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CHANGES IN THE TENNESSEE DAIRY INDUSTRY

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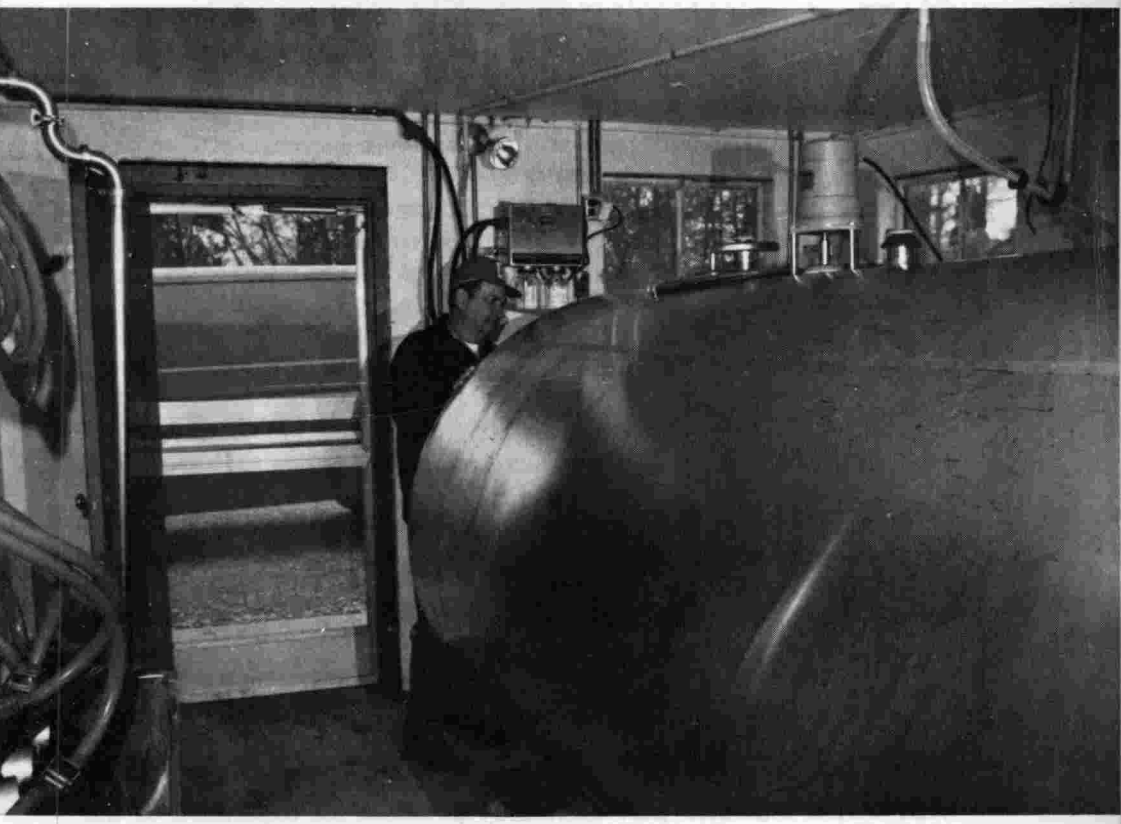

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SUMMARY

The dairy industry has undergone continual and substantial change. In general, cow numbers are down; those herds remaining are increasing in size and total milk production is relatively stable due to increased output per cow. Plant numbers are down. Consumption patterns are changing. The purpose of this study is to describe these changes in the Tennessee dairy industry.

In Tennessee there was a decrease of 72 percent in the number of farms with dairy cows from 1959 to 1969. Most of the decrease in the number of farms came in farms with one to nine cows (over a 70 percent decrease in number). The number of cows on farms has decreased by about 19,000 head per year since 1960. Total milk produced has dropped by 302 million pounds from 1960 to 1974. On the positive side, the average production per cow increased by about 290 pounds per year from 1960 to 1974. Also, the seasonality of production has decreased which has resulted in a more stable monthly flow of milk to the market.

The demand sector has remained relatively stable. The utilization of total milk for fluid uses has a slight upward trend. Of the four primary markets, Knoxville is expected to have the greatest increase in per capita demand (7 percent) by 1980 with Chattanooga, Memphis, and Nashville per capita demands increasing 5 percent, 5 percent, and 4 percent, respectively. Given the present trend in total milk production and the projected increase in demand, Tennessee may become a net importer of milk in the near future.

There has been a substantial decrease in the number of plants processing milk in Tennessee. The overall decrease has been 68 percent from 1954 to 1975. The largest reduction in numbers of plants occurred in fluid milk plants and condensed and evaporated milk plants. Creamery butter plants increased from three to four. The Census of Manufactures data indicate that from 1963 to 1972 total dairy processing plant numbers decreased by 49 percent.

Value added by manufacture (deflated) decreased by 13 percent. This gives evidence that the average output per plant has increased. In terms of labor productivity, the fluid milk segment has increased in efficiency by approximately 33 percent. Productivity for condensed and evaporated milk and for ice cream and frozen desserts increased from 1963 to 1967 but fell during the period 1967 to 1972.

In conclusion, the number of cows, plants, and people engaged in the dairy industry is declining. Total production of milk and milk products is relatively stable. Demand is expanding somewhat which indicates that there may be room for expansion of the dairy industry in Tennessee.

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CHANGES IN THE TENNESSEE DAIRY INDUSTRY

by James G. Snell and GonZalee Martin*

INTRODUCTION

The Dairy Industry has undergone continual and substantial change. During the period 1950 to 1959, the number of farms with dairy cows in Tennessee declined 43 percent with most of the decrease in farms with only one to two cows.[1] Further changes during the 1950-59 period included a decline in the number of milk cows (21 percent), and an increase in output per cow (29 percent).[2]

The year-to-year changes in the number of cows and production per cow brought about a fluctuating total milk production in Tennessee ranging from about 95 percent to 105 percent of the 1949-1951 average milk production. Changes also occurred in the processing sector with the number of dairy plants declining and sales per plant increasing.[3] Many of these trends continued during the 1960's and into the early 1970's.

Economic conditions have changed drastically since 1972: feed costs have increased; petroleum products have increased in price; milk prices increased into 1973, then fell. The above factors accelerated some of the changes in the dairy industry. Information concerning the changes would benefit the industry as well as policymakers.

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[1]S. P. Parry and D. G. Greiner, **Changes in the Structure of the Tennessee Dairy Industry,** The University of Tennessee Agricultural Experiment Station, Bulletin 348, August 1962, p. 7.

[2]**Ibid.**, pp. 8 and 9.

[3]**Ibid.**, p. 17.

PRODUCER SECTOR

All Farms with Dairy Cows

Number of Farms

There was a 72 percent reduction in the number of Tennessee farms with dairy cows during the period 1959 to 1969 with the largest reduction (78 percent) occurring in the number of farms reporting one to four milk cows (Table 1). The smallest reduction in numbers of farms came on those farms with 20 or more cows (14 percent).

The bulk of the decline in number of farms with dairy cows came from farms which apparently produced milk for home consumption or used dairy cows to produce calves. In 1969 only 40 percent of those farms with dairy cows sold milk and cream off the farm while 27 percent were classified as commercial dairy farms[4] (Table 2). This was a decrease of 3 percent in the number of farms from which milk was sold and a 16 percent increase in the percentage of farms classified as commercial dairy farms for the period 1959-1969.

The trend toward decreasing number of dairy farms has continued into the mid 1970's. In 1975, the Federal Milk Market Administrators reported a total of 6,896 milk producers sold milk in Tennessee as of March 1975.[5] Of these 6,896 producers, approximately 35 percent produced Grade A milk with the remaining 65 percent producing manufacturing milk. (The location of these producers by counties is shown in Figures 1 and 2.) It was reported in the 1969 Census of Agriculture that 9,988 Tennessee dairymen sold milk in 1969. Apparently then, the number of milk producers in Tennessee has declined by about 3,092 producers during the period 1969 to 1975.

[4]A farm is classified as a commercial dairy farm if 1) 50 percent or more of the total value of all farm products sold was dairy products, or 2) if a) dairy products sold accounted for more than 30 percent of the total value of product sold; b) milk cows represented 50 percent or more of total cows; or c) the value of dairy products sold plus the value of cattle and calves sold amounted to 50 percent or more of the total value of all farm products sold.

[5]The data are too limited to learn how many of the 6,896 dairy farms were commercial dairy farmers.

Table 1. Number of farms reporting milk cows and percentage change in number of farms reporting milk cows, by herd size, Tennessee, 1959, 1964 and 1969

Number of milk cows	Number of farms			Percent change from	
	Year				
	1959	1964	1969	1959-1964	1959-1969
1 – 4	62,869	33,820	13,742	-46	-78
5 – 9	13,686	9,544	4,018	-30	-71
10 – 19	7,129	5,281	3,558	-50	-26
20 and over	4,433	4,286	3,823	-3	-14
†† Totals	88,137	52,931	25,141	-40	-72

Source: United States Department of Commerce, **Census of Agriculture**, Vol. 31, pt. 1, 1959, 1964, 1969, Bureau of the Census, Washington, D. C.

Table 2. Total number of farms with dairy cows, total number of farms selling milk and cream and total number of commercial dairy farms, Tennessee, 1959, 1964, and 1969

Totals	Year			Percent of total		
	1959	1964	1969	1959	1964	1969
Farms with dairy cows	88,137	52,931	25,141	100	100	100
Farms selling milk and cream	38,211	22,769	9,988	43	43	40
Commercial dairy farms	9,642	10,133	6,806	11	19	27

Source: United States Department of Commerce, **Census of Agriculture**, Vol. 31, pt. 1, 1959, 1964, 1969, Bureau of the Census, Washington, D. C.

