Agricultural Experiment Stations of Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin and U. S. Department of Agriculture Cooperating.

NORTH CENTRAL REGIONAL PUBLICATION 113

DISPOSING OF SURPLUS FLUID MILK IN MIDWESTERN MARKETS

TOTAL RECEIPTS

SURPLUS

USES REQUIRING MILK OF BOTTLING QUALITY

JAN. APRIL JULY OCT.

BULLETIN 664

UNIVERSITY OF ILLINOIS
AGRICULTURAL EXPERIMENT STATION
The persons named below were on the regional committee during the period of the study. Members of the subcommittee in charge of the project are indicated by asterisks (*).

Illinois........................................ Roland W. Bartlett
Indiana.......................................... Charles E. French
Iowa............................................... George W. Ladd
Kansas........................................... Paul L. Kelley*
Kentucky......................................... John B. Roberts
Michigan......................................... Gerald G. Quackenbush
Minnesota........................................ E. Fred Koller*
Missouri.......................................... Stephen F. Whitted
Nebraska......................................... Ernest Feder, Clarence J. Miller
North Dakota................................. Fred R. Taylor, Richard J. Goodman
Ohio............................................... Elmer F. Baumer*
South Dakota................................. Travis W. Manning, Ralph O. Felberg
Wisconsin........................................ Hugh L. Cook,* Truman F. Graf

U. S. Department of Agriculture
   Agricultural Marketing Service.......... Louis F. Herrmann
   Farmer Cooperative Service.............. Donald E. Hirsch,
                                          Stanley F. Krause

State Experiment Stations
   Division, Agricultural Research Service..... Whitney B. Stout

Administrative adviser to the committee was Noble Clark, Associate Director of the Wisconsin Agricultural Experiment Station. Federal-state cooperative agent was Sheldon W. Williams.
Foreword

Fluid milk markets receive substantial quantities of milk in excess of their needs for packaged milk products and other items required to be made from milk of bottling quality. Experience suggests that these surpluses will continue.

Numerous studies have been made of the pricing of this surplus milk. Much less research has been done on the handling of surplus milk and the changes in handling arrangements needed to take advantage of technological developments in milk marketing. To fill in this gap, the North Central Regional Committee on Dairy Marketing Research undertook a series of studies of the management of surplus milk in fluid milk markets.

First in the series was a regionwide survey of the quantity of surplus milk in fluid markets, problems associated with it, and arrangements for handling it. That survey was the primary source of the information reported in this publication. Subsequent studies of the problem (now under way and to be reported later) include: (1) case studies in 15 selected markets of the character of fluid milk surpluses from 1950 to 1957, their relationship to market conditions, arrangements for disposing of surplus, and the surplus-handling problems of marketing agencies; (2) analytical studies of the costs and returns involved in handling surplus fluid milk under alternative arrangements in a variety of market situations; and (3) an evaluation of the effectiveness of pricing mechanisms, such as supply-demand adjusters, in adjusting supplies of milk on fluid markets to handlers’ needs.

Federal milk market administrators, cooperative managers, milk dealers, and others contributed to this study a wealth of information that is gratefully acknowledged. The schedules were taken by committee members and other representatives of the 13 state agricultural experiment stations participating. Mrs. Patricia Barham did much of the statistical work. Members of the regional committee contributed many helpful suggestions for the analysis and presentation of the data.
CONTENTS

DESCRIPTION OF THE STUDY .................................................. 8

SURPLUS FLUID MILK IN MIDWESTERN MARKETS ......................... 9

  Importance ........................................................................... 9

  Seasonal Aspects ............................................................... 12

  Short-Time Surpluses ......................................................... 15

  Surpluses of Butterfat and of Skimmilk ............................... 18

  Factors Related to the Proportion of Surplus Milk ................. 18

MILK MARKETING AGENCIES AND THEIR FACILITIES FOR
  SURPLUS DISPOSAL ............................................................. 22

  Cooperatives With Bargaining Activities ............................ 22

  Milk Bottling Plants ......................................................... 25

  Arrangements Between Bargaining-Type Cooperatives
    and Handlers .................................................................. 28

  Products Made From Surplus ............................................. 29

SURPLUS DISPOSAL ARRANGEMENTS ....................................... 31

  Classification of Disposal Arrangements ............................ 31

  Importance of Arrangements, by Types ............................... 34

  Conditions Influencing Choice of Arrangements .................. 36

EVALUATION OF SURPLUS-MILK HANDLING ARRANGEMENTS ......... 40

  Desirable Characteristics .................................................. 40

  Conditions to Which Various Arrangements Are Best Suited .... 43

  Developments Affecting Choice of a System ........................ 45

SUMMARY AND CONCLUSIONS ............................................... 49

LITERATURE CITED ............................................................... 51

Urbana, Illinois, September, 1960
Disposing of Surplus Fluid Milk in Midwestern Markets

Sheldon W. Williams and Orval G. Kerchner

Fluid milk markets seldom receive from regular producers exactly the quantities of milk required to meet the needs of those markets. Because of fluctuations in quantities of milk received from producers and in quantities used in packaged milk and related products, at any given time these markets can expect supplies from regular producers to be either in excess or short of their needs. In the nineteen-fifties, as in the thirties, surpluses have been more troublesome than shortages.

Several types of surpluses are involved. Serious short-time supply problems are developing in many markets because of increasingly wide day-to-day fluctuations in the quantities of packaged milk sold (pages 15 to 18). The extra supply of milk that a market finds it necessary to carry to meet this day-to-day fluctuation in sales of packaged milk, together with some day-to-day differences in milk receipts from producers, has been termed its “operating reserve” (Fig. 1) (10).

Another type of surplus results mainly from seasonal variation in the quantity of milk received from producers. This seasonal variation is characteristically pronounced, while sales of packaged milk products are comparatively uniform throughout the year (page 12). To be adequately supplied, a market needs sufficient milk from regular producers in the period of low production to take care of its fluid needs and to allow an “operating reserve.” The excess beyond this that it carries at other times of the year as a result of seasonal fluctuations in supplies may be termed the “seasonal surplus.”

To the extent that a market has supplies during the season of short production that exceed bottled sales plus an operating reserve, it has a third type of surplus that we

---

1 Sheldon W. Williams, Federal-State Cooperative Agent with the North Central Regional Committee on Dairy Marketing Research. Orval G. Kerchner, former Research Assistant, University of Illinois, and now Agricultural Economist with the Agricultural Marketing Service, U. S. Department of Agriculture.

The regionwide survey reported here and subsequent case studies were planned and supervised by a subcommittee whose members were: Elmer F. Baumer, Chairman; Hugh L. Cook; Paul L. Kelley; and E. Fred Koller. This subcommittee operated under the general direction of the regional committee.

2 The terms “packaged milk” and “bottled milk” are used interchangeably in this report to refer to milk for fluid consumption whether packaged in glass or in paper containers.

3 Numbers in parentheses refer to references listed on page 51.

4 This type of surplus also has been termed “seasonal reserve” (10).
might term "surplus in excess of operating reserve and seasonal surplus."¹

In this study, the definition of "surplus milk" was based upon the use made of the milk in relation to health department requirements. Surplus milk was defined as milk of the quality approved by health regulations for use in packaged whole milk that was in excess of the amount used in products required to be made of milk of that quality.² Surplus milk as thus defined included operating reserves and seasonal surpluses as well as milk in excess of that included in these two types of surplus.

An excess supply of fluid milk complicates marketing operations and may lead to instability in prices paid to producers. A major reason for this is that products made from surplus milk might alternatively be made from milk of manufacturing quality. To enable processors who make these products from surplus fluid milk to compete, surplus milk must be priced at approximately the price level of manufacturing milk. This necessitates pricing such milk below the price of milk used in bottled products, in some cases by substantial amounts.

The irregular quantities of surplus fluid milk available pose problems in handling it efficiently. Facilities provided to handle this milk in periods of peak supplies will be only partly utilized, and so will operate at below peak efficiency in periods of slack supplies. Because of this and the comparatively small volume of surplus fluid milk that may be available, under some conditions it can be handled most efficiently by diverting it to plants that manufacture dairy products from milk of manufacturing quality.

Even diversion of surplus to regular manufacturing plants may involve problems, however, because peak surpluses of fluid milk commonly coincide with peak receipts of manufacturing milk. If they do, manufacturing plants may be unable to handle the surplus fluid milk without taking on extra help or paying labor at overtime rates. Such situations sometimes lead the management of such plants to discount prices they offer for surplus fluid milk in flush periods below the price

¹ Many fluid milk plants consider the production of ice cream and cottage cheese to be integral parts of their operations, and do not classify milk used in these products as "surplus." For a discussion of procurement policies of a group of plants in south central United States, see (6).

² In many markets health regulations did not require that ice cream and cottage cheese be made from milk of the quality approved for use in packaged whole milk. In those markets, surplus milk, as defined in this study, included any milk of this quality that was used in such items. However, under this same definition, in cities like Chicago, where either ice cream or cottage cheese or both were required to be made from milk of bottling quality, the milk used to manufacture them was not classified as surplus.
they regularly pay for manufacturing milk. In extreme cases, it may be impossible to find worthwhile outlets for surpluses of skimmilk, with the result that it is fed to livestock or wasted. Losses incurred in disposing of milk under conditions such as these are likely to show up in reduced prices to producers.

Because surplus milk must be marketed at below the price paid for milk used in bottled products and is irregular in volume, this surplus is a consideration in the bargaining between producers' cooperatives and milk dealers. Many dairy farm leaders believe that if producer organ-

**QUANTITY**

![Graph](image)

**MONTHS**

- SURPLUS IN EXCESS OF OPERATING RESERVE AND SEASONAL SURPLUS
- SEASONAL SURPLUS
- OPERATING RESERVE (SURPLUS)
- USE IN PRODUCTS REQUIRING MILK OF BOTTLING QUALITY

Hypothetical illustration of use of milk in products requiring milk of bottling quality and types of surpluses in fluid milk markets. (Fig. 1)
izations take responsibility for disposing of surplus milk, thereby keeping bothersome surpluses off the market, they may improve their bargaining position. Thus, in developing arrangements for handling surplus milk, the type of agency taking responsibility for it is a consideration.

**DESCRIPTION OF THE STUDY**

This study was made to obtain information about the handling of surplus fluid milk in the Midwest. Its major objectives were: (1) to determine and classify the arrangements used in handling surplus milk of bottling quality in the North Central Region; (2) to examine relationships between the arrangements in use and characteristics such as size of market, type of agency responsible for surplus disposal, and the status of the manufacturing-milk industry in the area; and (3) to evaluate the suitability of the various handling arrangements to different market situations.

