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Marketing Operations of Dairy Cooperatives

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ABSTRACT

Some 32,000 member-producers — owners of the Nation's 118 dairy cooperatives — marketed 167 billion pounds of milk in 2017, or about 77.8 percent of all U.S. milk marketed that year. Including milk received from non-members and non-cooperative firms, total milk handled by U.S. cooperatives was 182 billion pounds, or an 84.8 percent-share of the national market.

Milk plants and receiving facilities were operated by 41 cooperatives. Dairy co-ops marketed 86 percent of the Nation's butter, 90 percent of nonfat and skim milk powders, 23 percent of natural cheeses, and 37 percent of dry whey products.

Dairy co-ops are also major employers, with 86 co-ops reporting that they employed 35,004 full-time and 1,507 part-time employees, for a total of 36,511 employees. In 2017, those same 86 cooperatives, on a per-hundredweight (cwt) basis, had: total assets of $12.71, total liabilities of $8.55, total equity of $4.16, and a net margin before taxes of 48 cents, or a return-on-equity of 11.6 percent.

This report focuses on 2017, with results compared to 2012 and 2007. It also provides some historical and trend statistics from previous studies for more extensive comparison of dairy cooperatives through time.

Key Words: Cooperatives, milk, plants, dairy products, marketing.

Marketing Operations of Dairy Cooperatives, 2017

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CONTENTS

PREFACE

Information for this report came primarily from the responses to a United States Department of Agriculture (USDA) survey of all U.S. dairy cooperatives that has been conducted once every 5 years since 1987. It was conducted intermittently prior to 1987. The dairy-specific data were collected in conjunction with the annual survey of all cooperatives by the Cooperative Programs' statistics staff of USDA Rural Development. In some cases, data were estimated for non-respondents based on their financial statements or other sources (note 1).

Cooperatives were asked to supply information on their milk-marketing operations for the 2017 fiscal year. These fiscal years vary within the calendar year, so the data reflect some differences in time periods.

When calculating cooperative marketing shares of various products, information for U.S. total milk volumes came from statistics reported by the USDA National Agricultural Statistics Service in: *Milk Production, Disposition and Income, 2017 Summary, April 2018; Dairy Products, 2017 Summary, April 2018*; and also by the USDA Agricultural Marketing Service (AMS) in: *Estimated Fluid Milk Product Sales Report, EFMS-0818, October 2018*. Market share calculations are approximate because cooperatives' fiscal years vary and do not exactly match the calendar year.

The cooperation and assistance of the responding cooperatives is gratefully acknowledged. USDA's AMS staff provided essential advice and information for this study, and USDA Rural Development cooperatives statistics staff members Charita Coleman and Judith Rivera provided data assistance. The author wishes to credit K. Charles Ling (USDA retired agricultural economist) for his work, analyses, and authorship of predecessor reports that provided the methodology and templates used to conduct this study.

EXECUTIVE SUMMARY

Dairy cooperatives are the dominant market force, in terms of milk volume handled, in the United States dairy industry. Milk production in the United States continues to rise as industry consolidation results in fewer cooperatives and fewer dairy farmers. Thus, cooperatives on average are handling much more milk and producing larger volumes of dairy products — such as butter, powder and cheese — than in the past. Likewise, dairy farms are becoming larger, producing much more milk per farm, on average.

Milk prices have been relatively low following a period of record-high prices in 2014. At the same time, the cost of producing milk has increased, exacerbating the situation for many dairy farmers and leading many to exit the business, due to low margins. However, even in this climate of tight margins, some new, large operations have opened in regions of the country where it is relatively less expensive to produce milk. Some farmers have also expanded their operations, taking advantage of economies of scale. Recently, policy decisions in Canada and structural changes in the U.S. market have resulted in a number of non-member farms losing their milk market. In many cases, a cooperative was able to step in and provide a home for their milk. These events underscored the value of cooperative membership.

Dairy cooperatives' dominant share of U.S. butter and dry milk powder production attests to the important role they play in ensuring that there is a market for dairy farmers' milk. Cooperatives perform the critical function of ensuring adequate supplies of milk are available for manufacturers and processors when they are needed, despite the ebb and flow of milk production relative to the demand for milk. Cooperatives, many with significant structural investments in processing and with effective selling strategies in place, continue to seek ways to help alleviate the pressures and challenges that their member-producers face in this complex agricultural system.

Study Highlights

- Member-producers of dairy cooperatives marketed 167 billion pounds of milk in 2017, a 3.6-percent increase from 2012 and up 9.5 percent from 2007. This volume represented 77.8 percent of the milk marketed by farmers nationally, a decrease from 80.9 percent 5 years earlier, and down from 82.6 percent 10 years earlier. (Cooperative shares of the Nation's milk and dairy product marketing are approximate, because cooperatives' fiscal years vary and do not exactly match the calendar year.)

- Including milk received from non-members and non-cooperative firms, total milk handled by cooperatives was 181.9 billion pounds, or 84.8 percent of national milk marketed. Unlike member milk, this represented a slight increase from 2012 and 2007. (See note 2 for information on cooperative organic milk.)

- The number of dairy cooperatives decreased from 132 in 2012 to 118 in 2017. There were 41 cooperatives that processed and manufactured dairy products and operated receiving stations. The other 77 co-ops had no milk-handling facilities.

- Sixty-five percent of total cooperative volume was sold as raw milk in 2017 versus 66 in 2012 and 63 in 2007. The other 35 percent was manufactured at plants owned and operated by cooperatives.

- There were 32,165 cooperative member producers marketing milk in 2017, 23.4 percent (9,834) fewer than 5 years earlier, and 35.2 percent (17,510) fewer than 10 years previously. Three regions — East North Central, North Atlantic, and West North Central — together accounted for 85 percent of all member producers and 54 percent of cooperative milk volume. The Western region was the top source of cooperative milk — at 60.3 billion pounds, that region accounted for 36 percent of all cooperative milk.

- In 2017, dairy cooperatives owned and operated 198 plants, 10 received and shipped milk only, 30 manufactured American cheese, 19 produced Italian cheese, 52 packaged fluid milk products, 30 churned butter, 46 dried milk products, and 20 dried whey products. Many other plants made various other dairy products or dairy-related products. (A plant may perform more than one function.)

- Volume of butter and nonfat and skim milk powders increased by 14 percent and 8 percent, respectively, from 2012 to 2017. Cooperative share of butter, at 1.6 billion pounds, was 86 percent of U.S. production, and cooperative share of nonfat and skim milk powders, at 2.1 billion pounds, was 90 percent. Cheese made by cooperatives increased by 21 percent from 2012, after having decreased from 2007 to 2012. However, cooperative cheese share fell by 1 point, with the 2.9 billion pounds marketed accounting for 22 percent of U.S. cheese production. Cooperative production of dry whey products fell by 7 percent, and co-op share of national whey production fell from 43 percent to 37 percent in 2017.