Milk Production and Number of Milk Cows

Total milk production was relatively stable during the period 1960 to 1972 even in the face of constantly declining cow numbers (Figure 3 and Appendix Table 1). The stability in total milk production with decreasing cow numbers was possible by increases in production per cow. Genetic improvement undoubtedly contributed to increased production per cow; however, the general conclusion was that the cows being culled were relatively low producers from small, inefficient operations.

In 1973, milk production per cow dropped for the first time in approximately 20 years[6] (Figure 3). Cow numbers dropped between 1972 and 1974; however, the rate of decline was approximately the same as previous years so that the reduction in total milk production cannot be attributed to declining cow numbers. This drop

[6]S. P. Parry and D. G. Greiner, **Changes in the Structure of the Tennessee Dairy Industry**, Bulletin 348, August 1962, pp. 3, 6, 9. Figure 2. p. 9. shows a continual increase in production per cow from 1954 to 1961.

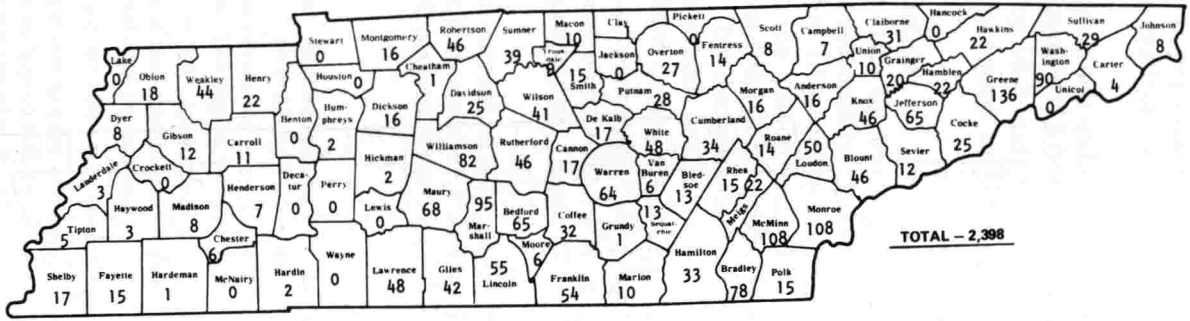

Figure 1. Grade A milk producers, Tennessee, March, 1975.
Source: The Division of Animal and Plant Inspection Service, ARS, USDA, Nashville, Tennessee (private correspondence).

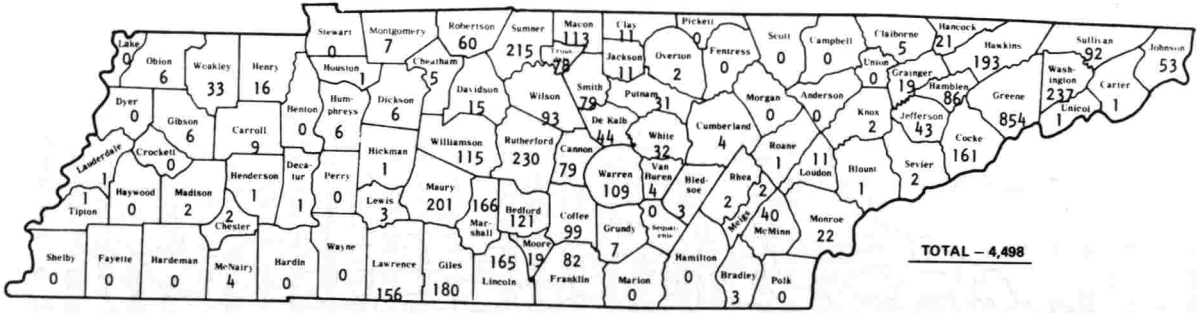

Figure 2. Manufactured milk producers, Tennessee, March, 1975.
Source: The Division of Animal and Plant Inspection Service, ARS, USDA, Nashville, Tennessee (private correspondence).

in total production and production per cow has been attributed to a reduction in the feeding rate brought about by relatively high feed costs.[7] Production per cow regained its general upward trend in 1974, but total production continued to decline in 1974 as did cow numbers.

Straight line projections indicate that cow numbers have been declining by approximately 18,000 head per year, total milk production has declined by 16.7 million pounds per year, and that mean production per cow increased by 286.8 pounds during the 15-year period.[8]

Seasonality of Production

Milk production data by months for the period 1960 to 1974 indicates a decreasing seasonality of production as well as a declining annual total production (Appendix Table 2). The variation in annual total production for the period ranged from a high of 7 percent above the mean annual total production in 1961 to a low 11 percent in 1974 (Table 3). The decrease in seasonality of production is supported by the standard deviation of the monthly production by years. These standard deviations show a rather strong downward trend for the period. Apparently the movement toward larger and probably more efficient operations has also brought about a decrease in the seasonality of production (Table 3).

Cash Receipts

Cash receipts in current dollars from farm marketing of milk and cream have climbed steadily from 1965 to 1974. The 1974 cash receipts were 74 percent larger than the 1965 receipts. In terms

[7]This conclusion was reached through conversations with dairy farmers, cooperative officials, and University of Tennessee Extension personnel.

[8]Simple regressions were run on cow numbers, pounds of milk produced, and mean production per cow. The results were as follows:

Thousands of cows = 500 - 18.996 (Time).
Millions of pounds of milk produced = 2,268 - 17.746 (Time).
Average pounds produced per cow = 3, 931 + 293.9 (Time).

Where Time was defined as: 1960 = 1, 1961 = 2, etc.

This trend in cow numbers cannot continue at its present rate or Tennessee will have no dairy cows in approximately 12 years. This would be a ridiculous projection. Perhaps a more realistic projection would be that Tennessee would continue to produce 1,800 to 2,000 million pounds of whole milk with production per cow increasing to approximately 10,000 pounds per cow. This would call for 180,000 to 200,000 cows by 1980. This projection assumes a relative constant demand for milk. If demand declines as it appears to be doing, then the above projection may be too high.

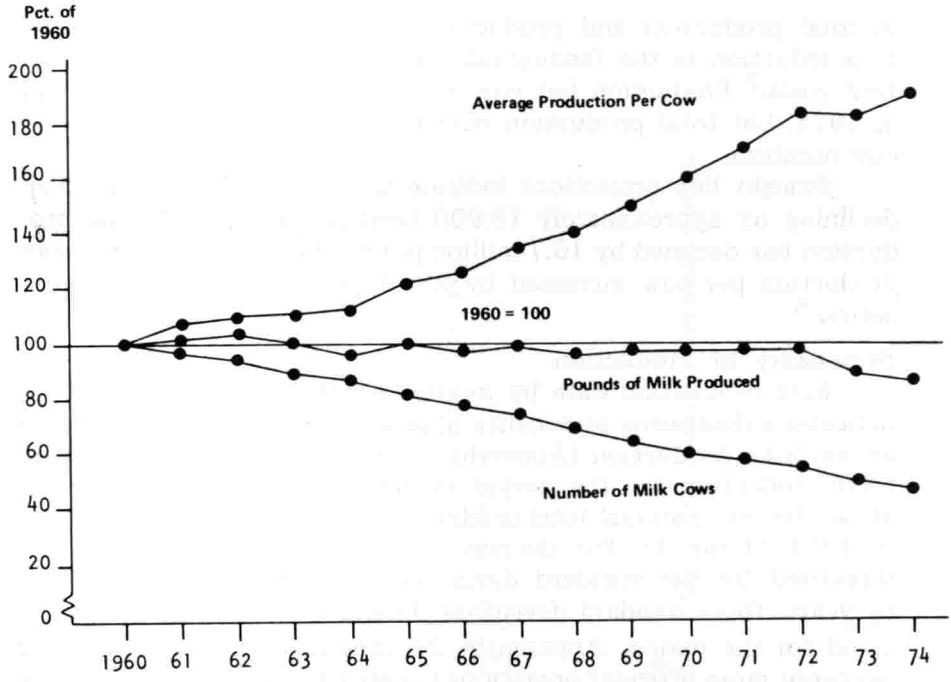

Figure 3. Number of milk cows, pounds of milk produced, average production per cow as a percent of 1960, 1960 to 1974. Data used to plot this graph can be found in Appendix Table 3.

of constant or deflated dollars, a much different picture is presented (Figure 4).[9] The increase in cash receipts from the sale of milk and cream has increased by 5 percent from 1965 to 1974. However, during the 72-74 period the deflated cash receipts declined. This recent decrease in deflated cash receipts does not indicate that dairy farmers made less profit as there are many factors affecting profit or loss. First, cash receipts are simply total revenue to the industry; costs are not considered and hence profit cannot be determined. Second, there are fewer dairy farmers to share the total returns. Also some dairy farmers may be "locked in" on certain factors (long-term credit) and their costs may not increase at the same rate as the wholesale price index.

Dairy farming in Tennessee declined slightly in overall importance as a total revenue generator. Cash receipts from dairy as a percentage of total crop and livestock cash receipts remained rela-

[9]The wholesale price index for all commodities (1967 = 100) was used on the deflator.