In this study, a market typically consisted of a population center such as a city and its suburbs, in which milk dealers received fluid milk and packaged it for sale to consumers as milk and cream. In most Federal order markets, the marketing area regulated by the order was the unit considered as a market in this study. In some cases this involved considering as markets Federal order marketing areas comprised of more than one population center. Examples of these were the Neosho Valley area in Kansas and Missouri and the Omaha-Lincoln-Council Bluffs area in Nebraska and Iowa, data for which were best available on a marketing-area basis. On the other hand, individual population centers in a few area orders, such as Portsmouth, Ohio, in the Tri-State order (Ohio, West Virginia, Kentucky), and Sioux Falls and Mitchell in the Sioux Falls-Mitchell, South Dakota order, were treated as separate markets. Characteristics of the component markets and the availability of data were major determinants of the approach used.

Information was obtained for 104 markets in the North Central Region for the calendar year 1955. With few exceptions, state workers surveyed their largest markets. The number included in each state was determined by the representative from that state. In approximately half of the states from 8 to 10 markets were included, but in the other states numbers ranged from 2 to 15.

Nearly half of the surveyed markets were population centers of less than 50,000, while only one-seventh had 300,000 people or more. Nevertheless, although few in number, the markets of 300,000 or more handled 75 percent of the milk received by all markets in the survey,
while the large number of markets of less than 50,000 handled only 3 percent of the milk, as the following figures show.

<table>
<thead>
<tr>
<th>Market population</th>
<th>Number of markets</th>
<th>Percent of total milk supplies of surveyed markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25,000</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>25,000 to 50,000</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>50,000 to 75,000</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>75,000 to 150,000</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>150,000 to 300,000</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>300,000 to 600,000</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>600,000 or more</td>
<td>8</td>
<td>61</td>
</tr>
<tr>
<td>All markets</td>
<td>104</td>
<td>100</td>
</tr>
</tbody>
</table>

* Based on data for 98 markets for which total receipts were reported. The 6 markets without data included 3 of less than 25,000 and one of 150,000 to 300,000. If data had been available for these markets, the percentages would not have been changed materially from those shown.

Not quite half of the markets were in the 6 states of the region that are east of the Mississippi river (Fig. 2). Because there are more large cities in the eastern than in the western states of the region, the majority of the large markets were in the eastern states, and most of the small markets in the western states.

Schedules were obtained for all but 4 of the markets in the region that had populations of 50,000 or more. The practically complete coverage of the large markets meant that information was obtained from the markets handling a large portion of the milk of bottling quality sold in the region. These are also the markets in which the most highly developed arrangements for handling surplus fluid milk are likely to be found.

A drawback of the method of selection used was that it included in the survey a considerably larger proportion of the markets of less than 50,000 people from the western part of the region than from the eastern part. Consequently, in arrangements used for handling surplus milk, the markets of less than 50,000 included in the survey may not be representative of all markets of that size in the region.

**SURPLUS FLUID MILK IN MIDWESTERN MARKETS**

**Importance**

Considering the year 1955 as a whole, 27 percent of the total milk supplies of the markets in the study was surplus milk as defined in this study—that is, milk approved for bottling but used in products for which milk of bottling quality was not required. The proportion of surplus varied widely among markets. In one-tenth of the 97 markets
Location of 104 fluid milk markets surveyed in the North Central Region, 1955 (Fig. 2). The markets included and their estimated urban populations to the nearest thousand follow.

**Illinois:** Bloomington, 46; Champaign-Urbana, 79; Chicago, 5,619; Danville, 53; Decatur, 82; Peoria, 206; Quad cities (Moline, Rock Island, and Davenport and Clinton (Iowa)), 242; Quincy, 47; Rockford, 141; Springfield, 104.

**Indiana:** Elkhart, 58; Evansville, 156; Fort Wayne, 158; Indianapolis, 568; Kokomo, 42; Lafayette, 55; Muncie, 66; Richmond, 47; South Bend and La Porte, 193; Terre Haute, 83.

**Iowa:** Des Moines, 213; Dubuque, 53; Marshalltown, 20; Sioux City, 105; Waterloo, 93.

**Kansas:** Manhattan, 14; Neosho Valley (Pittsburg, Coffeyville, Joplin (Missouri), and other towns), 154; Southwest Kansas (Dodge City, Garden City, Great Bend, and other towns), 84; Topeka, 105; Wichita, 259.

**Kentucky:** Louisville, 536; Paducah, 57.

**Michigan:** Battle Creek, 94; Detroit, 3,159; Grand Rapids, 255; Jackson, 68; Muskegon, 98; Saginaw Valley (Bay City, Saginaw, Midland), 200.

**Minnesota:** Albert Lea, 14; Austin, 26; Duluth and Superior (Wisconsin), 200; Hibbing, 18; Mankato, 21; Minneapolis-St. Paul, 1,088; Rochester, 32; St. Cloud, 30; Winona, 26.

**Missouri:** Cape Girardeau, 23; Columbia, 34; Fulton, 10; Hannibal, 21; Jefferson City, 28; Kansas City, 814; Kirksville, 11; Mexico, 13; Moberly, 13; Ozarks (Springfield and other towns), 158; Poplar Bluff, 17; St. Joseph, 85; St. Louis, 1,658; Sedalia, 20; Sikeston, 13.

**Nebraska:** Norfolk, 12; Omaha, Lincoln, and Council Bluffs (Iowa), 452; Platte Valley (Grand Island, Hastings, North Platte, and other towns), 100.

**North Dakota:** Bismark-Mandan, 29; Devils Lake, 6; Dickinson, 8; Fargo and Moorhead (Minnesota), 60; Grand Forks, 35; Jamestown, 14; Minot, 25; Valley City, 8; Williston, 12.

**Ohio:** Akron, 389; Canton, 222; Cincinnati, 896; Cleveland, 1,530; Columbus, 492; Dayton and Springfield, 508; Lima, 59; Portsmouth, 54; Toledo, 384.

**South Dakota:** Aberdeen, 23; Black Hills (Rapid City, Sturgis, Belle Fourche, and other towns), 80; Huron, 14; Mitchell, 13; Redfield, 3; Sioux Falls, 59; Watertown, 14; Yankton, 9.
Proportion of markets having various percentages of surplus milk, North Central Region, 1955. (Based on 97 markets for which data were available.) (Fig. 3)

Average percentage of fluid milk supplies that were surplus in the four sections of the North Central Region, 1955. (Based on 97 markets for which data were available.) (Fig. 4)

**Wisconsin:** Eau Claire, 38; Fond du Lac, 31; Green Bay, 77; Janesville, 26; Kenosha, 60; La Crosse, 54; Madison, 126; Manitowoc, 29; Milwaukee, 883; Oshkosh, 71; Racine, 89; Sheboygan, 53; Wausau, 32.

Most of the estimates of populations are taken from *Sales Management*, Survey of Buying Power. Bill Brother Publishing Corp., Philadelphia, Pa. 1955. Population estimates for a few area markets were made by dairy marketing workers who obtained the data for these markets.
for which statistics on supplies and utilization of milk were available, less than 5 percent of total fluid milk supplies were reported utilized as surplus (Fig. 3). At the other end of the range, 6 percent of the markets reported 35 percent surplus or more—some as much as 50 percent.

Differences among various parts of the region in the proportion of surplus were small. The proportion of the milk surplus was somewhat below average in the south mid-section of the region (Fig. 4).

**Seasonal Aspects**

The volume of surplus fluid milk varied widely over the year (Fig. 5). It increased through the winter and spring to a high peak in May, dropped sharply during the summer to a low in the fall (usually September), and increased gradually late in the year. In two of the four subsections, the volume of surplus milk in the peak month was fully four times that in the low month. Even in the section where the volume of surplus milk was least variable, that in the peak month was two-and-one-half times that in the low.

Seasonal variation in the volume of surplus milk was attributable mainly to seasonal fluctuations in milk supplies. Typically, milk supplies increased through the winter and early spring to a peak in May (Fig. 6). They subsequently declined to seasonal lows that occurred in late summer in the western section but somewhat later in the other sections.

The quantity of milk used in products for which milk of bottling quality was required was seasonally much less variable than the quantity of such milk available. Utilization in those products was practically uniform during the first 4 or 5 months of the year but declined during the summer, especially in the western section and south mid-section. In all four sections, utilization regained or even exceeded its previous high level during September and continued at approximately the September level during the rest of the year.

In roughly one-fourth of the markets, respondents stated or implied that there was no problem in handling seasonal surpluses. In about another fourth of the markets the impression was given that seasonal surpluses presented important handling problems. In the other markets there appeared to be minor but not serious problems in handling surpluses of this type.

---

1 Reduced use of milk in schools during the summer months was a factor in this decline.
DISPOSING OF SURPLUS FLUID MILK

Index of average daily volume of surplus milk in the North Central Region, 1955, based on 96 markets for which data were available. It shows the usual pattern of being highest when pastures are lush and lowest during the fall and winter months.

(Fig. 5)
INDEX NUMBER
(yearly average of total supplies = 100)

WESTERN SECTION

NORTH MID-SECTION

SOUTH MID-SECTION

EASTERN SECTION

Index of average daily volumes of total supplies, producer receipts, and milk used in products requiring milk of bottling quality, North Central Region, 1955. (Based on 95 markets for which data were available.) (Fig. 6)
**Short-Time Surpluses**

A quarter of a century ago, when nearly all bottled milk was delivered to homes each day, day-of-the-week variation in sales of milk was not pronounced (8). With the growth of the sale of milk through stores, and reduced frequency of delivery on retail routes, day-to-day variation in sales of packaged milk has become more and more acute. Typically, surpluses appear over the weekend, and to a lesser extent during the fore part of the week, when sales through stores are relatively light. Later in the week, bottling of large quantities of milk for sale through stores on Friday and Saturday may use all milk from regular producers and necessitate bringing in supplementary supplies. Similar fluctuations in sales occur around holidays. This variability in the need for milk has been intensified in many plants by the adoption of 5-day-a-week bottling schedules.

Statistical data that provide an overall indication of the amount of day-to-day fluctuation in sales in a number of markets, and differences in the extent of it, are not available. However, some information is available as to the character of these fluctuations and their impact on surplus handling.

A suggestion of the extreme day-of-the-week fluctuations in sales of packaged milk through supermarkets may be found in the experience of a large plant in the East that packages milk exclusively for sale through chain stores. In the early fifties, this plant sold 44 percent of its weekly volume of packaged milk products on Friday and Saturday (13). Day-to-day fluctuations in retail deliveries are, of course, much smaller than this. Consequently, the day-of-the-week sales pattern for a market can be expected to vary with the proportions of the milk sold on wholesale and retail routes.

