political interests. From a bargaining standpoint, the processors covering numerous major markets and having widespread distribution can deal with several potential suppliers and shift their sources when economic or other conditions may warrant it. In contrast, each separate market will have one or more producer cooperatives. The interest of farmers in each cooperative receives priority. It is difficult to unify programs. Patterns of cross haul and back haul develop as each separate organization strives to maintain and expand its separate marketing opportunities.

Changing Market Concepts

In building for the future, strategic plant location will become increasingly more important. Interstate road systems, as well as the location of producers and the price structure, will play a large part in this. These developments will be of greatest concern to producers and processors of fluid milk.

A distributor viewing his future markets might well locate outside any given population center. He might not even insist on supply contracts in which both producer and processor rights would be protected as to quantities, terms and conditions of sale. It is possible that, by adopting new techniques, major companies could supply consumers over extensive geographic areas from as few as 10 plant locations. Each market area could well contain three to five major cities and numerous secondary centers of a lesser size. With this concept, separate markets in isolated geographic space have little meaning.

Kentucky now has these kinds of emerging market structures. There are intermarket shipments and cross shipments that involve major cities from 100 to 250 miles apart. There are cities within 80 miles of each other which are a part of interrelated competitive marketing areas. A study made in 1964 showed that in rural areas numerous towns had from 3 to 11 different brands of milk and the milk in the package was that produced by members of four different cooperative associations. The processing was done at five widely separated locations. In 1970 processing locations were even more widely dispersed, but the number of competitors and the number of brands were reduced. The federal order marketing jurisdictions that originally had been four increased to involve eight.[19]

Federal Order Orientation

Federal order milk programs have been among the most constructive partnerships between farmers, processors and public agencies. They have been highly successful in stabilizing and bringing order within the fluid milk segments. They have recognized progressive changes in a major industry and successfully operated within a legal framework established by law which may not have been fully kept up to date.

From the technical standpoint, each order has in the past been developed independently. Each order had considered appropriate locational differentials, classifications, compensatory supply-demand and other technical devices. From an economic standpoint, the firms supplying the milk to different markets did not necessarily stand as equals with respect to all consuming centers where they had chosen to operate. Firms did not stand as equals in terms of conditions of sales and services. This problem is not new.

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[19]John B. Roberts. Fluid Milk Marketing Summary and Grocery Store Distribution. University of Kentucky Agricultural Experiment Station, August 1964, and unpublished data from personal files, 1970.

The report to the Secretary of Agriculture by the Federal Order Milk Study Committee reinforces the ideas. According to the report, "Major factors in the shaping of the present system were the increasing urbanization of the country, advancing technologies, and the growing concentration of operative organizations in the milk trade. This concentration was characterized by the merging of many small local milk handlers into large market corporations, often operating in many metropolitan areas—even nationally—and by the growth among producers of strong cooperative bargaining associations . . . these organizations are the major channels through which the system operates."[20]

Technological changes and further centralization in both the processing and distribution segments of the market in the 1960's resulted in economic strains and concern of producers over price structures and their impacts on dairy income. The competitive environments set the stage for a real struggle that involved not only the marketing firms but competition between cooperatives and farm groups. Under these kinds of pressures it takes restraint to avoid destructive and crash programs to capture one another's markets. Inherent in the situation is the question of over-order negotiations and super-pooling. Economic strain between markets, firms and producer cooperatives is yet to be resolved. Federal orders become enmeshed in this kind of situation.

MARKET CONFLICTS

However, there are two points that should be made with respect to the present and future of the federal order program.

First, growth of large scale dairy corporations, through expansion, merger and consolidation, has been rapid. Historically, major dairy companies have been able to present a consistent coordinated position in keeping with corporate policy on a market-by-market basis. The basic interests of large national or regional dairy corporations generally, have much in common in given markets and in a series of individual markets in which they operate. With expanding market areas there are opportunities to allocate sales areas to conform with economic opportunity and over-all policy.

On the opposite side of the coin is a whole series of producer groups that strive to best serve their individual producer's self interest or autonomy. Accordingly, support for prices, classifications, supply controls and related order program features differ market by market; often, only short-run or opportunistic considerations result. Nevertheless, like dairy corporations, dairy farm cooperative marketing organizations merged at unprecedented rates in the 1960's. For the 1970's new cooperative structures are emerging. This is important so far as hearing procedures are concerned. It is important so far as market power is concerned. Yet, there is no common united policy front among farmers.

Differences in legal counsel, cooperative objectives, supporting evidence and inconsistent stands among individual cooperatives within contiguous geographic areas can become even wider as between different regions.