Table 3. Percentage deviation from the 1960-1974 average production and the standard deviation based on monthly data, by years, Tennessee, 1960-1974*

Year	Percent deviation from the 1960-74 average[a]	Standard deviation in (000,000 lb.)[b]
1960	+3	32
1961	+7	41
1962	+6	33
1963	+2	34
1964	-1	28
1965	+2	30
1966	0	25
1967	+1	26
1968	-1	21
1969	-1	21
1970	0	22
1971	0	19
1972	+1	17
1973	-8	18
1974	-11	15

*Data used to compute these data can be found in Appendix Table 2.
[a]Average for 1960 to 1974 = 2,127 million pounds of milk.

$$\left| \frac{X_i - \bar{X}}{\bar{X}} \right|$$

where X_i = production for year i, $\bar{X}$ is average for the 1960-74 period.

$$b = \sqrt{\frac{\sum_{i=1}^{12} (X_{ji} - X_j)^2}{n-1}}$$

where X_{ij} = the ith monthly output & j = years and $\bar{X}_j$ = average monthly output for year j.

tively constant, ranging from 14.8 percent in 1965 to a high of 17.3 percent in 1968 and declining to 14.8 in 1972. In 1973 cash receipts from dairy farms fell to 11.6 percent of total crop and livestock cash receipts. Cash receipts from dairy farms in 1973 actually increased rather substantially over 1962 ($103 million to $133 million); however, crop and livestock cash receipts increased proportionally more, hence the decline in the percentage of total cash receipts attributed to dairy farming (Table 4).

The situation reversed in 1974. Total receipts from crops and livestock declined in both current and constant dollar terms while cash receipts from dairy farming increased in current dollars and remained relatively stable in constant or real terms (Appendix Table 3).

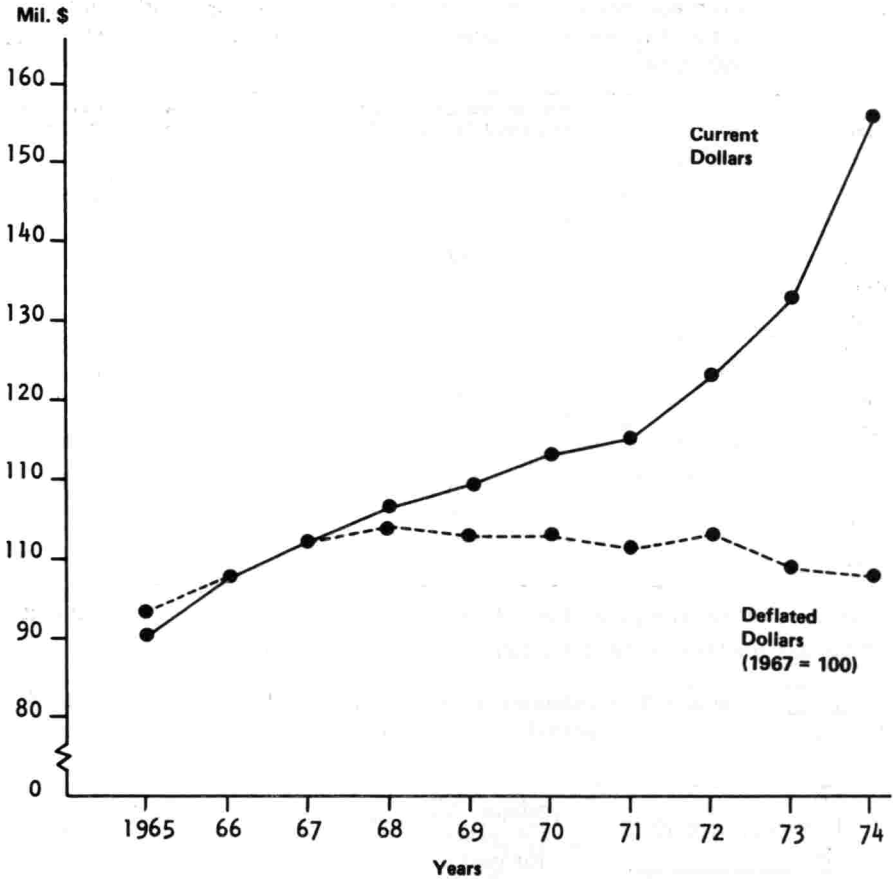

Figure 4. **Cash receipts in current and deflated dollars from farm marketings of milk and cream, Tennessee, 1965-74. Data used to plot this graph can be found in Appendix Table 3.**

Commercial Dairy Production

The previous discussion has been on aggregate data. Detailed data are available from the Census of Agriculture for commercial dairy farms. The point that commercial dairy farms are of the primary economic importance is illustrated by the fact that in 1969, 92 percent of all milk sales came from 6,806 commercial dairy farms (Table 5). The remaining 3,182 farms whose operators sell dairy products received only 8 percent of the total revenue from selling dairy products. With this in mind, the remainder of the section will focus on commercial dairy farms.

Table 4. Cash receipts from farm sales of milk and cream as a percent of crops and livestock cash receipts, Tennessee 1965 to 1974

Year	Dairy as a percent of Crops and livestock	Dairy as a percent of Livestock
	Percent	
1965	14.8	29.2
1966	16.2	28.1
1967	16.9	28.5
1968	17.3	28.9
1969	16.2	26.4
1970	16.1	26.1
1971	15.6	27.4
1972	14.8	23.8
1973	11.6	20.8
1974	15.5	34.0

Source: Derived from data in Appendix Table 3.

Table 5. Number of farms reporting dairy cows, commercial dairy farms, pounds of milk sold, revenue for selling milk, and percent commercial sales, Tennessee, 1959, 1964, and 1969

Items	Year 1959	Year 1964	Year 1969
Farms reporting dairy cows	88,137	52,931	25,141
Number of farms selling milk and cream	38,211	21,913	9,988
Commercial farms selling milk and cream	9,642	10,133	6,806
Pounds of milk sold (millions)	1,597	1,732	NA[a]
Revenue from selling milk (million dollars) all farms	62	75	96
Revenue from selling milk, commercial dairy farms (million dollars)	44	63	89
Percent milk sales from commercial dairy farms is of total milk sales	70	84	92

[a]NA = not available with comparable data.

Source: United States Department of Commerce, **Census of Agriculture**, Vol. 31, pt. 1, 1959, 1964, 1969, Bureau of the Census, Washington, D. C.

Herd Size—Economic Class[10]

Average herd size has increased during the period 1959-1969. The number of farms with less than 50 cows per farm declined with the decrease ranging from 79 percent for farms with 1-9 cows to 12 percent for farms with 30-49 cows (Table 6). Farms with more than 50 cows increased in number. Farms with 50-99 cows increased by 58 percent, and farms with more than 100 cows increased 171 percent.

As might be expected with increasing herd size, the percentage of farms in Classes III, IV, and V declined in number during the 1959-1969 period while farms in Classes I and II increased in number (Table 7).[11]

These data indicate that the general trend toward fewer but larger dairy operations in commercial dairy farms is similar to the trend in all dairy farms.

Tenure of Farm Operator

There was little change in the tenure status of dairy farm operators between 1959 and 1969. Sixty-two percent of the operators were full owners in 1959 as opposed to 64 percent for 1969. The percentage of dairy farm operators who were part owners increased from 26 percent in 1959 to 29 percent in 1969. Dairy farm operators who were tenants decreased from 11 percent in 1959 to 8 percent in 1969. These changes do, however, indicate a slight trend to ownership status by dairy farm operators (Table 8).

Farm Size in Acres

There has been little change in the distribution of commercial dairy farms by size of farms in acres (Table 9). It appears, however, that there is a slight trend toward larger farms as shown by the slight decrease in the percentage distribution in farms of less than 140 acres and a slight increase in the percentage distribution in farms over 260 acres.

[10]Classes: Class I—$40,000 or more of farm product sales; Class II—$20,000 to $39,999 of farm product sales; Class III—$10,000 to $19,999 of farm product sales; Class IV—$5,000 to $9,999 of farm product sales; Class V—$2,500 to $4,999 of farm product sales or having a value of products sold of less than $2,500 provided they had the acreage or livestock operation which normally would have had excess of $2,500. These would include new farm operations, farms having crop failure, and farms with large inventories and small 1969 sales.

[11]The large percentage increases are due to the fact that there were few large dairy operations in 1959. The change in the numbers of farms is still quite significant. See Table 7 for definitions of Economic Classes.

Table 6. Percentage change in the number of commercial dairy farms, by herd size, Tennessee, 1959 to 1964 and 1959 to 1969

Number of milk cows per farm	Percent change from 1959	
	Year	
	1964	1969
	Percent	
1 – 9	0	-79
10 – 19	+8	-24
20 – 29	-12	-30
30 – 49	0	-12
50 – 99	+38	+58
100 or more	+90	+171

Source: Data derived from Appendix Table 4.

Table 7. Percentage change in the number of commercial dairy farms, by economic class, Tennessee, 1959 to 1964 and 1959 to 1969

Period	Total	Economic Class[1]				
		I	II	III	IV	V
1959–64	+2[2]	+213	+66	+32	+9	0
1959–69	-32	+968	+200	-10	-30	-50

Source: Data derived from Appendix Table 4.

[1]Classes: Class I—$40,000 or more of farm product sales; Class II—$20,000 to $39,999 of farm product sales; Class III—$10,000 to $19,999 of farm product sales; Class IV—$5,000 to $9,999 of farm product sales; Class V—$2,500 to $4,999 of farm product sales or having a value of products sold of less than $2,500 provided they had the acreage or livestock operation which normally would have had excess of $2,500. These would include new farm operations, farm having crop failure, and farms with large inventories and small 1969 sales; Class VI—$50 to $2,499 of farm product sales and a farm operator who is under 65 years of age and did not work off the farm 100 days or more in the census year.

[2]Includes Class VI.