The impact of this day-to-day variation in sales on surplus handling is well illustrated by data for the Indianapolis, Indiana, market. These data are estimates of daily quantities of milk diverted to surplus-manufacturing plants outside the city under the supervision of the Milk Producers’ Auditing Agency, Inc. This is an agency that coordinates the activities of cooperatives that supply the great bulk of the milk for that market. Indianapolis is a market of well over a half million people in which approximately half of the milk is sold on wholesale routes. The large plants there do not package milk on Sundays and Wednesdays. Most of the milk that dealers do not use in their regular operations is diverted in the country directly to manufacturing plants.¹

¹ Data were made available through the courtesy of Raymond J. Pickett, auditor for the Agency.
Short-time surplus problems may be eased by storing excess milk from one day to the next in large plant holding tanks. (Photo courtesy USDA) (Fig. 7)

Over the 8-week period May 4 through June 28, 1958, when surplus was at a peak, diversions to manufacturing plants outside the market were half again as large on Saturdays, Sundays, and Tuesdays as they were on Thursdays and Fridays (Fig. 8). During this flush season, diversions were comparatively heavy also on Mondays and Wednesdays. In the 7-week period November 2 through December 20, 1958, when supplies were tight, over half of the small quantity of milk not going to bottling plants was diverted on Saturdays and Sundays. For both flush and short periods, day-of-the-week fluctuations in the quantity of milk diverted were more pronounced in 1958 than they were in corresponding periods in 1955.

In large markets, supply plants in the outlying parts of the milkshed may make much greater day-to-day, as well as seasonal, adjustments in the volume of milk they ship into the market than do most
Estimated average daily quantities of milk diverted to surplus manufacturing facilities outside the market by Milk Producers Auditing Agency, Inc., Indianapolis, Indiana, during periods of flush and short supplies, 1958. (Fig. 8)

suppliers. In Chicago in May, 1956, a selected group of country milk plants sold approximately four times as much milk on Wednesdays and Thursdays as on Saturdays and Sundays. The previous October, when milk was short, sales by these plants were much more uniform from day to day, and averaged about three times as large as they were the following May (5).

Milk suppliers by no means make all the adjustments needed to equate supplies from day to day with sales of packaged milk products. Bottlers make the adjustment in varying degrees by carrying milk over in holding tanks from idle and light bottling days to heavy bottling days. To some extent, dealers also package milk ahead of needs in anticipation either of peak sales or a day in which milk is not packaged. The extent to which it is possible for them to make these adjustments may be limited by health regulations, quality considerations, or holding tank or cold room capacity.

In nearly half of the markets in the survey, short-time surpluses were not considered a problem, and in a considerable number of others they were rated as a minor problem. In about one-seventh of the
markets, however, these surpluses were rated a definite problem. There is some indication that weekend surpluses are more burdensome now than in the period surveyed. Sales of milk through supermarkets have continued to increase and, in consequence, day-of-the-week surplus problems probably have intensified.

In general, weekend and other short-time surpluses are most serious for small dealers, many of whom have limited holding facilities and poor arrangements for disposal of surplus. In many areas, these types of surpluses are most apt to be burdensome in the season of flush production, when manufacturing facilities already are taxed by peak supplies of milk. In a few cases, however, they may be a problem in the fall, when standby manufacturing facilities are closed.

**Surpluses of Butterfat and of Skimmilk**

In two-thirds of the markets, respondents indicated that the proportions of butterfat and skimmilk in surplus were approximately the same as in whole milk. The other third were almost equally divided between those in which there were proportionally large amounts of butterfat in surplus and those in which there were proportionally large amounts of skimmilk. Most of the markets reporting proportionately large quantities of surplus butterfat were in the southern half of the region; most of those with proportionately large quantities of skimmilk were in the northern half. This would be expected. In general, more cream is sold in the northernmost markets than in markets farther south. Also, the butterfat content of milk from producers tends to be higher in the southern than in the northern parts of the region.

**Factors Related to the Proportion of Surplus Milk**

**Type of pool**

Thirty-eight of the 104 markets in the study were regulated by Federal orders. Twenty-nine of these Federal order markets had market-wide pools and nine had individual-handler pools. In addition to these regulated markets, there were 19 nonregulated markets that had market-wide pools and 3 that had individual-handler pools. Milk was not pooled in the other 44 markets.\(^1\)

\(^1\) A market was classified as having no pool if (a) two or more utilization categories for milk were not established and priced separately, and (b) returns from them divided among producers—either on a market-wide or individual-handler basis—by payment of a blend (uniform) price for milk comparable in butterfat test, zone of production, and possibly other attributes of quality. Handlers in a few of the markets without pools used base-excess payment plans in determining prices to individual producers.
Percentages of milk going into surplus uses differed among groups of markets having different pooling arrangements, as the figures below, based on the 97 markets for which statistics were available, show.

<table>
<thead>
<tr>
<th>Type of pool</th>
<th>Federal order markets</th>
<th>Unregulated markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market-wide</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Individual-handler</td>
<td>16 (4)</td>
<td></td>
</tr>
<tr>
<td>None*</td>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>

* Apparent differences in percentages of surplus milk between the group of Federal order markets with individual-handler pools and each of the two groups of unregulated markets were not significant at the 5 percent level. All other differences shown above were significant at that level.

1 Data available for only one market.
2 Returns for milk not pooled (see footnote 1, p. 18).
3 No markets in this category.

Surpluses were larger in Federal order markets having market-wide pools than in Federal order markets having individual-handler pools, or in unregulated markets in which milk was not paid for on the basis of a classified price plan. Among markets with market-wide pools, surpluses were larger in those having Federal orders than in those that were unregulated.

As one might expect, the smaller the percentage of surplus milk, the larger the proportion of the market’s milk supplies obtained from supplementary sources. Accordingly, other-source milk comprised 9 percent of supplies in individual-handler pool markets as compared with 2 percent in markets with market-wide pools.

Various explanations have been offered to account for the differences in the proportion of surplus milk in markets having different arrangements for dividing returns among producers. On the one hand, it has been pointed out (2, 9) that market-wide pooling provides little incentive for dealers and cooperatives to keep their purchases of milk closely adjusted to fluid sales. With a market-wide pool, distant plants that market a comparatively small proportion of their milk in fluid uses may find it profitable to come onto the market, as they may be able to draw money from the pool (2). In areas where some markets have market-wide pools and others do not, dealers and cooperatives that operate on both types of markets are believed to direct most of their surplus to markets having market-wide pools, and to rely upon those markets for supplies when milk is short. A somewhat related problem is that market-wide pooling reduces the incentive to handlers to use as much milk as possible in classes that yield highest returns to producers (9).

On the other hand, it has been contended that among Federal order markets market-wide pools have been provided in markets that had
comparatively large amounts of surplus when regulation became effective, and individual-handler pools in markets where surpluses were small. This reasoning holds that in Federal order markets the proportion of surplus milk is more the determinant of the type of pool used than the result of it. This does not mean that the type of pool adopted would have no effect on the amount of milk classified as surplus. For example, milk from a supply plant might be included in an individual-handler pool only in those months and to the extent that milk from that plant was purchased by bottlers in the market. With market-wide pooling, however, milk from such a plant would be included in the pool throughout the year if the plant met the pool plant requirements specified in the order (3).

**Primary and secondary markets**

The percentages of the milk used as surplus in several primary markets were compared with the corresponding percentages for their secondary markets. Relationships were inconsistent.

Chicago, with a market-wide pool in operation since 1939, carried a larger proportion of surplus than any of its 16 secondary markets included in the survey. Among these, Milwaukee, with an individual-handler pool, used only 13 percent of its supplies as surplus as compared with 31 percent surplus in Chicago.

Somewhat similar results were obtained in Detroit. That market, which has had market-wide pooling since regulation became effective in 1951, had a larger percentage of surplus than 3 out of 4 of its secondary markets for which data were available, and approximately the same percentage as the fourth.

But, in St. Louis, where market-wide pooling was adopted in 1953, the percentage of surplus milk exceeded the percentages of surplus in only about one-half of its secondary markets. Limited comparisons also were possible for Minneapolis-St. Paul, which had an individual-handler pool until about the end of the surveyed period, and for Kansas City, which had a market-wide pool. The percentages of surplus milk in these markets were not generally larger than in the smaller markets within their milk-sheds for which comparisons could be made.²

---

²A primary market is a market that is of sufficient size to exert a controlling influence on the price of milk paid to dairymen in producing regions tributary to this market. A secondary market is a market located within the producing regions of a primary market (1).

²Differences among primary markets in other conditions may have contributed to the lack of uniformity in this relationship. St. Louis, for instance, had relatively stringent pool plant requirements that may have been partly responsible for the comparatively small percentage of surplus in that market. The length of time the primary market had used market-wide pooling may also have influenced the relationship.
Seasonal variation in supplies

Seasonal changes in supplies are largely responsible for seasonal surpluses of fluid milk (page 12). Consequently, markets with comparatively little seasonal variation in receipts would be expected to have smaller than average proportions of surplus.

The relationship may be illustrated by comparing the surplus of the five markets of over 150,000 that had most seasonal variation in supplies with the surplus of the five markets of similar size that had the least seasonal variation in supplies (Fig. 9). The average percentage of surplus was about twice as large in the group of markets with most variation in supplies as in the group with the least variation.

Comparison of surplus in five markets with populations of over 150,000 having seasonally most uniform receipts with surplus in five markets with populations of over 150,000 having seasonally most variable receipts, North Central Region, 1955. (Fig. 9)
Moreover, other things being equal, the greater uniformity in volume of surplus in the latter group would facilitate surplus disposal.\footnote{The markets having greater uniformity in volume of supplies had a smaller proportion of surplus milk in the fall as well as in the spring. This suggests that in some cases previous shortages of milk in the fall may have induced these markets to take active measures to level supplies. To the extent that this was so, the proportion of surplus milk helped to determine the seasonal pattern.}

For various reasons, the proportion of surplus is not in all cases closely related to the seasonal pattern of receipts. A market with heavy vacation-time sales can use extra milk in the summer in bottled products. In like manner, a market in which ice cream is required to be made from inspected milk can use additional milk in the summer in a category not classified in this study as "surplus." Moreover, a market with a uniform seasonal pattern of receipts could have considerable surplus milk throughout the year.

With the data available from this survey, significant relationships could not be established between a number of factors that might conceivably be related to the proportion of surplus milk and the percentage of the milk that was surplus, as defined in this study. The factors included: (1) market population; (2) products required to be made from inspected milk; (3) level of Class I price in relation to Class I price in Eau Claire, Wisconsin, plus cost of transporting milk to the market (12); (4) density of manufacturing milk supplies around the market; and (5) availability and capacity of surplus-milk manufacturing facilities belonging to fluid milk bargaining associations. More detailed study might show relationships between some of these factors and the proportion of surplus milk.

