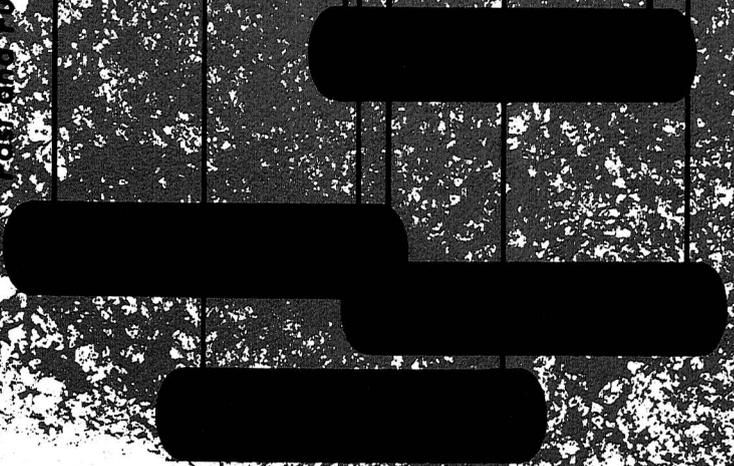


CHANGES IN DAIRYING

Past and Future Trends, Based on St. Louis Marketing Surveys



B844 FEB., 1966
AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MISSOURI

ACKNOWLEDGEMENT

This is a report of research under NCM-26 and Department of Agricultural Economics project 422, Dairy Market Organization. The information in it was obtained cooperatively with the St. Louis Market Administrator's Office. Special recognition is due the many dairymen who contributed most of the data included in it.

Changes in Dairying

Past and Future Trends, Based on St. Louis Marketing Surveys

SAMMY E. MCCROSKEY
RICHARD F. FALLERT
STEPHEN F. WHITTED

It is impossible to consider the St. Louis market in isolation from its larger setting in the entire dairy industry. It is not the purpose of this study to cover the nation-wide industry but a short review of its present conditions and trends is needed to give the setting for study of the St. Louis market production.

The downward trend in milk cows on farms, which started in 1944, is continuing. The number of milk cows on farms in the United States reached a peak in 1944 and, except for 1953, declined every year since. The 1964 number was 16.1 million June 1, compared with an average of 19.3 million for 1953-62. The decline has averaged 2 percent per year since 1944.

This drop in dairy cow numbers is closely related to declining numbers of farms with milk cows. The number of farms with milk cows decreased about 50 percent from 1950 to 1959. In 1959, only 48 percent of all farms had milk cows, compared with 68 percent in 1950.¹

Many farms leaving dairying were those with small sideline dairy enterprises. With dairy herds increasing in size and with small dairy enterprises leaving dairying, the average number of milk cows per farm is increasing substantially.

Along with the trend to fewer cows and larger

herds is the trend to increased production per cow. Milk production per cow in 1964 was 7,880 pounds, up 4.2 percent from 1963, compared with a 3.1 percent average annual gain during 1954-63.²

The St. Louis marketing area is a part of this national trend in the specialization of the dairy enterprise. The annual average number of producers on the St. Louis market declined from 9,946 in 1936 to 2,775 in 1964. This was a reduction of 72 percent or an average of 2.6 percent per year.

While the number of producers was declining, the average daily production per farm and the value of milk production per farm were increasing. In 1936, the average daily production per farm was 102 pounds. In 1964, it was 858 pounds, an increase of eight-fold from the 1936 level. The value of milk production per farm, F.O.B. the market, was \$711.01 in 1936. In 1964 the comparable per farm value in terms of constant dollars was \$6,193.71.³

The St. Louis market dairyman is an important part of the agricultural economy of Missouri and Illinois. He becomes more important when the employment of those providing goods and services to him and those who perform the marketing functions after the product leaves the farm are considered.

²*Ibid.*, p. 12.

³St. Louis Market Administrator's records. The index of prices received by farmers was used to convert the 1964 per farm value of \$12,820.97 into constant dollars.

¹*The Dairy Situation* (October, 1964), p. 10.

Operations of Dairymen on the St. Louis Market

The dairy business, like all of agriculture and the rest of the economy, is experiencing a technological revolution. It is common knowledge that farms are increasing in size and decreasing in number; dairy herds are increasing in size and decreasing in number; farm population is declining; and capital requirements are increasing. The St. Louis market dairyman is a part of this technological revolution.

General Information

Iowa and Wisconsin producers have entered the St. Louis market only recently, but they have been in the dairy business as long as Missouri and Illinois producers. At the time of interview, the average producer in the sample had been in the dairy business 20 years (Table 1). Missouri producers had been in the dairy business an average of 21 years, Illinois producers 20 years, Iowa producers 20 years, and Wisconsin producers 19 years. The data in Table 1 indicate that Illinois has had more new producers entering the St. Louis market than the other states. Eleven percent of the Missouri producers and 15 percent of the Illinois producers had been in the dairy business less than 10 years. None of the Iowa and Wisconsin producers had been dairying less than 10 years.

Illinois producer milk on the St. Louis market may continue to increase relative to producer milk supplied by Missouri. This could result from the above indication that Illinois has had more new producers entering the market than has Missouri, plus the fact that production per cow is higher in Illinois than in Missouri. In 1960 Missouri supplied 52 percent of the producer milk on the St. Louis market, while Illinois supplied 46 percent. In 1964, Missouri producer milk had decreased to 45 percent and Illinois producer milk had increased to 49 percent.

The dairy farm operators in the sample averaged 45 years of age (Table 2). Eighteen percent of the operators were less than 35 years old and 23 percent were over 55. Illinois had 10 percent more producers below age 35 than did Missouri. The fact that Illinois had a greater percentage of young producers and a lower average age than Missouri would coincide with the indication that Illinois had more new producers entering the market.

The average dairy farmer selling on the St. Louis market plans for his dairy operation to continue 17 years (Table 3). Since the average age was 45 years, this would indicate that the average producer in the sample would be 62 years old when he

TABLE 1 --LENGTH OF TIME ST. LOUIS MARKET PRODUCERS
HAD BEEN IN THE DAIRY BUSINESS, 1964

Years	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
0 - 4	12	3	14	4					26	3
5 - 9	30	8	39	11					69	9
10 - 19	138	36	132	37	8	61	2	40	280	37
20 - 29	118	31	94	27	1	8	2	40	215	29
30 - 39	59	16	50	14	3	23	1	20	113	15
40 - 49	19	5	24	7	1	8			44	6
50 & above	5	1							5	1
Non-response	1	**							1	*
	382	100	353	100	13	100	5	100	753	100

* Missouri producers had been in the dairy business an average of 21 years, Illinois 20 years, Iowa 20 years, Wisconsin 19 years, and the market average was 20 years.

** Less than one percent.

discontinues his dairy operation. Either by design or coincidence, this would be the minimum age necessary to take advantage of Social Security. Twenty percent of the producers in the sample plan to continue dairying less than ten years. This would be a 2 percent decline per year in the number of producers. If we assume that the 13 percent who were in the "unknown" category also will discontinue dairying within 10 years, the decline would be 3.3 percent per year. The actual decline per year on the

St. Louis market for the past ten years has been 3.6 percent. The fact that 3 percent of the producers had been on the market less than 4 years indicates that there was some entry into the market.

Table 3 also shows that 38 percent of the producers are planning to continue more than 20 years in the dairy business.

Although the dairy business is a confining enterprise and utilizes a large amount of family labor, 20 percent of the producers in the sample had non-

TABLE 2 -- AGE DISTRIBUTION OF DAIRY FARM OPERATORS ON THE ST. LOUIS MARKET, 1964

Years	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
19 - 24	10	2	10	3					20	2
25 - 34	47	11	79	20	3	20	1	20	130	16
35 - 44	108	26	122	32	3	20	2	40	235	29
45 - 54	142	34	97	25	5	33	2	40	246	30
55 - 64	92	22	66	17	4	27			162	20
65 & above	19	5	10	3					29	3
	418	100	384	100	15	100	5	100	822	100

* The additional individuals in comparison to the original sample are due to partnership operations.

** Missouri operators averaged 47 years old, Illinois 44, Iowa 46, Wisconsin 39, and the market average was 45 years old.

TABLE 3 -- DISTRIBUTION OF ST. LOUIS MARKET DAIRY FARMERS ACCORDING TO THE NUMBER OF YEARS THEY PLAN TO CONTINUE DAIRYING, 1964*

Years	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
0 - 4	36	10	19	6	1	8			56	8
5 - 9	42	12	41	13	2	15			85	12
10 - 19	107	30	73	24	5	38	2	40	187	27
20 - 29	62	17	91	30	3	23	1	20	157	23
30 - 39	21	6	43	14	1	8	2	40	67	10
40 - 49	12	3	14	5					26	4
50 & above	1	*	4	1					5	1
Unknown	66	18	22	7	1	8			89	13
Non-response	14	4	1	*					15	2
	361	100	308	100	13	100	5	100	687†	100

* Missouri producers plan for their dairy operations to continue an average of 15 years, Illinois 19, Iowa 14, Wisconsin 25, and the market average was 17 years.