DEMAND SECTOR

Federal Orders

Federal milk orders are operating in most of the fluid milk marketing areas of the United States. According to a report by the Dairy Division Consumer and Marketing Service, about 80 percent

Table 8. Tenure of commercial dairy farm operator by number of farms and percentage distribution of tenure, Tennessee, 1959, 1964, and 1969

Tenure	1959		1964		1969	
	Number of farms	Percent of total farms	Number of farms	Percent of total farms	Number of farms	Percent of total farms
Full owner	5,984	62	6,161	61	4,347	64
Part owner	2,484	26	2,934	29	1,983	29
Tenant	1,088	11	988	10	476	8
Totals	9,556	100	10,083	100	6,806	100

Source: Data derived from Appendix Table 5.

of the milk eligible for fluid use is marketed under the terms of these orders.[12]

There was a decrease in the number of federal order markets during the period 1960 to 1972 (Table 10). However this does not represent a decrease in the quantity of milk being marketed under federal regulation but a consolidation of marketing orders. Also the number of handlers and producers have declined in the federal order markets while the percentage of milk sold going into fluid uses has increased as has the average daily deliveries by producers.

Tennessee Federal Order Markets

Tennessee has five federal orders: they are Appalachian, Chattanooga, Knoxville, Memphis, and Nashville (Figure 5). The Appalachian order contains only three Tennessee counties while the Nashville order (the largest) has 35 counties. There appears to be no significant difference between the federal order counties of the state and those counties not in federal order. The possible exception is the area of Lincoln, Franklin, and Moore counties which have a slightly heavier concentration of manufacturing grade milk producers (Figure 5). In this area 85 percent of the producers produce manufacturing milk compared to approximately 70 percent for the state. Lincoln County also has four manufacturing plants which may account for the heavier concentration of manufacturing milk producers.

[12]Questions and Answers on Federal Milk Marketing Orders by the Dairy Division, Consumer and Marketing Service, United States Department of Agriculture, October, 1971.

Table 9. Percentage distribution of farm size by number of acres, 1959, 1964, and 1969

Number of acres	Year 1959	1964	1969
	Percent		
1 – 9	1.1	.9	1.7
10 – 49	8.9	10.2	6.4
50 – 99	24.1	24.6	22.4
100 – 139	19.4	17.4	17.3
140 – 179	13.2	12.2	13.4
180 – 219	9.4	8.8	10.4
220 – 259	6.6	9.1	6.4
260 – 499	13.6	12.7	15.8
500 – 999	3.2	3.5	5.3
1000 – 1999	.5	.5	.8
2,000 or more	.1	.1	.1
Totals[a]	100.1	100.0	100.0

[a]Totals may not equal 100 due to rounding error.
Source: Data derived from Appendix Table 6.

Table 10. Measures of growth in Federal Milk Order markets, selected years 1960-1973, United States

Year	Number of markets	Number of handlers	Number of producers	Receipts as percentage of milk sold to plants and dealers: Fluid grade	All milk	Producer deliveries (Million lb.)	Daily deliveries per producer in lb.
1960	80	2,259	189,816	64	43	44,812	648
1961	81	2,314	192,947	67	45	48,803	704
1962	83	2,258	186,468	70	47	51,648	761
1963	82	2,144	176,477	70	48	52,860	821
1964	77	2,010	167,503	70	48	54,447	888
1965	73	1,891	158,077	70	48	54,444	944
1966	71	1,724	145,964	70	48	53,012	994
1967	74	1,650	140,657	71	49	53,761	1,056
1968	67	1,637	141,620	74	52	56,444	1,089
1969	67	1,628	144,275	77	56	61,026	1,164
1970	52	1,566	143,400	79	59	65,104	1,244
1971	62	1,529	141,347	80	60	67,872	1,316
1972	61	1,487	136,881	98	60	68,719	1,372
1973	61	1,355	131,566	78	60	66,229	1,386
1974	61	1,312	126,919	79	62	67,780	1,463

Source: Agriculture Marketing Service, **Federal Milk Order Market Statistics, Annual Summary for 1974**; Statistical Bulletin No. 542, USDA, Washington, D. C., p. 9.

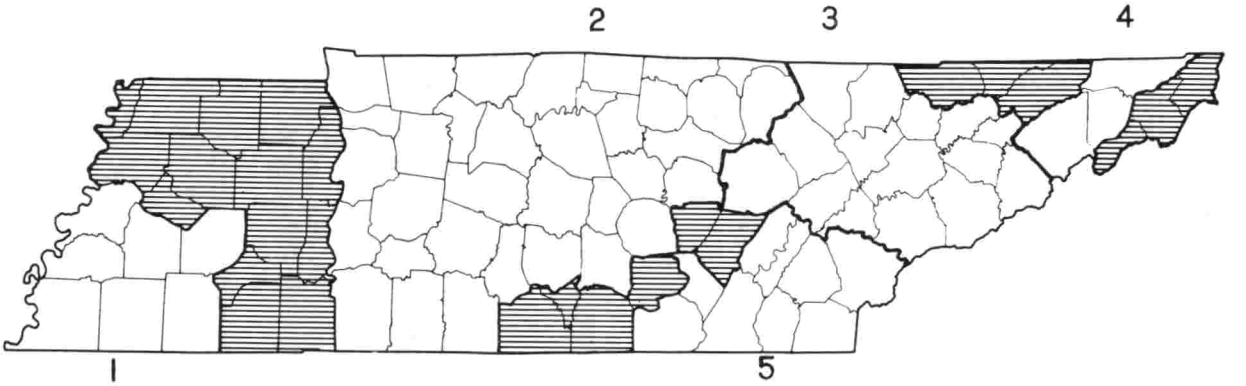

Figure 5. Tennessee federal milk marketing orders.

Utilization of Producer Milk

The utilization of milk in the United States is shown in Figure 6. Approximately 45 percent of the total milk supply for the United States was used as fluid products. The percentage of producer milk used as fluid milk in Tennessee was much higher ranging from a low 61 percent for the Nashville order to a high of 90 percent for the Memphis order (Table 11).

The most dramatic change in milk consumption has been the increased sales of 2 percent milk and a decrease in whole milk sales. Statistics concerning 2 percent milk were first reported in 1966. At that time, 8 percent of the fluid milk products sold in the Knoxville order was 2 percent milk (Appendix Table 12). The sales of 2 percent milk in the other Tennessee Federal Orders was somewhat higher (Appendix Tables 10-14). By 1974, 2 percent milk had claimed a significant share of the fluid milk market in all Tennessee Federal Orders. The percentage of 2 percent milk of all fluid milk ranged from 35.3 percent in the Knoxville order to a low of 10.4 percent in the Nashville order. During the time period 1960 to 1974, flavored milk drink sales tended to increase slightly. The largest yearly increases in 2% milk sales occurred in 1973 and 1974. This increase in the rate of change could be attributed to price increases in milk during the period.

Tennessee Demand

The estimated increase in consumption for fluid milk in the major Tennessee markets is shown in Table 12.[13] By 1980 per capita consumption in the Knoxville market is projected to be 7 percent larger than in 1970. In absolute terms this means an aggregate increase of about 16 million more pounds of milk consumed in the Knoxville market. The per capita consumption is expected to be up 4 percent in Nashville and up 5 percent in Chattanooga and Memphis. Aggregate consumption was 1,802 million pounds in 1970 and projected to 1,978 million pounds in 1980 for an overall increase of 9.7 percent. Per capita consumption increases will account for the bulk of a 9.7 percent aggregate increase with increases in population accounting for the remaining increase.

[13]These projections are taken from Robert Raunikar and Joseph C. Purcell, **Trends in the Milk Market,** University of Georgia, College of Agriculture Experiment Stations, July, 1972, Research Report 139, p. 24. These projections must be used with caution. The earlier work was based on a time period when milk prices were quite stable. Retail milk prices in 1972-75 have increased substantially.

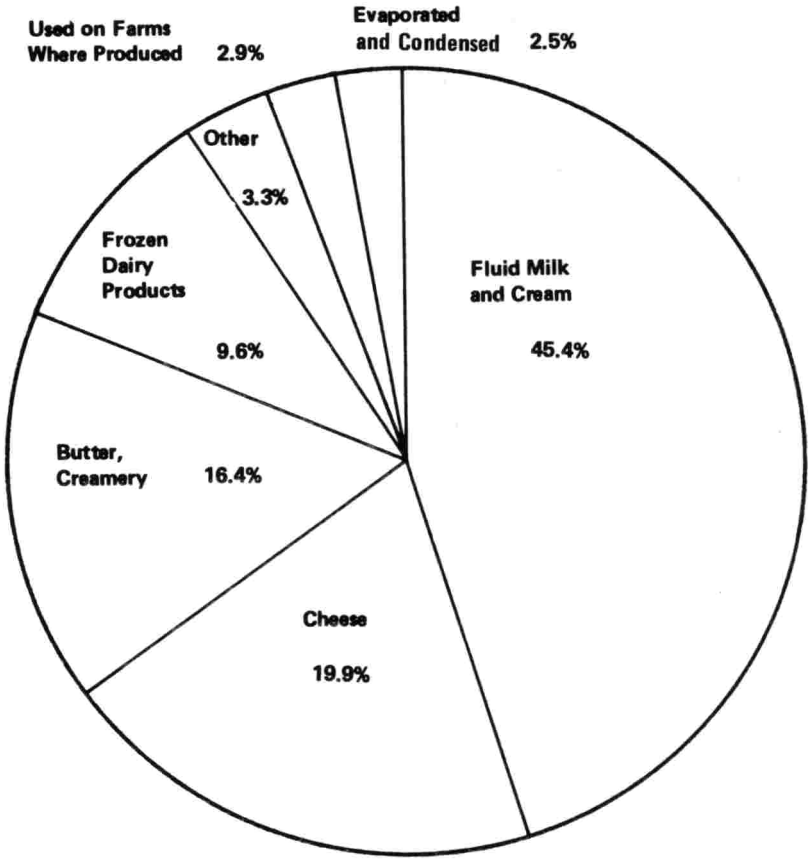

Figure 6. How 1973 United States milk supply was used by product.

