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An Economic Analysis of the Retail Raw Milk Industry in the State of Utah

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AN ECONOMIC ANALYSIS OF THE RETAIL RAW MILK INDUSTRY IN THE STATE OF UTAH

by

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INTRODUCTION

History and Development

For 98 years after the first "Mormon" pioneers entered the Salt Lake Valley there was no statewide control of the sale and distribution of fluid milk. Prior to any statewide control, however, laws were passed in Salt Lake City and Ogden outlawing sale of raw milk to final consumers in those cities as of January 1, 1945 (4, 3).

Creation of a dairy section within the Utah State Department of Agriculture by the 1945 Utah Legislature was the first major step in regulating the production and distribution of milk and dairy products in the state. A dairy advisory board was also provided for by this act (6). These two groups were established to work together in regulating the dairy industry as provided for in the law. The specific duties of these two groups are pointed out in the following two excerpts from the law:

> There is hereby created within the Utah State Department of Agriculture a dairy section under the direction of the State Board of Agriculture for the administration of the provisions of this act. The State Board of Agriculture shall be charged with the enforcement of this act and rules and regulations promulgated under authority of this act, and shall be responsible for directing the administrative activity and work of the dairy section and determining and establishing the administrative policies under which the dairy section shall function and operate.
>
> The said dairy advisory board shall advise and consult with the State Board of Agriculture on all matters pertaining to the sanitary production, processing and distribution of milk and milk products as herein defined. The said advisory board shall recommend to the board of agriculture rules and regulations and interpretations necessary for the proper production and processing of milk and milk products designated herein. It shall be the duty of the board of agriculture to review and consider such advice and recommendations. (6)

Sale of raw milk for consumption was not banned by the Dairy Act of 1945. However, upon recommendation from the Dairy Advisory Board the State Board of Agriculture adopted the following regulation (8): "All milk and market milk products defined herein must be pasteurized or made from pasteurized milk before being sold or offered for sale."

Enforcement of this regulation proved to be difficult. In addition to the inherent problem of policing the many small milk producers in the state, lack of clarification by the law led raw milk producer-distributors to claim immunity to the provisions of the law. This claimed immunity was based on the following section of the Dairy Act of 1945 (6): "The provisions of this act shall not apply to milk or milk products which are not going through the regular channels of retail and wholesale trade."

Failure to define the term "regular channels of trade" led to difficulty in enforcing the law. Those producers who continued to sell raw milk for fluid consumption maintained that retail sale of raw milk by producer to consumer, at the producer's farm, was not within the bounds of regular channels of trade.

The state prosecuted one man for continuing to sell raw milk for fluid consumption. The state was able to establish that the defendant was selling raw milk for fluid consumption, but the court ruled that this act was not in violation of the law and the case was dismissed (5).

The weakness of the law and the need to have the term "regular channels of trade" clarified was recognized by the State Department of Agriculture. This concern is evidenced by the following excerpt from the Sixteenth Biennial Report of the Utah State Board of Agriculture:

> The 1951 amendments to the [1945 dairy] act made by the legislature made some very important clarifications in certain sections of the

law which undoubtedly will be very valuable in the future enforcement of the program. This clarification, however, was not provided by the legislature with respect to Section 21, in that no clarification or definition was forthcoming with respect to the term "channels of trade," and this section constitutes a very great weakness in the enforcement of the provisions requiring pasteurization of all milk for the protection of all of the consumers in the state. This section, through the lack of proper definition of "channels of trade," exempts certain segments of the dairy industry from control, and a need for a clarification is felt very much in trying to apply enforcement satisfactorily to the whole industry. (9)

No clarification of the law was accomplished until the meeting of the 1959 Utah Legislature. The legislature then passed a law effective May 1, 1959 specifically dealing with the retailing of raw milk. The provisions of this law are presented in the following quotation:

> The sale of raw milk shall be permitted by the state board of agriculture, and a permit issued by said board, when sold to consumers for consumption and not for resale and the sale and delivery is made on the premises where it was produced and the production and handling of such milk conforms to the following standards:
>
> a. When such milk is produced on premises with production facilities in conformity with the laws and regulation of the state of Utah governing the production of Grade A raw milk.
>
> b. That such milk is bottled on the premises where produced in sanitary containers furnished by the seller under sanitary conditions and labeled "raw milk."
>
> c. The average bacterial plate count of such milk does not exceed 20,000 per c.c. or the average direct microscope count of which does not exceed 20,000 per c.c. if individual clumps are counted, or 80,000 per c.c. if individual organisma are counted and meets the coliform count as provided in section 6 Milk Ordinance and Code recommended by the U.S. Public Health Service in 1953. Average bacterial plate count and average direct microscope count shall be taken to mean the logarithmic average.
>
> d. All of the dairy animals on the premises shall be free of tuberculosis and brucellosis and other diseases carried through milk, and every dairy animal on the premises must be properly identified at all times by neck chain, ear tag, tatto mark, or breed registration papers.
>
> e. All persons on said premises performing any work in connection with the production, bottling, handling or sale of said milk shall be free of all communicable disease.

f. All milk sold pursuant to this section shall within one hour after being taken from the cow be cooled to 50° farenheit or lower and kept at 50° farenheit or lower until sold to the consumer.

g. If the state department of agriculture shall find that production, handling or sale of such milk or the bacteria counts violate the provision hereof, or the health of any person or dairy animal fails to conform to any of the requirements hereof, the permit of such milk producer shall by this order be suspended until such time as the said production, handling, sale and bacteria counts conform to the requirements hereof. (7).

This law definitely sets the conditions under which raw milk can be retailed in the state. It has given the State Board of Agriculture the power needed to regulate the retail sale of raw milk. It has not solved all problems connected with regulation of this sector of the dairy industry, however. Enforcement of this law with the many small milk producers in the state is still a difficult task.

The effect of this law on the dairy industry has been the development of a group of specialized retail raw milk businesses replacing the many "sell to your neighbor" small side line operations. It is recognized that raw milk is still being sold as a side line by some producers. This is in violation of the law and the State Board of Agriculture is attempting to stop this practice. Between May 1959 and December 31, 1960 28 producers were licensed by the state to be producer-distributors of retail raw milk. As of December 31, 1960 one had gone out of business leaving a total of 27 licensed raw milk producer-distributors in the state.

Objectives

The objectives of this study are to: (a) describe the retail raw milk industry in the state of Utah; (b) determine the relative profitability of retailing as opposed to wholesaling raw milk.