\textbf{MILK MARKETING AGENCIES AND THEIR FACILITIES FOR SURPLUS DISPOSAL}

\textbf{Cooperatives With Bargaining Activities}

\textbf{Extent}

The majority of the surveyed markets had producer associations that served as bargaining agencies for their members in the sale of their milk to dealers. Many of these were cooperatives that had been formed by dairymen who produced milk of bottling quality to represent them in price negotiations and to carry on related activities, such as checking weights and tests. A majority of the cooperatives enumerated in this survey that apparently had been formed in this manner had no facilities for receiving or manufacturing milk.

Nevertheless, about two-fifths of the cooperatives that bargained
for producers in the sale of their milk had facilities for receiving or receiving and manufacturing milk. Some of these were fluid milk cooperatives, commonly relatively large ones, that had added these facilities to strengthen their bargaining position. However, many were dairy-manufacturing cooperatives that had developed supplies of milk of bottling quality and served as marketing agencies for that milk. Many of the cooperatives of this type continued to receive and process milk of manufacturing quality, and so were in good position to process surplus milk of bottling quality.¹

Sixty-six markets had cooperatives that carried on bargaining activities. These 66 markets had 114 cooperatives of that type. No market of less than 150,000 population had more than one bargaining-type cooperative, but some of the large markets had several, and Chicago had about 20.

Considerably fewer than half of the markets of less than 50,000 had cooperatives that carried on bargaining activities, as the figures below show. However, the majority of the medium-sized markets and

<table>
<thead>
<tr>
<th>Market population</th>
<th>Number of markets</th>
<th>Percent of markets with bargaining-type co-ops</th>
<th>Percent of producers belonging</th>
<th>Co-op operated trucks</th>
<th>Co-op controlled trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50,000</td>
<td>44</td>
<td>36</td>
<td>74</td>
<td>0</td>
<td>46</td>
</tr>
<tr>
<td>50,000 to 150,000</td>
<td>32</td>
<td>72</td>
<td>84</td>
<td>16</td>
<td>52</td>
</tr>
<tr>
<td>150,000 or more</td>
<td>28</td>
<td>96</td>
<td>83</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>All markets</td>
<td>104</td>
<td>63</td>
<td>83</td>
<td>9</td>
<td>38</td>
</tr>
</tbody>
</table>

¹ Includes all cooperatives that regularly sold milk in bulk lots to dealers for use in bottled milk products. Some of these associations had receiving or receiving and manufacturing facilities, and a few packaged part of their fluid milk.

² Based on 55 markets for which data were available.

practically all those of 150,000 or more had producer organizations of this type.

In the 66 markets having cooperatives that bargained for the sale of milk, the proportion of the producers who were members varied widely. Nevertheless, in approximately 30 percent of the 66 markets, all producers were members, and in approximately an equal number,
90 to 99 percent of the producers were members. In only 5 percent of these markets with bargaining-type cooperatives did less than half of the producers belong. For all markets having such cooperatives, an average of 83 percent of the producers were members. This is total for all associations if there is more than one in the market.

**Control over assembly**

A factor in the ability of a fluid milk-bargaining cooperative to influence the handling of surplus milk, and so its bargaining position, is the extent to which it can determine the point of delivery of the milk. If the cooperative operates milk assembly trucks, or can determine where the trucks of contract haulers will deliver milk, it may attain thereby a degree of control over the disposal of surplus.

In the markets in the study, bargaining associations had, in one or the other of these ways, considerable influence over the assembly of milk. Although only one-tenth of the milk was assembled on trucks operated by these cooperatives, nearly two-fifths was assembled on contract-hauler trucks whose points of delivery could be determined by cooperatives. The percentage of the producer milk for which points of delivery could be determined by bargaining cooperatives was largest in markets of 50,000 to 150,000.

Somewhat related to the direction a bargaining-type cooperative might exercise over assembly was the part it might play in diverting surplus milk to manufacturing facilities. Bargaining-type cooperatives were active in such diversion in 28 of the 61 markets which had such associations and for which information was available. In 20 of these markets, it was reported that they transferred, in their own trucks or trucks they controlled, all the milk so diverted.

**Surplus disposal facilities**

In only 20 of the 66 markets having bargaining cooperatives of the type described previously did these associations have manufacturing facilities for surplus fluid milk, as the figures show.

<table>
<thead>
<tr>
<th>Market population</th>
<th>Number of markets having co-ops with bargaining activities</th>
<th>Percent of markets with bargaining-type co-ops in which they had—</th>
<th>Tie-in arrangements with manufacturing co-ops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50,000</td>
<td>16</td>
<td>Own manufacturing facilities</td>
<td>6</td>
</tr>
<tr>
<td>50,000 to 150,000</td>
<td>23</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>150,000 or more</td>
<td>27</td>
<td></td>
<td>52</td>
</tr>
<tr>
<td>All sizes</td>
<td>66</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>


The presence of such facilities was a function of market size; practically none of the small markets had them, but approximately half of the large ones did. Some cooperatives not having such facilities had tie-in relationships with dairy-manufacturing cooperatives to handle their surplus for them. Such arrangements were reported in about one-sixth of the markets having bargaining-type cooperatives.¹

In the 20 markets in which bargaining cooperatives had their own manufacturing facilities, there were facilities for different products with the frequencies indicated:

<table>
<thead>
<tr>
<th>Product</th>
<th>Number of markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td>15</td>
</tr>
<tr>
<td>Dry milk (chiefly nonfat dry milk)</td>
<td>15</td>
</tr>
<tr>
<td>Condensed (or evaporated) milk</td>
<td>13</td>
</tr>
<tr>
<td>Ice cream</td>
<td>13</td>
</tr>
<tr>
<td>Cottage cheese</td>
<td>11</td>
</tr>
<tr>
<td>Other cheese</td>
<td>9</td>
</tr>
<tr>
<td>Plastic cream, or canned whole milk</td>
<td>4</td>
</tr>
</tbody>
</table>

In a few markets these cooperative facilities for manufacturing surplus fluid milk into butter, powder, condensed milk, and “other cheese” were used only on a seasonal basis. In all cases, facilities for making ice cream and cottage cheese were used throughout the year.  

### Milk Bottling Plants

#### Numbers, by ownership

As might be expected, the average number of milk bottling plants per market was directly related to market size, as these figures indicate.

<table>
<thead>
<tr>
<th>Market population</th>
<th>Number of markets</th>
<th>Number of milk plants per market</th>
<th>Percent of plants that were Proprietary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50,000</td>
<td>41</td>
<td>3.0</td>
<td>12 Chains, 69 Independents, 12 Co-ops, 7 Other¹</td>
</tr>
<tr>
<td>50,000 to 150,000</td>
<td>32</td>
<td>5.3</td>
<td>19 Chains, 76 Independents, 5 Co-ops, 0 Other</td>
</tr>
<tr>
<td>150,000 or more</td>
<td>25</td>
<td>19.8</td>
<td>12 Chains, 85 Independents, 3 Co-ops, 0 Other</td>
</tr>
<tr>
<td>All markets</td>
<td>98</td>
<td>8.0</td>
<td>13 Chains, 82 Independents, 4 Co-ops, 1 Other</td>
</tr>
</tbody>
</table>

¹ Based upon 98 markets for which data were available.

In markets of all sizes, the great bulk of these plants were proprietary, and a majority were independents. Only in markets of less than 50,000 did cooperative bottling plants comprise more than 5 percent of the total number.

¹ In small and medium-sized markets both types of arrangements were not found in the same market. That was not true, however, in some of the large markets that had two or more bargaining-type cooperatives.
Cooperatives that regularly bottled all of their members' milk that was used in bottled products were reported in one-fourth of the markets. Approximately half of these bottling cooperatives were in markets of less than 50,000. Most bottling cooperatives in the smaller markets were fluid milk operations that had been added by creameries or whole milk-manufacturing plants in North Dakota and Minnesota to supply packaged milk for local markets. A number of the cooperative bottling operations in the larger markets also had been developed by manufacturing cooperatives, but some had been established or taken over by fluid-milk producer groups.1

In their surplus-milk handling operations, cooperatives that normally packaged all their milk that went into fluid use did not generally take responsibility for any surplus other than that of their own producers. In that sense, they behaved more like other milk-bottling firms than like bargaining-type cooperatives. Consequently, in studying surplus-milk handling arrangements, no distinction was made between the markets with these bottling cooperatives and those without such cooperatives.

**Ability to handle surpluses**

In each market an overall evaluation was obtained of the ability of fluid milk bottlers to handle (1) day-to-day surplus and (2) seasonal and year-round surplus. For each type of surplus, three categories of handling ability were established: (1) not able to handle that type of surplus as it occurs normally; (2) able to handle normal surpluses of that type, but not heavy ones; (3) able to handle all surpluses of that type.

In about 30 percent of the markets, milk bottlers were considered unable to handle normal day-to-day surpluses, but in about 50 percent were considered able to handle all such surpluses. In about 50 percent of the markets, bottlers were considered unable to handle normal seasonal surpluses; in about 30 percent they were considered able to handle all surpluses of this type. For each type of surplus, the percentage of markets in which milk bottlers were rated as able to handle it was above average in the small markets and below average in the large markets (Fig. 10).

Milk bottlers' ability to handle surplus also appeared to be related to the presence or absence of bargaining-type cooperatives. Best evidence of this was found in the group of markets with populations of less than 50,000, which was the only group with sizeable numbers of

---
1 In the smaller markets, these cooperatives packaged about half of the milk; in the larger ones, about one-quarter.
markets with and without bargaining-type cooperatives. Among markets of this size that had no bargaining-type cooperatives, milk bottlers were considered able to handle all day-to-day surpluses in 71 percent, and all seasonal and year-round surpluses in 54 percent. Among markets of this size that had bargaining-type cooperatives, the corresponding percentages were 44 and 19. In some of this latter group of markets, bargaining-type cooperatives had apparently relieved bottlers of the responsibility for taking care of surpluses.

![Bar chart showing percent of markets in which milk bottlers had different levels of ability to handle day-to-day and seasonal surpluses.](Fig. 10)
Arrangements Between Bargaining-Type Cooperatives and Handlers

In 55 of the 66 markets with bargaining-type cooperatives, information was obtained as to sales arrangements between cooperatives of this type and milk bottlers. The categories of arrangements were: (1) bottler has delivered to him the entire supply of the cooperative or of a group of patrons of the cooperative; (2) bottler buys entire supply of the cooperative or of a group of patrons of the cooperative, but has the cooperative handle any surplus; (3) cooperative contracts to supply the bottler only with milk needed for fluid products (with no necessary implication that the cooperative provides supplementary supplies in periods of shortage).