- In 2017, seven cooperatives (up from 4 in both 2007 and 2012) each handled more than 6 billion pounds of member milk. Together, these 7 cooperatives handled 110.7 billion pounds of member milk, or 66 percent of total cooperative milk in 2017.

- Both the cooperative number and the milk volume of the next size group (3 billion to 6 billion pounds) dropped over the 5-year period. This group lost 5 cooperatives and showed a significant drop in the share of total cooperative milk volume (from 28.3 percent in 2012 to 12.7 percent, a 15.6-point decrease). Some of the cooperatives in this second group moved up into the largest size group.

- Together, the 13 cooperatives in the 2 largest groups (each of which marketed at least 3 billion pounds) accounted for 79 percent of cooperative milk.

- The four largest cooperatives increased their share of the Nation's milk, up from 47.8 percent in 2012 to 53.1 percent in 2017. Broadening the focus to the largest 8 dairy cooperatives and the largest 20 dairy co-ops, each group also saw its share of U.S. milk increase.

- In terms of milk volume, the dominant position of dairy cooperatives relative to the rest of the industry increased slightly.

- Sixty-seven cooperatives reported having 35,004 full-time and 1,498 part-time employees in 2017, while 4 other cooperatives had 9 part-time employees. Another 15 cooperatives reported having no employees. The other 32 cooperatives did not supply data on their number of employees.

- Complete financial data obtained for 86 dairy cooperatives (out of the total of 118) showed that total assets for the fiscal year ending in 2017 were $20.4 billion ($12.71 per hundredweight), total liabilities were $13.8 billion ($8.55 per cwt), and total equity was $6.7 billion ($4.16 per cwt). Seventy-five percent of the equity was allocated to members.

- Net margin before taxes was $779 million (48 cents per cwt), a return on equity of 11.6 percent (return was 8 percent in 2012 and 12.2 percent in 2007). Together, these cooperatives marketed 96 percent of total cooperative member milk volume, with 16 cooperatives reporting that their dairy sales included $677 million of dairy exports.

- The number of dairy cooperatives has steadily decreased, from 2,338 in 1936, to 1,746 in 1957, to 592 in 1973, 435 in 1980, 296 in 1987, 226 in 1997 and to 118 in 2017.

- While there are fewer co-ops, member-producer milk delivered to cooperatives increased by 63.8 million pounds (62 percent) from 1987 to 2017, while total pounds of milk handled by cooperatives increased by 76.1 million pounds (72 percent).

MARKETING OPERATIONS OF DAIRY COOPERATIVES, 2017

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Farmer owned and operated dairy cooperatives continue to provide a significant channel for marketing milk from the Nation's dairy farms. In line with industry and dairy farm trends, the number of cooperatives is declining, but those remaining are handling larger volumes. In addition to marketing milk, many cooperatives own and operate plants to process, manufacture, and market various dairy products.

This report, the 11th in a series of periodic appraisals of the scope and performance of dairy cooperatives, describes their continuing evolution in an ever changing and challenging market environment.

Information is presented in 10 sections: cooperative industry profile; milk volume and utilization; member supply and location; plant operations; dairy products marketed; cooperative size review; cooperative concentration; employee status; financial performance; and historical statistics and trends.

Cooperative Industry Profile

Between 2012 and 2017, the number of dairy cooperatives decreased by 14 (11 percent), from 132 to 118. The pace was slower than the reduction of 23 cooperatives (15 percent) recorded from 2007 to 2012. In 2017, 99 (84 percent of all dairy cooperatives) were headquartered in the North Atlantic, East North Central, and West North Central regions; the North Atlantic region had the most dairy co-ops with 42, down from 45 in 2012 and 55 in 2007 (table 1; see figure 1 for region demarcation).

TABLE 1 — Number of dairy cooperatives by type of operation and by headquarters region, 2007, 2012, and 2017

Region	Operating milk plants or receiving facilities			Not operating milk plants or receiving facilities			Totals		
	2007	2012	2017	2007	2012	2017	2007	2012	2017
North Atlantic	7	4	3	48	41	39	55	45	42
South Atlantic	2	2	2	3	4	4	5	6	6
East North Central	23	21	20	12	13	9	35	34	29
West North Central	14	12	10	25	20	18	39	32	28
South Central	1	1	1	2	1	1	3	2	2
Western	10	7	5	8	6	6	18	13	11
All regions	57	47	41	98	85	77	155	132	118
Share of total co-ops (percent)	37	36	35	63	64	65	100	100	100

FIGURE 1 — Number of cooperatives operating in each region, member-producers, member milk, and milk per producer, 2017

Three regions showed a drop in dairy cooperative numbers from 2012, while the South Atlantic and South Central regions each remained unchanged. The East North Central region had the steepest reduction of five cooperatives, followed by a reduction of four in the West North Central region, three in the North Atlantic region, and two in the Western region.

In 2017, 41 cooperatives (35 percent of all dairy cooperatives) operated milk-handling facilities (milk plants or receiving facilities), a decline of 6 from 2012 and 16 from 2007. The decreases occurred in four regions, while the South Atlantic and South Central regions each remained unchanged. The East North Central region still had the most cooperatives (20, down 1 from 2012) with plants and milk-receiving facilities.

Cooperatives that did not have plants or milk-receiving facilities decreased from 85 to 77 (a drop of 8) from 2012 to 2017, and a drop of 21 from 2007 to 2017. Half of these (39) were in the North Atlantic region. The East North Central region experienced a decrease of 4 such cooperatives from 2012, the steepest drop among the 3 regions that showed a decline. The South Atlantic, South Central, and Western regions remained the same from 2012 to 2017.

Ninety-six dairy cooperatives sold at least some bulk raw milk in 2017, down 18 from 2012 and 40 from 2007 (table 2). The number of

TABLE 2 — Cooperatives[1] marketing selected dairy products, 2007, 2012, 2017

	2007	2012	2017	5-year Change	10-year change
			Number of cooperatives		
Bulk raw milk	136	114	96	(18)	(40)
Butter	19	15	14	(1)	(5)
Nonfat dry milk	14	16	14	(2)	0
Skim milk powder[2]	-	9	8	(1)	-
Dry whole milk	5	7	6	(1)	1
Dry buttermilk	10	13	12	(1)	2
Natural cheeses and other than cottage cheese	31	25	28	3	(3)
American cheese	18	16	18	2	0
Italian cheese	6	8	8	0	2
Swiss cheese	4	4	5	1	1
Other (specialty) cheeses	15	14	13	(1)	(2)
Cottage cheese	6	6	6	0	0
Sour cream	8	6	6	0	(2)
Packaged fluid milk products	13	10	11	1	(2)
Yogurt	6	6	6	0	0
Dry whey products	11	12	12	0	1
Whey protein concentrates & isolates	6	11	8	(3)	2
Lactose	4	6	5	(1)	1

[1] A cooperative may market several products.