Method of Procedure

Information on history and development of the retail raw milk industry was obtained from state and city law books, State Department of Agriculture reports, interviews with state dairy officials, and court records.

A complete enumeration of the licensed raw milk producers as of December 31, 1960 was taken to obtain information regarding their operations between the time they became licensed and the end of 1960. Each producer-distributor was interviewed personally. Names and addresses of producer-distributors were obtained from the Dairy Division of the Utah State Department of Agriculture.

Grade A and manufacturing milk handlers were the source of wholesale prices paid producers during the period included in the study.

Of the 27 licensed producer-distributors interviewed two were retailing pasteurized milk in addition to retail raw milk sales. Retail raw milk made only a relatively small proportion of their total sales. Because they were so different from the rest and their small effect on total retail raw milk sold, they were not included in the analysis.

Data from the remaining 25 producer-distributors were analyzed and used in presenting a description of the retail raw milk industry in the state.

Data on investment, additional costs and returns, and factors affecting additional returns are based on questionnaires from 17 producer-distributors who all formerly wholesaled grade A milk. Of the other eight producer-distributors, five formerly retailed raw milk on an unliscensed basis, one wholesaled manufacturing milk, and two were not

in production formerly. Because of limited numbers these groups were not analyzed for additional costs and returns.

Assumptions

For purposes of analysis the following assumptions were made:

1. The same volume of milk would have been produced by each producer-distributor if he had produced under former marketing practices as was produced under prevailing conditions.
2. All production costs remained constant except those affected by changes in marketing methods.
3. Grade A base for those producing grade A milk remained the same as when they began retailing raw milk.

DESCRIPTION OF INDUSTRY

Production and Utilization of Milk

Total production

During the 20-month period, May 1959 through December 1960, 1,079,745 gallons of milk were produced by the 25 licensed raw milk producer-distributors included in the study. This does not include milk used by the farm family and milk fed to calves. Average production per month amounted to 53,987 gallons. Total production by all licensed producers increased from 27,977 gallons during May 1959, the first month of licensed operations, to a high of 92,543 gallons during December 1960, the last month of the study (Figure 1). The increase in total production was the result of a larger number of producers becoming licensed, rather than an increase in production per producer. Average production per producer was actually less during six of the eight months of May through December, 1960 than during corresponding months in 1959.

Monthly production per licensed producer amounted to an average of 3,606 gallons and varied from a low of 498 gallons to a high of 6,322 gallons.

Retail sales

Milk sold retail amounted to 815,109 gallons during the period covered by the study. Monthly sales varied from 18,135 gallons in June, 1959 to 69,673 gallons in December, 1960. Retail sales amounted to an average of 40,755 gallons per month (Figure 1).

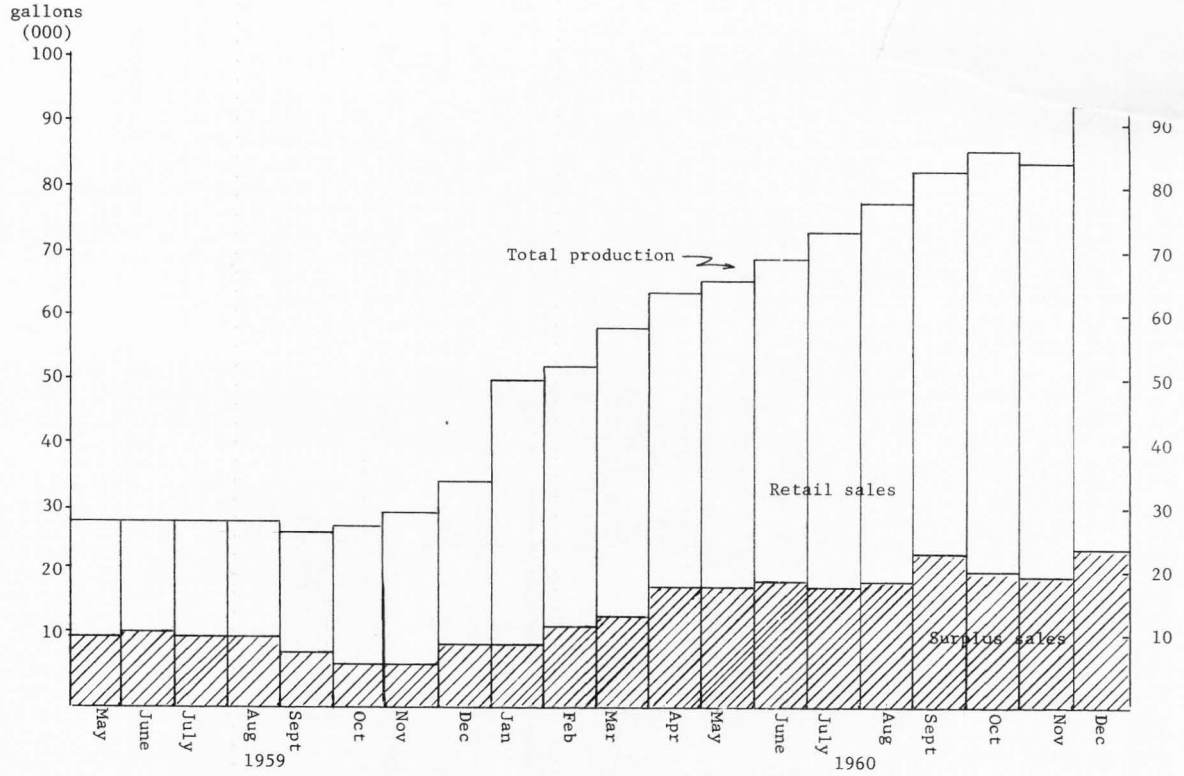

Figure 1. Production and utilization of milk by 25 retail raw milk producer-distributors, Utah, May 1959-December 1960

Average percent of total production sold retail was 75.5 percent. Retail sales ranged from 65.5 to 83.7 percent of monthly total production during the study period.

Average percent of production sold retail was 4.4 percent higher during May to December 1960 than during the same period in 1959.

The small time period covered by the observations and changing number of producer-distributors does not facilitate use of the data for predictive statements concerning seasonal fluctuations.

Producer-distributors had average monthly retail sales of 2,531 gallons. Average monthly sales ranged from 498 to 6,110 gallons. Even though average production per producer did not increase during the period studied average monthly retail sales were 115 gallons higher at the end of the period than at the first.

Dairy sales averaged 83 gallons per producer and ranged from 16 to 201 gallons.