Table 1.—Proportion of Milk Sold by Bargaining-Type Cooperatives to Bottlers Under Each of Three Types of Arrangements, by Size of Market, 55 Markets

<table>
<thead>
<tr>
<th>Market population</th>
<th>Number of markets</th>
<th>Percent of milk sold under arrangement in which</th>
<th>Bottler buys entire supply</th>
<th>Bottler handles surplus</th>
<th>Co-op handles surplus</th>
<th>Bottler buys only milk needed for fluid products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50,000 .............</td>
<td>12</td>
<td>Bottler handles surplus</td>
<td>48</td>
<td>30</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>50,000 to 150,000 ........</td>
<td>21</td>
<td>Co-op handles surplus</td>
<td>30</td>
<td>31</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>150,000 or more ..........</td>
<td>22</td>
<td>Bottler buys only milk needed for fluid products</td>
<td>29</td>
<td>40</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>All sizes ................</td>
<td>55</td>
<td></td>
<td>30</td>
<td>38</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

* Markets with bargaining-type cooperatives for which the information was available.

b These arrangements covered about four-fifths of the milk in these markets. "Surplus," as interpreted here, refers to milk beyond bottler's regular needs. Likewise "milk needed for fluid products" was generally interpreted to include any milk regularly used by a bottler in cottage cheese and ice cream.

In terms of volume of milk involved, the arrangement under which the bottler purchased the entire supply of the cooperative, or a group of its producers, but had the cooperative handle the surplus, was a little more important than either of the others (Table 1). In markets of less than 50,000 a larger percentage of the milk was sold under arrangements by which the bottler had to dispose of the surplus than was true in medium-sized and large markets.

1 In this classification, the term "surplus" was interpreted to refer to milk the bottler did not want for his regular operations, in which he may have used some milk of bottling quality in cottage cheese, or ice cream, or both. Likewise, the term "milk needed for fluid products" was interpreted to include milk of bottling quality regularly used in cottage cheese and ice cream.
Table 2.—Extent of Use of Full-Supply Contracts by Bargaining-Type Cooperatives, by Size of Market, 66 Markets

<table>
<thead>
<tr>
<th>Market population</th>
<th>Number of markets having co-ops with bargaining activities</th>
<th>Percent of markets with bargaining-type co-ops in which the co-ops had full-supply contracts with—</th>
<th>All bottlers&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Part of bottlers&lt;sup&gt;b&lt;/sup&gt;</th>
<th>No bottlers&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 50,000</td>
<td>16</td>
<td>19</td>
<td>81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50,000 to 150,000</td>
<td>23</td>
<td>48</td>
<td>13</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>150,000 or more</td>
<td>27</td>
<td>22</td>
<td>30</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>All sizes</td>
<td>66</td>
<td>30</td>
<td>17</td>
<td>53</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> All markets in which cooperatives bargained for the sale of producers' milk.
<sup>b</sup> Bottlers to whom cooperative sold milk.

Cooperatives that supply bottlers only with the milk they need may use full-supply contracts.¹ Bargaining-type cooperatives had full-supply contracts with all bottlers they supplied in nearly one-third of the markets having such cooperatives, and with part of the bottlers in about one-sixth of these markets (Table 2).

The use of full-supply contracts was related to market size. These contracts were in use in only one-fifth of the markets of less than 50,000 that had bargaining-type cooperatives, but in half to three-fifths of the markets of more than 50,000 that had such cooperatives. In the small and medium-sized markets, cooperatives using full-supply contracts commonly had them with all bottlers to whom they sold milk. On the other hand, in markets of 150,000 or more, cooperatives using such contracts had them more commonly with part of the bottlers they supplied than with all of them.

**Products Made From Surplus**

Information was obtained as to the chief products made from surplus and the location of the facilities in which they were processed. Facilities were considered to be "local" if they were in the city or within a 10-mile zone around it; "out-of-town" if beyond the 10-mile zone.²

¹ A full-supply contract is an agreement under which the cooperative supplies the bottler only as much milk as he needs for his regular operations. Under such a contract the cooperative usually is the only source of the bottler's milk supplies, and commonly obtains supplementary milk if the volume from regular producers is insufficient to meet the bottler's needs.

² The 10-mile zone was allowed to include suburbs and the majority of any outlying plants attached to the market.
Ice cream, butter, dry milk (mainly nonfat dry milk), cottage cheese, cheese other than cottage cheese, and condensed milk were the products most commonly made from surplus milk (Table 3). Ice cream and cottage cheese were mainly processed in local facilities. Most other major products were processed in facilities outside the city about as commonly as they were processed locally.

Butter is one of the products most commonly made from surplus milk. (Photo courtesy University of Minnesota)
Table 3.—Chief Products Made From Surplus Fluid Milk and Location of Processing Facilities, 101 Markets

<table>
<thead>
<tr>
<th>Product</th>
<th>Percent of markets reporting surplus milk used in product (^)</th>
<th>Percent of markets disposing of surplus milk in that product in which it was manufactured</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>In local facilities</td>
</tr>
<tr>
<td>Ice cream ^e</td>
<td>92</td>
<td>71</td>
</tr>
<tr>
<td>Butter</td>
<td>75</td>
<td>43</td>
</tr>
<tr>
<td>Dry milk ^d</td>
<td>68</td>
<td>41</td>
</tr>
<tr>
<td>Cottage cheese ^a</td>
<td>63</td>
<td>78</td>
</tr>
<tr>
<td>Cheese ^e</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>Condensed milk ^f</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Evaporated milk ^f</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Other products ^f</td>
<td>15</td>
<td>40</td>
</tr>
</tbody>
</table>

^a Markets for which data were available.
^b Percentages total in excess of 100 because most markets reported two or more products.
^c Excludes cottage cheese and ice cream manufactured locally where required to be made from milk of bottling quality. Such exclusions applied in 19 markets for cottage cheese, 2 for ice cream.
^d Chiefly dry non-fat milk.
^e Cheese other than cottage cheese.
^f Bulk cream, baby foods, plastic cream, pressurized cream, powdered cream, yogurt, canned whole milk, and specialty products.

SURPLUS DISPOSAL ARRANGEMENTS

Classification of Disposal Arrangements

In a given market, fluid milk not used in bottled milk products may be disposed of in a variety of ways. Many milk bottling plants use surplus milk in making products such as cottage cheese and ice cream. Because of limited outlets for such products, milk distributors are usually unable to dispose of large quantities of surplus milk through them. Consequently, it is generally necessary to dispose of part of the surplus milk—in many cases the greater part of it—under one or more other arrangements.

In classifying the markets into major categories on the basis of surplus milk disposal methods, it was not feasible to take into account each surplus-milk handling arrangement in use in a market and its relative importance. Instead, each market was classified on the basis of the dominant surplus-milk handling arrangement employed in that market. The dominant arrangement was considered to be that used in handling the largest volume of milk. In a few markets, where several arrangements were in use, less than half of the surplus milk may have been handled under the dominant arrangement even though it was more important than any other.
Two criteria were considered in defining categories of surplus-milk handling arrangements. These were: (1) where the surplus milk was manufactured; and (2) if surplus milk was diverted from the channels through which milk used in bottled milk products was marketed, the point of diversion.

Six categories of surplus-milk handling arrangements were defined (Fig. 12):

1. Manufactured in plants of fluid milk handlers. Surplus milk handled in this way was received by the fluid milk handlers who would have received it if it had been used in bottled milk products, and manufactured by them into surplus products. Most common end-products for surplus milk so used were cottage cheese, ice cream, and butter.

Example: In Bismarck-Mandan, North Dakota, the two handlers received the surplus milk and manufactured it into ice cream and butter. (In that market cottage cheese had to be made from milk of bottling quality, so was not an outlet for surplus milk as defined in this study.)

2. Diverted in the country. Surplus milk going through this channel was diverted in the producing areas to manufacturing facilities outside the city for which the milk was produced. Most commonly this diversion was accomplished by having the trucks that picked up milk at farms deliver it directly to manufacturing facilities. Milk was diverted in this way whether it was in cans or in bulk. In a few markets milk was delivered to country receiving stations and subsequently diverted in tank trucks to manufacturing plants.

Example: In Indianapolis, Indiana, surplus milk was mostly diverted directly from farms to manufacturing plants in the producing areas on trucks that regularly picked up milk at the farms.

3. Trucked into the city and diverted to local manufacturing facilities; not received by fluid handlers. Surplus milk handled in this way was brought into the city on trucks that assembled it from farms, but was diverted to local manufacturing facilities. In some cases, loads of milk were taken to the plant of the fluid handler, and perhaps partly unloaded there before being trucked to the plant where surplus was manufactured. In many cases, however, surplus milk going through this channel was hauled directly to regular or standby manufacturing facilities without going by the fluid handler's plant. This arrangement was distinguished from diversion in the country on trucks that assembled milk from the farms by the difference in the location of the manufacturing facilities.
1960] DISPOSING OF SURPLUS FLUID MILK

Schematic representation of surplus-milk handling arrangements. (Fig. 12)
Example: In Dayton-Springfield, Ohio, the producers’ bargaining association had a surplus manufacturing plant in Dayton. The greater part of the surplus milk in that market was routed directly to that plant on trucks that assembled milk from the farms.

4. Trucked into the city and diverted to out-of-town manufacturing facilities; not received by fluid handlers. Surplus milk moved through this channel was handled in the same way as milk going through channel 3 except that it was diverted to manufacturing facilities more than 10 miles from the city.

Example: In Janesville, Wisconsin, the trucks that assembled milk from farms unloaded at the fluid plants only the milk needed by handlers. Milk in excess of those needs was left on the trucks and hauled to manufacturing plants at Beloit or Stoughton. Trucks picked up both Grade A and manufacturing milk on their routes. Consequently the surplus Grade A milk was delivered to the manufacturing plants, along with the manufacturing milk, with no increase in hauling charge.

5. Trucked into the city, received by fluid handlers, and diverted to local manufacturing facilities. This category was for surplus milk that was received at the plant of the fluid handler before being diverted, in cans or in bulk, to surplus manufacturing facilities in or within 10 miles of the city.

Example: The two handlers in Kirksville, Missouri, received, weighed, and tested all milk from their producers. Surplus was drawn off in cans and transferred to the local manufacturing plant.

6. Trucked into the city, received by fluid handlers, and diverted to out-of-town manufacturing facilities. Surplus milk moved through this channel was handled in the same way as milk going through channel 5 except that it was diverted to manufacturing facilities more than 10 miles from the city.

Example: In the Southwest Kansas marketing area, surplus milk was received at one of the larger handler’s plants in Dodge City and then trucked by a tanker of the bargaining association to manufacturing facilities at Arkansas City, Kansas, or Hillsboro, Kansas, each more than 150 miles distant.