In contrast, many of the processors have the same legal and technical personnel at different hearings who assess the merits of proposals in the light of common corporate objectives. In some areas of administration, there will be a common front which tends to minimize differences between markets; on other questions, positions will vary on an opportunistic basis.

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[20]Federal Order Study Committee, Report to the Secretary of Agriculture, USDA, April 1962.

In resolving conflicting interests through the use of federal orders, both the Department of Agriculture and the Secretary of Agriculture have an unenviable position. They are caught in the web between loosely-stated general legislation, national political policy, and as a representative of public interest and general welfare.

Their decisions must conform to legislative intent and must compromise differences in proposals affected by points of view and selfish interests. In some cases, there is obsolete and outmoded basis legislation. In spite of its limitations, the Federal Order System has initiated progressive refinements and has steadily expanded. The program is neither free, nor completely controlled. Changes in orders are molded by private and public mechanisms that conform to less than steadfast national policy and reflect the timbre and temper of Congressional action.

Generally, there is the pressure of conformity to the conventional rather than for pioneering innovation. But the federal order system has grown. The number of federal orders increased from 28 in 1945 to 83 in 1962. Subsequent consolidation of federal orders resulted in a decrease to 62 by 1971. However, the number of markets regulated rose from 28 in 1945 to well over 100 in 1971. The percentage of fluid grade milk regulated increased from 35 to 81 during the same period.

PRICE ALIGNMENTS

Problems of pricing, price alignments and market definition have not been solved in the 1960's. They will continue as the center of interest for producers, processors and distributors in the 1970's. Order provisions which create inequities disrupt orderly procedure or manipulate the markets are inconsistent with the goals of federal order marketing programs; so, there is a continuing need to adjust order programs to meet both longer run and temporary supply-demand; and market changes. Especially troublesome in the decade ahead will be the inequities resulting by the growing numbers of producers who have qualified as grade A milk shippers.

In the Midwest and Lakes States, particularly, there have been unprecedented shifts from producing manufacturing to fluid grade milk. In Kentucky the conversion of milk from manufacturing to fluid or grade A milk has been slower than in some other regions. Yet, in 1970 about a third of the state's production was manufacturing grade milk, and about 60 percent of the milk processed went to manufacture products. Thus the potential for increased graded milk in Kentucky is relatively large. Either declining markets or a persistence of unfavorable markets for manufacturing milk can bring about previously unknown competitive problems as more and more producers of manufacturing milk make the investments required and insist on sharing the proceeds of fluid milk sales. Unquestionably, in the 1970's increased pressure from outside sources of fluid milk and (unless regulated) the problems of market sharing and uneconomic movement of milk seeking fluid markets will be in the forefront.

ECONOMIC PRESSURES

The conflict between producers and their organizations over the sharing of returns from fluid markets is inherent in the multiple uses of milk. Differences in the value in uses have long been recognized by cooperative selling in this country and by cooperatives and governmental agencies wherever the dairy industry has become well organized. However, in the United States the conflict between producers selling to the manufacturing segments and those in fluid industries has grown in intensity and scope. What were once considered to be localized problems are becoming more widely recognized as industry problems, and a search is being made to find some way to spread the benefits of class prices more generally. The development of the super-pool

techniques and the cooperative federations in the field of price alignments have already emerged.

Concerted efforts by cooperatives within the framework of federations have strengthened price negotiations stretching across and transcending regional and geographic boundaries. But, because not all of the competitive problems were resolved, further efforts are being made that would transplant problems of surplus and market adjustments common to the heavy surplus regions into widely spaced geographic areas where price, marketing structures and traditions and ideology in dairying are greatly different.

THE DISPLACEMENT PROBLEM

The problem of inter-regional competition for fluid milk markets and the question of producer and dealer market penetrations have been growing rapidly. For example, competition between plants in Kentucky, in adjacent cities and from large processing plants located many miles away—St. Louis, Mo., Indianapolis, Ind., and Dayton, Columbus, and Marietta in Ohio are part of an established marketing pattern. The distribution on a regular basis is made by such firms as Kroger Company, National Dairies, the Borden Company and other firms with multi-plant operations. In addition to regular suppliers just noted, there are frequent shipments of both packaged and fluid bulk milk whose point of origin is much farther away.

Competition based on complex market structures and pricing arrangement involves producers as well as processing firms. Where milk is moved from one area to another there will always be an added cost for transportation and handling, and if shipments force locally available supplies out of the market and into manufactured uses serious economic losses to producers may result. After paying the transportation and related cost the long distance shipper gains may be less than the losses to local dairymen who are displaced. The processors or buyers of milk for maintaining and expanding their operations may or may not profit, depending on the particular circumstances.