A producer selling 83 gallons of milk per day would distribute 30,295 gallons of milk in a year. This would be equivalent to 260,537 pounds of milk.

The smallest daily volume, 16 gallons, would result in a yearly sales of 5840 gallons or 50,224 pounds of milk.

A daily volume equal to that of the largest producer-distributor, 201 gallons, would result in yearly sales of 73,365 gallons or 630,939 pounds of milk.

Seventeen of the 25 licensed retail raw milk producer-distributors had daily retail sales of 100 gallons or less. Seven producers had daily retail sales of 101-200 gallons. One producer had daily retail sales of 201 gallons or more (Table 1).

Table 1. Variation in average daily retail milk sales

Gallons per day	No. of producers	Percent of total
0 - 50	9	36
51 - 100	8	32
101 - 150	4	16
151 - 200	3	12
201 - 250	1	4
Total	25	100

Retail milk sales ranged from 22.9 to 100 percent of production among the 25 producer-distributors. Twenty percent of the producer-distributors sold less than 50 percent of their production retail. Thirty-two percent of the producer-distributors sold from 50 - 99.9 percent of their production retail and 48 percent sold 100 percent retail (Table 2).

Table 2. Variation in percent of production sold retail

Percent of production sold retail	No. of producers	Percent of total
0 - 49.9	5	20
50 - 99.9	8	32
100	12	48
Total	25	100

Surplus sales

Surplus sales, or milk sold in addition to retail sales, amounted to 264,590 gallons for the 25 licensed producer-distributors between May, 1959 and December, 1960 (Figure 1). This was equivalent to 2,275,474 pounds of whole milk. Of this milk 165,490 gallons were sold mostly at Grade A prices on the Las Vegas, Nevada market and 99,100 gallons on the Utah market to manufacturing milk handlers at manufacturing milk prices.

Surplus sales amounted to an average of 24.5 percent of production. The percent of production sold as surplus ranged from a low of 15.5 percent in January, 1960 to a high of 34.5 percent in June, 1959.

Thirteen of the 25 producer-distributors reported having surplus sales. Producers selling their surplus milk on the Utah market sold only that milk remaining after their retail milk sales were completed. Producer-distributors selling on the Las Vegas, Nevada market maintained a regular grade A base which they met in addition to their retail raw milk sales.

Producer-distributors selling surplus milk had average monthly surplus sales of 1,776 gallons per producer. Average surplus sales ranged from 100 to 4,872 gallons per month.

Five producer-distributors sold more than 50 percent of their production as surplus milk. Four of the five had an outlet for surplus milk where they receive a grade A price. The other one was just getting started and expected his situation to change to the point where he could sell his total production at retail.

Location

General area

The 25 raw milk producer-distributors were located in 12 counties throughout the state (Figure 2). Six were located in Salt Lake County. Other counties having three or more producers were Box Elder and Washington. These three counties contain 52 percent of the licensed raw milk producer-distributors in the state and account for 61.2 percent of total retail sales. All producer-distributors were located near areas of urban population.

Distance from town

All producer-distributor outlets were located within six miles of the nearest town, with all but two located within four miles. Sixty-five percent were located less than two miles from the nearest town (Table 3). Six of the eight largest producer-distributors had outlets two or more miles from the nearest town.

Table 3. Distance from producer-distributor outlet to nearest town, oiled road, main highway

Number of miles	Location with reference to nearest		
	Town	Oiled road	Main highway
	Number of producer-distributors		
Less than 1	8	24	8
1 - 1.9	5	1	8
2 - 2.9	6	0	5
3 - 3.9	4	0	4
Four or more	2	0	0
Total	25	25	25

Figure 2. Location of retail raw milk producer-distributors, Utah, December 31, 1960.

Distance from oiled road

Twenty-four producer-distributors were located on oiled roads (Table 3). The one producer-distributor not located on an oiled road reported that he had bought out another retail raw milk producer-distributor located in the same area who had been located on an oiled road. The increase in daily retail raw milk sales for the purchasing producer-distributor was only equal to 90 percent of the daily sales volume of the business purchased. He felt the main factor that kept him from realizing 100 percent of the former producer-distributors daily sales volume was the fact that he was not located on an oiled road, even though he was closer to town.

Distance from main highway

Main highway, in this study, is defined as one which is a U.S. Highway, or is a state highway between major cities or towns in the area. Sixty-four percent of the producer-distributors were located within two miles of a main highway (Table 3). The four producer-distributors located three to four miles from a major highway had total daily sales of 659 gallons, or an average of 164.8 gallons per day. The eight producer-distributors located on or within one mile of a major highway had 599 gallons total average daily sales and 74.9 gallons average per producer.

Location between working centers and industrial areas, even though not on the main highway between such areas, was indicated by producer-distributors to be very desirable.

Type of Ownership

Twenty-one of the retail raw milk producer-distributor operations were individual proprietorships. Three operations were partnerships. Each of the partnership operations had only family members as co-owners. One operation was a family owned barn and milking parlor, with each brother owning his own cows.

Importance of Retail Sales to Family Income

An average of 90.4 percent of income received by producer distributors was derived from their farms. Sixteen reported 100 percent of their income came from their farms while one producer-distributor reported 33 percent of his income came from his farm.

The average of total farm income for producer-distributors derived from retail milk sales was 78 percent. Ten reported 100 percent of their farm income was derived from retail milk sales. Twenty-three percent of farm income was the smallest percent of farm income attributed to retail sale of milk.

Eight of ten reporting 100 percent of farm income from retail raw milk sales also reported 100 percent of their income being made on the farm. The average daily sales from these eight producers was 111.4 gallons of retail raw milk.

Types of Containers

Retail raw milk was sold in six types of containers. Containers ranged in size from one-quart bottles to three-gallon cans. The customer was required to pay a deposit on the container in all cases. The deposit on the container was usually at least enough to pay for the

container. In general the deposit was adjusted up to the nearest five-cent interval to make handling deposit money more convenient. Some producer-distributors charged a deposit that allowed some leeway to cover the expense of cracked or chipped bottles that are turned back in but cannot be reused. The averages and ranges of deposit required for various type containers are shown in Table 4. An average of $12.81 is required for a gallon can while the average deposit of a gallon jug is $.48.

The only type of metal container allowed was stainless steel.