** Less than one percent.

† This question was not asked the 66 personal interviewees, which accounts for having only 687 in the sample.

farm employment (Table 4). These producers received an average of 26 percent of their gross income from non-farm employment. The remaining 80 percent of the market sample received 100 percent of their gross income from the farm. The average percentage of gross income received from the farm for all producers in the sample was 95 percent.

Twenty-five percent of the Missouri producers had a source of non-farm income, compared to only 14 percent of the Illinois producers. This difference could be due to more readily available non-farm employment opportunities in the Missouri portion of the milkshed.

There was considerable difference between states as to the importance of dairying as a source of gross farm income. For Missouri, dairying fur-

nished 100 percent of the gross farm income for 43 percent of the producers and was the source of less than 70 percent of the gross farm income for only 12 percent. For the Illinois supply area, dairying furnished 100 percent of the gross farm income for only 9 percent of the producers; it furnished less than 70 percent of the gross farm income for 47 percent of them (Table 5). The dairymen in Illinois have farms better adapted to grain production and more intensive cultivation than the Missouri dairymen. This would also be true for Iowa producers. For 8 percent of the Illinois producer sample and 15 percent of the Iowa producer sample, dairying could be considered as a secondary enterprise since these producers received less than 50 percent of their gross farm income from dairying.

TABLE 4 -- PERCENT OF GROSS INCOME RECEIVED FROM THE FARM FOR ST. LOUIS MARKET PRODUCERS, 1964

	Missouri	Illinois	Iowa	Wisconsin	Market
Percent of producers receiving all of their income from the farm.	75	86	75	100	80
Average percent of gross income received from the farm for those with non-farm employment.	74	80	75	--	74
Average percent of gross income received from the farm for all producers.	93	97	94	100	95

TABLE 5 -- PERCENT INCOME FROM DAIRYING WAS OF GROSS FARM INCOME FOR ST. LOUIS MARKET PRODUCERS, 1964

Income (Percent)	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
0 - 49	10	3	29	8	2	15			41	5
50 - 59	19	5	79	23	1	8			99	13
60 - 69	15	4	56	16	1	8			72	10
70 - 79	47	12	75	21	3	23			125	17
80 - 89	47	12	40	11	2	15	1	20	90	12
90 - 99	70	18	32	9	1	8	1	20	104	14
100	161	43	33	9	2	15	2	40	198	26
Non-response	13	3	9	3	1	8	1	20	24	3
	382	100	353	100	13	100	5	100	753	100

Table 6 gives the estimated percentages of the gross farm income derived from various enterprises. The figures given coincide with the discussion above as to the considerable difference between states in the importance of dairying as a source of gross farm income. Dairying was of greater importance as a source of farm income for Missouri and Wisconsin producers than for Illinois and Iowa producers. It furnished an average of 87 percent of the gross farm income for Missouri producers, 68 percent for Illinois, 72 percent for Iowa, and 93 percent for Wisconsin producers. For Missouri producers the most important supplementary enterprise was hogs, followed closely by cash grain and beef. Cash grain was the most important supplementary enterprise for Illinois producers, followed by hogs. In the Iowa supply area, cash grain and hogs were the most important enterprises combined with

dairying and for Wisconsin the most important was hogs.

Forty-five percent of the producers reported three or more family members working with the dairy enterprise, 41 percent reported two family members, and 13 percent, only one (Table 7). A comparison of the equivalent number of family members working with the dairy enterprise by states is given in a footnote to Table 7.

Thirty-three percent of the producers in the market sample did not use any hired help in their dairy enterprise (Table 8). Of the producers using hired help, 30 percent hired less than 100 days of labor per year, and 13 percent hired at least one full time man. The average number of days of hired labor was 101 days for Missouri, 89 for Illinois, 179 for Iowa, 474 for Wisconsin, and 100 days for the St. Louis supply area.

TABLE 6 -- ESTIMATED PERCENTAGES OF GROSS FARM INCOME DERIVED FROM VARIOUS ENTERPRISES FOR ST. LOUIS MARKET PRODUCERS, 1964

Enterprise	Missouri (percent)	Illinois (percent)	Iowa (percent)	Wisconsin (percent)
Dairy	87	68	72	93
Grain	3	23	12	
Hogs	4	6	13	6
Beef	3	1	2	1
Poultry	1	1		
Other	2	1	1	
	100	100	100	100

TABLE 7 -- NUMBER OF FAMILY MEMBERS ACTIVELY CONTRIBUTING TO THE DAIRY ENTERPRISE PER FARM, 1964

Number of Family Members	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
One	39	10	57	16			1	20	97	13
Two	162	43	140	40	6	46			308	41
Three	87	23	63	18	3	23			153	21
Four	56	15	60	17	1	8	3	60	120	16
Five	26	7	23	7	1	8	1	20	51	7
Six	4	1	4	1	2	15			10	1
Seven	2	**							2	*
Eight	1	**	2	**					3	*
Non-response	5	1	4	**					9	1
	382	100	353	100	13	100	5	100	753	100

* The average number of family members working per farm in Missouri was 2.6, Illinois 2.6, Iowa 3.5, Wisconsin 3.4, and the St. Louis market average was 2.6.

** Less than one percent.

TABLE 8 -- NUMBER OF DAYS OF HIRED WORK USED IN THE DIARY ENTERPRISE 1964*

Eight-Hour Days	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
0	140	37	108	31	3	22	1	20	252	33
1-99	100	26	124	35	4	30			228	30
100-199	21	6	18	5	1	8			40	5
200-299	13	3	21	6	1	8			35	5
300-399	32	8	30	8	1	8	1	20	64	8
400-499	8	2	4	1					12	2
500-599	6	2	4	1	1	8	1	20	12	2
600-699	1	*	1	*					2	*
700-799	2	*	3	1	1	8	2	40	8	1
800-899										
900-1000	4	1							4	*
Non-response	55	14	40	11	1	8			96	13
	382	100	353	100	13	100	5	100	753	100

* The average number of days hired per farm for Missouri was 101, Illinois 89, Iowa 179, Wisconsin 474, and the St. Louis market average was 100 days hired per farm.

** Less than one percent.

TABLE 9 -- AVERAGE NUMBER OF ACRES OWNED AND RENTED BY ST. LOUIS MARKET PRODUCERS DURING 1964, BY STATES AND TENURE GROUPS

Tenure Group	Dairymen		Owned (Acres)	Rented (Acres)	Total (Acres)
	(No.)	(%)			
<u>Missouri</u>					
Owner-Operator	313	82	286	38	324
Renter	21	6	0	232	232
Partnership	43	11	315	41	356
Hired Management	1	*	360	0	360
Non-Response	4	1			
TOTAL	382	100			
<u>Illinois</u>					
Owner-Operator	251	71	186	60	246
Renter	59	17	0	233	233
Partnership	42	12	234	97	331
Non-Response	1	*			
TOTAL	353	100			
<u>Iowa</u>					
Owner-Operator	7	54	305	27	332
Renter	2	15	0	220	220
Partnership	4	31	315	127	442
TOTAL	13	100			
<u>Wisconsin</u>					
Owner-Operator	2	40	120	0	120
Renter	1	20	0	460	460
Partnership	2	40	231	0	231
TOTAL	5	100			
<u>St. Louis Milk Supply Area</u>					
Owner-Operator	573	76	242	47	289
Renter	83	11	0	235	235
Partnership	91	12	276	70	346
Hired Management	1	*	360	0	360
Non-Response	5	1			
TOTAL	753	100			

* Less than one percent.

In summary, the average producer shipping to the St. Louis market had been in the dairy business 20 years and he planned to continue his dairy operation an additional 17 years. He was 45 years of age and would be 62 years of age when he discontinued his dairy operation. Twenty percent of the dairymen had non-farm employment, while 80 percent of the dairymen received all of their income from the farm. The average percentage of gross income received from the farm for all producers in the sample was 95 percent. Dairying was of greater importance as a source of farm income for Missouri and Wisconsin producers than for Illinois and Iowa producers. The average number of family members working per farm was 2.6 and the average number of days work hired (8 hour day equivalents) per farm was 100.

Tenure and Farm Size

There was considerable difference in tenure groups of dairy farm operations in Missouri, Illinois, Iowa, and Wisconsin. Table 9 shows that 82 percent of the Missouri producers were owner-operators, compared to 71 percent of the Illinois producers. Six percent of the Missouri producers were renters compared to 17 percent of the Illinois producers. This difference of 11 percent between owner-operators and renters in Missouri and Illinois may be due to the higher price of land in the Illinois area. Missouri and Illinois had approximately the same number of partnership operations with 11 and 12 percent, respectively. The Iowa and Wisconsin producers reported fewer ownership operations and a larger percentage of renter and partnership operations than did the Missouri and Illinois producers.