[2] Separately counted for 2012 and 2017.

cooperatives marketing butter in 2017 dropped by one from 2012, and by five from 2007, while those marketing cheese (all cheese other than cottage cheese) increased by three from 2012. Within those cheese-marketing cooperatives, the number marketing American cheese increased by two and those marketing Swiss cheese increased by one. Eight cooperatives marketed Italian cheese, unchanged from 2012. The number of cooperatives marketing skim milk powder, dry whole milk, dry buttermilk, and lactose dropped by one, and the number marketing cottage cheese, sour cream, yogurt, and dry whey products remained unchanged. And, the number of cooperatives marketing whey-protein concentrates and isolates dropped from 11 to 8 from 2012 to 2017. Finally, the number of cooperatives marketing packaged fluid products was up 1 from 2012, to 11 cooperatives. But that is down two cooperatives from 10 years ago.

As of Oct. 1, 2018, 95 dairy cooperatives (80.5 percent of the Nation's dairy cooperatives) were qualified to pool milk under a Federal Milk Marketing Order. Dairy cooperatives have unique treatment under Federal Milk Marketing Order regulations, recognizing their role in providing balancing services to the entire market and providing their members with market information and testing services. (See note 3 for sources for more information on Federal Milk Marketing Orders.)

Milk Volume and Utilization

In 2017, cooperative member-producers marketed 167 billion pounds of milk, or 77.8 percent of milk marketed by all U.S. producers (table 3). The cooperative share of milk decreased 3.1 points from 2012, when it was 80.9 percent, and dropped 4.8 points from 2007, when it was 82.6 percent. From 2012 to 2017, pounds of milk

TABLE 3 — Cooperative share of milk marketed by producers, 2007, 2012, and 2017[1]

Year	Milk from member-producers	Milk from sources other than cooperatives[2]	Total milk handled by cooperatives[3]	United States Total[4]	Member milk[5]	Total milk handled[5]
		Million pounds			*Percent*	
2007	152,514	3,272	155,786	184,565	82.6	84.4
2012	161,222	6,451	167,673	199,362	80.9	84.1
2017	166,978	14,938	181,916	214,487	77.8	84.8
		Percent				
5-year change	3.6	131.6	8.5	7.6		
10-year change	9.5	356.5	16.8	16.2		

[1] Cooperatives' fiscal years vary and do not exactly match the calendar year.
[2] Milk from non-members and non-cooperative firms.
[3] Handled by physical receipt, bargaining, or servicing transactions, excluding inter-cooperative volume.
[4] Obtained from USDA's National Agriculture Statistics Service (See note 1).
[5] Cooperative share of U.S. total.

marketed by cooperative members increased 3.6 percent, while the increase was 7.6 percent by all U.S. producers. From 2007 to 2012, milk marketed by cooperative members increased 9.5 percent, and the increase of all U.S. producers then was 16.2 percent. (Cooperative shares of national marketing of milk and dairy products are approximate, because cooperatives' fiscal years vary and do not exactly match the calendar year.)

Milk received from non-members and non-cooperative firms more than doubled when compared with 2012, increasing by 8.5 billion pounds, from 6.5 billion pounds to 14.9 billion pounds (note: in 2017, the milk cooperatives received directly from non-members decreased from 2012, while the milk they received from non-co-op firms substantially increased).

In total, cooperatives handled or bargained for 181.9 billion pounds of milk in 2017, or 84.8 percent of all milk marketed by U.S. producers. Cooperative share in 2017 was 0.7 percent higher than in 2012. (See note 2 for information on cooperative organic milk.)

Cooperatives marketed 65 percent of the milk volume they handled as bulk raw milk (including the volume shipped to plants that cooperatives had investment in), down one point from 2012 (table 4). In other words, cooperatives processed or manufactured 35 percent of the milk in the plants they owned and directly operated. In sum, the overall pounds of milk handled by cooperatives increased by 14.2 billion pounds from 2012 to 2017. Of this, milk sold raw increased by 7.6 billion pounds and milk processed or manufactured rose by 6.6 billion pounds. The 10-year (2007 to 2017) changes show 26.1 billion more pounds of milk handled by cooperatives, 19.8 billion more pounds sold raw, and 6.3 billion more pounds processed or manufactured.

TABLE 4 — Utilization of milk marketed by cooperatives, 2007, 2012 and 2017[1]

Year	Milk marketed *Million pounds*	Utilization rate *Percent*
2007		
Sold raw[2]	98,288	63
Processed or manufactured	57,498	37
Total	155,786	100
2012		
Sold raw[2]	110,481	66
Processed or manufactured	57,192	34
Total	167,673	100
2017		
Sold raw[2]	118,080	65
Processed or manufactured	63,836	35
Total	181,916	100

[1] Excludes inter-cooperative volume and includes milk from non-member producers and non-cooperative firms.
[2] Includes milk shipped to plants that cooperatives had investment in.

Member Supply and Location

There were 32,165 cooperative member-producers marketing milk in 2017 (table 5). Most were in the East North Central region (10,780) and North Atlantic region (10,700). The West North Central region was next, with 6,014 member-producers. Together, these three regions were home to 86 percent of cooperative member producers, but only 54 percent of cooperative member milk.

Following the continuing national trend of decreasing dairy farm numbers, dairy cooperatives reported a 23-percent decline in the number of member-producers — from 41,999 in 2012 to 32,165 in 2017. Over a 10-year period (2007 to 2017), the drop was 35 percent. The greatest declines were in the East North Central region, which lost 6,543 producers (38 percent) in that time span while the West North Central region lost 2,151 (26 percent) member-producers. Those two regions lost the most members, based on numbers and proportion (percent).

Figure 1 provides the same data as table 5, but in a map format that identifies the States in each region. Every region of the Nation seemed to be adequately served by dairy cooperatives. The South Central region was served by 11 cooperatives, while 47 cooperatives had members in the North Atlantic region.

In 2017, as in 2007 and 2012, the Western region remained the top source of cooperative milk volume. The 2,096 member-producers there (6.5 percent of all dairy cooperative members) marketed 60.3 billion pounds of member milk. This represented 36 percent of member milk marketed by all cooperatives; the share was just slightly lower than the 37 percent reported in 2012, even with fewer member producers. The East North Central region accounted for 26 percent of total member milk volume, while the North Atlantic and West North Central regions supplied 16 and 12 percent, respectively, of the total U.S. cooperative member volume.