Table 4. Types of containers used, deposits required, and percent of sales made in each type of container

Item	Type of container					
	Gallon jug	2 qt. bottle	1 qt. bottle	1 gal. can	2 gal. can	3 gal. can
No. of producers using	18	4	3	4	4	4
Average deposit required	$.48	$.33	$.15	$12.81	$13.31	$13.81
Range of deposit	$.40-.60	$.25-.40	$.15	$10.00-14.75	$10.00-15.75	$10.00-16.75
Percent of total sales	65.7	6.3	1.1	4.6	16.7	5.6

During December, 1960, 65.7 percent of retail sales were made in gallon jugs. About 17 percent of sales were made in two-gallon cans. The other four types of containers were relatively less important and accounted for about 17 percent of the total sales.

The majority of the producer-distributors using glass containers other than gallon jugs did so only for the convenience of some of their

customers. Of the 18 producer-distributors using gallon jugs, 15 used them for 100 percent of their sales. One used two-quart bottles for 35 percent of his sales, and one for two percent of his sales. The other had 10 percent of his sales in one-quart bottles.

The State Dairy Control office has indicated that producer-distributors entering the retail raw milk business in the future will not be allowed to use stainless steel containers. All new producer-distributors will have to use glass containers. The use of glass containers is the only method provided for by the raw milk law (7).

Prices Received for Milk Sold

Retail prices

The average price received for retail raw milk was 63.7 cents per gallon. Prices received varied from 50 to 75 cents per gallon (Table 5).

Table 5. Variation in prices received for retail milk

Price received per gallon	No. of producers	Percent of total producers
$.50	2	8.0
.55	0	0.0
.60	7	28.0
.65	9	36.0
.70	6	24.0
.75	1	4.0
Total	25	100.0

A volume discount was given by one producer-distributor. A five cent per gallon discount was given if 10 gallons were paid for in advance by purchase of a card entitling the purchaser to 10 gallons of milk.

Prices received for retail milk did not reflect any quality difference of the product but varied between locations. The higher prices being received by those located nearer the larger cities.

Prices received in Salt Lake County averaged 69.1 cents per gallon, or 5.4 cents per gallon higher than the state average.

Surplus prices

Price received for surplus milk varied with the area in which the producer-distributor was located and outlets available. Milk shipped to Las Vegas, Nevada received $1.60 per pound of butterfat. Prices received for milk sold in Utah varied between $.74 and $.88 per pound butterfat.

The price per gallon received for surplus milk depended on the butterfat test of the milk sold. The butterfat test for the producers averaged 3.9 percent and ranged between 3.2 percent and 5.2 percent.

Method and Hours of Sale

Two methods of sale were used by producer-distributors in retailing raw milk.

Personal sales

The most common method was the personal sales system. Under this system sales rooms are usually open both morning and evening with an attendant, or attendants present to dispense milk and collect payment.

Nineteen producer-distributors were using the personal sales system.

Thirteen of these were open both morning and evening.

Those open during the morning were open an average of 2.9 hours, ranging from one to seven hours. Early morning hours were the most common for the sales rooms to be open. The earliest any sales room opened was 4 a.m. All but two of the sales rooms, of those reporting morning sales, were open by 7 a.m. Only three sales rooms remained open after 9 a.m.

Evening sales started as early as 3 p.m. The latest any producer-distributor began evening sales was 5:30 p.m. All 19 producer-distributors using the personal sales method were open in the evening. The number of hours sales rooms were open in the evening ranged from one to four hours. All sales rooms were closed by 8 p.m.

Fifteen producer-distributors using the personal sales system are open on Sunday. Three of those open on Sunday have reduced hours that day.

Indications were that producer-distributors who closed on Sunday made up for that day's sales during the preceding and following day, with total weekly sales remaining about the same. Producer-distributors not open on Sunday sold 41.1 percent of their weekly total sales Saturday through Monday compared with 41.7 percent for those open on Sunday.

Honor system

Six producer-distributors utilize the honor system for retailing milk. Under this system sales rooms are always open and patrons have free access to the refrigeration unit. Payment for milk and bottle deposit are left in empty bottles returned. Producer-distributors using this type of sales method report no loss of milk nor money. They did say, however, that they do not receive deposit on all bottles taken.

Selling with the honor system reduces the labor requirements to retail milk as no labor is required for selling.

Other Products Handled

Several producer-distributors handled products other than retail raw milk. Punch was sold in gallon jugs by several producer-distributors in addition to milk. Other products handled by producers were: bread, pastry, potatoes, eggs, honey, and dairy products. Prices charged for these products, except home produced products, were the same as in local stores in the area.

Advertising and Promotional Methods

Raw milk producer-distributors did little advertising and sales promotion. Radio and newspaper advertising were used by some while getting their business started. However, this type of advertising media was not continued. One producer-distributor gave pony rides once a week in the summer with a milk cap being required as a ticket. Three producer-distributors had given away shetland ponies for promotional efforts. One chance on the pony was awarded with each gallon of milk purchased. Less than half of the producer-distributors had made use of signs at the entrance of their premises to advertise raw milk for sale. Only two producer-distributors made use of signs on highways near their farms advertising their raw milk.

INVESTMENT IN BUILDINGS AND EQUIPMENT

Total Investment

Replacement value of buildings, including only milking parlor and milk storage facilities before producers modernized to become licensed retail raw milk producer-distributors, averaged $5,924 (Table 6) for the 17 producer-distributors who were formerly wholesaling grade A milk. This replacement value ranged from $200.00 to $17,000.

Table 6. Average investment in buildings and equipment

Item	Value before becoming licensed	Additional to become licensed	Total
Buildings	$ 5,924	$3,728	$ 9,652
Equipment	$ 4,179	$4,850	$ 9,029
Total	$10,103	$8,578	$18,681

Additional investment required in buildings to provide facilities to produce retail raw milk was an average of $3,728 per producer. Additional investment in buildings ranged from $50 to $12,000.

Average current building investment after remodeling or building new buildings was $9,652. Current investment in buildings ranged from $2,500 to $20,000.

Practically all new buildings consisted of cinder block construction as did those buildings remodeled.

Average investment in equipment used for preparing milk for market before preparing to become licensed was $4,179. Investment ranged from $335 to $9,440.

Average additional equipment investment to become licensed was $4,850. Additional equipment investment ranged from $1,089 to $15,236.

After preparing to retail milk the average investment by producer-distributors in equipment used to prepare milk for market was $9,029. Total investment in equipment ranged from $3,566 to $21,986.

Including both buildings and equipment, producers had an average investment of $10,103 before retailing raw milk, $8,578 to prepare for retailing raw milk, making a current total investment of $18,681.

Building Requirements

All facilities must meet grade A standards. The rigid standards set by the raw milk law caused grade A producers who converted to retailing raw milk to improve their facilities as well as provide extra space for the additional operations required to retail milk.