Importance of Arrangements, by Types

Diversion of surplus milk in the country was the most common method of disposal. It was the dominant arrangement for handling surplus in a few more than one-third of the markets (Table 4). Manu-
Table 4.—Relative Importance of Various Surplus Milk Disposal Arrangements, by Size of Market, 104 Markets

<table>
<thead>
<tr>
<th>Surplus disposal arrangement</th>
<th>Percent of markets in which arrangement was dominant—</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under</td>
</tr>
<tr>
<td>Manufactured in plants of fluid milk handlers</td>
<td></td>
</tr>
<tr>
<td>Diverted in the country</td>
<td></td>
</tr>
<tr>
<td>Trucked into the city and diverted, without being received by fluid handlers to:</td>
<td></td>
</tr>
<tr>
<td>Local manufacturing facilities</td>
<td>7</td>
</tr>
<tr>
<td>Out-of-town manufacturing facilities</td>
<td>7</td>
</tr>
<tr>
<td>Trucked into the city, received by fluid handlers, and diverted to:</td>
<td></td>
</tr>
<tr>
<td>Local manufacturing facilities</td>
<td>7</td>
</tr>
<tr>
<td>Out-of-town manufacturing facilities</td>
<td>20</td>
</tr>
</tbody>
</table>

Manufacturing in the plants of fluid milk handlers, the second most common method of surplus disposal, was the dominant method in nearly one-fourth of the markets. Least common as a dominant arrangement was that in which surplus was trucked into the city and diverted to out-of-town manufacturing facilities without being received by fluid milk handlers.

The extent of use of a number of these arrangements was closely related to market size. Manufacture of surplus in the plants of fluid milk handlers was the chief method of handling it in nearly half of the markets of less than 50,000, but in no markets of 150,000 or more. Likewise, there were no markets of 150,000 or more in which the dominant method of handling surplus milk involved trucking it into the city and then diverting it to manufacturing plants outside the market. On the other hand, diversion of surplus milk in the country was the chief method of disposal in only a few of the smaller markets but in a substantial majority of those of 150,000 or more.

Because methods of surplus disposal were related to market size, the volumes of surplus milk handled in the markets employing them should be considered along with the number of markets in which each was dominant. This does not indicate accurately the quantity of surplus milk disposed of under each arrangement. In many markets, more than one disposal arrangement was employed and information was not available as to the quantity handled under each arrangement. Nevertheless, the differences in the relative quantities of milk disposed of by
each of the several groups of markets in which the various surplus-handling arrangements dominated are pronounced. Even though they do not show accurately the comparative quantities of surplus milk handled under the various arrangements, they ought to be taken into account.

Among 97 markets for which information about the quantity of surplus milk was available, 80 percent of that milk was in the group of markets for which diversion in the country was the dominant system of handling. Eleven percent of the total was in the group of markets in which the dominant surplus disposal arrangement involved trucking it into the city and diverting it to local manufacturing facilities without receiving it at fluid plants. No other of these groups of markets accounted for more than 3 percent of the total amount of surplus.

**Conditions Influencing Choice of Arrangements**

**Volume of surplus milk**

Grouping the markets by volume of surplus handled showed substantially the same relationship to surplus-handling arrangements as did the groupings by market size (page 35). This is to be expected as there was a close relationship between market size and the volume of surplus milk to be disposed of. The relationship to handling systems that resulted probably reflected the influence of both of these factors on arrangements. A large market had a large volume of surplus milk. For the agency concerned, the choice of handling method was influenced by the quantity of milk involved as well as by other characteristics typical of large markets, such as the longer average distance from producing areas to market.

**Bargaining-association activity in surplus disposal**

In 39 of the 104 markets, bargaining-type cooperatives took primary responsibility for surplus disposal. Some of these associations operated manufacturing facilities for surplus. Others arranged for outlets and for any needed transportation of the surplus and supervised diversion. There were few markets of less than 50,000 population in which bargaining-type cooperatives took major responsibility for disposal of surplus milk. In these small markets, and in markets of 50,000 to 150,000, bargaining organizations were unlikely to assume this responsibility unless their members supplied a large share of the market’s milk.

In more than half of the 38 markets of less than 50,000 people in which dealers took primary responsibility for disposing of surplus
milk, it was manufactured in the plants of fluid milk handlers (Table 5). In contrast, in markets of that size in which bargaining associations were responsible for the surplus, it was mainly diverted to manufacturing facilities—either after being trucked into the city and received by fluid milk handlers or in the country.

The contrast was even sharper in markets of 50,000 to 150,000. In over half the markets of this size in which cooperatives were responsible for surplus, diversion in the country was the dominant disposal arrangement. On the other hand, in two-thirds of the markets of this size in which handlers were responsible for surplus, the dominant handling arrangement involved trucking it into the city, receiving by fluid handlers, and then diversion to manufacturing facilities. Particularly in markets of this size, it appears that bargaining-association activity in surplus disposal may have resulted in more efficient arrangements for handling it. Cooperatives seemingly had sufficiently large volumes of surplus milk to make country diversion feasible, while individual handlers did not.

Apparently this was not true in markets of 150,000 or more. In the majority of the markets of this size, diversion in the country was the dominant arrangement no matter what type of agency was primarily responsible for surplus disposal.

Table 5.—Relationship of Surplus Milk Handling System to Type of Agency Taking Primary Responsibility for Surplus Disposal, by Size of Market, 104 Markets

<table>
<thead>
<tr>
<th>Agency taking responsibility for surplus</th>
<th>Number of markets</th>
<th>Manufactured in plants of fluid milk handlers</th>
<th>Diverted in the country</th>
<th>Trucked into the city and diverted to manufacturing facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bargaining-type Handlers...................</td>
<td>38</td>
<td>53</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Markets of less than 50,000</td>
<td></td>
<td></td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Bargaining-type Handlers...................</td>
<td>17</td>
<td>12</td>
<td>52</td>
<td>18</td>
</tr>
<tr>
<td>Markets of 50,000 to 150,000</td>
<td></td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Markets of 150,000 or more</td>
<td></td>
<td></td>
<td></td>
<td>67</td>
</tr>
<tr>
<td>Bargaining-type Handlers...................</td>
<td>16</td>
<td>0</td>
<td>62</td>
<td>38</td>
</tr>
<tr>
<td>Markets of 150,000 or more</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Bargaining-type Handlers...................</td>
<td>15</td>
<td>13</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Markets of 150,000 or more</td>
<td></td>
<td></td>
<td></td>
<td>67</td>
</tr>
<tr>
<td>Bargaining-type Handlers...................</td>
<td>12</td>
<td>0</td>
<td>83</td>
<td>0</td>
</tr>
<tr>
<td>Markets of 150,000 or more</td>
<td></td>
<td></td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>
Manufacturing plants available

The information obtained in the survey seemed to show an overall relationship between the presence or absence of dairy-manufacturing plants that depended primarily on supplies of manufacturing milk and surplus disposal arrangements in use for fluid milk.

In sections where a number of manufacturing-milk plants were accessible, surplus fluid milk that handlers did not want apparently could, as a rule, be readily diverted to such plants. On the other hand, in areas where regular manufacturing plants were few or nonexistent, fluid milk cooperatives or dealers quite commonly provided manufacturing facilities for milk of bottling quality not wanted by fluid milk handlers in their regular operations. In cases in which fluid milk marketing agencies in such areas did not provide manufacturing facilities, longer hauls and other more expensive handling procedures were generally needed than in areas with larger numbers of regular manufacturing plants.

There was not sufficient available information about the number and location of regular manufacturing plants around the markets studied to permit a careful statistical analysis of this apparent relationship. Nevertheless, contrasts can be drawn between the surplus-handling arrangements that were in use in sections that differed widely in numbers of regular manufacturing plants. The state-wide quantity of whole milk manufactured per square mile\(^1\) was used as an indicator of the comparative numbers of regular manufacturing plants. That quantity ranged from a high of 226,000 pounds in Wisconsin to a low of 1,000 pounds in North Dakota.

In all 9 North Dakota markets in the survey, manufacturing in the plants of the fluid milk handlers was the principal method of surplus disposal. This arrangement was the chief one in only 1 of the 13 Wisconsin markets. In 7 of the Wisconsin markets, diversion in the country was the dominant arrangement. In the 5 other Wisconsin markets, dominant arrangements involved trucking the milk into the city and then diverting it to local or out-of-town manufacturing facilities.

Although Wisconsin markets were generally larger than North Dakota markets, the difference in size was not primarily responsible for the difference in handling methods. In 5 of 9 Wisconsin markets of 25,000 to 75,000 population, diversion in the country was the dominant surplus-disposal arrangement. There were 4 North Dakota markets in that population group and, as indicated, in all of them surplus fluid milk was disposed of mainly by manufacturing it in the plants of the fluid milk handlers.

\(^1\) Based upon data in “Production of Manufactured Dairy Products” (11).
The quantity of surplus milk available is a major consideration in choice of handling arrangements. Large volumes are effectively diverted to specialized manufacturing plants, which in the flush season may operate overtime to take care of them. Some bottlers can dispose of comparatively small quantities of surplus milk to good advantage by making cottage cheese for their own routes, or by similar uses.

(Photos courtesy Miami Valley Cooperative Milk Producers' Association and Urbana Pure Milk Company) (Fig. 13)
EVALUATION OF SURPLUS-MILK HANDLING ARRANGEMENTS

This study did not provide the information needed to establish conclusively the suitability of each of the various disposal arrangements for surplus fluid milk to different market situations. Nevertheless, consideration of the goals to be sought and the characteristics of the various arrangements enables us to draw tentative conclusions as to the market situations to which each type of arrangement is likely to be best suited.

Desirable Characteristics

Efficient physical handling

A major goal in working out arrangements for handling surplus fluid milk is to provide as efficient handling of that milk as is possible in the existing market situation. Three conditions will help in the attainment of this goal.

1. Handling of surplus milk in large lots. Full loads and large volume in processing are helpful in minimizing unit costs of hauling and manufacture.

2. Avoiding needless hauling or handling. Other things being equal, surplus fluid milk should be processed as near producing areas as is feasible and delivered to plants with a minimum of cross hauling or back hauling. In similar manner, the receiving of milk that is handled in cans before it is diverted, the reloading of milk that is in cans, and similar practices that involve extra handling are costly procedures that should be avoided if possible.