The Missouri owner-operated farms averaged 78 acres larger than the Illinois owner-operated farms. The fact that producers reported total acres instead of tillable acres may account for part of this difference in size. The Illinois producers probably had a larger percentage of tillable acres than did the Missouri producers. The renter operations of Missouri and Illinois were approximately equal in size while the Missouri partnership operations averaged 25 acres larger than the Illinois partnership operations.

For the St. Louis supply area as a whole, 76 percent of the dairy farms were owner-operated, 11 percent were rented, 12 percent were partnerships, and less than 1 percent were under hired management. Excluding the one farm under hired management, the partnership operations were the largest with 346 acres, next were the owner-operated farms

with 289 acres, and finally, the renter operations with 235 acres.

Herd Size

The average herd size as indicated by the market sample was 39 cows (Table 10). Missouri herds averaged 40 cows and Illinois herds averaged 36 cows. Iowa and Wisconsin producers had the largest herds with an average of 61 and 83 cows, respectively.

TABLE 10 - AVERAGE HERD SIZE OF ST. LOUIS MARKET PRODUCERS BY GROUPS AND BY STATES, 1964

Groups of Producers	Average Number of Cows in Herd				
	Mo.	Ill.	Ia.	Wisc.	Whole Mkt.
Bucket-type milker	32	28	--	--	30
Pipeline milker	47	44	61	83	46
Average	40	36	61	83	39

Producers using a pipeline milker had an average of 16 more cows in their herd than those using a bucket-type milker.

Production per Cow

The average production per cow in the sample herds was 9,207 pounds. Missouri producer herds averaged 8,450 pounds per cow, Illinois herds 9,341 pounds, Iowa herds 9,611 pounds, and Wisconsin herds 9,276 pounds per cow. These production data were based upon the volume of milk shipped by the sample in 1963. The data on milk shipped was obtained from the market administrator's records, while the cow numbers for 1963 were obtained from the St. Louis Health Department. No allowance was made for milk used for home consumption and feeding dairy calves.

The average production per cow in Missouri was 8 percent below the market average, but the average herd size was 3 percent above the market average. In contrast, the average production per cow in Illinois was 1 percent above the market average and the average herd size was 8 percent below the market average. Considering that the average butterfat content of Missouri milk has historically been higher than that of Illinois milk, the difference in production per cow between the two states would probably be reduced if production per cow were figured on a milk-equivalent basis.

Milking Facilities

In early 1964, 43 percent of the St. Louis market producers had milking parlors with stanchions, 47 percent had walk-through type milking parlors, and 9 percent had herringbone milking parlors (Table 11). Iowa and Wisconsin producers had a larger proportion of walk-through and herringbone milking parlors than the Missouri and Illinois producers, but 6 percent of the Missouri producers and 8 percent of the Illinois producers indicated they were planning to construct new dairy barns by 1970. Thirty-eight percent of the new barns will be the walk-through type milking parlor, and 62 percent will be the herringbone type. Producers who were planning to construct new dairy barns averaged 41 years in age and had an average herd of 35 cows. This was 4 years younger than the market average age and the herd size was four cows below the market average. The construction of these new facilities would enable these producers to increase the size of their herds and increase their labor efficiency.

Milking Equipment

Forty-seven percent of the market sample had bucket-type milking machines, and 52 percent had pipeline milking machines (Table 12). All of the Iowa and Wisconsin producers had pipeline equipment whereas 49 percent of the Missouri producers and 54 percent of the Illinois producers had such equipment.

Eight percent of the market sample were can producers and 92 percent were bulk tank producers (Table 13). Fifteen percent of the Missouri producer sample were can producers while only 1 percent of the Illinois producer sample were can producers. Ten percent of the Missouri can producers were planning to install bulk tanks by 1970.

The average size bulk tank for the market was 350 gallons. The 200 to 400 gallon sizes were the most predominant with 57 percent of the sample reporting tanks in this range (Table 14). Four percent of the Missouri producers who presently have bulk tanks, compared with 8 percent of the Illinois and Iowa producers, indicated they were planning to install larger bulk tanks by 1970.

Utilization of Existing Facilities

Forty percent of the producers were operating at full capacity in 1964 and could not add to their herds with existing facilities (Table 15). For the sample as a whole, the average number of cows that could be added per herd was about the same for

TABLE 11 -- DAIRY BARNs BY STATES AND FOR THE ST. LOUIS MARKET, 1964

	Producers Having Item	
	(Number)	(Percent)
<u>Milking Parlors With Stanchions</u>		
Missouri	171	45
Illinois	154	44
Iowa	0	0
Wisconsin	0	0
Market	<u>325</u>	<u>43</u>
<u>Milking Parlors--Walk-Through</u>		
Missouri	175	46
Illinois	163	46
Iowa	12	92
Wisconsin	1	20
Market	<u>351</u>	<u>47</u>
<u>Milking Parlors--Herringbone</u>		
Missouri	29	7
Illinois	34	10
Iowa	1	8
Wisconsin	4	80
Market	<u>68</u>	<u>9</u>
<u>Non-response</u>		
Missouri	7	2
Illinois	2	*
Market	<u>9</u>	<u>1</u>

* Less than one percent.

TABLE 12 -- MILKING EQUIPMENT, BY STATES AND FOR THE ST. LOUIS MARKET, 1964

	(Number)	(Percent)
<u>Bucket-type Milking Machine</u>		
Missouri	190	50
Illinois	163	46
Iowa	0	0
Wisconsin	0	0
Market	<u>353</u>	<u>47</u>
<u>Pipeline Milking Machine</u>		
Missouri	188	49
Illinois	189	54
Iowa	13	100
Wisconsin	5	100
Market	<u>395</u>	<u>52</u>
<u>Non-response</u>		
Missouri	4	1
Illinois	1	*
Market	<u>5</u>	<u>1</u>

* Less than one percent.

TABLE 13 -- CAN AND BULK MILK PRODUCERS
ON THE ST. LOUIS MARKET, 1964

	Number	Percent
<u>Can Producers</u>		
Missouri	59	15
Illinois	5	1
Iowa	0	0
Wisconsin	0	0
Market	64	8
<u>Bulk Tank Producers</u>		
Missouri	323	85
Illinois	348	99
Iowa	13	100
Wisconsin	5	100
Market	689	92

TABLE 14 -- DISTRIBUTION, BY SIZE, OF BULK TANKS ON FARMS
IN THE ST. LOUIS MILK SUPPLY AREA, 1964*

Capacity (Gallons)	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Non-response	7	2	15	5	2	15			24	3
Under 150	3	1	4	1					7	1
150-199	10	3	11	3					21	3
200-299	90	28	136	39					226	33
300-399	88	27	74	21	2	15			164	24
400-499	67	21	49	14	3	23			119	17
500 or more	58	18	59	17	6	46	5	100	128	19
	323	100	348	100	13	100	5	100	689	100

*The average capacity of Missouri bulk tanks was 358 gallons, Illinois 333, Iowa 500, Wisconsin 764, and the market average was 350 gallons.

TABLE 15 -- THE NUMBERS OF HERDS SURVEYED THAT COULD ADD VARIOUS NUMBERS
OF COWS WITH THEIR EXISTING FACILITIES*

Number of Cows	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
None	162	43	136	38	5	38	2	40	305	40
1-2	11	3	9	3					20	3
3-5	40	10	41	12					81	11
6-10	59	16	61	17	5	38	1	20	126	17
11-15	21	5	34	10	1	8			56	7
16-20	49	13	33	9			2	40	84	11
21-30	8	2	10	3	1	8			19	2
More than 30	13	3	13	4	1	8			27	4
Non-response	19	5	16	4					35	5
	382	100	353	100	13	100	5	100	753	100

* The weighted average number of cows that could be added to Missouri herds was 10, Illinois 9, Iowa 11, Wisconsin 10, and the St. Louis market average was 9 cows.

each state in the St. Louis milkshed. The average number of cows that could be added per herd was: Missouri 10, Illinois 9, Iowa 11, and Wisconsin 10. The market average was nine.

If those farms which were not fully utilizing their facilities were to bring their operations to full capacity, it would increase their annual sales of milk by approximately 83,000 pounds. At the 1963 weighted average blend price, F.O.B. St. Louis and with a 3.5 percent butterfat standard, the annual value of sales per farm for those producers would be increased more than \$3,000.

Producers Quitting Dairying

Twelve percent of the sample indicated they were planning to quit dairying by 1970. Fifty-five percent of these were from Missouri, 43 percent from Illinois, and 2 percent from Iowa.

The producers planning to quit dairying had been in the dairy business an average of four years

longer and were 7 years older than the St. Louis market average. Their herds were 23 percent smaller and the production per cow was 6 percent below the St. Louis market average. Sixteen percent were can producers and 84 percent were bulk tank producers, compared to 8 percent can producers and 92 percent bulk tank producers for the St. Louis market (Table 16).