Four regions had increased milk volumes from cooperative members, while the West North Central and South Central regions had slight decreases. The greatest increase was in the North Atlantic region, up 4.2 billion pounds in 5 years, a 19-percent increase. The Western and East North Central regions had increases of 982 million and 872 million pounds, respectively.

Similar to the last 5-year period (2007 to 2012), milk deliveries per member-producer were up in all regions in the last 5 years. Nationally, it increased 25 percent, from 3.84 million pounds to 4.81 million pounds (the same percentage increase occurred from 2007 to 2012). Per-member delivery was highest in the Western region, at 28.79 million pounds, up 20 percent from 2012. The East North Central region had the largest change in per-member delivery at 64 percent.

Only the North Atlantic region had an increase in cooperative share of milk, from 80 percent in 2012 to 87 percent in 2017. The Western region was the same as in 2012 at 72 percent. The other four regions all experienced declines: South Atlantic (from 92 to 89 percent), East North Central (from 92 to 83 percent), West North Central (from 97 to 84 percent, the largest decline), and South Central (from 71 to 60 percent).

Plant Operations

Three regions are used in reporting locations of dairy plants: the Atlantic region (a combination of the North and South Atlantic regions in figure 1); the Central region (combination of the East North Central, West North Central, and South Central regions); and the Western region.

Cooperatives owned and operated 198 dairy

TABLE 5 — Number of co-ops operating in each region, member-producers, member milk, and milk per producer, 2007, 2012, and 2017[1]

Year and region[2]	Co-ops[3]	Producers	Member milk	Milk per producer	Co-op regional share of milk[4]
		Number	*Number*	*Million pounds*	*Percent*
2007					
North Atlantic	62	12,078	20,428	1.69	76
South Atlantic	10	2,118	7,350	3.47	94
East North Central	47	20,255	37,675	1.86	91
West North Central	49	10,160	19,192	1.89	97
South Central	11	2,328	9,788	4.20	83
Western	21	2,736	58,081	21.23	76
Total		49,675	152,514	3.07	82.6
2012					
North Atlantic	53	10,693	22,078	2.06	80
South Atlantic	13	1,709	7,362	4.31	92
East North Central	47	17,323	42,923	2.48	92
West North Central	42	8,165	20,238	2.48	97
South Central	12	1,629	9,266	5.69	71
Western	16	2,480	59,356	23.93	72
Total		41,999	161,222	3.84	80.9
2017					
North Atlantic	47	10,700	26,271	2.46	87
South Atlantic	13	1,307	7,476	5.72	89
East North Central	41	10,780	43,795	4.06	83
West North Central	34	6,014	20,101	3.34	84
South Central	11	1,268	8,996	7.10	60
Western	16	2,096	60,338	28.79	72
Total		32,165	166,978	4.81	77.8

[1] Cooperatives' fiscal years vary and do not exactly match the calendar year. Many cooperatives have members in several States, some in multiple regions, and a couple of cooperatives have nationwide memberships.
[2] Figure 1 shows States by region.
[3] Cooperatives operating in region (having member-producers in region).
[4] Cooperative member milk volume as a percentage of regional volume marketed by all producers.

plants in 2017, 14 more than in 2012 (table 6). Two-thirds of the plants (130 plants, or 66 percent) were in the Central region (mainly from the East North Central and West North Central regions within). The Central region was also the most prominent in almost all categories of dairy plants, except for drying milk products. The Western region had the most plants for manufacturing dry milk products and was close to the Central region's 13 plants for churning butter (with 11 plants).

The Central region had 11 more plants operated by cooperatives in 2017 than in 2012, the Atlantic region had 4 more plants, and the Western region had 1 less plant than in 2012.

Ten plants served only as milk-receiving stations, compared with 13 in 2012 and 17 in 2007. All 10 of those plants were in the Central region. Processing and manufacturing operations were carried out in 188 plants, 17 more than 5 years ago.

Fifty-two cooperative plants packaged fluid milk products, up from 49 plants in both 2007 and 2012. The Central region had the most, with 35, 1 plant more than 5 years ago. The Atlantic region gained four plants, and the Western region lost two plants.

Thirty plants manufactured butter, up from 24 in both 2007 and 2012. Forty-six plants manufactured dry milk products (other than dry whey products), up 11 from 5 years earlier.

Many cooperative manufacturing operations are devoted to cheesemaking: 30 plants made American cheese, 19 made Italian, and 29 made other cheeses. The number of cooperative plants making Italian cheese was down by two from 2012, while there were two less plants making American cheese in 2017. The Central region had the most cooperative plants making cheese in every category.

In 2017, cultured products were made in 23 cooperative plants, an increase of 8 from 2012 and up 12 from 2007. The number of plants that made ice cream increased by 8, to 15 plants from 2012 to 2017. Dry whey products were made in 20 cooperative plants, down 4 from the 24 plants reported in 2007 and 2012.

The number of cooperative plants that made other dairy-related products in 2017 dropped by 2, to 45 from 2012. But that number is still a significant increase compared to 26 such plants in 2007.

Dairy Foods, a trade magazine, published a list of the Top 100 dairy processors operating in North America for 2017. The list included 20 U.S. cooperatives and reported that those farmer-owned businesses operated 167 plants, or 22 percent of the total 763 plants identified on the list (see note 4).

Dairy Products Marketed

This section and the accompanying tables (tables 7 and 8) describe the volume of selected dairy products marketed by cooperatives. Comparisons are made between the volume marketed by cooperatives and total U.S. production.

■ **Butter** — Cooperatives churned 1.6 billion pounds of butter in 2017, up 14 percent from 2012 and up 46 percent from 2007. The cooperative share of U.S. butter production increased from 71 percent in 2007 and 75 percent in 2012 to 86 percent for 2017.

■ **Dry milk products** — Cooperatives marketed 2.1 billion pounds of nonfat and skim milk powders (nonfat dry milk, skim milk powders, and dry skim milk for animal) in 2017, an increase of 8.6 percent from 5 years ago. Cooperatives had a 90-percent share of U.S. production of these dry milk products in 2017, a 1-point drop from the 91 percent reported in 2012, and a 6-point drop from the 96 percent reported in 2007.