Wash room

A wash room is required to wash milking equipment and bottles. The size of this room depends on the type of equipment used for washing bottles and whether or not the bulk tank is in this room. Wash room sizes reported varied from 10 by 10 feet to 30 by 20 feet.

Processing room

A processing room in which milk is bottled must be provided. This room should be large enough to permit the bottling operation to take place and to permit easy movement of full and empty bottles. It is a

common practice to have the bulk tank located in this room. Sizes reported ranged from 6 by 8 feet to 20 by 20 feet. If an outside sales window is used it is possible to use the processing room as the sales room also.

Sales room

Sales room requirements depend on type of sales method used. The most desirable for personal sales is an inside "walk through" passageway with a glassed off area for the operator to use to distribute the milk. The sales area should be so arranged that it provides the operator easy access to the milk cooler. Outdoor sales windows are convenient when the weather is pleasant but are not desirable in times of cold or inclement weather.

Sales area for honor-system sales should be large enough to admit several people at one time. An area for stacking of empty bottles must be provided. Coolers that require only reaching in to get milk are preferred to walk-in type coolers for this type of sales method.

Additional Equipment Requirements

Milkers

Nine producer-distributors reported buying milk units. These were either new complete milking systems or additional units to speed up the milking process. Prices ranged from $35 to $3,400 depending on type and condition of milker (Table 7).

Pipeline milkers were preferred by those installing new systems. By using pipeline milkers the milk can be delivered to the bottle without being exposed to air.

Table 7. Cost, size and condition of milkers purchased by retail raw milk producer-distributors

Number of milking units	Cost	Condition when purchased
6	$2,200	New
4	3,400	New
4	1,900	New
3	700	New
3	500	New
1	600	New
1	120	New
1	50	Used
1	35	Used

Bulk tanks

Fourteen producer-distributors used bulk tanks in their operations. The majority of the producer-distributors had bulk tanks in use at the time they switched over to selling raw milk. Three producer-distributors reported purchasing bulk tanks when they began selling retail raw milk (Table 8).

Table 8. Bulk tank cost, capacity, and condition when purchased by retail raw milk producer-distributors

Capacity (gals.)	Cost	Condition when purchased
100	$ 60	Used
250	1700	Used
450	4000	New

Wash vats

Both stainless steel and galvanized vats were utilized by those interviewed. Those using stainless steel vats felt that the extra years of service justified the additional cost. The opinion was expressed that stainless steel vats had additional value because of their appearance when customers inspected the premises. The number of wash vats required depended on the size of operation and the method used for washing bottles. If an automatic bottle washer was used the requirements for wash vats were less than when a brush type washer was used.

Bottle and capper

All producer-distributors who retail raw milk in bottles must, by law, have a mechanical bottle filler and capper. The cost depends on type of machine purchased.

Prices paid for bottling and capping machines ranged from $478 to $2,800. The largest group of producers were those paying between $500 to $999 for a bottling and capping machine (Table 9). The average for this group was $674.

Table 9. Prices paid for bottling and capping machines

Price range	No. of producers[a]
$ 0 - 499	1
500 - 999	12
1,000 - 1,499	2
1,500 or more	1

[a] One producer-distributor sold in stainless steel cans and did not require a bottler and capper.

Coolers

Two types of coolers were used by producer-distributors. The most common type cooler used was the chest-type cooler. Several of these coolers were the glass front type used in grocery stores for milk and cold drink display. These were both front and back fill. The back fill machines were usually connected to a walk in cooler that was used to store the milk in and reduce the amount of glass front cooler area required. Cost of chest-type coolers ranged from $300 to $1300 (Table 10).

Table 10. Capacity, cost and condition of chest-type coolers purchased by raw milk producer-distributors

Capacity (gals.)	Cost	Condition when purchased
260	$ 300	Used
188	1,080	New
100	1,300	New

The other type of cooler used was the walk-in cooler. This type was preferred where sales are made through a sales window and only the sales personnel have access to the cooler. Cost data were not available for this type cooler as costs were included in building costs and not broken down sufficiently.

Bottle washers

The majority of producer-distributors used some variation of a semi-automatic bottle washer. This consisted of one or more brushes mounted on an electric motor. The brush when inserted in the bottle would clean out the inside. The cost on this type of machine ranged from $45 to $100.

The average price was $67.25.

The other type bottle washer used was an automatic machine where bottles placed on one end of a belt would be washed and sterilized and emerge at the other end of the machine ready for use. This type of machine is much faster but costs much more. The price on these automatic machines ranged from $1,700 to $1,800 and averaged $1,750 per unit.

Water heaters

All producer-distributors reported a water heater as necessary for their operations. Those using bottles required a larger one than those selling in stainless steel containers. This was because of the extra hot water required for washing bottles. Two producer-distributors installed furnace type heaters to provide adequate hot water for their automatic bottle washers. These furnaces cost $1,700 and $1,800. A wide range of prices and sizes were utilized by producer-distributors (Table 11).

Table 11. Size, cost, and condition of water heaters purchased by retail raw milk producer-distributors

Size (gals.)	Cost	Condition when purchased
40	$100	Used
80	125	Used
50	45	Used
80	200	New
80	160	New
60	150	New

Heating units

All but the producer-distributors in Washington County reported using some type of heater in their operation. The type of heater utilized depended on the requirements of the individual operator. Those using furnaces for water heating purposes utilized the same units in heating the portion of the building where milk was processed and sold. Electric heaters in each room were utilized by some while others used gas or oil stoves. Cost of heating units ranged from $10 for an oil stove to $1,750 for a gas furnace.

Cases

Cases to hold bottles were used by those using bottles. These cases were both wood and metal type. Cases for gallon jugs held four jugs each. Enough cases are required to store the amount of milk on hand at the producers at any one time. It is important for those selling with the honor system to have adequate cases on hand to handle bottles as they are returned. New cases cost an average of $3.75 per case. They ranged in price from $3.00 to $4.80. Used cases ranged in price from $2.00 to $4.00 and averaged $2.58 per case.

Carts

Carts to move the cases of milk are useful if milk must be moved from room to room after it is bottled. The type of carts used ranged in price from $20.00 to $37.00 per cart. The number of carts required depends on volume of milk sold and method of storing bottles. If bottles are stored on the carts then more carts are required.

Pumps

Eighteen producer-distributors reported having purchased pumps to either work additional milkers or to supply the increased demand for water. This expense in all cases was $300 or less and averaged $179.