3. Full use of surplus-handling facilities. Unit costs of disposing of surplus milk are likely to be high if the facilities involved are not utilized fairly near to capacity. Of course, the seasonal fluctuations in the quantity of surplus milk to be processed make it unlikely that most surplus-milk manufacturing facilities will have enough milk to operate efficiently in months of low production. In general, the seriousness of the problem varies directly with the amount of seasonal variation in milk supplies. Similarly, day-of-the-week changes in the quantity of surplus milk present problems in operating surplus-manufacturing facilities most effectively. These problems can be lessened, however, by using holding tanks to distribute peak quantities over longer periods.

Dependable outlets

Other things being equal, agencies responsible for disposing of surplus milk will prefer outlets that take that milk under all conditions.
Disposing of Surplus Fluid Milk

Manufacturing plants are most likely to decline to take surplus milk, or to reduce prices offered for it, in the season of flush production. In that season, supplies of milk from their regular manufacturing-milk producers are at a peak. Handling extra milk at that time may necessitate hiring extra help or paying overtime rates.

If usual outlets will not take surplus milk in the flush season, other potential outlets are likely to be poor prospects for the same reason. Under these conditions, finding a market for surplus may involve either selling it at distress prices or else incurring heavy expense to transport it a long distance to a plant that will take it. Problems in disposing of surplus milk at such times have helped to induce some bargaining-type cooperatives to provide their own facilities for processing surplus milk.

The surplus to be disposed of is not necessarily all whole milk. The ratio of butterfat to skimmilk in surplus varies regionally (page 18). Also, to some extent the ratio varies seasonally, reflecting fluctuations in the butterfat content of producer milk and in the relative quantities of such high fat items as cream that are sold for fluid use (7). Accordingly, surplus disposal may involve marketing considerable quantities of cream or skimmilk, depending upon conditions. Impressions gained in this survey suggest that in some cases fluid milk marketing agencies have more difficulty in marketing surplus skimmilk than surplus cream. Skimmilk is so low in value per 100 pounds that it is impractical to ship it long distances. Moreover, costs of making it into spray powder are excessive unless a considerable volume is available. It is feasible to manufacture smaller quantities into condensed skimmilk, and many plants have successfully marketed surplus Grade A skimmilk in this form. However, if skimmilk is available in limited quantities or for only a short period of the year, marketing it as condensed skim may also prove impractical.

Producer bargaining strength preserved

Because surplus milk must be marketed at below the price for milk used in bottled products, and is irregular in volume, it is a consideration in the bargaining between producer associations and milk dealers. In unregulated markets, dealers who must dispose of milk in excess of what they want for their regular operations may use the low returns for that milk, and the comparatively high costs of handling irregular quantities of it, as arguments for reducing prices. A producers' association that does not dispose of the surplus may not be well informed about the returns that can be obtained for it. If that is so, and alternative
outlets for the surplus are not readily available, the cooperative may not have much influence in determining the price paid for it. Consequently, such an organization may receive distressed prices.

Many persons believe that for a producers' association to maintain a strong bargaining position it must take responsibility for disposing of surplus milk. Many associations appear to market surplus milk successfully by arranging for outlets, and supervising diversion of the surplus to those outlets. The outlet can be either a proprietary plant or another cooperative that has manufacturing facilities. Other associations have considered it preferable to provide their own manufacturing facilities.

Under some conditions, ownership of surplus manufacturing facilities by the producer association does strengthen the cooperative's hand in bargaining by insuring an outlet for surplus. However, there are some situations in which providing such facilities is not feasible, and many others in which the relatively high costs of manufacturing milk in them opens to question the wisdom of cooperative ownership. If the quantity of surplus milk is small, a cooperative is likely to find operation of its own surplus manufacturing plant out of the question. If the supply is larger but fluctuates widely between seasons, costs of manufacturing it in a standby plant operated by the cooperative are apt to be comparatively high.

**Central responsibility**

In many market situations, the best surplus-milk handling arrangements are most likely to be realized if one agency takes responsibility for disposing of all surplus milk in that market. There are four potential advantages of such an arrangement.

1. An agency can concentrate the surplus into large lots for efficient handling.

2. The central agency can assure the best use of milk supplies by balancing out shortages and surpluses of individual dealers. This will forestall having surplus milk from some bottlers going into low priced surplus uses while other bottlers need more milk for packaged products or other premium-paying uses.

3. An agency handling comparatively large amounts of surplus will have more incentive to find the best market for it, and will be in stronger position to bargain for good markets and good prices, than will a dealer with a small volume of surplus.

4. If the agency taking this responsibility is the producers' association, it can strengthen its bargaining position with dealers by removing the surplus from the market.
Conditions to Which Various Arrangements Are Best Suited

Manufacture in plants of fluid milk handlers

Manufacturing of surplus milk by fluid milk handlers (arrangement 1, page 32) is most commonly employed in small markets having limited volumes of milk in excess of fluid needs. In some markets surplus milk can be processed efficiently by these handlers. For example, in a number of markets in the northwest corner of the region, milk bottling is a sideline operation in dairy-manufacturing plants that receive whole milk, or farm-separated cream, or both. Such plants can economically absorb the relatively small quantities of surplus fluid milk they receive, or at least the butterfat from it. Even under less favorable conditions, where processing costs in such plants are relatively high, this may be the best available way to dispose of surplus milk if the quantity is not large and alternative outlets for it are not conveniently available.

Many handlers whose main interest is in packaging and distributing fluid milk use milk and cream in excess of their bottling requirements in ice cream, cottage cheese, and perhaps butter. Limited quantities of milk can be utilized in such products, especially if the volume to be manufactured does not fluctuate too widely. In most markets, milk used in these products would be classified as surplus milk under the definition used in this study. However, many handlers want milk for such products, and do not consider it to be surplus (see footnote 1, page 6).

Diversion in the city

In general, trucking surplus milk into the city and then diverting it to manufacturing facilities appears best suited to small or medium-sized cities with nearby producing areas. In such situations, bringing the surplus milk into the city is unlikely to increase hauling distances materially. And, in small markets, bringing it in may be the best way to get it together in lots large enough for low cost handling.

When surplus milk is diverted in the market, it frequently goes to local manufacturing facilities. These may be facilities of the bargaining-type cooperative representing local producers and provided primarily to dispose of surplus fluid milk. Quite commonly, however, they are regular dairy-manufacturing operations of proprietary handlers or, in some cases, of manufacturing-milk cooperatives. Surplus milk can be diverted to such facilities on trucks used in assembling it from farms without adding materially to hauling distances. Diversion may be of full loads or of parts of loads not wanted by bottling plants.
Little surplus milk diverted in this way is received at the bottling plant before being diverted. Such rehandling should be avoided on milk diverted short distances unless special circumstances make it necessary.

In areas with sparse production of manufacturing milk, fluid milk that bottlers do not want in their regular operations may be received and subsequently diverted to manufacturing facilities at some distance from the market. Where milk is diverted over long distances it usually is hauled in tank trucks. If the milk is picked up at the farms in cans, it is necessary to receive it in order to transfer it to bulk tanks, and perhaps to cool it further prior to shipment.

**Diversion in the country**

Diversion of surplus fluid milk in the country is an arrangement that, in general, is best suited to use in large markets. In such markets, diversion directly to manufacturing plants in producing areas can eliminate the need for hauling large quantities of surplus milk into the city. The saving thus made is most important, of course, for production areas that are at long distances from the city.

Diversion in the country is facilitated if manufacturing plants are conveniently available in the producing area. In fact, a good outlet for surplus milk in or near the producing area may lead to its diversion in the country in a small or medium-sized market even though the saving made by not hauling the milk into the city is small. In large markets, however, the economies of manufacturing the surplus in the country can be considerable. To obtain these savings, the agency responsible for the surplus may provide standby manufacturing facilities for it in the producing areas if no satisfactory alternative outlets are available.

In some markets dominant proprietary handlers are in good position to divert surplus milk directly from farms to manufacturing plants. In many markets, however, this diversion can be accomplished most effectively by a producers' bargaining association, or some other agency that takes overall responsibility for surplus. In small and medium-sized markets, a central agency supervising the operation may be able to get together sufficient milk to make diversion worthwhile when individual handlers cannot do so. Even in larger markets, an overall agency can make possible such economies as the diversion of milk to the nearest manufacturing plant rather than having milk transferred indiscriminately from one part of the milkshed to another.

**Disposal by a cooperative**

In the smaller markets, a bargaining-type cooperative is unlikely to take responsibility for the disposal of surplus milk unless its mem-
bers supply a large part of the milk used in the market. Although perhaps not essential, other conditions that favor cooperative initiative in this respect include enough control over the assembly of milk to specify where loads are to be delivered and authority to shift milk from a handler who does not need it for bottling to another who does.

A cooperative’s incentive to take responsibility for the disposal of surplus milk can be expected to depend upon the size of the market, the volume of surplus milk involved, and the relative level of surplus milk and manufacturing-milk prices. The availability and adequacy of alternative outlets for surplus milk influence the decision. If the volume of excess milk is relatively small, or good outlets are available for it, or both, the cooperative may believe there is little to be gained by taking responsibility for surplus disposal. On the other hand, if the volume is comparatively large, the price obtained for it relatively low, or outlets uncertain—or if there is a combination of these circumstances—the producers’ association may operate at a serious disadvantage if it does not take over surplus disposal. And these same factors—volume of surplus, price received for it, and availability and reliability of alternative outlets for it—are major considerations in determining whether the cooperative provides its own manufacturing facilities for the surplus or markets surplus through other outlets.

**Developments Affecting Choice of a System**

**Increasing specialization by dealers**

Many milk dealers are limiting their operations to the processing, packaging, and distribution of fluid milk products, cottage cheese, and, less commonly, ice cream. Most dealers who do this are interested in receiving only the milk they need for these products. They wish to avoid handling and taking responsibility for milk in excess of these needs. Similarly, they prefer not to have to procure supplementary supplies in shortage periods.

This situation favors the use of full-supply contracts by producers’ associations supplying these dealers. These place responsibility for disposing of the surplus upon the cooperative. If such a dealer, who prefers not to buy directly from producers, does not obtain his milk from a cooperative, he may buy it from another dealer or broker, who becomes the agency that balances supplies with utilization for him.

**Growing day-to-day variation in sales**

Widening day-to-day variation in sales of packaged milk is another consideration. Dealers, by carrying milk over in holding tanks and bottling ahead on slack days, frequently take in more uniform amounts
from day to day than they sell. Nevertheless, the variation in sales is becoming so marked that it is creating serious short-term surplus problems in some markets (pages 15 to 18).

A strong bargaining cooperative may be able to minimize the short-term problem by requiring dealers to take in usual quantities of milk on slack bottling days and carry it over for use on heavy bottling days. If, however, it is not feasible to get dealers to do this, centralized management of the surplus by the producers' association, or some other agency, appears to offer advantages in dealing with the day-of-the-week surpluses that result.