Fluid milk and cream sales 28.2 bil. qts.	60,680 mil. lb.
Frozen dairy product[a]	11,183 mil. lb.
Creamery butter	19,039 mil. lb.
Cheese	23,160 mil. lb.
Evaporated and condensed milk	2,857 mil. lb.
Used on farms where produced	3,410 mil. lb.
Other uses	3,882 mil. lb.

[a]Only that milk used directly in making frozen dairy products. Does not include approximately 2,036,000,000 pounds of milk derived from other manufactured dairy products which, when added, give a total of 13,219,000,000 pounds of milk used to produce frozen dairy products in 1973.

Source: **Milk Facts,** 1974, Milk Industry Foundation, Washington, D.C. p. 16.

Table 11. Percent of producer milk utilized as fluid milk by Federal Order, Tennessee, 1961 to 1974

Year	Appalachian	Chattanooga	Knoxville	Memphis	Nashville
1961	84	73	67	90	74
1962	88	73	78	93	77
1963	89	79	81	91	81
1964	90	87	81	90	82
1965	92	80	79	87	79
1966	92	81	78	89	77
1967	89	76	70	89	74
1968	91	78	75	89	79
1969	91	73	70	88	78
1970	90	73	76	86	74
1971	94	63	80	85	72
1972	90	66	77	82	68
1973	86	74	86	80	74
1974	88	73	87	88	61

Source: Milk Market Order Dir., AMS; USDA, **Federal Milk Order Market Statistics,** Statistical Bulletin No.'s 284, 335, 345, 361, 374, 403, 426, 437, 453, 470, 488, 521, and 542; Washington D. C.

Table 12. 1980 estimated percentage increase in per capita and aggregate demand for fluid milk, frozen dessert and cheese as a percent of the 1970 demand, Tennessee major markets areas

	Fluid milk		Frozen dessert		Cheese	
Market	Per capita	Agg.	Per capita	Agg.	Per capita	Agg.
Chattanooga	105	113	115	123	112	125
Knoxville	107	103	122	116	116	112
Memphis	105	112	114	121	109	115
Nashville	104	111	114	123	111	116

Source: Robert Raunikar and Joseph C. Purcell, **Trends in the Milk Market,** University of Georgia, College of Agriculture Experiment Stations, July, 1972, Research Report 139, pp. 16, 19, 21, 24.

The consumption of ice cream and frozen dessert is also projected to increase. Knoxville per capita demand is expected to increase by 22 percent over 1970 (Appendix Table 16). The other three markets are projected to increase 14 to 15 percent. An aggregate consumption of frozen desserts is expected to increase by 21 percent.

The estimated consumption for cheese is much the same as that

of fluid milk and frozen desserts. Knoxville leads with a projected increase in per capita consumption of 16 percent followed by Chattanooga with 10 percent, Nashville with 11 percent, and Memphis with 9 percent. Aggregate demand is projected to be 68 million pounds for a 17 percent increase over the 58 million pounds in 1970 (Appendix Table 17). This represents an increase of 100 million pounds of additional milk needed.

PROCESSING SECTOR

Introduction

The general trend in fluid milk processing plant numbers in the United States has been one of a steady decline from 1961 to 1971 (Table 13). The downward trend has also been present in manufacturing milk plants; however, the average output per plant has increased by a greater percentage than the percentage decrease in plant numbers. This, with the fact that total producer deliveries have increased, indicates that total productive capacity increased during this period (Table 14).

Table 13. Number of fluid milk bottling plants by commercial processors in the United States, December 1961-1971

December	Regulated by Federal Order	Other	Total	Pct. of 1961
	Number			
1961	2,217	2,742	4,959	100
1962	2,136	2,742	4,683	94
1963	2,060	2,382	4,442	90
1964	1,940	2,163	4,103	83
1965	1,785	1,958	3,743	76
1966	1,532	1,847	3,379	68
1967	1,456	1,522	2,978	60
1968	1,485	1,171	2,656	54
1969	1,478	995	2,473	50
1970	1,343	873	2,216	45
1971	1,248	832	2,080	42

Source: United States Department of Agriculture, ERS, Compilation of Statistical Material, Federal Orders, 1969—1974, May 1974.

Plant Numbers

Tennessee manufacturing plants and fluid milk plant numbers have decreased by 57 percent and 77 percent, respectively, from 1954 to 1975 (Table 15). (The general location of these plants is shown in Figure 7.) Data from the Census of Manufacturing for 1963,

1967, and 1972 indicate a decline in Tennessee in plant numbers as well as decreases in production workers and man-hours worked and value added by manufacturer (deflated) (Table 16). Total plant numbers decreased by 47 percent during the period 1963 to 1972 (Table 17). Value added by manufacturers (deflated), decreased by 10 percent. This implies that the capacity of those remaining plants has increased which follows the general trend in productivity in the U. S. Dairy Industry.

Labor Utilization

Total number of production workers and man hours worked decreased by 35 and 38 percent, respectively, for all Tennessee dairy processing plants during the period 1963 to 1972. It appears that productivity has increased in fluid milk plants as evidenced by increases in the value added per man-hour worked (deflated) from $14.70 per man hour in 1963 to $23.50 per man hour worked in 1972.[14] This was about a 60 percent increase in productivity. Productivity in terms of value added per man hour (deflated) has also increased in the ice cream and frozen dessert sector of the dairy industry ($9.80 per man hour in 1963 to $14.50 per man hour in 1972). The condensed and evaporated milk sector has decreased in productivity with the value added per man hour (deflated) decreasing from $10.90 per man hour in 1963 to $8.50 per man hour in 1972. The 1967 value added per man hour (deflated) was $15.90. It is not possible to determine if the 1972 decrease was a short term deviation from the general upward trend in productivity or a shifting of the productivity downward in the condensed and evaporated milk sector.

TENNESSEE PRODUCTION OF MANUFACTURED DAIRY PRODUCTS

In general, total butter production had increased rather steadily from 1960 to 1974 with the exception of 1973 when total production of milk dropped. The increase in total butter production from 1960 to 1974 was 75 percent (Table 18).

The mean cheese production per year for the 1960 to 1974 period was 46.9 million pounds. With a conversion rate of 10 pounds of milk for 1 pound of cheese, the mean production of cheese represents 469 million pounds of milk utilized per year. Total cheese production tended to decrease from 1960 to 1966 with the trend

[14]Value added per man hour worked is used as a rough measure of productivity.

Table 14. Number of plants making dairy products and average output per plant, selected years 1957-1972, United States

Product	Number of manufacturing plants			Percent change		Average output per plant in thousand pounds			Percent change	
	1957	1963	1972	57-72	63-72	1957	1963	1972	57-72	63-72
Butter	2060	1321	475	-77	-64	685	1075	2320	+239	+116
American cheese	1194	924	613	-49	-34	853	1200	2682	+214	+124
Swiss cheese	184	133	76	-59	-43	544	902	2339	+330	+159
Italian cheese	167	184	199	+19	+ 8	668	1045	2574	+285	+146
All cheese	1603	1282	901	-44	-30	880	1273	2892	+229	+127
Cream cottage cheese	1654	1086	482	-71	-56	419	732	2103	+402	+187
Nonfat dry milk	456	405	180	-61	-56	3561	5200	6797	+ 91	+ 31
Dry whole milk	66	48	32	-52	-33	1666	1896	2351	+ 41	+ 24
Canned whole milk	93	68	36	-61	-47	26962	29062	32869	+ 22	+ 13
Totals	5932	4210	2106							
Ice cream	3397	2476	1451	-57	-41	179	475	513	+187	+ 87
All frozen dairy products	3447	2512	1480	-57	-41	214	375	652	+205	+ 85
Total manufacturing plants	–	6134[a]	3312	–	-46[a]	–	10.4[a]	188	–	+ 81[b]

[a]1961 data. [b]1961-72 data.

Source: United States Department of Agriculture, **Dairy Situation**, ERS, July, 1974, p. 13.

shifting upward from 1967 to 1971. During the period 1972-1974, cheese production dropped in 1971 and 1972 but recovered somewhat in 1974.

Processed milk production has generally trended downward during the entire 1960 to 1974 period.[15] The 1973 production of processed milk was only 55 percent of the 1960 total production.[16]

Total production of frozen products and milk has followed a general upward trend during the first half of the 1960-1974 period with total production remaining relatively stable during the last half.

[15]See Table 18 for definition of Processed Milk.

[16]The 1974 reported production was very low in that total production was not reported to avoid disclosing individual plant data.