Problems of equity between producers within production areas and the problems of displacement between areas will press hard for some solutions in the 1970's. If one considers the interests of all dairymen, it does not make economic sense nor is it in the public interest to ship either bulk or packaged milk long distances into marketing areas where surpluses of graded milk already exist. Neither is it economically sound to prevent the entry to new shippers or conversions from manufacturing markets when at the same time milk is being supplied by long distance shipments. Especially damaging is the displacement of local producers' milk that has no alternative to seek a manufacturing outlet. Where no manufacturing facilities are available, the economic consequences may be extremely severe.

PRODUCER ORIENTED PROBLEMS AND ISSUES

It is not necessary to identify the individual farm situation to point out problem areas and issues where the farmer is directly involved. None of the issues are strictly local or problems of Kentucky alone, but all need to be resolved and their relationship to the welfare of the future of the dairy industry understood. Any milk producer who plans to make dairying an important income source will become involved in economic and political questions that affect his income. Some of the issues that center around the dairy farm operations are:

1. **The Cost-Price Squeeze.**—Net return to the management in dairy farm operations has been limited and unsatisfactory for many. Despite marked increases in output per cow and increased size of operations, prices received have not kept pace with rapidly rising costs for factors used in production. As a consequence, profits in milk production tend to be low, and the

cost-price squeeze is a real problem over which individual dairymen have little direct control. Especially serious is the dilemma facing young farmers, those with limited marketing alternatives, and those who still owe a farm debt.

2. **Technological Squeeze.**—Demands for quality, the adoption of new methods, investments in new machinery and the process of upgrading productivity are factors in building herds into efficient production units. Technological pressures that result in more specialization are hard to separate from the price-cost squeeze.

The dairyman who has made technological progress is now specialized; he has heavy capital investment and cannot easily get out of dairying. Pressure for specialization will continue. Dairy farms will be fewer and larger. This means greater efficiency at the cost of flexibility. Think about it. What kind of adjustment would result from lower prices? What kind of production control or marketing programs could be used most effectively to stabilize and maintain dairy farm incomes?

3. **The Conflict of Dairy Interests.**—Farmers produce milk that is very much the same county by county and region by region. But there is no similarity once it has been received for processing. A united dairy industry as yet does not exist. Products are not interchangeable. Producers individually and collectively are concerned with outlets that produce cheese, or butter, or powder or some combination of these, or their markets are centered around evaporated case goods, ice cream, package fluid products and branded containers. Each potential market involves a degree of special interest, that make it difficult to establish a national dairy policy. Because of divided interests economically and spacially, there are mixed emotions. Congressmen, the Secretary of Agriculture, farm leaders and others face a dilemma. Kentucky dairymen who supply the fluid milk markets and the farmers who sell manufacturing grade milk are both parts of the dairy problem. Neither can escape the issues. A way must be found to minimize differences between dairy groups in order to resolve the broader issues of economics and equity with respect to the future markets and their potentials.

4. **Governmental Programs.**—Government is a vital part of today's dairy situation. The attitudes and beliefs of people differ. In government policy there are two basic interests. First is the question of public interest—the obligation of government to all its people, sometimes called taxpayers. Second is the obligation of government toward special groups, labor, business agriculture—the dairy farms. What one believes the obligation should be depends on a very personal set of values. Some believe the government has no place in the dairy business. The sooner it gets out, the better they may feel. Others believe we must have even more governmental controls to solve the dairy riddle. On both issues milk producers need to be well informed, to look at and support positive programs that promise benefits to dairymen and the public generally.

It would be unrealistic to anticipate a viable dairy industry in the 1970's without governmental activities relating supply, demand, and public health issues.

PART VI

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 is no longer a producer of farm-separated cream for 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.[21] 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:
      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 requires 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

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

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, and
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. Milk producers, processors, and distributors jointly and separately need to support research, product development, promotional and educational programs to maintain and expand markets. For all dairymen the newly formed "United Dairy Industry Association" has great potential. This organization is an independent coordinating agency through which programs of the American Dairy Association, the National Dairy Council and Dairy Research Incorporated will be directed and unified. Instead of financing several agencies, farmers now can support U.I.D.A. and secure sales promotion, nutrition education, new product research and programs directed at consumers and market expansion. Such programs are national, regional and local in scope. Their sponsorships, including local nutritional clinics, June Dairy Month, 4-H clubs, community appreciation and similar efforts represent evidence of the dairy farmer's interest in his 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.** These are essential to dairying in the state. Education, recruitment, and retention of informed, aggressive 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.