Less-confining farm enterprises and off-farm employment opportunities are likely to continue as alternatives which encourage some operators to liquidate herds. The rate at which St. Louis market dairymen will leave dairying depends upon the availability and attractiveness of these on-farm and off-farm economic opportunities, compared to returns from the dairy enterprise. The off-farm opportunities are more limited due to a lack of mobility of farmers and their inability to take advantage of these opportunities. This is especially true for the producers in the older age group.

TABLE 16 -- SELECTED CHARACTERISTICS OF 93 PRODUCERS QUITTING DAIRYING BY 1970 COMPARED WITH AVERAGE ST. LOUIS MARKET PRODUCERS

	Producers Quitting By 1970	St. Louis Market
Years in Dairying	24	20
Age of Operator	52	45
Herd Size	30	39
Production Per Cow (pounds)	8,653	9,207
Can Producers (percent)	16	8
Bulk Producers (percent)	84	92

Attitudes of Dairymen on the St. Louis Market

The majority of farmers tend to believe that the returns they are receiving from their farming operations are low compared with the returns received in other segments of the economy. To remain competitive with other farmers, they must adopt new technology. This is expensive; thus a larger operation is needed to lower per unit cost. The expansion is coming at a time of increasing

prices for inputs purchased by the farmer. As cost-price pressures arise, exit is not easy for the dairyman. His operation is specialized and he himself is a specialist. He thus is limited in his alternatives.

To learn more specifically what the dairyman's attitudes were, the St. Louis market producers were asked to express their attitudes as to their most profitable alternative to dairying, the profit per hun-

dredweight of milk they considered to be reasonable, the price needed per hundredweight to obtain this profit, and their supply response to changes in the price of milk.

Alternatives to Dairying

The next most profitable alternative to dairying for dairy farmers in the St. Louis supply area varied considerably among states. Twenty-three percent of the Missouri producer sample stated that non-farm employment was their most profitable alternative. Beef was the most profitable for 21 percent, hogs for 14 percent, and cash grain for 10 percent of the producers. Five percent of the Missouri producers indicated they did not have a profitable alternative to dairying (Table 17).

Cash grain was thought to be the next best alternative by 51 percent of the Illinois producer sample. Hog production was designated by 14 percent and non-farm employment by 12 percent. These differences in alternatives between Missouri and Illinois dairymen indicate that Missouri has relatively more available non-farm employment opportunities while Illinois has more alternative farming enterprises.

The data in Table 17 indicate that the majority of the dairymen would be in some other type of farming if they were not in the dairy business. They would probably shift the emphasis from their dairy enterprise to their most important supplementary enterprise. Only 18 percent of the producers felt they could take advantage of non-farm employment opportunities; the remaining producers were limited

to other farm enterprises as their alternative to dairying.

Profit per Hundredweight

Eight percent of the producer sample indicated a profit of less than \$1.00 per hundredweight to be reasonable, 27 percent indicated a profit of \$1.00 to \$2.00 to be reasonable, and 40 percent indicated a profit of \$2.00 or more per hundredweight to be reasonable.⁴ Twenty-four percent of the producers did not respond as to what they considered to be a reasonable profit per hundredweight (Table 18). Illinois and Missouri producer responses were similar.

Such a large percentage of non-respondents could suggest that a large number of producers do not keep records adequate enough to enable them to determine how much profit they consider to be reasonable. Or, these producers could have a good knowledge of costs but have no idea of what a norm for profit should be for themselves or for the industry.

Price per Hundredweight

Very few of the St. Louis market producers were satisfied with the price they received for milk. The average uniform price in 1963 was \$4.00 per hundredweight, F.O.B. the market, for 3.5 percent milk. Only 4 percent of the producers indicated that

⁴Profit was not defined on the questionnaire. The investigator feels the average dairyman would define profit as the cash balance resulting from all farm cash receipts minus all farm cash expenses.

TABLE 17 -- BEST ALTERNATIVE ENTERPRISES TO DAIRYING AS INDICATED BY FARMERS IN THE ST. LOUIS SUPPLY AREA, 1964

Alternative	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Beef	80	21	20	6	1	8			101	14
Poultry	10	3	8	2					18	2
Cash Grain	37	10	179	51	3	23	1	20	220	29
Hogs	53	14	50	14	4	31	1	20	108	14
Non-farm employment	88	23	43	12	2	15			133	18
Other	21	5	7	2					28	4
Combination of two of the above*	31	8	27	8	1	8	2	40	61	8
No other alternative	19	5	10	3			1	20	30	4
Non-response	43	11	9	2	2	15			54	7
	<u>382</u>	<u>100</u>	<u>353</u>	<u>100</u>	<u>13</u>	<u>100</u>	<u>5</u>	<u>100</u>	<u>753</u>	<u>100</u>

* The combination category for Missouri was primarily beef and hogs and for Illinois it was primarily cash grain and hogs.

TABLE 18 -- PROFIT PER HUNDREDWEIGHT OF MILK CONSIDERED TO BE REASONABLE BY ST. LOUIS MARKET PRODUCERS, 1964*

Profit	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Non-response	86	23	92	26	6	45			184	24
\$0.00-0.24	1	**	3	1					4	**
0.25-0.49	2	**	5	1					7	1
0.50-0.74	19	5	8	2			1	20	28	4
0.75-0.99	6	2	15	4	1	8			22	3
1.00-1.24	53	14	46	13	3	23	1	20	103	14
1.25-1.49	13	3	11	3	1	8	1	20	26	3
1.50-1.74	31	8	27	8			2	40	60	8
1.75-1.99	9	2	8	2					17	2
2.00-2.49	86	23	76	22					162	22
2.50-2.99	43	11	30	9	1	8			74	10
3.00-3.49	26	7	25	7	1	8			52	7
3.50-3.99	4	1	5	1					9	1
4.00-4.99	3	1	1	**					4	**
5.00			1	**					1	**
	382	100	353	100	13	100	5	100	753	100

* The averages were \$1.82 profit per hundredweight for Missouri, \$1.78 for Illinois, \$1.50 for Iowa, \$1.15 for Wisconsin, and \$1.79 per hundredweight for the entire St. Louis market

** Less than one percent.

TABLE 19 -- PRICE PER HUNDREDWEIGHT ST. LOUIS MARKET PRODUCERS THOUGHT THEY SHOULD RECEIVE AS AN ANNUAL AVERAGE FOR THEIR MILK, 1964*

Price	Missouri		Illinois		Iowa		Wisconsin		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Non-response	68	18	60	17	4	30			132	18
\$3.75	2	**	2	**					4	**
4.00	8	2	18	5	1	8	1	20	28	4
4.25	11	3	13	4			1	20	25	3
4.50	45	12	53	15	1	8	2	40	101	13
4.75	16	4	37	10					53	7
5.00	110	29	106	30	4	30			220	29
5.25	10	3	12	3			1	20	23	3
5.50	33	9	23	7	1	8			57	8
5.75	10	3	3	1					13	2
6.00	62	16	23	7	1	8			86	11
6.50	4	1	2	**	1	8			7	1
7.00			1	**					1	**
7.50	1	**							1	**
8.00	2	**							2	**
	382	100	353	100	13	100	5	100	753	100

* Missouri producers thought they should receive an annual average price of \$5.19 per hundredweight; Illinois producers gave the average figure of \$4.93, Iowa \$5.21, Wisconsin \$4.46, and the St. Louis market average was \$5.07 per hundredweight.

** Less than one percent.

\$4.00 per hundredweight or less was the price they needed to obtain the profit per hundredweight they considered to be reasonable. Twenty-three percent of the producers stated that they needed from \$4.25 to \$4.75 per hundredweight, and 54 percent wanted at least \$5.00 or more per hundredweight (Table 19).

Table 20 is a summary by states showing the average price and average profit per hundredweight desired by producers. If profit is assumed to be defined by the average producer as the cash balance resulting from cash receipts minus cash expenses, then price minus profit would be equal to the cash expenses. Using these assumptions, the price minus profit column of Table 20 would be the cash expense per hundredweight of milk. The average price per hundredweight minus the average profit per hundredweight was \$3.37 for Missouri producers, \$3.15 for Illinois, \$3.71 for Iowa, \$3.31 for Wisconsin, and a \$3.28 average for the market.

In the absence of cost of production studies with which to compare our observations, the Missouri and Illinois estimated costs per hundredweight fall close to that which could be expected from observing farming conditions in these states. When studying these data, it should be kept in mind that they represent dairymen's opinions, not analysis of cost records.

Many dairymen can increase their output without a proportionate increase in their inputs and thus lower their average costs. They do not use the term "economies of scale," but they are acquainted with the idea. As they increase the output of their dairy operation up to a certain point, it tends to become more efficient. This may help explain why the profit and price desired tend downward in Table 21 as the volume sold increases.