As with seasonal surpluses, a central agency, with large volume, may be in position to develop better outlets than individual dealers. Moreover, in periods of tight milk supplies such a market-wide agency may be able to ease the problem a little by shifting milk among dealers who have dissimilar day-of-the-week sales patterns.

In trying to deal with the day-of-the-week surplus problem, some milk-marketing agencies have at times brought milk into the market in one part of the week and shipped out surplus in another part of the same week. This bringing in of supplementary supplies to meet peak day-of-the-week needs, while alternately exporting surplus on slack days, is most likely to be practiced in the season of short supplies. At such times it may be possible to sell the exported milk for fluid use, thereby holding down the cost of the exchange. If day-of-the-week variation in sales becomes more acute, practices such as this may become more common.

Expanding use of bulk tanks

Farm bulk tanks have come into use rapidly in midwestern milk markets in recent years. In 34 Federal order markets in the region for which information is available, the average proportion of the milk delivered in bulk increased from 20 percent in January, 1956, to 63 percent in January, 1959.¹ It is clear from this that in looking toward the handling of surplus milk in the future we will be considering the handling of milk assembled in tank trucks.

This outlook raises the question of how bulk assembly influences surplus milk disposal arrangements. Some tentative conclusions can be drawn from information obtained in this study. It should be recognized, however, that at the time of the study surplus-handling arrangements in some of the surveyed markets may not yet have been adjusted to take advantage of the modifications made possible by bulk handling.

¹ Adapted from data in (4). For 5 markets 1956 percentages, unavailable in that report, were estimated from data for July, 1956, obtained in the regional survey of surplus milk handling.
Surplus-handling arrangements were compared in two groups of markets of similar population. In one of these groups, all milk was assembled in cans; in the other, 75 to 100 percent was assembled in bulk as the figures below show.

<table>
<thead>
<tr>
<th>Percent of milk received in bulk</th>
<th>Number of markets</th>
<th>Average market population</th>
<th>Manufactured in plants of fluid milk handlers</th>
<th>Diverted in the country</th>
<th>Trucked into the city and diverted to manufacturing facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>30</td>
<td>39,000</td>
<td>37</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>75 to 100</td>
<td>14</td>
<td>42,000</td>
<td>35</td>
<td>29</td>
<td>7</td>
</tr>
</tbody>
</table>

The proportion of the markets in which diversion in the country was the dominant surplus-handling arrangement was twice as large for the bulk assembly as for the can assembly markets. Correspondingly, diversion in the city was less common in bulk than in can markets.

Similar indications were obtained in recent intensive studies of the handling of surplus milk in 15 midwestern markets (7). Replies were generally to the effect that bulk handling facilitated diversion. Further, it was suggested that bulk handling might lead to the diversion of more surplus milk directly from farms to manufacturing plants.

It seems likely that bulk handling will reduce surplus disposal costs materially whenever it eliminates taking in, dumping, and subsequent shipment to manufacturing facilities of milk received in cans. This extra handling occurs with surplus milk that is received at a plant prior to diversion. With milk coming from the farm in tank trucks, it should generally be feasible to truck any not needed by the bottling plant directly to manufacturing facilities, if they are nearby. If the surplus is going to a distant plant, and shipment in larger lots offers economies, it can either be transferred directly into an over-the-road tanker, or pumped into the plant for holding for such a tanker. Similar but smaller savings are possible if reloading or rehandling of cans is eliminated. In hot weather, a cooling of the milk may be eliminated, since milk in tanks is likely to reach market at lower temperatures than milk in cans. With these possibilities, it is understandable how bulk handling can facilitate diversion of surplus milk from farms to manufacturing plants.

To the producers’ association, bulk handling appears to reduce the need to invest in manufacturing facilities for surplus. With milk in
cans, the expense of receiving was likely to be incurred if milk had to be diverted over considerable distances. In addition, it might be necessary for the cooperative to own or rent one or more large tank trucks to haul the milk to point of manufacture. These considerations could help justify the cooperative's providing its own manufacturing facilities. Bulk handling, however, largely eliminates the expense in re-handling. Also tankers used in picking up bulk milk at the farm are being used to ship milk farther than can pickup trucks—not only because they haul more milk but also because milk stays cool longer.

The outlook for optimum arrangements

In general, the developments that have just been discussed and a number of other considerations suggest that there may be a growing tendency in the future, especially in medium-sized and large markets, for a producer association or some other overall agency to take responsibility for disposing of surplus fluid milk. The following reasons support this conclusion.

1. Many milk dealers are specializing in the packaging and distribution of fluid milk and related items. These dealers apparently prefer not to be bothered with surplus milk or with the procurement of supplementary supplies. If the source from which they obtain milk will not tailor the supply to their needs, they will be tempted to shift to a source that will do so.

2. In many markets, surplus milk can be disposed of more efficiently and marketed to better advantage by an agency that takes overall responsibility for it than by individual dealers. Such developments as the increasing day-of-the-week variation in sales appear to be intensifying this advantage.

3. The general adoption of bulk handling is providing another means by which an overall agency that adjusts milk supplies to needs can dispose of surplus milk without heavy investment and fixed costs in manufacturing facilities.

4. In many market situations it is in the producers' interest to have their own organization relieving the market of surpluses and obtaining needed supplementary supplies.

Action by a co-operative or similar agency in balancing milk supplies with the quantity used by dealers is less needed in areas having readily available alternative outlets for surplus milk than in areas without such facilities. Likewise, small producer associations may be in poor position to carry on such activity. However, associations serving small markets should not overlook the possibility that they may be able to operate most effectively by merging with other associations.
With the growing size of milk distributors' operations, and the expanding areas over which they market milk, the balancing of milk supplies with needs may best be attained over wider areas than single markets. In some situations it may be advantageous to have a regional agency to dispose of surplus fluid milk.

**SUMMARY AND CONCLUSIONS**

Many fluid milk markets receive large quantities of milk of bottling quality in excess of the amount needed for packaged milk products. Most markets have surpluses of two types: (1) seasonal; and (2) day-of-the-week. Some also have year-round excesses.

This study was made to describe and classify the arrangements used in disposing of surplus fluid milk in midwestern markets; to determine the factors influencing the choice of arrangements; and to evaluate the suitability of the various surplus handling arrangements to different market situations. It was based upon data for 104 markets, which included nearly all cities of 50,000 or more in the region.

For this study, surplus milk was defined as milk of bottling quality that was used in products not requiring milk of such quality. Surplus milk as thus defined was commonly used in manufactured dairy products. In most markets, milk of bottling quality was not required to produce cottage cheese and ice cream. In those markets, Grade A milk used in these products was considered to be surplus even though dealers may regularly have used Grade A milk in them.

In the aggregate, 27 percent of the total milk supplies of the surveyed markets was surplus. Typically, the volume was three to four times as large in May as at its low point in the late summer or fall. Ice cream, cottage cheese, butter and non-fat dry milk were the most common end uses for surplus milk. Ice cream and cottage cheese were made mainly in local facilities, while the other products frequently were manufactured in out-of-town plants.

Analysis of the information obtained in the survey showed three factors to be related in some degree to the percentage of surplus milk: (1) pooling arrangements; (2) whether the market was a primary or secondary market; and (3) the amount of seasonal variation in receipts.

Cooperatives that bargained with bottlers in the sale of producers' milk were in position to assume much of the responsibility for disposing of surplus milk. About two-thirds of the markets had cooperatives of this type. Nearly half the milk for these markets was assembled on trucks operated by these cooperatives or by haulers whose points of delivery could be determined by the cooperatives. In approximately one-third of the markets having bargaining-type cooperatives, these
associations had their own manufacturing facilities for surplus. In a considerable number of markets, cooperatives had been taking care of surpluses for a number of years. In such situations milk bottlers were not in position to handle surpluses. That was true especially in large markets where a considerable number of bottlers had full-supply contracts or similar arrangements under which cooperatives took care of the surplus.

Arrangements for disposing of surplus milk were classified into six categories on the basis of the dominant practice in each market. The criteria for classification were the point of surplus diversion and location of facilities for manufacturing surplus milk (page 32). These arrangements were: (1) manufactured in plants of fluid milk handlers; (2) diverted in the country; (3) trucked into the city and diverted to local manufacturing facilities; not received by fluid handlers; (4) trucked into the city and diverted to out-of-town manufacturing facilities; not received by fluid handlers; (5) trucked into the city, received by fluid handlers, and diverted to local manufacturing facilities; (6) trucked into the city, received by fluid handlers, and diverted to out-of-town manufacturing facilities.

There were wide differences in the extent of use of these arrangements. Diversion in the country was the dominant arrangement in about one-third of the markets, including most of the larger ones. These markets accounted for about four-fifths of the total surplus in the surveyed markets. Markets in which the dominant arrangement was to truck surplus directly from farms to manufacturing facilities in the city were the only others having substantial quantities of surplus. Some of the other arrangements, particularly manufacture by fluid milk handlers, were dominant in appreciable numbers of small markets, but these had comparatively little surplus milk.

Market size and volume of surplus, which were closely interrelated, appeared to be major factors determining the choice of surplus-handling arrangements. Other conditions that affected the choice were: (1) the agency taking responsibility for the surplus; and (2) the number of dairy-manufacturing plants depending primarily on supplies of manufacturing milk located in the producing area around the market.

Conditions that should be sought in disposing of surplus fluid milk include efficient handling arrangements and dependable outlets. In many situations these conditions are most readily attained if one agency takes overall responsibility for the surplus. With these goals in mind, the adaptation of surplus-marketing arrangements to various market situations may be considered.

In small markets with limited quantities of surplus and poor alter-
native outlets, the best arrangement may be for fluid milk handlers to manufacture the surplus. Diversion in the city appears best suited to small or medium-sized markets with nearby production areas. Diversion in the country is especially well suited to large markets with extensive producing areas.

Changing conditions will influence the choice of handling systems. Many handlers are specializing in the processing, packaging, and distribution of milk and do not want to be concerned either with surplus or with procurement of supplementary supplies. This specialization, and increasing day-to-day variation in sales of packaged milk, favor centralized management of the surplus by some overall agency. Possibly of greater significance is the increase in bulk handling. Bulk handling greatly facilitates the diversion of surplus and reduces the need for standby manufacturing facilities. Together with other developments, it may stimulate cooperatives to assume increasing responsibility for surplus disposal.

LITERATURE CITED

7. North Central Regional Committee on Dairy Marketing Research. Unpublished data from detailed studies of the handling of surplus fluid milk in 15 midwestern markets.
Other Regional Publications of the
North Central Dairy Marketing Research Committee


These publications are distributed by the state agricultural colleges of the North Central Region. Copies are available free of charge while supplies last.