VI. **Growth Potentials.** Both the dairy farm and processing industry income could be greatly increased by a better job being done 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 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.

APPENDIX–TABLE A

Total Marketing of Milk and Cream, Percent of Grade A, and Volume and Percent Manufactured, by States, 1970

State	Total Marketings Milk and Cream (mil.lb)	Milk Sold to Plants and Dealers		Milk for Manufactured Products	
		Quantity 1/ (mil.lb)	Fluid Grade 1/ (pct)	Quantity 2/ (mil.lb)	Share of Mktgs. (pct)
	(1)	(2)	(3)	(4)	(Col.4÷Col.1)
NORTHEAST:					
Maine	596	580	100	66	11
New Hampshire	342	336	100	16	5
Vermont	1,929	1,905	100	503	26
Massachusetts	651	600	100	480	74
Rhode Island	73	69	100	19	26
Connecticut	647	624	100	216	33
New York	10,221	10,115	100	2,463	24
New Jersey	717	695	100	335	47
Pennsylvania	6,939	6,720	98	2,192	32
Delaware	138	136	100	10	7
Maryland	1,548	1,540	2/	677	44
Regional Totals:	23,801	23,320		6,977	29
LAKE STATES:					
Michigan	4,479	4,440	87	1,922	43
Wisconsin	17,752	17,725	51	12,919	73
Minnesota	9,473	9,335	25	8,968	95
Regional Totals:	31,704	31,500		23,809	75
CORN BELT:					
Ohio	4,259	4,225	89	1,965	46
Indiana	2,325	2,305	83	1,117	48
Illinois	2,847	2,825	73	1,807	63
Iowa	4,522	4,305	32	3,158	70
Missouri	2,908	2,865	58	2,008	69
Regional Totals:	16,861	16,525		10,055	60
NORTHERN PLAINS:					
North Dakota	1,001	625	33	897	90
South Dakota	1,447	1,330	15	1,121	77
Nebraska	1,520	1,300	43	1,178	77
Kansas	1,590	1,535	72	736	46
Regional Totals:	5,568	4,790		3,932	71
APPALACHIAN:					
Virginia	1,688	1,660	85	320	19
W. Virginia	341	325	2/	100	29
North Carolina	1,329	1,330	97	300	22
Kentucky	2,275	2,225	63	1,364	60
Tennessee	1,993	1,980	68	1,187	60
Regional Totals:	7,646	7,550		3,271	43
SOUTHEAST:					
South Carolina	480	473	2/	97	20
Georgia	1,154	1,140	100	159	14
Florida	1,625	1,525	100	316	19
Alabama	736	715	97	198	27
Regional Totals:	3,995	3,853		770	19

-Continued-

(Appendix Table A—continued)

State	Total Marketings Milk and Cream (mil.lb)	Milk Sold to Plants and Dealers		Milk for Manufactured Products	
		Quantity[1] (mil.lb)	Fluid Grade[1] (pct)	Quantity[2] (mil.lb)	Share of Mktgs. (pct)
DELTA STATES:					
Mississippi	966	960	91	289	30
Arkansas	644	630	64	348	54
Louisiana	1,031	1,015	100	241	23
Regional Totals:	2,641	2,605		878	33
SOUTHERN PLAINS:					
Oklahoma	1,187	1,145	90	723	61
Texas	2,951	2,910	100	720	24
Regional Totals:	4,138	4,055		1,443	35
MOUNTAIN:					
Montana	316	260	89	130	41
Idaho	1,420	1,400	27	1,224	86
Colorado	839	760	[2]	346	41
New Mexico	291	252	100	34	12
Arizona	572	540	100	176	31
Nevada	137	134	100	25	18
Utah	807	755	69	567	70
Wyoming	131	117	[2]	73	56
Regional Totals:	4,513	4,218		2,575	57
PACIFIC:					
Washington	2,021	1,924	100	981	48
Oregon	923	875	79	561	61
California	9,370	8,895	90	3,801	41
Regional Totals:	12,314	11,694		5,343	43
U.S. TOTALS:	113,181	110,110		59,053	52

[1] Source: Milk Production Disposition and Income, 1969-70, Da 1-6 (71) USDA, pp. 12-13.

[2] Source: Production of Manufactured Dairy Products 1970, Da 2-1 (71) USDA, Table 32, p. 57.

2.5M–5–72