At the 600,000 to 799,999 pound level, the profit desired increases considerably and the price desired increases slightly. It could be at this point that the efficiency of managing the operation has reached its peak. The operation has become large enough that it is difficult for one man to operate and coordinate the enterprise. However, the operator could obtain a hired hand or partner to assist in the operation. With this assistance, the output could be increased and economies of scale could once again begin. Thus the profit desired per hundredweight ranges from \$1.85 for the producers with a volume of less than 100,000 pounds per year downward to \$1.14 for those with a million pounds or more per year. The profit and price desired per hundredweight tended downward as the milk production per cow increased (Table 22). The fixed cost for a

TABLE 20 -- AVERAGE PRICE AND PROFIT PER HUNDREDWEIGHT DESIRED BY ST. LOUIS MARKET DAIRYMEN, 1964

	Price per Cwt.	Profit per Cwt.	Price Minus Profit
Missouri	\$5.19	\$1.82	\$3.37
Illinois	4.93	1.78	3.15
Iowa	5.21	1.50	3.71
Wisconsin	4.46	1.15	3.31
Market	5.07	1.79	3.28

* These data are based on dairymen's opinions, not on actual cost records.

TABLE 21 -- PROFIT AND PRICE DESIRED BY ST. LOUIS DAIRYMEN AS RELATED TO ANNUAL VOLUME SHIPPED

Annual Volume (pounds)	Profit per Cwt.	Price per Cwt.
0- 99,999	\$1.85	\$5.18
100,000-199,999	1.88	5.21
200,000-299,999	1.83	5.10
300,000-399,999	1.73	4.96
400,000-499,999	1.75	4.96
500,000-599,999	1.49	4.99
600,000-699,999	1.62	5.00
700,000-799,999	1.63	5.00
800,000-899,999	1.26	5.02
900,000-999,999	1.00	4.81
1,000,000 and over	1.14	4.98

TABLE 22 -- PROFIT AND PRICE DESIRED BY ST. LOUIS DAIRYMEN AS RELATED TO PRODUCTION PER COW

Production Per Cow (pounds)	Profit Per Hundredweight	Price Per Hundredweight
Below 4,999	\$1.73	\$5.22
5,000-5,999	2.02	5.46
6,000-6,999	1.80	5.14
7,000-7,999	1.88	5.29
8,000-8,999	1.85	5.02
9,000-9,999	1.76	4.98
10,000-10,999	1.65	4.92
11,000-11,999	1.54	5.04
12,000-12,999	1.89	4.84
13,000-13,999	1.35	4.72
14,000 & above	1.53	4.68

low producing cow is near that for a high producing cow. With higher production, the variable costs would be higher, but the costs would be spread over more units, resulting in a lower average cost per unit. Thus as production per cow increases, the price necessary to cover costs decreases.

Most farmers indicate they realize the need for more volume and increased production per cow when they say, "We have to get in or get out." To "get in" requires an addition to or a better utilization of one or all of the factors of production of land, labor, and capital. The farmer must also grow in the skill of farm business management. If he does not grow in this skill, he will be unable to assemble and coordinate the economic factors of production efficiently.

Indicated Supply Response to Price Changes

The information presented in this section concerns actions which dairymen believe they would take in response to suggested future price changes. The decisions which they would make when actually confronted with such a price change might vary due to other factors which cannot be foreseen.

To estimate the effect a price change would have upon the supply of milk marketed, the St. Louis market producers were asked how many cows

they would add to or delete from their herds if the price were increased or decreased. The price changes they were asked about were: 25 cents per hundredweight, 50 cents per hundredweight, and 1 dollar per hundredweight over both a short-run and long-run period. The short-run changes in price were indicated as being six months or less, while the long-run changes in price were indicated as being permanent. The producers were asked to estimate the number of cows they would add to or delete from their herds, because the majority of producers tend to think in terms of cow numbers instead of the quantity of milk marketed.⁵ Since the average production per cow was known, the variation in cow numbers given by each producer was converted into pounds of milk. The volume of milk shipped by the producer sample was also known. From this, the net change in the quantity of milk marketed was calculated for each price change.

Table 23 shows, for each price change and time period, the percentage of producers that would not change their herd size; and the percentages that would increase their herd size, decrease their herd size, or quit dairying. It also shows the net change

⁵ It is recognized that some producers might change variable inputs to effect changes in supply response even though they would not change herd size.

TABLE 23 -- INDICATED SUPPLY RESPONSE TO PRICE CHANGES BY ST. LOUIS MARKET PRODUCERS, 1964

	Producers Changing Herd Size				Net Change in Quantity Marketed (percent)	Elasticity
	No Change (percent)	Increase Herd (percent)	Decrease Herd (percent)	Quit Dairying (percent)		
Short-Run Price Increase						
\$0.25 per hundredweight	95.4	4.2	0.4	-0-	0.79	.13
0.50	91.5	7.5	1.0	-0-	1.16	.09
1.00	83.8	13.9	2.3	-0-	3.28	.13
Long-Run Price Increase						
\$0.25 per hundredweight	90.0	9.2	0.8	-0-	2.03	.32
0.50	79.2	17.7	3.1	-0-	4.56	.36
1.00	65.9	29.1	5.0	-0-	8.53	.34
Short-Run Price Decrease						
\$0.25 per hundredweight	84.8	1.3	5.2	8.7	-11.01	1.76
0.50	74.9	2.2	9.7	13.2	-16.51	1.32
1.00	57.6	2.0	12.3	28.1	-33.90	1.36
Long Run Price Decrease						
\$0.25 per hundredweight	74.0	2.6	12.6	10.8	-15.10	2.42
0.50	58.4	3.7	17.5	20.4	-32.84	2.63
1.00	36.4	3.0	19.7	40.9	-52.23	2.09

in the quantity marketed resulting from this variation in herd size. Elasticity (the percentage change in quantity divided by the percentage change in price) was calculated for each price change and time period. Elasticity of supply shows the responsiveness of the quantity placed on the market to price changes. The base price of milk from which the hypothetical price changes were made to calculate elasticity was the 1963 weighted average blend price, F.O.B. St. Louis, which was \$4.00 per hundredweight.

For each price increase there were some producers who said they would decrease their herd size. They would cull their lower producing cows, have more leisure, and would experience no loss in income. However, more of them indicated they would react in a conventional manner by increasing their herd size. A short-run price increase of a dollar per hundredweight would result in an indicated increase in the quantity of milk marketed by 3.28 percent, and for the long-run the quantity marketed would be up 8.53 percent.

For price decreases some producers indicated they would increase their herd size. Apparently they would attempt to do this with the idea of maintaining their gross income. However, more of them would decrease their herd size, apparently with the idea of decreasing costs. Since most of the producers indicated changes in line with that predicted by economic theory, the net change in the quantity marketed increased with rising prices and decreased with falling prices. With a short-run decrease of a dollar per hundredweight in the price of milk, producers said they would reduce the quantity marketed by 33.9 percent and 28 percent of the producers thought they would quit dairying. With a long-run decrease of a dollar per hundredweight, 40.9 percent of the producers thought they would quit dairying, and the volume of milk marketed would decrease 52 percent.

Most of the dairymen indicated they would

make no change in herd size as a result of the suggested price changes. The only exception to this was the changes they indicated in event of a long-run decrease of \$1.00 per hundredweight.

The figures in Table 23 concerning elasticity show that supply response to price decreases is more elastic than for price increases. Adjustments to price decreases are normally expected to be more inelastic than the adjustments for price increases because of the fixed costs involved. These data take into consideration producers who would quit dairying at a lower price but do not take into consideration those who might enter the market at a higher price. In support of the theory that price decrease adjustments are more inelastic than price increase adjustments, Table 23 shows that 29 percent of the producers would increase their herd size with a long-run price increase of a dollar while only 20 percent would decrease their herd size with a decrease of a dollar in price. The elasticity figures would be more in line with expected theory if they included those dairymen producing manufacturing milk, those producing for another market, or those who did not have a dairy enterprise but would become producers if the price incentive became great enough.

The supply response results are in conformity with economic theory in that long-run elasticities are greater than short-run elasticities. In the short-run the dairyman is restricted in varying the inputs. In the long-run he has considerably greater flexibility in changing inputs to effect changes in the supply of milk produced.

These data cannot be used as a precise measurement of supply response to future milk price changes. Such response would depend upon human decisions in accord with the situation which exists at that time. Factors other than price also affect these decisions. The data do give an approximation of what could be expected.

Changes of Bulk Producers Interviewed in 1958 and in 1964

In 1958, The University of Missouri in cooperation with the St. Louis Market Administrator's office published a study entitled *Impact of New Milk Collection System On St. Louis Dairy Farmers*, Uni-

versity of Missouri Research Bulletin 719. Information for the study was obtained by personal interviews with a sample of 96 bulk producers on the St. Louis market. This group was a representative

sample of the producers who had converted to bulk tank use at that time.

The conversion to bulk in the St. Louis market began in September, 1954, and by March, 1958, 1,811 producers (47.5 percent) had bulk tanks on their farms. The 1958 study indicated that the bulk tank installations acted as a catalyst as far as technological development in the dairy industry was concerned. In July, 1964, these same 96 producers were interviewed personally to determine what adjustments had taken place since the 1958 study.