Cooperatives more than doubled dry whole-milk

TABLE 6 — Number of dairy plants owned and operated by cooperatives performing various marketing functions, by plant location, 2007, 2012, and 2017[1]

	Region[2]			
Marketing function	**Atlantic**	**Central**	**Western**	**Total**
2007				
Receive and ship milk[3]	0	13	4	17
Churn butter	5	11	8	24
Make dry milk products	8	15	16	39
Make American cheese	4	24	6	34
Make Italian cheese	1	14	2	17
Make other cheeses	1	17	0	18
Package fluid milk	8	35	6	49
Make cultured products	2	8	1	11
Make ice cream	0	8	3	11
Make condensed products[4]	1	2	1	4
Make dry whey products	2	18	4	24
Other dairy-related activities	8	13	5	26
Total[5]	27	131	35	193
2012				
Receive and ship milk[3]	0	10	3	13
Churn butter	5	8	11	24
Make dry milk products	8	10	17	35
Make American cheese	3	23	6	32
Make Italian cheese	1	13	3	17
Make other cheeses	0	18	0	18
Package fluid milk	8	34	7	49
Make cultured products	3	8	4	15
Make ice cream	0	7	1	8
Make condensed products[4]	1	1	0	2
Make dry whey products	2	16	6	24
Other dairy-related activities	7	28	12	47
Total[5]	26	119	39	184
2017				
Receive and ship milk[3]	0	10	0	10
Churn butter	6	13	11	30
Make dry milk products	8	17	21	46
Make American cheese	2	24	4	30
Make Italian cheese	2	15	2	19
Make other cheeses	6	21	5	32
Package fluid milk	12	35	5	52
Make cultured products	5	15	3	23
Make ice cream	1	13	1	15
Make condensed products[4]	0	1	0	1
Make dry whey products	1	12	7	20
Other dairy-related activities	6	30	9	45
Total[5]	30	130	38	198

[1] All dairy plants, including joint venture plants operated by co-ops.
[2] Atlantic region=North and South Atlantic; Central region=East North Central, West North Central, and South Central.
[3] Facilities that only performed milk receiving and shipping functions.
[4] Plants that only condensed milk as final products without further processing onsite.
[5] Total number of dairy plants (some plants perform multiple functions in the same plant so column will not sum to total).

TABLE 7 — Selected dairy products marketing by cooperatives, 2007, 2012, and 2017

	2007	2012	2017	5-year change	10-year change
		Thousand pounds		*Percent*	*Percent*
Butter	1,087,012	1,396,363	1,585,778	13.6	45.9
Dry milk products					
Dry whole milk	16,322	39,783	87,854	120.8	438.3
Dry buttermilk	53,043	96,609	71,872	(25.6)	35.5
Nonfat and skim milk powders	1,444,395	1,967,341	2,136,381	8.6	47.9
Nonfat dry milk, human	1,357,782	1,929,236[1]	1,772,235	(8.1)	30.5
Skim milk powders	83,790	36,8641	360,287	877.3	330.0
Dry skim milk, animal	2,823	1,241	3,859	211.0	36.7
Milk protein concentrates		64,410	67,855	5.3	-
Natural cheeses other than cottage cheese	2,512,713	2,385,980	2,886,320	21.0	14.9
American cheese	1,698,485	1,513,174	1,925,824	27.3	13.4
Blue and Gorganzola		13,701	39,382	187.4	-
Specialty (Cream, Neufchatel, Feta, Gouda)		13,010	56,755	336.2	-
Hispanic		6,503	6,394	(1.7)	-
Italian cheese	742,830	732,572	797,500	8.9	7.4
Muenster		13,183	6,428	(51.2)	-
Swiss cheese	36,921	31,363	34,875	11.2	(5.5)
Not separately identified & other cheese	34,477	62,475	19,162	(69.3)	(44.4)
Dry whey and modified whey products	1,027,144	1,125,349	1,043,780	(7.2)	1.6
Dry whey, and reduced lactose and minerals	739,877	678,781	667,834	(1.6)	(9.7)
Whey protein concentrates & isolates	171,077	195,878	171,350	(12.5)	0.2
Lactose	116,190	250,690	204,596	(18.4)	76.1
Packaged fluid milk products	4,034,808	6,742,982	5,752,797	(14.7)	42.6
Condensed whole & skim milk	765,221	-	494,133	-	(35.4)
Condensed buttermilk	11,040	-	12,113	-	9.7
Bulk fluid cream (butterfat)	485,536	391,500	721,227	84.2	48.5
Bulk fluid skim	390,331	643,425	469,711	(27.0)	20.3
Miscellaneous					
Cottage cheese	259,789	113,779	114,525	0.7	(55.9)
Ice cream (thousand gallons)	49,268	15,141	13,488	(10.9)	(72.6)
Ice cream (thousand gallons)	93,411	67,130	70,412	4.9	(24.6)
Sour cream	162,827	94,371	104,399	10.6	(35.9)
Yogurt (all types)	70,231	96,044	154,246	60.6	119.6

[1] Nonfat dry milk (human) may be over-counted and skim milk powders and dry skim milk (animal) undercounted, because some cooperatives reported the three products as a lump sum number. In 2017, the three were further broken out by the cooperatives.

TABLE 8 — Selected dairy products marketed by cooperatives and share of U.S. production, 2007, 2012, and 2017[1]

	2007 co-ops	2007 U.S.	Co-op share	2012 co-ops	2012 U.S.	Co-op share	2017 co-ops	2017 U.S.	Co-op share
Thousand pounds of product, share in percent									
Butter	1,087,012	1,532,717	71	1,396,363	1,859,554	75	1,585,778	1,847,473	86
Dry milk products									
Dry whole milk	16,322	31,746	51	39,783	58,132	68	87,854	122,397	72
Dry buttermilk	53,043	81,386	65	96,609	109,132	89	71,872	112,904	64
Nonfat and skim milk powders	1,444,395	1,503,992	96	1,967,341	2,154,913	91	2,136,381	2,364,785	90
Total dry milk products	1,513,760	1,617,124	94	2,103,733	2,322,177	91	2,296,107	2,600,086	88
Milk protein concentrates				64,410	102,318	63	67,855	139,047	49
Natural cheeses other than cottage cheese	2,512,713	9,776,785	26	2,385,980	10,890,144	22	2,886,320	12,659,091	23
American cheese	1,698,485	3,877,214	44	1,513,174	4,358,477	35	1,925,824	5,071,991	38
Blue and Gorganzola				13,701	87,940	16	39,382	91,299	43
Specialty (Cream, Neufchatel, Feta, Gouda)[2]				13,010	953,512	1	56,755	1,135,986	5
Hispanic				6,503	224,259	3	6,394	286,943	2
Italian cheese	742,830	4,198,800	18	732,572	4,633,627	16	797,500	5,383,864	15
Muenster				13,183	152,630	9	6,428	187,818	3
Swiss cheese	36,921	313,689	12	31,363	320,599	10	34,875	316,653	11
Not separately identified & other cheese[2]	34,477	1,387,082	2	62,474	159,100	39	19,162	184,537	10
Dry whey and modified whey products	1,027,144	2,420,250	42	1,125,349	2,620,581	43	1,043,780	2,822,931	37
Dry whey, and reduced lactose and minerals	739,877	1,231,798	60	678,781	1,088,565	62	667,834	1,097,667	61
Whey protein concentrates & isolates	171,077	432,928	40	195,878	505,890	39	171,350	601,107	29
Lactose	116,190	755,525	15	250,690	1,026,126	24	204,596	1,124,157	18
Packaged fluid milk products	4,034,808	54,619,000	7	6,742,982	52,847,000	13	5,752,797	48,061,000	12
Condensed whole & skim milk	765,221	1,902,254	40	-	-	-	494,133	1,865,156	26
Condensed buttermilk	11,040	55,754	20	-	-	-	12,113	113,035	11
Miscellaneous									
Cottage cheese	259,789	787,044	33	113,779	700,708	16	114,525	1,065,305	11
Ice cream	49,268	1,279,332	4	15,141	1,209,432	1	13,488	2,602,325	1
Ice cream mix	93,411	725,512	13	67,130	698,084	10	70,412	771,436	9
Sour cream	162,827	1,111,742	15	94,371	1,278,946	7	104,399	1,387,149	8
Yogurt (all types)	70,231	3,522,534	2	96,044	4,451,242	2	154,246	4,478,308	3