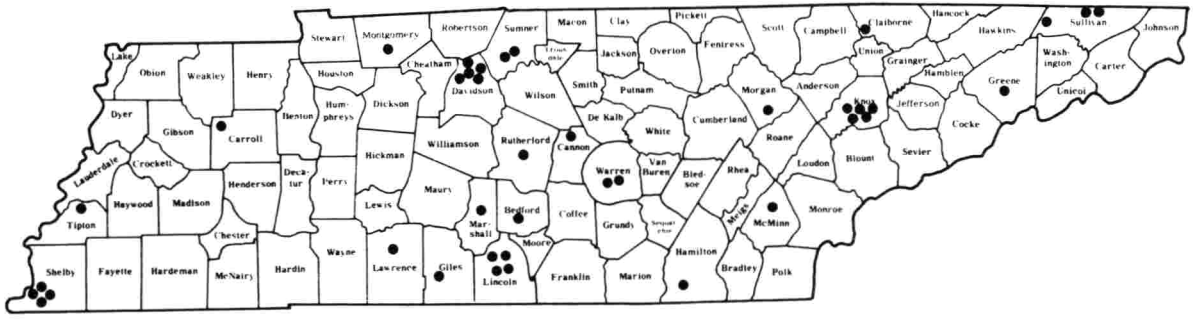

Figure 7. Location of dairy processing plants, 1975. Map excludes location of ice cream plants.

Table 15. Dairy plant changes in Tennessee, 1954 through 1975

Dairy plants	Number of plants 1954	1958	1975	Percent of change 1954 to 1975
Creamery butter	3	3	4	+33
Natural cheese	20	19	9	-55
Condensed and evaporated milk	13	8	3	-77
Ice cream and frozen desserts	39	39	16	-59
Special dairy plants[a]	5	3	2	-60
Total manufacturing	80	72	34	-57
Fluid milk plants	91	82	21	-77
Totals	171	154	55	-68

[a]Special plants: Kraft Food-Gellatin-cream cheese; Kraft Food-Fayetteville-Swiss cheese.

Source: Federal Milk Market Administration, Knoxville Tennessee (personal communication).

Table 16. Percentage change for 1963 to 1972 in number of plants, number of production workers, man hours worked, and value added by manufacturer in dairy processing, Tennessee

Item	Percentage change from 1963 to 1972: Number of plants	Production workers	Man-hours worked	Value added by manufacture[a]
	Percent			
Fluid milk	-56	-30	-35	4
Condensed and evaporated milk	+57	-25	-33	-48
Ice cream and frozen desserts	-52	-50	-77	-20
Totals	-47	-35	-38	-10

[a]Dollar values are in constant dollars 1967 = 100.

Source: Computed from data contained in Appendix Tables 7 and 9.

Table 17. Increase in value added[1] per man-hours worked in Tennessee for 1963, 1967, and 1972

Productivity	Value added per man-hour[2]		
	1963	1967	1972
	Dollars		
Fluid milk	14.7	14.8	23.5
Condensed and evaporated milk	10.9	15.9	8.5
Ice cream and frozen dessert	9.8	14.1	14.5
Aggregate	12.5	14.1	18.0

[1]Deflated values. (The deflator used was the wholesale price index for all commodities 1967 = 100.

[2]Computed from data contained in Appendix Tables 7, 8, and 9.

Table 18. Production of butter, cheese, processed milk and frozen products and milk, Tennessee, 1960 to 1973[a]

Year	Butter	Cheese	Processed milk[b]	Frozen products and milk
	000,000 lb.			000,000 gal.
1960	9.6	47.9	223.8	35.7
1961	11.8	55.3	238.6	37.2
1962	10.6	50.8	257.9	40.5
1963	8.6	45.8	231.5	41.2
1964	7.9	44.0	207.4	43.4
1965	8.4	45.8	200.4	46.4
1966	8.7	45.4	191.4	43.8
1967	13.7	48.5	162.6	45.8
1968	11.4	49.9	124.1	43.0
1969	12.2	49.3	132.2	41.9
1970	12.8	48.9	141.8	44.7
1971	15.7	48.9	173.5	44.3
1972	16.1	45.5	152.1	43.8
1973	12.9	37.6	123.6	45.3
1974	16.8	40.1	42.5[c]	45.7

[a]These are minimum production data as data for some years were not released to protect identity of individual plants.

[b]Cottage cheese, cottage cheese curd, condensed milk, evaporated milk, condensed or evaporated buttermilk, condensed whey, dry milk.

[c]The large decrease from 73 to 74 is due to not reporting of evaporated and condensed whole milk for 1974 to avoid disclosing individual plant data. Total production of the item was 74,785,000 pounds in 1973.

Source: U. S. Crop Reporting Board. **Production of Manufactured Dairy Products.** S.R.S., USDA, Washington, D. C. 1960-1974.

APPENDIX

Appendix Table 1. Number of milk cows on farms, percentage of 1960, pounds of milk produced on farms, percentage of 1960, mean production per cow, and percentage of 1960, 1960 to 1974

Year	Number of milk cows	Pct. of 1960	Pounds of milk produced on farms	Pct. of 1960	Mean production per cow	Pct. of 1960
	(000)	%	(000,000)	%	Pounds	%
1960	477	100	2,194	100	4,600	100
1961	461	97	2,277	101	4,940	107
1962	448	94	2,262	103	5,050	110
1963	426	89	2,173	99	5,100	111
1964	409	86	2,106	96	5,150	112
1965	387	81	2,171	99	5,610	122
1966	369	77	2,122	97	5,750	125
1967	348	73	2,144	98	6,160	134
1968	329	69	2,115	96	6,430	140
1969	307	64	2,104	96	4,853	149
1970	288	60	2,123	97	7,372	160
1971	272	57	2,122	97	7,801	170
1972	255	54	2,147	98	8,420	183
1973	234	49	1,946	89	8,316	181
1974	218	46	1,892	86	8,679	189

Source: United States Department of Agriculture and Tennessee Department of Agriculture, **Tennessee Agricultural Statistics Annual Bulletin,** T-12, Tennessee Crop Reporting Service, September 1975.

Appendix Table 2. Milk Production: Total milk produced on farms, by months, Tennessee, 1960-1974

Year	Months												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Million pounds												
1960	147	136	155	183	220	215	223	223	203	180	160	149	2,194
1961	138	133	167	199	236	228	237	239	213	187	150	150	2,277
1962	148	143	168	197	226	219	232	226	198	193	161	151	2,262
1963	148	134	159	193	218	215	223	220	200	175	147	141	2,173
1964	140	136	156	176	206	201	207	212	198	173	153	148	2,106
1965	149	138	163	193	217	213	217	211	190	176	154	150	2,171
1966	148	136	160	185	210	204	201	201	191	177	155	154	2,122
1967	153	138	161	197	215	206	205	201	184	177	154	153	2,144
1968	154	148	162	188	207	201	197	194	183	175	156	150	2,115
1969	148	143	162	190	206	197	193	190	183	176	159	157	2,104
1970	152	146	166	190	207	198	194	191	185	175	159	160	2,123
1971	153	141	164	192	205	194	192	190	182	179	166	164	2,122
1972	158	149	169	192	206	198	192	192	178	183	166	164	2,147
1973	151	138	163	179	189	181	175	173	160	150	145	142	1,946
1974	139	132	158	173	179	173	168	165	163	155	143	143	1,892

Source: United States Department of Agriculture and Tennessee Department of Agriculture, **Tennessee Agricultural Statistics Annual Bulletin,** T-12, Tennessee Crop Reporting Service, August, 1975.

Appendix Table 3. Cash receipts in current and deflated dollars from crops and livestock, livestock, dairy and dairy products, 1965 to 1974

Year	Crops and livestock		Livestock		Dairy	
	Current	Deflated	Current	Deflated	Current	Deflated
	$000,000					
1965	607	628	307	318	90	93
1966	601	603	346	346	97	97
1967	603	603	359	359	102	102
1968	616	601	372	363	106	104
1969	673	632	414	389	109	103
1970	703	637	435	396	113	103
1971	741	651	427	370	115	101
1972	831	698	515	433	123	103
1973	1,143	849	640	475	133	99
1974	1,005	627	459	287	156	98

Source: United States Department of Agriculture and Tennessee Department of Agriculture, **Tennessee Agricultural Statistics Annual Bulletin,** T-1 through T-12, Tennessee Crop Reporting Service, August 1975.

Appendix Table 4. Number of dairy farms, by herd size, by economic class, Tennessee, 1959, 1964, and 1969

Number of milk cows	Total number[a]	Class I	II	III	IV	V
			1959			
1–9	2,521	–	10	25	100	795
10–19	3,246	–	–	36	905	1,950
20–29	1,692	5	11	311	955	405
30–49	1,394	–	95	787	457	55
50–99	592	31	271	249	41	---
100 or more	82	25	56	1	---	---
Totals	9,767[b]	61	443	1,409	2,451	3,205
			1964			
1–9	2,578	–	2	37	246	1,105
10–19	3,531	–	17	191	1,233	1,863
20–29	1,503	3	30	398	845	222
30–49	1,397	9	208	827	333	20
50–99	817	71	432	287	27	---
100 or more	156	108	43	5	---	---
Totals	9,982[b]	191	732	1,745	2,684	3,210
			1969			
1–9	582	1	7	13	77	484
10–19	2,485	–	5	235	1,144	1,101
20–29	1,197	1	97	519	494	86
30–49	1,240	36	706	484	14	---
50–99	936	399	509	28	---	---
100 or more	223	215	8	---	---	---
Totals	6,663	652	1,332	1,279	1,729	1,671

[a]Includes Class VI.

[b]Totals differ due to apparent error in original source.

Source: United States Department of Commerce, **Census of Agriculture**, Vol. 31, pt. 1, 1959, 1964, 1969, Bureau of the Census, Washington, D. C.