Of the original sample, 70 were still shipping to the St. Louis market, nine had discontinued selling to the St. Louis market but were still in the dairy business, and 17 had quit dairying.

Four of the 70 producers on the St. Louis market would not supply information for the current study. However, these four producers were included

in the information on production per cow and seasonality since this information was available at the market administrator's office. All other sections include only data from the 66 respondents.

Producers Shipping to the St. Louis Market

Milking Parlors and Equipment—Tables 24 and 25 show the changes made in milking parlors and equipment since 1958 by the 66 bulk producers currently shipping to the St. Louis market. As would be expected, there had been a decrease in stanchion parlors and bucket-type milkers and an increase in the herringbone and walk-through parlors with pipeline equipment. Twenty percent of the producers had constructed new parlors since 1958 while 24 percent had installed pipeline milkers.

None of the Missouri producers had changed bulk tanks since 1958. Twenty-seven percent of the

TABLE 24 -- MILKING PARLORS FOR 66 ST. LOUIS MARKET BULK PRODUCERS
JULY, 1964, AS COMPARED TO JULY, 1958

	July 1958		July 1964		1964 % Minus 1958 %
	(No.)	(%)	(No.)	(%)	
<u>Milking Parlors with Stanchions</u>					
Missouri	12	57	11	52	- 5
Illinois	34	76	23	51	-25
Market	46	70	34	52	-18
<u>Milking Parlors--Walk-Through</u>					
Missouri	9	43	8	38	- 5
Illinois	11	24	16	36	+12
Market	20	30	24	36	+ 6
<u>Milking Parlors--Herringbone</u>					
Missouri	0	0	2	10	+10
Illinois	0	0	6	13	+13
Market	0	0	8	12	+12

TABLE 25 -- MILKING EQUIPMENT FOR 66 ST. LOUIS MARKET BULK PRODUCERS
JULY, 1964, AS COMPARED TO JULY, 1958

	July 1958		July 1964		1964 % Minus 1958 %
	(No.)	(%)	(No.)	(%)	
<u>Bucket-Type Milking Machine</u>					
Missouri	14	67	11	52	-15
Illinois	36	80	23	51	-29
Market	50	76	34	52	-24
<u>Pipeline Milking Machine</u>					
Missouri	7	33	10	48	+15
Illinois	9	20	22	49	+29
Market	16	24	32	48	+24

Illinois producers had installed new bulk tanks to increase their capacity. Only two of the 66 tanks had been recalibrated since installation.

Herd Size—Table 26 shows the changes in herd size since the 1958 study and the future plans of the bucket-type milker producers and the pipeline milker producers. The producers with bucket-type milkers increased their average herd size 14 percent after 1958; producers with pipeline milkers increased their average herd size 24 percent. The average herd size at present is 32 cows for producers using bucket-type milkers and 46 cows for the pipeline producers. In 1958 the producers using the bucket-type milkers predicted they would have 36 cows in 1965, and at the time of this survey (1964) they expected to have 35 cows in 1965. The pipeline milker producers plan to have an average of 47 cows in their herd by 1965; in 1958 they predicted

they would have 49 cows by 1965. These figures indicate that producers are quite accurate in their long range plans for their dairy operations. If they continue to expand as planned, the bucket-type milker producers will have an average herd size of 38 cows by 1970, while the pipeline milker producers will have an average of 52 cows.

The average herd size increased by eight cows from 1958 to 1964. Producers indicated they would add eight more cows from 1964 to 1970. This amounts to a 27 percent increase from 1958 to 1964, and a 21 percent expected increase from 1964 to 1970.

These producers were asked what factors would limit the expansion of their herds from their present size. The size of the bulk tank was the greatest limiting factor with 50 percent of the producers indicating it as such (Table 27). Other limiting factors

TABLE 26 -- CHANGE IN HERD SIZE OF 66 ST. LOUIS MARKET BULK PRODUCERS, BY GROUPS AND BY STATES

Groups of Producers	Average Number of Cows in Herd					Percentage Increase in Average Herd Size		
	July 1958	July 1964	Plans for 1965 as Indicated in 1958	Plans for 1965 as Indicated in 1964	Planned for 1970	1958 to 1964	1964 to 1965	1965 to 1970
	Bulk Tank and Bucket-Type Milker	28	32	36	35	38	14	9
Bulk Tank and Pipeline Milker	37	46	49	47	52	24	2	11
Missouri Producers	31	37	37	38	43	19	3	13
Illinois Producers	30	39	40	42	47	30	8	12
St. Louis Market	30	38	39	41	46	27	8	12

TABLE 27 -- LIMITATIONS TO EXPANSION OF 66 DAIRY HERDS PRODUCING FOR THE ST. LOUIS MARKET, JULY, 1964

Limitations	Missouri		Illinois		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)
Size of farm	6	29	9	20	15	23
Feed supply	3	14	11	24	14	21
Labor supply	11	52	19	42	30	45
Size of bulk tank	11	52	22	49	33	50
Milking facilities	3	14	3	7	6	9
Holding facilities	1	5	4	9	5	8
Desire more leisure	5	24	9	20	14	21
Availability of finances	2	10	1	2	3	5
No limitations	2	10	6	13	8	12

TABLE 28 -- PRODUCTION STATISTICS OF 70 ST. LOUIS BULK TANK PRODUCERS

	Production per Cow (pounds)		Prod. per Cow	Percent Increase 1958 to 1963	
	1958	1963		Annual Volume Sold	Total Cow No.
Missouri	7,055	7,672	9	31	20
Illinois	8,796	9,605	9	45	33

Source: Market Administrator's Records

TABLE 29 -- PERCENT THAT DAILY PRODUCTION PER FARM IN NOVEMBER WAS OF DAILY PRODUCTION PER FARM IN THE PRECEDING MAY, 70 ST. LOUIS PRODUCERS

	Illinois (percent)	Missouri (percent)	Total (percent)
1958	84.7	84.1	84.5
1959	85.1	82.2	84.3
1960	80.7	77.3	79.8
1961	85.7	75.9	82.9
1962	82.8	77.5	81.2
1963	89.7	76.3	86.3

TABLE 30 -- PERCENT THAT DAILY PRODUCTION PER FARM IN NOVEMBER WAS OF DAILY PRODUCTION PER FARM IN THE PRECEDING MAY ON THE ST. LOUIS MARKET, 1958-1963*

	Illinois (percent)	Missouri (percent)	Market (percent)
1958	81.5	71.2	75.8
1959	85.8	74.4	80.4
1960	79.2	69.6	76.8
1961	81.8	75.1	78.8
1962	80.0	78.9	79.4
1963	89.7	74.9	82.2

* Information secured from St. Louis Market Administrator

were: labor supply, 45 percent; size of farm, 23 percent; feed supply, 21 percent; and desire for more leisure, 21 percent. Twelve percent of the producers believed they had no limitations to expansion of their herd size. The problem of the size of the bulk tank could be solved rather easily, while the remainder of limitations would be more difficult to overcome.

Production Data—Production data were available for all 70 current producers. The 22 Missouri producers had an average production of 7,672 pounds of milk per cow and the 44 Illinois producers had an average production of 9,605 pounds of milk per cow (Table 28). Since the 1958 study, the average production per cow had increased 9 percent for both Missouri and Illinois producers.

The 22 Missouri producers had increased their total volume shipped per year by 31 percent since 1958, while their total cow numbers increased only 20 percent. This compares with an increase of 45 percent in the total volume shipped per year and a 33 percent increase in total cow numbers since 1958 by the 44 Illinois producers.

Seasonality of Production—Tables 29 and 30 provide data for a comparison of the seasonality of production of the 70 producer sample and the seasonality of the entire St. Louis market.⁶ The 70 bulk tank producers have a somewhat more even seasonality pattern than the entire St. Louis market. This could be due to the fact that the sample is a select group of producers in that they were among the first to convert to bulk tank production in the St. Louis market. However, it can be seen that in 1958 the difference between the 70 producer sample and the entire market was 8.7 percent and in 1963 this difference had decreased to 4.1 percent. This would seem to indicate that as a greater percentage

⁶The method of presenting the seasonality data is not the standard form of seasonal index, but is a procedure commonly used in connection with data on dairy production.

of the market becomes bulk tank producers the seasonal flow of milk to the market becomes more stable.

Missouri producers have not kept pace with the improvements made by Illinois producers in the seasonality of production. This could be explained in part by the fact that the Illinois producers operate more intensive farming operations than do the Missouri producers. Dairying utilizes their labor in the slack months of fall and winter. Therefore, they have more incentive to have fall freshening. With fall freshening the labor required for the dairy enterprise decreases in the spring and summer months and can be used for other farm enterprises. Since the Missouri producers do not operate such intensive farming operations and thus do not have this extra incentive to use labor in the slack season, they probably consider it to their advantage to have spring freshening to more fully utilize spring pasture and more comfortable weather.