[1] Cooperative years may vary and do not exactly match the calendar year.

[2] For 2012 and 2017, specialty cheese is broken out of "not separately identified & other cheese" and brick cheese is included in the latter (however, specialty cheeses in 2012 were likely lumped into the "not separately identified & other cheese" category).

production, but had decreased production of dry buttermilk by 26 percent in the past 5 years. They marketed 72 percent of the Nation's dry whole milk, up from 68 percent in 2012. Their share of dry buttermilk was 64 percent, down from 89 percent in 2012.

Cooperatives marketed 2.3 billion pounds of dry products (combining dry whole milk, dry buttermilk, and nonfat and skim milk), 88 percent of total U.S. production in 2017. In 2012, cooperative production totaled 2.1 billion pounds of all dry products (192 million pounds less than in 2017), but that amount was 91 percent of total U.S. production.

Milk protein concentrates (a line of dry milk product reported starting in 2012) marketed by cooperatives increased by 5 percent from 2012 to 2017. Cooperative share of this product category, at almost 68 million pounds, was 49 percent of national production, down from 63 percent in 2012.

■ **Cheese** — In 2017, cooperatives marketed more than 2.8 billion pounds of natural cheeses, excluding cottage cheese, an increase of 21 percent from 2012 and up 15 percent from 2007. Cooperative share of U.S. natural cheese production was at 23 percent, up 1 point from 2012.

Among natural cheeses produced by cooperatives, two-thirds (1.9 billion pounds or 67 percent) was American cheese, followed by Italian cheese (798 million pounds, or 28 percent). American cheese made by cooperatives was up 27 percent from 2012 and up 13 percent from 2007. Cooperative market share of American cheese increased to 38 percent in 2017, up almost 3 points from 2012. However, that 2017 share was still lower than the 44-percent share that cooperatives experienced in 2007.

Similarly, cooperatives increased production of Italian cheese by 9 percent from 2012 to 2017, from 733 million pounds to 798 million pounds. However, given an increase in U.S. production of Italian cheese by 16 percent from 2012 to 2017, cooperative market share of Italian cheese dipped to 15 percent in 2017.

Cooperative Swiss cheese production in 2017 was almost 35 million pounds, 11 percent higher than in 2012. Cooperative share of Swiss cheese U.S. production increased slightly from 10 percent in 2012 to 11 percent in 2017.

Blue and Gorganzola cheese production increased significantly in the 2012-17 period, from 13.7 million pounds to 39.4 million pounds. Specialty cheeses (cream, Neufchatel, Feta, Gouda) also significantly increased, from 13 million to 56.8 million pounds (note: some of these specialty cheeses may have been reported by cooperatives as being in the "unidentified and other cheese" category in 2012 rather than broken out into separate categories). Hispanic cheese production dropped slightly, to 6.4 million pounds in 2017, while Muenster cheese production dropped from 13.2 million pounds to 6.4 million. Cooperative shares of these cheeses were 43 percent, 5 percent, 2 percent, and 3 percent, respectively.

Cooperatives also reported marketing 19 million pounds of other cheese, including cheese that was not separately identified above or was not categorized (including brick cheeses) in the survey. The production of these cheeses was significantly smaller than in 2012, when 62.5 million pounds was marketed (again, some cooperatives may have lumped some of their cheeses into this category in 2012).

■ **Dry whey and modified whey products** — In 2017, cooperatives marketed just more than 1 billion pounds of dry whey and modified whey products.

This demonstrates a decrease of 7 percent from 2012, but still up almost 2 percent from 2007. Co-op market share dropped to 37 percent in 2017, down from 43 percent in 2012 and 42 percent in 2007. Each item among dry whey and modified whey products decreased from 2012 as well.

Cooperative production of dry whey and reduced lactose and minerals whey decreased 7 percent, production of whey protein concentrates and isolates decreased 13 percent, and lactose decreased by 18 percent. Respectively, these three categories of cooperatively produced whey products had 61 (down 1 point from 2012), 29 (down 10 points), and 18 (down 6 points) percent share of U.S. production for each product.

■ **Other processed dairy items** — In 2017, cooperatives produced 5.7 billion pounds of packaged fluid milk products, a 12-percent market share. That was a drop in volume of 15 percent from 2012, but a 43 percent increase from 2007. Condensed whole and skim milk production (494 million pounds in 2017) and condensed buttermilk production (12 million pounds) were not reported in 2012. But while condensed whole and skim milk production dropped by 35 percent from 2007, condensed buttermilk production increased by 10 percent. Market share for these two products was 26 and 11 percent, respectively, in 2017.

Cooperative production of yogurt (154 million pounds) increased by 60 percent from 2012 and more than doubled from 2007. However, market share was just 3 percent of U.S. production of all types of yogurt.

Cooperatives produced just slightly more cottage cheese in 2017 (115 million pounds) than in 2012, and market share was 11 percent. Ice cream production (13 million pounds) dropped by 11 percent in 2017, but ice cream mix production (70 million pounds) increased by 5 percent. Sour cream production (104 million pounds) increased by 11 percent from 2012 and cooperative market share was 8 percent.