Appendix Table 5. Tenure of farm operator by economic class, Tennessee, 1959, 1964, and 1969

Status	Total[a]	Class I	II	III	IV	V
			1959			
Full owners	5,984	19	199	697	1,433	2,210
Part owners	2,484	18	192	519	765	695
Tenants	1,088	5	40	178	255	320
Totals	9,556[b]	42	431	1,394	2,453	3,225
			1964			
Fullowners	6,161	65	313	857	1,574	2,253
Part owners	2,934	107	350	738	851	668
Tenants	988	15	66	153	291	322
Totals	10,083[b]	187	729	1,748	2,716	3,243
			1969			
Full owners	4,347	279	736	772	1,224	1,336
Part owners	1,983	348	514	424	426	271
Tenants	476	34	97	92	121	132
Totals	6,806	661	1,347	1,288	1,771	1,739

[a]For 1959 and 1964, Class IV is included in the total.

[b]Totals differ from those in other tables due to apparent error in original source.

Source: United States Department of Commerce, **Census of Agriculture,** Vol. 31, pt. 1, 1959, 1964, 1969, Bureau of the Census, Washington, D.C.

Appendix Table 6. Dairy farms by size in acres, Tennessee, 1959, 1964, and 1969

Number of acres	Total	Class I	II	III	IV	V
			1959			
1–9	110	—	—	—	10	15
10–49	850	—	—	15	50	250
50–99	2,325	—	—	35	460	1,020
100–139	1,870	—	10	170	565	820
140–179	1,271	—	11	210	435	410
180–219	905	—	25	225	350	270
220–259	635	—	20	200	240	150
260–499	1,316	31	200	475	330	270
500–999	308	17	156	75	40	20
1,000–1,999	47	11	21	12	2	—
2,000 or more	5	2	—	2	1	—
Totals	9,642	61	474	1,219	2,473	3,210
			1964			
1–9	96	—	2	4	9	26
10–49	1,074	—	1	17	106	460
50–99	2,578	—	11	132	668	1,206
100–139	1,830	2	36	261	635	689
140–179	1,276	2	63	285	461	386
180–219	924	5	82	289	296	218
220–259	592	6	71	215	181	108
260–499	1,330	65	323	465	326	132
500–999	365	78	131	91	42	18
1,000–1,999	57	29	21	6	1	—
2,000 or more	11	9	1	1	—	—
Totals	10,133	196	742	1,766	2,725	3,243
			1969			
1–9	114	3	12	17	31	51
10–49	437	—	2	39	102	294
50–99	1,523	—	66	198	512	745
100–139	1,179	13	127	267	464	308
140–179	912	25	208	228	294	157
180–219	710	35	223	196	168	88
220–259	433	60	162	101	77	33
260–499	1,077	269	430	208	119	51
500–999	359	200	111	33	4	11
1,000–1,999	53	45	6	1	—	1
2,000 or more	9	9	—	—	—	—
Totals	6,806	661	1,347	1,867	1,771	1,739

Source: United States Department of Commerce, **Census of Agriculture,** Vol. 31, pt. 1, 1959, 1964, 1969, Bureau of the Census, Washington, D.C.

Appendix Table 7. General statistics for milk processing plants, Tennessee, 1963

Processing plants	Total	Establishment with 20 employees or more	All employees		Production workers			Value added by manufacture	Cost of material fuel, etc.	Value of industry shipment	Capital expenditure
								1963			
			Number	Payroll	Number	Man-hours	Wages				
			1000	Mil.	1000	Mil.	Million dollars				
Fluid milk	59	37	2.9	14.3	1.0	2.3	4.5	31.9	69.3	101.1	2.0
Condensed and evaporated milk	7	5	.5	2.4	.4	.9	1.9	9.3	24.0	33.5	.3
Ice cream and frozen desserts	33	19	1.1	4.7	.6	1.3	2.2	12.0	18.2	0.1	1.5
Totals	99	61	4.5	21.4	2.0	4.5	8.6	53.2	111.5	164.0	5.5

Source: United States Department of Commerce, **Census of Agriculture,** Vol. 31, pt. 1, 1959, 1964, and 1969, Bureau of the Census, Washington, D.C.

Appendix Table 8. General statistics for milk processing plants, Tennessee, 1967

Processing plants	Total	Establishment with 20 employees or more	All employees		Production workers			Value added by manufacture	Cost of material fuel, etc.	Value of industry shipment	Capital expenditure
								1967			
			Number	Payroll	Number	Man-hours	Wages				
			1000	Mil.	1000	Mil.	Million dollars				
Fluid milk	36	26	2.2	13.6	.8	1.8	4.1	26.7	73.9	100.5	2.0
Condensed and evaporated milk	10	6	.5	2.7	.4	.7	2.0	11.1	24.2	35.9	.3
Ice cream and frozen desserts	25	18	1.1	6.2	.5	1.2	2.5	14.4	24.1	38.3	1.2
Totals	71	50	3.8	22.5	1.7	3.7	8.6	52.2	122.2	174.7	3.5

Source: United States Department of Commerce, **Census of Agriculture,** Vol. 31, pt. 1, 1959, 1964, and 1969, Bureau of the Census, Washington, D.C.

Appendix Table 9. General statistics for milk processing plants, Tennessee, 1972

Processing plants	Total	Establishment with 20 employees or more	All employees		Production workers			Value added by manufacture	Cost of material fuel, etc.	Value of industry shipment	Capital expenditure
								1972			
			Number	Payroll	Number	Man-hours	Wages				
			1000	Mil.	1000	Mil.	Million dollars				
Fluid milk	26	21	2.2	18.6	.7	1.5	5.4	42.0	99.7	141.7	3.7
Condensed and evaporated milk	11	6	.3	2.6	.3	.6	2.0	6.1	30.1	37.3	.4
Ice cream and frozen desserts	16	11	.6	4.7	.3	.7	2.1	12.1	20.8	33.0	.5
Totals	53	48	3.1	25.9	1.3	2.8	9.5	60.2	150.6	212.0	4.6

Source: United States Department of Commerce, **Census of Agriculture**, Vol. 31, pt. 1, 1959, 1964, and 1969, Bureau of the Census, Washington, D.C.

Appendix Table 10. Fluid milk products as a percentage of total fluid milk sold in marketing areas defined by Federal Milk Orders in Tennessee, 1960 to 1974, Appalachian Order

Year	Whole milk[1]	2% milk	Skim milk[2]	Butter milk	Flavored milk drinks	Milk & cream mixtures	Cream[3]	Sour cream	Eggnog	Daily average total milk sold (Pounds)
	Percent									(000)
60	86.6	na	1.5	9.1	2.	.3	.3	–	.1	286.4
61	86.6	na	1.8	8.9	2.	.3	.2	–	.1	288.2
62	86.4	na	1.9	8.8	1.9	.3	.2	–	.3	307.7
63	86.6	na	2.2	8.8	1.8	.3	.1	.1	.2	316.0
64	86.6	na	2.5	8.8	1.4	.3	.1	.1	.1	320.2
65	86.9	na	2.7	8.5	1.2	.3	.1	.1	.2	333.6
66	86.8	1.5	2.5	8.5	1.1	.3	.1	.1	.2	339.4
67	87.0	.5	2.6	8.4	.9	.3	.1	.1	.2	330.8
68	86.2	.8	2.5	8.2	1.6	.3	.04	.1	.1	366.1
69	84.9	1.7	2.6	8.2	2.0	.3	.03	.1	.1	378.6
70	83.0	4.0	2.8	7.9	1.8	.3	.03	.1	.1	401.3
71	81.1	6.4	2.6	7.5	1.8	.2	.03	.1	.2	423.3
72	80.7	7.1	2.8	7.1	1.7	.2	.02	.1	.2	455.7
73	77.8	10.9	2.8	6.9	1.6	na	na	na	na	454.8
74	76.8	12.3	2.1	6.6	2.2	na	na	na	na	424.2

[1]Plain and flavored.

[2]Plain and solids added.

[3]Light and heavy.

Source: Milk Market Order Dir., AMS; USDA, **Federal Milk Order Market Statistics,** Statistical Bulletin No.'s 284, 335, 345, 361, 374, 403, 426, 437, 453, 470, 488, 521, and 542; Washington, D.C.

Appendix Table 11. Fluid milk products as a percentage of total fluid milk sold in marketing areas defined by Federal Milk Orders in Tennessee, 1960 to 1974, Chattanooga Order

Year	Whole milk[1]	2% milk	Skim milk[2]	Butter milk	Flavored milk drinks	Milk & cream mixtures	Cream[3]	Sour cream	Eggnog	Daily average total milk sold (Pounds)
	Percent									(000)
60	83.7	na	3.2	9.8	2.1	.3	.4	.1	.3	244.2
61	83.1	na	4.1	9.6	2.0	.4	.4	.1	.3	246.6
62	82.0	na	5.0	9.6	2.3	.4	.3	.1	.3	261.0
63	83.1	na	6.0	9.4	.4	.5	.2	.1	.3	270.5
64	83.7	na	6.3	8.8	.3	.4	.2	.1	.2	285.7
65	84.9	na	5.7	8.3	.2	.4	.2	.2	.2	295.3
66	82.3	4.8	3.7	8.2	.1	.4	.2	.2	.2	299.6
67	74.2	10.7	3.6	8.3	2.3	.4	.2	.2	.2	291.9
68	71.7	12.1	4.0	8.6	2.9	.4	.1	.2	.1	303.9
69	73.5	11.0	3.2	9.0	2.7	.3	.1	.1	.1	511.2
70	72.2	12.8	2.8	8.9	2.6	.3	.1	.1	.1	519.9
71	69.5	15.7	2.7	8.7	2.6	.3	.1	.1	.1	539.9
72	67.9	17.2	2.7	8.5	2.9	.3	.1	.1	.2	561.3
73	64.3	20.9	3.0	8.4	3.4	na	na	na	na	565.6
74	57.3	27.3	2.8	8.2	4.4	na	na	na	na	556.0

[1]Plain and flavored.