Labor Requirement—According to the 66-producer sample, the weighted average estimated change in the labor requirement in the milking operation after conversion to bulk was a reduction of 12 percent per herd. Thirty-six percent of the producers said there had been no change in the labor requirement, 7 percent said the labor requirement had increased, and 55 percent stated there had been at least a 10 percent reduction (Table 31).

This reduction in labor was due not only to the use of bulk tanks, but also to the use of more pipeline milking equipment and walk-through milking parlors. The improved milking facilities and equipment enabled the producers to expand their herds while actually reducing labor. While the herd size had increased by 27 percent and production per cow, 9 percent since 1958, the increase in labor efficiency resulted in a 12 percent reduction in the labor requirement.

Two of the four producers who indicated that more labor was required after bulk tank installation were producers using stanchion barns and bucket-type milkers, but who had increased their herd size considerably. These producers had increased their herd size more rapidly than they increased their labor efficiency.

The weighted average estimated reduction in the labor requirement of the farming operation was 3 percent (Table 32). Seventy-seven percent of the producer sample stated that there had been no change in the labor requirement, 5 percent stated it had increased, and 14 percent stated it had decreased.

TABLE 31 -- ESTIMATED PERCENTAGE CHANGE IN THE LABOR REQUIREMENT OF THE MILKING OPERATION AT PRESENT VS. PRIOR TO BULK CONVERSION*

Percent Change	Number of Producers	Percent of Producers
30	1	2
25	1	2
10	2	3
0	24	36
- 10	13	20
- 20	11	16
- 30	8	12
- 40	2	3
- 50	3	4
Non-response	1	2
Total	66	100

* Based on 66 farms in the St. Louis milk supply area; surveyed July, 1964. Weighted average percentage reduction in labor requirement was 12 percent.

TABLE 32 -- ESTIMATED PERCENTAGE CHANGE IN THE LABOR REQUIREMENT OF THE FARMING OPERATION AT PRESENT VS. PRIOR TO BULK CONVERSION*

Percent Change	Number of Producers	Percent of Producers
+ 25	2	3
+ 10	1	2
0	51	77
- 10	6	9
- 50	2	3
- 75	1	2
Non-response	3	4
Total	66	100

* Based on 66 farms in the St. Louis milk supply area; surveyed July, 1964. Weighted average percentage reduction in labor requirement was 3 percent.

This reduction of 3 percent likely was due to improved farm equipment.

Management Practices—Table 28 data indicated that 11 to 12 percent of the increase in volume of milk shipped from 1958 to 1963 was due to such factors as selective culling, better feeding, and better breeding. Table 33 gives the selected management practices of 1964 compared with those of 1958.

Forty-eight percent of the 66 producers were using artificial insemination, 33 percent were using

their own bull, and 19 percent were using a combination of artificial insemination and their own bull. Compared with 1958, this is a decrease in those using only artificial insemination and an increase in producers using a combination. This increase in the use of the combination is probably due to a practice becoming more common among some dairymen of breeding their lower producing cows to a beef bull.

Ninety-seven percent of the producers were

TABLE 33 -- SELECTED MANAGEMENT PRACTICES; 1964 COMPARED WITH 1958*

Management Practices	1958	1964
<u>Breeding Practices</u>		
Producers using only artificial (%)	56	48
Producers using own bull (%)	33	33
Producers using combination (%)	11	19
<u>Replacement Heifers</u>		
Producers raising heifers (%)	95	97
Producers buying heifers (%)	5	3
Range (number raised and bought per year)	3-26	3-30
Mean (number raised and bought per year)	11	14
<u>Feeding System</u>		
Producers using drylot (%)	6	15
Producers using pasture (%)	58	49
Producers using combination (%)	36	36
<u>Hay Raised</u>		
Range (%)	50-100	50-100
Mean (%)	96	96
<u>Grain Raised</u>		
Range (%)	0-100	30-100
Mean (%)	88	91
<u>Silage Fed</u>		
Producers feeding silage (%)	92	97
Range--Capacity of silo (tons per cow)	2-19	1-18
Mean--tons per cow fed	6	6
<u>Improved Pasture</u>		
Producers having improved pasture (%)	89	88
Range (acres)	7-180	7-180
Mean (acres)	34	37
<u>Green Chop</u>		
Producers feeding chop (%)	11	18
Range (days fed)	14-150	14-150
Mean (days fed)	51	41
<u>Checking Production</u>		
Producers using DHIA (%)	12	13
Producers using WADAM (%)	6	9
Producers using other checking program (%)	4	3
Producers not checking production (%)	78	75

* Based on survey of 66 St. Louis market bulk milk producers.

raising their own replacement heifers. The producers had the facilities for raising dairy calves. Dairy calves also utilized family labor in that the children and/or the wife were usually given this chore. Raising dairy calves instead of buying calves would normally be considered as conducive to more selective culling and replacement of dairy cattle, since the operator would know the production of the dams. But since only 25 percent of the 66 producers were keeping production records, the remaining 75 percent could not accurately select dairy heifers on the basis of the dam's production. Only 13 percent were using the services of the Dairy Herd Improvement Association, 9 percent were using the Weight A Day A Month plan, and 3 percent were using some other program such as checking their own production.

Table 33 shows no major changes in management practices since 1958. Dry lot feeding increased, which naturally led to an increase in the use of silage and green chop, while the percentage of hay and grain raised had changed very little since 1958. These data do not show changes in the quality of feed nor do they show changes in numerous other management practices which would affect production.

The practice which obviously needs improvement is the production testing program. Many management practices are based upon the production per cow, yet only 25 percent of the producers were checking production.

Producers Who Discontinued Shipping to St. Louis Market

Nine percent of the producers in the 1958 sam-

ple have changed markets. Three of the producers had problems in meeting the St. Louis Health Department regulations; two were transferred when a producer cooperative purchased a plant in another market; one was dissatisfied with his hauler; one was dissatisfied with the handler he sold to; one received a somewhat higher price when he transferred markets; and one entered a partnership agreement which involved selling to a handler in another market. All of these were miscellaneous happenings which caused producers to change markets.

All of the nine producers are satisfied with their present markets and do not intend to return to the St. Louis market.

Producers Who Quit Dairying

Seventeen of the 96-producer sample had quit dairying since the 1958 study. Five of the 17 stated that dairying was too much work and too confining; four said that too much work along with the low price of milk were the reasons for quitting; three indicated that the low price of milk was the sole reason for quitting; two quit in order to enter non-farm employment; one retired; one lost his lease; and one quit because his cows had mastitis (Table 34).

At the time of this study, four of these producers were occupied in non-farm employment, 12 were in general farming (hogs, beef, and grain), and one was retired.

At the time of exit from the dairy business these producers were receiving 98 percent of their gross income from the farm. The Missouri producers

TABLE 34 -- REASONS GIVEN FOR QUITTING DAIRYING
BY 17 ST. LOUIS MARKET PRODUCERS

Reason	Missouri		Illinois		Total	
	(No.)	(%)	(No.)	(%)	(No.)	(%)
Too much work, too confining	3	43	2	20	5	29
Too much work, low price of milk	1	14	3	30	4	23
Low price of milk	1	14	2	20	3	18
Non-farm employment opportunities	1	14	1	10	2	12
Retired			1	10	1	6
Lost lease			1	10	1	6
Cows had mastitis	<u>1</u>	<u>14</u>	<u>—</u>	<u>—</u>	<u>1</u>	<u>6</u>
	7	100	10	100	17	100

among these were averaging 70 percent of their gross farm income from dairying and the Illinois producers were receiving 59 percent from dairying. This compares with 87 percent for the average Missouri producer and 68 percent for the average Illinois producer in the mail questionnaire sample of the St. Louis market. Hogs were the most important supplementary enterprise for the Missouri producers at the time of exit from dairying, and the most important supplementary enterprise for the Illinois producers was cash grain.

Not only was dairying less important to producers who quit dairying, compared with the St. Louis market sample, but there were other differences in producer characteristics (Table 35). The farms of the owner-operators who quit were 112 acres (39 percent) smaller than those of the owner-operators in the St. Louis market sample, the rented farms were 14 acres (6 percent) smaller, and the partnership operations were 66 acres (19 percent) smaller.

The dairy farm operators who quit averaged four years older than the average dairy farm operator in the St. Louis market sample. They had an average of 2.3 family members working with the dairy enterprise compared with 2.6 family members working with the average dairy enterprise on the St. Louis market. The herd size of these producers was nine cows smaller than the average herd size of the

St. Louis market and they had a larger percentage of milking parlors with stanchions and bucket-type milkers than the St. Louis market producer sample.

All of these producers but one sold their dairy herds either at public auctions, private sales, or at stock yards. One producer kept his dairy cows and was running beef calves with the cows. All of the 17 bulk tanks were sold at public auctions or by private sales. Two of the producers indicated they received only 20 percent of the original purchase price of the tank. Fourteen producers sold their other dairy equipment while three producers still have their equipment.