ADDITIONAL COSTS AND RETURNS

Receipts

Receipts represent payments producer-distributors receive from sale of milk after hauling charges for milk sold to milk handlers have been deducted.

Receipts under former practices were arrived at by assuming that producer-distributors would have sold the same amount of milk that they did under their current practices, and that they would have sold this milk to the handler to whom they formerly sold. The price they would have received and the hauling charge they would have been charged were obtained from milk handlers who had been servicing these producers.

It was further assumed that the grade A base held by producer-distributors at the time they converted to retail raw milk sales would not have changed.

Receipts if former practices had been maintained are purely hypothetical and were arrived at by following the aforementioned assumptions.

Receipts under current practices have hauling charges deducted from sales of surplus milk. The total value of retail raw milk sold is included in the calculations. Only the 17 producers who shifted from wholesaling grade A milk to retailing raw milk are included in this section on additional costs and returns.

Current marketing practices

Average receipts to producer-distributors were $2,112.05 per month under current marketing methods (Table 12). This varied from $524.09 to

Table 12. Additional receipts, costs and net returns to 17 retail raw milk producer-distributors previously wholesaling grade A milk

Item	Average per month	Average per gallon produced
Receipts from sales of milk:		
Current marketing practices	$2,112.05	$ .5738
Former marketing practices	1,406.29	.3820
Current less former marketing practices	705.76	.1917
Additional costs:		
Buildings	27.36	.0074
Equipment	63.54	.0173
Additional operating costs:		
Labor:		
Family	292.88	.0796
Hired	24.97	.0068
Utilities	40.18	.0109
Cleaning supplies	18.40	.0050
Caps	13.21	.0036
Bottles	12.47	.0034
Veterinary	8.17	.0022
Milk permit	.08	a
Total additional operating costs	410.36	.1115
Total additional costs	501.26	.1362
Net additional returns	204.50	.0555
Plus allowance for family labor	292.88	.0796
Net additional returns not including family labor expense	497.38	.1351
Return to family labor per hour	1.87	

[a] Less than .0001.

$3,971.50 among the 17 producer-distributors.

Average receipts per gallon produced were $.5738. This varied from $.3423 to $.7000.

Former marketing practices

Average receipts to producer-distributors assuming their former marketing methods were $1,406.29 per month. This ranged from $314.88 to $2454.61.

Average receipts per gallon produced if former practices had been maintained were $.3820. This ranged from $.2941 to $4626.

Difference between current and former practices

Average receipts to producer-distributors were $705.76 higher per month due to marketing their milk under present methods. Differences in receipts when current practices were compared with former practices ranged from $52.19 to $1,516.89 per month.

The increase in receipts per gallon produced averaged $.1917 more under current than former practices. This difference ranged from $.0082 to $.3648.

Additional Costs

Costs studied were additional costs incurred by producer-distributors in changing from a wholesale to a retail market.

All farm costs and receipts were not included in the analysis because determining total farm profit or loss was not the objective of this thesis.

Total

Total additional costs per month ranged from $181.02 to $1,009.92 and averaged $501.26. Cost per gallon produced varied from $.0458 to $.3457. Average cost per gallon was $.1362.

Total costs were divided into two major groups--costs resulting from additional investment and additional operating costs.

Costs resulting from additional investment

Buildings. Additional building costs arise from depreciation, repairs, interest, taxes and insurance on additional investment in buildings.

The various yearly charges were assessed after interviews with representatives of the Bureau of Internal Revenue, reviewing other cost and return studies using similar information (1, 2) and discussions with people who work with the type of data needed.

Depreciation and repairs on buildings was set at 2.5 percent per year. This will allow a depreciation period of 40 years with any repairs adding to the years of useful life of the building. Interest on additional investment in buildings was charged at 5 percent per annum. Taxes and insurance were assessed at 1 percent per annum on additional investment.

Total additional building cost per month averaged $27.36 and ranged from $.35 to $84.84. Additional building cost per gallon was $.0074 and varied from $.0004 to $.0160.

Equipment. Equipment costs represent depreciation, repairs, interest, taxes and insurance on the additional investment in equipment.

The same sources were checked in determining the cost of equipment as were used for establishing building costs.

Depreciation and repairs were charged at a rate of 7 percent per annum. The rate of interest charged on investment was 6 percent per annum. A tax and insurance expense of 1 percent per annum was used.

Equipment costs ranged from $12.69 to $177.65 per month and averaged $63.54. Average cost per gallon produced was $.0173. Equipment cost per gallon produced ranged from $.0048 to $.0355.

Additional operating costs

Additional operating costs included all costs to producer-distributors that resulted from their changing from wholesale to retail sales.

Total. Average additional operating costs per producer per month were $410.36. Monthly additional operating costs ranged from $164.91 to $916.74 per month.

Additional operating costs averaged $.1115 per gallon produced. Cost per gallon of milk produced ranged from $.0370 to $.3290.

Labor. Additional labor to retail raw milk ranged from 2.5 to 24.5 hours per day. The average daily additional labor requirement was 8.4 hours.

Selling required more additional hours than any other job (Table 13). Other jobs requiring additional labor for producers were bottling and capping, washing bottles, and cleaning the milk utensils and facilities. Several producer-distributors indicated that more time is now required to milk than before they started selling raw milk because extra care must be taken to insure the production of milk clean enough to pass inspection.

Producer-distributors selling milk in cans did not have additional labor for bottling and capping nor washing bottles. Those selling with the honor system did not have labor requirements for selling.

Table 13. Additional labor requirements to retail raw milk

Job	Hours spent per day	
	Range	Average
Bottling and capping	0 - 4.0	2.8
Washing bottles	0 - 3.0	1.9
Selling milk	0 -11.0	4.0
Cleaning	.5 - 8.0	2.2
Total	2.5 -24.5	8.4

Additional labor cost per month averaged $317.85 for each producer. Average additional labor cost per gallon produced was $.0863. Additional labor expense amounted to 77.4 percent of total additional operating expenses.

An allowance of $1.10 per hour of family labor was included in expenses. This amounted to an average of $292.88 per month and accounted for 92.1 percent of total monthly labor expense. Hired labor, which was charged according to wages paid by producers averaged $24.97 per month and represented 7.9 percent of the total additional labor expense.

Utilities. Average additional utility cost was $40.18 per producer per month. There was a large range in additional costs between producers. This was because of differences in additional requirements and differences in rates charged for utility services.

Additional utility cost resulted primarily from additional requirements for hot water and for heating processing and sales areas.