Cooperative Size Review

There were seven cooperatives that handled more than 6 billion pounds of member milk in 2017, up from four cooperatives in both 2012 and 2007 (table 9). Member milk volume (111 billion pounds) of the seven co-ops (6 percent of total dairy co-ops) in this category increased by 34

TABLE 9 — Size of dairy cooperatives in terms of milk marketed by members, 2007, 2012, and 2017

Milk marketed by member-producers:	Cooperatives (no.)			Share of co-ops (%)			Member milk (million lbs)			Share of co-op milk (%)		
	2007	2012	2017	2007	2012	2017	2007	2012	2017	2007	2012	2017
More than 6 billion pounds	4	4	7	2.6	3.0	5.9	75,075	77,090	110,659	49.2	47.8	66.3
3 to 6 billion pounds	8	10	5	5.2	7.6	4.2	34,899	45,609	21,199	22.9	28.3	12.7
2 to 3 billion pounds	5	3	4	3.2	2.3	3.4	12,504	8,193	10,153	8.2	5.1	6.1
1 to 2 billion pounds	11	9	7	7.1	6.8	5.9	15,439	14,098	9,156	10.1	8.7	5.5
0.5 to 1 billion pounds	8	11	8	5.2	8.3	6.8	5,176	8,053	5,987	3.4	5.0	3.6
100 to 500 million pounds	32	27	33	20.6	20.5	28.0	6,740	5,770	8,000	4.4	3.6	4.8
Less than 100 million pounds	87	68	54	56.1	51.5	45.8	2,681	2,410	1,824	1.8	1.5	1.1
Total	155	132	118	100	100	100	152,514	161,223	166,978	100.0	100.0	100.0

billion pounds and accounted for 66.3 percent of member cooperative milk in 2017. The share was 18.5 points higher than the 47.8 percent reported for 2012.

The number of cooperatives in the next size group (3 billion to 6 billion pounds of milk) decreased from 10 in 2012 to 5 co-ops in 2017. Member milk volume of this group (21 billion pounds) occupied a 12.7-percent share of cooperative milk, a decrease of 15.5 points from 2012.

The 2-billion-to-3-billion-pound group grew by one cooperative since 2012, to four cooperatives in 2017. This group's share of cooperative milk (10 billion pounds) increased by almost 2 billion pounds, an increase of 24 percent. It had a 6.1-percent share of cooperative milk up from a 5.1-percent share in 2012.

In the 1-billion-to-2-billion-pound group, the number of cooperatives dropped from nine to seven. This size group's share of cooperative milk (9 billion pounds) decreased by 3.3 points, to 5.5 percent.

The 0.5-billion-to-1-billion-pound group dropped by three cooperatives, to eight in 2017. This group's member milk volume dropped by 2 billion pounds, and its share of cooperative milk decreased 1.4 points, to 3.6 percent in 2017.

Thirty-three cooperatives were in the group that marketed between 100 million and 500 million pounds of milk in 2017, an increase of six cooperatives. Together, this group had a 4.8-percent share of cooperative milk, up from 3.6 percent in 2012.

There were 54 cooperatives in the smallest sized group, which each marketed less than 100 million pounds of milk in 2017. This was a steep (21 percent) decline from 2012, when there were 68 cooperatives in this group (in 2007 there were 87). The group's milk volume (1.8 billion pounds) held only a 1.1-percent share of cooperative milk, a decline from a 1.5-percent share in 2012.

The 12 largest sized cooperatives (10 percent of all dairy co-ops) in the 2 largest size groups (greater than 3 billion pounds of milk each) marketed 131.7 billion pounds (up from 122.7 billion pounds in 2012 and 110 billion pounds in 2007) of member milk. These co-ops' milk

TABLE 10 — Share of milk marketed by members of largest[1] dairy cooperatives, 2007, 2012, and 2017

	2007	2012	2017
Share of cooperative volume			
4 largest cooperatives	49.2	47.8	53.1
8 largest cooperatives	62.3	61.5	69.7
20 largest cooperatives	83.7	84.5	88.5
Share of U.S. volume[2]			
4 largest cooperatives	40.7	38.7	41.3
8 largest cooperatives	51.6	49.8	54.2
20 largest cooperatives	69.1	68.3	68.9

[1] Size is based on pounds of member milk marketed.

[2] Cooperatives fiscal years vary and do not exactly match the calendar year.

accounted for 79 percent of total cooperative member milk, higher than the shares in 2012 (76.1 percent), and 2007 (72.1 percent).

Cooperative Concentration

A measure commonly used to gauge the concentration of a sector (or market) is the share occupied by the four largest firms in the sector. The largest four dairy cooperatives increased their share of cooperative milk to 53.1 percent in 2017, up from 47.8 percent in 2012 and 49.2 percent in 2007 (table 10). The four largest dairy cooperatives also increased their share of the total U.S. milk marketed in 2017 to 41.3 percent, up from 38.7 percent in 2012 (in 2007 it was 40.7 percent).

When the focus is expanded to the largest eight dairy cooperatives, their share of cooperative milk also increased from 2012 to 2017, to 69.7 percent, up 8.2 points from 2012. The eight largest cooperatives also increased their share of U.S. milk from 49.8 percent to 54.2 percent.

Meanwhile, the largest 20 dairy cooperatives had a 4-point increase in their share of cooperative milk, which rose to 88.5 percent, while their share of the Nation's milk increased by 0.7 point, to 69 percent.

In terms of milk volume, the relative position of dairy cooperatives to the rest of the industry remained dominant. The 4 and 8 largest cooperatives increased their market shares over both 2012 and 2007, while the 20 largest cooperatives increased their share from 2012 to what they experienced in 2007.

Employee Status

Eighty-six dairy cooperatives (72.9 percent of all dairy cooperatives) reported having 35,004 full-time and 1,507 part-time employees in 2017 (table 11). These cooperatives marketed 160.8 billion pounds of member milk, or 88.4 percent of cooperative milk. In addition to the main business of marketing milk, some cooperatives also handled farm supplies and/or other commodities. Therefore, not all employees were engaged in the business of handling milk and dairy products.

Sixty-seven cooperatives had both full-time and part-time employees, and those cooperatives marketed 157.4 billion pounds of milk. Four

TABLE 11 — Number of employees reported by 86 dairy cooperatives, 2017

	Cooperatives reporting	Full-time employees	Part-time employees	Member milk
	Number	*Number*	*Number*	*Million lbs.*
Having full-time employees	67	35,004	1,498	157,435
Having part-time employees	4	0	9	654
Having no employees[1]	15	0	0	2,741
Total	86	35,004	1,507	160,830

[1]Some of these cooperatives out-sourced work to other firms.

other cooperatives had only part-time employees. Together, these cooperatives reported a total of nine part-time employees and 654 million pounds of milk. Fifteen cooperatives reported having no employees (though some out-sourced work to other firms).