[2]Plain and solids added.

[3]Light and heavy.

Source: Milk Market Order Dir., AMS, USDA, **Federal Milk Order Market Statistics,** Statistical Bulletin No.'s 284, 335, 345, 361, 374, 403, 426, 437, 453, 470, 488, 521, and 542; Washington, D.C.

Appendix Table 12. Fluid milk products as a percentage of total fluid milk sold in marketing areas defined by Federal Milk Orders in Tennessee, 1960 to 1974, Knoxville Order

Year	Whole milk[1]	2% milk	Skim milk[2]	Butter milk	Flavored milk drinks	Milk & cream mixtures	Cream[3]	Sour cream	Eggnog	Daily average total milk sold (Pounds)
	Percent									(000)
60	84.9	na	3.4	7.9	2.8	.5	.4	–	.2	258.0
61	84.3	na	4.2	7.5	2.7	.5	.4	.1	.3	248.8
62	84.1	na	4.6	7.5	2.7	.5	.3	.1	.3	259.2
63	83.6	na	5.1	7.5	2.7	.4	.3	.1	.3	270.6
64	82.8	na	6.5	7.3	2.3	.4	.2	.1	.3	277.7
65	83.7	na	6.4	7.0	1.9	.4	.2	.1	.3	298.3
66	82.5	.8	5.6	6.9	2.1	.4	.2	.2	.3	298.4
67	82.5	1.1	4.8	8.1	2.8	.4	.1	.1	.2	509.0
68	80.4	3.0	5.2	7.9	2.8	.3	.1	.1	.1	542.1
69	74.3	9.2	5.3	7.9	2.7	.3	.1	.1	.1	557.9
70	69.4	14.9	4.6	7.6	2.8	.3	.1	.1	.1	565.8
71	65.5	19.3	4.2	7.4	2.9	.3	.1	.1	.1	585.5
72	62.1	23.3	3.9	7.0	3.1	.3	.1	.1	.1	610.1
73	58.4	26.9	4.1	6.9	4.0	na	na	na	na	617.1
74	50.4	35.3	3.3	6.5	4.4	na	na	na	na	620.4

[1]Plain and flavored.

[2]Plain and solids added.

[3]Light and heavy.

Source: Milk Market Order Dir., AMS; USDA, **Federal Milk Order Market Statistics,** Statistical Bulletin No.'s 284, 335, 345, 361, 374, 403, 426, 437, 453, 470, 488, 521, and 542; Washington, D.C.

Appendix Table 13. Fluid milk products as a percentage of total fluid milk sold in marketing areas defined by Federal Milk Orders in Tennessee, 1960 to 1974, Memphis Order

Year	Whole milk[1]	2% milk	Skim milk[2]	Butter milk	Flavored milk drinks	Milk & cream mixtures	Cream[3]	Sour cream	Eggnog	Daily average total milk sold (Pounds)
	Percent									(000)
60	87.0	na	1.5	9.4	1/	.8	.9	.1	.4	462.0
61	87.3	na	1.7	8.9	1/	.8	.8	.2	.4	465.0
62	87.7	na	1.8	8.5	1/	.8	.7	.2	.4	479.2
63	88.3	na	1.6	8.1	0	.8	.6	.2	.4	527.5
64	88.2	na	2.2	7.8	0	.8	.5	.1	.4	562.1
65	87.3	na	3.3	7.7	0	.8	.4	.2	.3	594.5
66	86.2	2.7	1.8	7.7	0	.8	.4	.2	.4	587.0
67	84.4	4.1	1.9	7.8	0 9/	.9	.3	.2	.4	580.3
68	82.8	5.3	2.5	7.7	0	.8	.3	.2	.4	600.5
69	81.5	6.3	3.1	7.6	0	.7	.2	.2	.3	631.2
70	81.2	6.5	3.5	7.4	0 9/	.6	.2	.2	.4	642.7
71	79.6	7.0	4.8	7.3	0 10/	.6	.2	.3	.3	648.2
72	77.9	9.6	4.3	6.9	0 10/	.6	.1	.3	.3	672.3
73	77.8	10.2	4.9	6.9	.1	na	na	na	na	644.3
74	72.5	10.8	4.5	6.9	5.2	na	na	na	na	609.4

1/Included in skim milk.

[1]Plain and flavored.

[2]Plain and solids added.

[3]Light and heavy.

Source: Milk Market Order Dir., AMS; USDA, **Federal Milk Order Market Statistics,** Statistical Bulletin No.'s 284, 335, 345, 361, 374, 403, 426, 437, 453, 470, 488, 521, and 542; Washington, D.C.

Appendix Table 14. Fluid milk products as a percentage of total fluid milk sold in marketing areas defined by Federal Milk Orders in Tennessee, 1960 to 1974, Nashville Order

Year	Whole milk[1]	2% milk	Skim milk[2]	Butter milk	Flavored milk drinks	Milk & cream mixtures	Cream[3]	Sour cream	Eggnog	Daily average total milk sold (Pounds)
	Percent									(000)
60	84.4	na	1.6	10.2	2.5	.8	.3	.1	.2	561.7
61	84.7	na	1.9	9.5	2.3	.8	.2	.1	.3	563.7
62	84.9	na	2.2	9.0	2.6	.7	.2	.1	.3	582.9
63	84.0	na	2.6	9.0	3.3	.7	.2	.1	.2	622.1
64	85.3	na	3.1	8.2	2.4	.6	.3	.1	.2	665.9
65	85.1	na	3.4	8.3	2.3	.5	.2	–	.1	878.3
66	85.2	1.7	2.0	8.1	2.1	.5	.1	.1	.2	921.0
67	85.3	1.8	2.1	8.0	2.0	.5	.1	.1	.2	928.2
68	83.9	2.1	3.1	8.1	1.9	.4	.1	.1	.3	963.8
69	82.6	2.1	4.1	8.2	2.0	.4	.1	.1	.3	965.4
70	82.8	2.1	4.1	8.0	2.0	.4	.1	.1	.3	988.5
71	81.9	2.5	4.6	7.8	2.1	.4	.1	.1	.3	1003.7
72	80.2	4.1	4.9	7.4	2.3	.4	.1	.2	.3	1034.5
74	78.0	6.5	4.9	7.0	2.5	na	na	na	na	1044.2
75	74.3	10.4	4.6	6.8	3.8	na	na	na	na	1027.6

[1]Plain and flavored.

[2]Plain and solids added.

[3]Light and heavy.

Source: Milk Market Order Dir., AMS; USDA, **Federal Milk Order Market Statistics,** Statistical Bulletin No.'s 284, 335, 345, 361, 374, 403, 426, 437, 453, 470, 488, 521, and 542; Washington, D.C.

Appendix Table 15. Estimated demand for fluid milk (product weight) by primary market, Tennessee, 1970 and projected to 1980

Primary market	Per capita: 1970 relative to U. S. average index (U.S.=100)	Per capita: 1980 relative to 1970 index (1970=100)	Aggregate: 1970 in mil. lb.	Aggregate: 1980 relative to 1970 index (1970=100)	Aggregate: Projected total consumption in mil. lb.
Chattanooga (Ga.)	81	105	187	113	212
Knoxville (Va., Ky.)	87	107	516	103	532
Memphis (Ky., Ark., Miss.)	75	105	746	112	843
Nashville (Ky.)	87	104	353	111	391
Totals	na[a]	na	1801	na	1978

[a]na = not applicable.

Source: Robert Raunikar and Joseph C. Purcell, **Trends in the Milk Market,** University of Georgia, College of Agriculture Experiment Stations, July, 1972, Research Report 139, pp. 16, 19, 21, 24.

Appendix Table 16. Estimated demand for frozen desserts by primary market, Tennessee, 1970 and projected to 1980

Primary market	Per capita: 1970 relative to U. S. average index (U. S.=100)	Per capita: 1980 relative to 1970 index (1970=100)	Aggregate: 1970 in mil. lb.	Aggregate: 1980 relative to 1970 index (1970=100)	Aggregate: Projected total consumption in mil. lb.
Chattanooga (Ga.)	98	115	41	123	50
Knoxville (Va., Ky.)	89	122	95	116	110
Memphis (Ky., Ark., Miss.)	89	114	161	121	195
Nashville (Ky.)	96	114	70	123	86
Totals	na[a]	na	365	na	441

[a]na = not applicable.

Source: Robert Raunikar and Joseph C. Purcell, **Trends in the Milk Market,** University of Georgia, College of Agriculture Experiment Stations, July, 1972, Research Report 139, pp. 16, 19, 21, 24.

Appendix Table 17. Estimated demand for cheese by primary market, Tennessee, 1970 and projected to 1980

Primary market	Per capita: 1970 relative to U. S. average index (U.S.=100)	Per capita: 1980 relative to 1970 index (1970=100)	Aggregate: 1970 in mil. lb.	Aggregate: 1980 relative to 1970 index (1970=100)	Aggregate: Projected total consumption in mil. lb.
Chattanooga (Ga.)	71	112	6	125	8
Knoxville (Va., Ky.)	66	116	15	112	17
Memphis (Ky., Ark., Miss.)	67	109	26	115	30
Nashville (Ky.)	70	111	11	116	13
Totals	na[a]	na	58	na	68

[a]na = not applicable.

Source: Robert Raunikar and Joseph C. Purcell, **Trends in the Milk Market,** University of Georgia, College of Agriculture Experiment Stations, July, 1972, Research Report 139, pp. 16, 19, 21, 24.

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