Cleaning supplies. Additional cleaning supplies cost an average of $18.40 per month. This cost increased because of materials used to clean and sanitize bottles and equipment. Additional floor space to keep clean

also required additional supplies for cleaning.

Caps. Average expense per month for caps was $13.21 per producer. Cap expense varies with the number of bottles used. If milk is sold in quart containers the cap cost per gallon is higher than if milk is sold in gallon jugs. The average price paid for caps was $34.71 per 10,000.

Bottles. One-third of the total cost of bottles was charged as an expense to the producer-distributor. Information supplied by producers indicated that approximately two-thirds of the cost of bottles was paid by consumers through bottle deposits.

Average bottle expense per month was $12.47.

Other. Additional veterinary expense to keep herd health and insure continuance of production of high quality milk under the new regulation averaged $8.17 per producer per month. Part of this cost was due to additional herd inspection paid for by producer-distributors.

Each producer-distributor was required to purchase a milk permit which cost $1.00 per year.

Additional Returns Above Additional Costs

Additional returns realized by producer-distributors after additional costs were deducted averaged $204.50 per producer per month. The range on additional returns was from $224.79 to $914.65 per producer per month.

Additional returns above additional costs per gallon produced averaged $.0555. Additional returns per gallon varied between-$.1021 and $.1844.

Twelve producer-distributors realized additional returns above additional costs by shifting their marketing method from grade A

wholesaling to retail raw sales. Five producer-distributors had additional costs greater than additional returns which resulted in their decreasing their net income by changing from a wholesale grade A outlet to retailing raw milk.

Return to Family Labor

Additional returns per producer with all costs deducted except family labor averaged $497.38 per month. Additional return per gallon produced not including family labor expense averaged $.1351.

The average return to producers and their families for the additional hours of labor supplied by them was $1.87 per hour.

FACTORS AFFECTING ADDITIONAL RETURNS PER GALLON

With any business enterprise there are factors that determine the degree of success enjoyed by the firm. This statement holds true for producer-distributors of retail raw milk. This section will be devoted to analyzing those factors that attribute to the additional returns received per gallon of milk produced.

Volume of Production and Additional Costs

Regression analysis was used to determine the additional cost per gallon at various levels of production. The two unknowns that must be calculated in performing regression analysis are identified as: a, which is the point at which the regression line intercepts the Y axis; and b, which is the value indicating the slope of the regression line. A positive b value indicates an upward slope of the regression line while a negative b value indicates a downward slope.

Regression analysis of the effect of volume of production on additional building cost per gallon resulted in an a value of $.0055 and a b value of $.000012 (Table 14). The b value in this instance was rather unusual in that it indicated an increased cost per gallon as volume of production increased. This relationship was due to larger producers building more expensive facilities to handle their milk while smaller producer-distributors tried to get along with as little additional investment as possible.

Results from regression analysis of additional equipment costs per gallon and volume of production show an a value of $.0178 and a b value

of -$.000017. This negative relationship is normal between these factors. Unit costs usually decrease as the number of units produced increases.

Table 14. Regression analysis between gallons of milk produced per day and additional costs per gallon

Item	a value	b value
Building costs	$.0055	+$.000012[a]
Equipment costs	.0178	- .000017[a]
Operating costs	.2326	- .000850[a]

[a] Significant at the 95 percent confidence level.

Regression analysis of additional operating cost per gallon produced and daily volume of production reveal an a value of $.2326 and a b value of -$.000850. The change in cost per gallon produced as volume increased was more pronounced with regard to additional operating cost than with equipment and building costs.

Additional costs were calculated at the 50, 100, 150 and 200 gallon levels of daily production. This range included most operations studied. Additional costs were derived from the regression coefficients. These costs are summarized in Table 15. Total additional costs decreased markedly as volume of production increased.

The effect of volume of production and variation in additional costs on additional returns are shown in Table 16. In constructing Table 16 average prices and percent of production were assumed. A business producing only 50 gallons per day would have lost $.0382 per gallon by shifting from a grade A wholesale to a retail raw milk market. A business producing 100 gallons per day would have made less than one cent

additional returns per gallon, while one producing 200 gallons would have made about nine cents extra per gallon.

Table 15. Additional cost per gallon at various levels of production

Daily production in gallons	Additional cost per gallon			
	Building	Equipment	Operating	Total
50	$.0061	$.0170	$.1901	$.2132
100	.0067	.0161	.1476	.1704
150	.0073	.0152	.1051	.1276
200	.0079	.0144	.0626	.0849

Table 16. Effect of volume of production on additional returns per gallon[a]

Daily production in gallons	Additional returns per gallon produced
50	-$.0382
100	.0046
150	.0474
200	.0901

[a] Assume: 75 percent of production sold retail, $.27 per gallon for surplus milk, $.65 per gallon for retail milk, $.38 per gallon under former marketing method.

Retail Raw Milk Price

Prices charged per gallon of retail raw milk varied between $.50 and $.75. Assuming other factors to be average, a business producing

only 50 gallons per day would have to charge $.75 per gallon in order to realize extra returns from retailing raw milk (Table 17). In order to make additional returns a 100 gallon operation would have to sell retail milk for at least $.65 per gallon, a 150 gallon business $.60, and a 200 gallon business $.55. Additional costs in retailing raw milk would exceed additional receipts for all producers if a price of $.50 or less were charged per gallon of milk retailed.

Table 17. Effect of price received per gallon of retail raw milk on additional returns per gallon at various levels of production[a]

Daily production in gallons	Price per gallon					
	$.50	$.55	$.60	$.65	$.70	$.75
	Additional returns per gallon produced					
50	-$.1507	-$.1132	-$.0757	-$.0382	$.0007	$.0368
100	- .1079	- .0704	- .0329	- .0046	.0421	.0796
150	- .0651	- .0276	.0099	.0474	.0849	.1224
200	- .0224	.0151	.0526	.0901	.1276	.1651

[a] Assume: 75 percent of production sold retail, $.27 per gallon received for surplus milk, $.38 per gallon received under former marketing practices, additional cost at each level of production as indicated in Table 15.

Percent of Production Sold Retail

Percent of production sold retail will affect the amount of additional income by causing the average price received per gallon to change. The larger percent of production sold retail raw the higher the average price received per gallon produced will be.

Assuming all other factors to be average, all producer-distributors would have to sell more than 50 percent at retail to make additional

returns from retailing raw milk. If production were 50 gallons per day, more than 75 percent of production would have to be sold retail to realize additional returns (Table 18).