According to the producers, none would have continued dairying had the price been higher by \$0.25 per hundredweight, 12 percent would have continued if the price had been \$0.50 higher per hundredweight, and 53 percent would have continued if the price had been \$1.00 higher per hundredweight. These 17 past bulk tank producers indicated that they had no plans for ever re-entering the dairy business.

These characteristics of smaller farms, older operators, less family labor, smaller herds, and less modern milking equipment are characteristics normally found among producers quitting their dairy operations.

TABLE 35 -- CHARACTERISTICS OF 17 PRODUCERS WHO QUIT DAIRYING COMPARED WITH CURRENT ST. LOUIS MARKET PRODUCERS

	Missouri		Illinois		Market Total	
	Average	Quit	Average	Quit	Average	Quit
Size of Farm (acres)						
Owner-Operator	324	222	246	239	289	177
Renter	232	-	233	221	235	221
Partnership	356	280	331	-	346	280
Age of Operator	47	52	44	46	45	49
Family Members Working	2.6	2.4	2.6	2.2	2.6	2.3
Average Herd Size	40	30	36	30	39	30
Milking Parlors (percent of producers)						
Stanchion	*45	29	44	90	*43	65
Walk-Through	46	71	46	10	47	35
Herringbone	7	-0-	10	-0-	9	-0-
Milking Equipment						
Bucket Milker	*50	29	46	90	*47	65
Pipeline Milker	49	71	54	10	52	35

* Does not total 100 percent due to non-response of some producers.

SUMMARY

The representative dairyman in this study, at 45 years of age, had been in the dairy business 20 years and planned to continue an additional 17 years. The number of acres farmed varied with the tenure group. If he was an owner-operator, he farmed an average of 289 acres. If he rented his farm, the average size was 235 acres. Those who had partnership operations operated 346 acres.

The representative dairyman received 95 percent of his gross income from farming and 5 percent from other sources. The percentage of the gross farm income derived from dairying varied among states. If he was a Missouri dairyman, 87 percent of his gross farm income came from dairying. This compared with 68 percent for Illinois, 72 percent for Iowa, and 93 percent for Wisconsin.

An average of 2.6 family members were contributing to the dairy operation. The number of hired days work (eight hour day equivalents) averaged 100 per farm at the time of interview.

The average dairyman had a dairy herd of 39 cows producing 9,207 pounds of milk per cow. More than half of the producers had walk-through or herringbone milking parlors and pipeline milkers. With existing facilities, the average dairyman could add nine cows to his herd. Generally, he felt that another farm enterprise was his most profitable alternative to dairying.

The average dairyman indicated that \$1.79 per hundredweight was a reasonable profit for milk. He would need an annual average price of \$5.07 per hundredweight to obtain this profit.

Of the 96 bulk producers who were interviewed in 1958 and in 1964, 70 were still shipping to the St. Louis market, nine had discontinued selling to the St. Louis market but were still in the dairy business, and 17 had quit dairying. The nine producers who had changed markets did so as a result of miscellaneous happenings. The major reasons for the discontinuance of dairying by the 17 producers were: dairying was too much work; the business was too confining; and the price received for milk was too low.

Of the producers still shipping to the St. Louis market, 20 percent had constructed new parlors since 1958 while 24 percent had installed pipeline milkers. The average herd size had increased 27 percent and the average production per cow had increased nine percent. While the dairy enterprises were increasing in size, the labor required for the milking operation had decreased an estimated 12 percent per herd.

If the trends indicated by this producer sample continue in the future, Missouri will supply less producer milk to the St. Louis market while Illinois will supply more. This study indicated that Missouri had fewer producers entering dairying and more producers leaving dairying than Illinois. These indications, plus the fact that Missouri had a lower production per cow than Illinois, would result in a shift in the supply of producer milk.

The reasons why Missouri had a lower production per cow than the other states in the St. Louis milkshed were not determined in this study. But, there is a definite and a great need for improvement in the production of milk per cow in Missouri.

One thing the producers need is adequate records, especially production records. They are needed as guides for production improvement and they provide farmers with information for making management decisions.

In the future, both Missouri and Illinois producers will produce more milk per farm by using more and better equipment. But, as was shown by the 96 early converters to bulk tank use, this increased investment is no assurance they can and will stay in the dairy business. As the investment increases the management responsibilities increase, and this requires a growth of management skills. Also, if the returns from the dairy enterprise are not comparable with returns from other farm enterprises or non-farm employment, the increased investment will not keep the farmer in the dairy business in the long run.

Appendix

Objectives of the study

The objectives of this study were: (1) To describe the representative dairyman delivering milk to the St. Louis market in 1964; (2) to determine the attitudes of St. Louis milk producers concerning alternatives to dairying, profit per hundredweight desired, price per hundredweight needed, and supply response to price changes; and (3) to determine the status in 1964 of 96 bulk tank producers who were interviewed in 1958 and determine what changes had occurred during the six year period.

The 1958 study of the early converters to bulk tank use concluded that bulk tanks were accelerating the trend toward larger and more specialized enterprises.⁷ However, this increased investment in bulk tank operations was not positive assurance that producers would stay in the dairy business. The producers upon which this conclusion was based were interviewed to determine what changes they had made in their operations since 1958 and to determine specifically how much larger and how specialized they had become. Of equal importance were the reasons why some producers did not stay in the dairy business.

Data describing the representative dairyman and his attitudes should be of special interest to those connected with the dairy segment of the agricultural economy. The findings help describe factors that have influenced fluid milk production trends in the past and to predict those factors that will affect it in the near future. The data could dispel or substantiate ideas that some have about the dairyman's operation and about what he thinks. They can be used by the dairyman himself as a benchmark to see how his operation and attitudes compare with those of his fellow dairymen.

Methods of Collecting Data

Schedules of information were obtained by personal interviews with 96 bulk tank producers who were interviewed in 1958. In this current survey, information was obtained from 66 producers currently producing for the St. Louis market, from nine producers currently producing for another market, and from 17 producers who had quit dairying (4 of the 70 current producers did not provide information).

Information also was obtained by sending mail questionnaires to all St. Louis market producers who were not personally interviewed. In July, 1964, there were 2,661 producers on the St. Louis market. Thus, of the 2,661 producers, all were sent mail questionnaires except the 66 current St. Louis market producers who were interviewed personally. There were 687 mail questionnaire respondents and 66 personal interview respondents for a total of 753. This was 28.3 percent of the producers shipping to the St. Louis market in July, 1964.

The 1963 annual sales to the St. Louis market of the mail questionnaire respondents and of the personal interview respondents were obtained from the St. Louis Market Administrator's records. These sales figures were from audited records and were not obtained from the interview schedules. The sales data were used in calculating the average production per cow.

A comparison of the location of the 753 respondents with the number of milk producers by counties during May, 1964, is given in Figure 1. This comparison indicated that the entire St. Louis milkshed was represented in the study.

There was a greater response from the large producers than from the small ones (Table 36).⁸ This is to be expected in a survey that is voluntary in response. The below average or smaller producers usually do not respond as well as the larger, more progressive producers. However, a study of Table 36 reveals that all classes of producers with sales of more than 100,000 pounds in 1963 are well represented. The less than full representation of the class of producers with sales of less than 100,000 pounds in 1963 does not seriously detract from the usefulness of the study. The section on Operations of Dairymen on the St. Louis market and on Attitudes of Dairymen on the St. Louis market include information obtained from both the mail questionnaires and the personal interviews. The section on Characteristics of Bulk Producers deals only with the personal interview respondents.

In many of the tables there are producers classified under the caption of "non-response." This is for those producers who completed schedules but did not answer the specific question referred to in the table.

⁷ Richard F. Fallert and Stephen F. Whitted, *Impact of New Collection System On St. Louis Dairy Farmers*, Missouri Agricultural Experiment Station Bulletin 719, December 1958.

⁸ The difference between the sample and the market population was statistically significant. F-ratio = 2.0, 1.13 = 5%, 1.19 = 1%.

TABLE 36 -- DISTRIBUTION OF THE ST. LOUIS MILK MARKET POPULATION AND THE PRODUCER SAMPLE, ACCORDING TO 1963 ANNUAL SALES*

1963 Production	Market		Sample	
	(No.)	(%)	(No.)	(%)
0- 99,999	123	5.11	16	2.37
100,000-199,999	681	28.29	163	24.22
200,000-299,999	685	28.46	183	27.19
300,000-399,999	464	19.28	150	22.29
400,000-499,999	224	9.31	74	10.99
500,000-599,999	106	4.40	35	5.20
600,000-699,999	41	1.70	15	2.23
700,000-799,999	31	1.29	15	2.23
800,000-899,999	19	.79	6	.89
900,000-999,999	9	.37	6	.89
1,000,000 and over	24	1.00	10	1.49
	<u>2,407</u>	<u>100.00</u>	<u>673</u>	<u>100.00</u>
Mean (pounds)	293,191		324,949	

* Only those producers who were on the market during all months of 1963 are included.

Figure 1—Comparison of the Number of Producers by Counties, May 1964, With the Location of Producers Included in the Market Sample.