Table 18. Effect of percentage of production sold retail on additional returns per gallon at various levels of production[a]

Daily production in gallons	Percent sold retail			
	25	50	75	100
	Additional returns per gallon			
50	-$.2282	-$.1332	-$.0382	$.0568
100	-.1854	-.0904	.0046	.0996
150	-.1426	-.0476	.0474	.1424
200	-.0999	-.0049	.0901	.1851

[a] Assume: Retail milk price of $.65 per gallon, surplus milk price of $.27 per gallon, price received under former marketing practice $.38 per gallon, additional costs as in Table 15.

Price Received Formerly

The lower the price received for milk under former marketing practices the more likely a producer retailing raw milk will be making additional returns. Assuming other factors to be average, a distributor producing only 50 gallons per day would have to have received less than $.35 per gallon under former marketing practices to make additional returns retailing raw milk (Table 19). If production were 200 gallons per day a producer-distributor would still make additional returns by retailing raw milk even though as much as $.45 per gallon were received formerly.

Table 19. Effect of price received under former marketing method on additional profit per gallon under present marketing practices at various levels of production[a]

Gallons produced per day	Price received per gallon under former marketing practices				
	$.25	$.30	$.35	$.40	$.45
	Additional returns per gallon				
50	$.0918	$.0418	-$.0082	-$.0582	-$.1082
100	.1346	.0846	.0346	- .0154	- .0654
150	.1774	.1274	.0774	.0274	- .0226
200	.2201	.1701	.1201	.0701	.0201

[a] Assume: Retail sold at $.65 per gallon, surplus sold at $.27 per gallon, 75 percent of production sold as retail raw, additional costs as represented in Table 15.

Price Differential Between Former and Current Marketing Practices

The larger the differential in average price received for milk under former and current marketing practices the more likely retailing raw milk will result in additional returns. The differential may vary depending on the price received for milk under former marketing practices, price of retail raw milk, price of surplus milk, and percent of production sold at retail.

With the additional costs determined through regression analysis (Table 15) a producer producing 50 gallons of milk per day would need a price differential of $.25 per gallon before he would realize additional returns by retailing his milk. A producer producing 200 gallons per day would realize additional returns from retailing raw milk with a price differential as small as $.10 per gallon (Table 20).

Table 20. Effect of price differential per gallon between former and current marketing practices and additional returns per gallon at various levels of production

Daily production in gallons	Price differential				
	$.05	$.10	$.15	$.20	$.25
	Additional returns per gallon				
50	-$.1632	-$.1132	-$.0632	-$.0132	$.0368
100	- .1204	- .0704	- .0204	.0296	.0796
150	- .0776	- .0276	.0224	.0724	.1224
200	- .0349	.0151	.0651	.1151	.1651

SUMMARY AND CONCLUSIONS

Passage of a law by the Utah State Legislature in 1959, controlling the retail sale of raw milk in the state, has resulted in the development of a group of specialized retail raw milk producer-distributors.

The purposes of this study were: (a) to describe the retail raw milk industry in the state, and (b) to determine the relative profitability of retailing raw milk as compared with wholesaling it.

Included in the study were 25 producer-distributors located in 12 counties throughout the state, producing an average of 53,987 total gallons of milk per month. An average of 75.5 percent of production was sold as retail raw milk. The remainder of the milk produced was sold as manufacturing milk in Utah and grade A milk in Nevada. The outlet used for surplus milk depended on the location of the producer-distributor.

All producer-distributors were located within six miles of a town. All were located within four miles of a major highway and all except one were on an oiled road.

For most producer-distributors, sale of retail raw milk was the major source of income. Eight reported 100 percent of their income came from the sale of retail raw milk.

Producer-distributors were using six types of containers in retailing raw milk. One-quart, two-quart and gallon glass containers were used. One, two and three gallon stainless steel containers were also utilized. Customers were charged deposits equal to about the cost of the container. A much higher deposit was required for the stainless steel containers than for bottles.

Prices charged by producer-distributors for retail raw milk varied from 50 to 75 cents per gallon, or an average of 63.7 cents per gallon.

Two methods of sale were utilized by producer-distributors. The most common was the personal sales method where an attendant was on duty to dispense milk. Morning and evening sales hours were prevalent under this method. Some used the honor system. Under this system sales rooms were left open all hours. This reduced the labor necessary to retail milk.

Many producer-distributors sold other products in addition to milk such as punch, bread, pastry, potatoes, eggs, honey and dairy products. Sale of these products added little to the total income of producers.

Few producer-distributors used advertising to promote sales.

Producer-distributors who formerly wholesaled grade A raw milk invested an average of $8,578 in additional buildings and equipment in becoming licensed to produce and retail raw milk. Investment in additional buildings averaged $3,728. This included expenditure for milking parlor, sales room, processing room and wash room. In some instances built-in-milk coolers were included. An average expenditure of $4,850 was made for new equipment necessary to produce and retail raw milk.

Grade A producers, in switching from wholesaling to retailing most of their milk, increased receipts an average of $706 per month, or $.1917 per gallon. Additional costs in producing and retailing raw milk amounted to $501 per month, or $.1362 per gallon. Additional costs included $.0074 per gallon for buildings, $.0173 per gallon for equipment, and $.1115 per gallon for additional operating expenses. Additional returns above additional costs averaged about $204 per month, or $.0555 per

gallon. In other words, in changing from wholesaling to retailing raw milk, producers increased receipts an average of $.1917 per gallon while increasing costs an average of only $.1362 per gallon, thus making it profitable to do so.

Factors influencing additional returns from retailing instead of wholesaling raw milk include volume of production and additional costs, price received for milk under former marketing practices, price of retail raw milk, price of surplus milk, and percent of production sold retail.

From data analyzed the following conclusions were made:

1. Retailing raw milk was a more profitable method of marketing milk for 12 of the 17 producers who were formerly wholesaling grade A milk. For five, additional costs exceeded additional receipts.

2. In order for a producer-distributor to realize average additional returns of $.0555 per gallon he would need a daily production volume of 121 gallons, sell 75.5 percent of production as retail, receive $.637 per gallon for retail milk, $.27 per gallon for surplus milk, and have sold milk previously for $.38 per gallon.

3. There is a growing demand for retail raw milk in the state. The potential demand is not known, but will likely remain a small proportion of total retail sales. The number of producers who can retail a sufficient volume of raw milk to make it profitable is likely limited. Before entering the retail raw milk market a producer-distributor should evaluate expected retail sales as well as expected costs of entering the business.

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