Financial Performance

This section presents information based on the 2017 balance sheets and income statements of 86 dairy cooperatives that provided complete financial information. These cooperatives marketed 160.8 billion pounds of member milk, 96.3 percent of the total member milk marketed by the 118 dairy cooperatives in 2017. This section also provides some comparisons to 2007 and 2012.

■ **Balance Sheet** — The total assets of the 86 dairy cooperatives included in this analysis for the fiscal year ending 2017 were $20.4 billion (table 12). Current assets accounted for $12.2 billion (60 percent of total assets), while fixed assets

TABLE 12 — Aggregated balance sheet of 86 dairy cooperatives, 2017

Assets	**Co-ops with Dairy Sales Only**[1]	**All 86 Co-ops**
Current assets	4,593,457	12,229,003
Net plant, property & equipment	2,658,685	4,777,972
Other assets	1,064,317	2,389,507
Total, own assets	8,316,459	19,396,482
Investments in other cooperatives & subsidiaries	659,073	1,051,012
Total assets	8,975,532	20,447,494
Liabilities and equity		
Current liabilities	3,695,865	9,730,124
Long-term liabilities	2,213,978	4,019,928
Total liabilities	5,909,843	13,750,051
Allocated equity	2,421,331	5,021,081
Retained earnings	572,549	1,577,354
Non-controlling minority interests	71,810	99,007
Total equity	3,065,690	6,697,442
Total liabilities and equity	8,975,532	20,447,494
Number of dairy cooperatives	54	86
Member milk (million pounds)	127,075	160,830
Total assets per hundredweight	$7.06	$12.71
Total liabilities per hundredweight	$4.65	$8.55
Total equity per hundredweight	$2.41	$4.16

[1] Fifty-four cooperatives that sell only milk and dairy products.

(net property, plant, and equipment (PP&E) and other assets) were $4.8 billion and $2.4 billion, respectively. Dairy cooperatives had investments of more than $1 billion (5 percent of total assets) in other cooperatives and subsidiaries.

Total liabilities were $13.7 billion (67 percent of total assets). Cooperatives owed $9.7 billion in current liabilities and $4.0 billion in long-term liabilities. (Dairy cooperatives typically pay members for their milk twice a month. A large proportion of the current assets and the current liabilities are related to such periodic cash payments to members. This is a unique characteristic of the balance sheet of dairy cooperatives.)

Total equity, the balance of assets and liabilities, was almost $6.7 billion. Most equity (75 percent, or $5 billion) was allocated to members. Retained earnings were $1.6 billion in 2017 while equity in non-controlling minority interests were 1.5 percent of total equity at $99 million.

On a per-hundredweight-of-milk basis, total assets were $12.71, total liabilities were $8.55 and equity was $4.16.

■ **Cooperatives with only milk and dairy product sales** — Among the 86 cooperatives analyzed, 54 cooperatives had only milk and dairy sales (and no other marketing or farm supply sales). These cooperatives had almost $9 billion in total assets, $5.9 billion in total liabilities, and $3 billion in total equity. On a hundredweight of member milk basis, total assets were $7.06, total liabilities $4.65, and total equity $2.41.

■ **Income Statement** — Total revenue reported by 86 dairy cooperatives in 2017 were $53.7 billion (table 13). Of this amount, 79 percent ($42.5 billion) was from milk and dairy product sales and almost 20 percent ($10.6 billion) was from other marketing and supply sales. Service receipts, subsidiary income, and other operating income was $628 million in 2017, or 1.2 percent of total revenue received.

Of the $42.5 billion milk and dairy product sales, $677 million (1.6 percent) was export sales, reported by 16 cooperatives.

Cost of goods sold was more than $49 billion in 2017, or 91 percent of total revenue. Expenses were $4 billion while other non-operating income and non-recurring losses totaled $81.4 million. Total costs and expenses were just under $53 billion, or 98.6 percent of total revenues.

Net margin before taxes was $778.9 million, providing an 11.6-percent return on equity. That equals 48 cents per hundredweight of member milk. Milk and dairy sales per hundredweight of milk marketed was $26.44 for these 86 dairy cooperatives. Total revenue per hundredweight was $33.41, while cost of goods sold was $30.48, and total expense was $2.50. Total costs and expenses were $32.93 per hundredweight. (See note 5 for further explanation of how some financial statements were analyzed.)

■ **Cooperatives with only milk and dairy product sales** — For the 54 cooperatives that just sold milk and dairy products, sales of those commodities were $32.7 billion in 2017. Service receipts, subsidiary income, and other operating income was $173 million, resulting in total revenue of $32.9 billion. Cost of goods sold was $30.7 billion, or 93 percent of total revenues. Expenses were $1.9 billion (6 percent of total revenue). Non-operating income and non-recurring losses totaled $78.4 million.

Net margin before taxes was $356.4 million while return on equity was 11.6 percent (the same percentage as for all cooperatives analyzed.) However, these cooperatives had a lower pre-tax

TABLE 13 — Aggregated income statement of 86 dairy cooperatives, 2017

	Co-ops with Dairy Sales Only[3]	All 86 Co-ops
Milk & dairy product sales[1]	32,743,265	42,525,188
Supply and other marketing sales	0	10,586,525
Service receipts, subsidiary, and other operating income	173,223	627,661
Total revenues	32,916,489	53,739,374
Cost of goods sold[2]	30,736,917	49,020,908
Expenses	1,901,584	4,021,021
Non-operating income (expense) and non-recurring losses	78,428	81,448
Total costs and expenses	32,560,073	52,960,481
Net margin before taxes	356,416	778,893
Number of dairy cooperatives reporting	54	86
Member milk (million pounds)	127,075	160,830
Milk & dairy product sales per hundredweight	$25.77	$26.44
Total revenue per hundredweight	$25.90	$33.41
Cost of goods sold per hundredweight	$24.19	$30.48
Total expenses per hundredweight	$1.50	$2.50
Total costs and expenses per hundredweight	$25.62	$32.93
Net margin before taxes per hundredweight	$0.28	$0.48
Before tax return on total equity	11.6%	11.6%

[1] Sixteen cooperatives reported export sales of $677 million.

[2] Includes the estimated value of milk that was bargained for by some cooperatives but was not reported in their income statements.

[3] Fifty-four cooperatives that sell only milk and dairy products.

TABLE 14 — Comparison measures of dairy cooperatives, 2007, 2012, and 2017[1]

Measures	2007	2012	2017
Current assets/total assets	60.4%	61.9%	59.8%
Total liabilities/total assets	72.4%	74.5%	67.2%
Total equity/total assets	27.6%	25.5%	32.8%
Total assets per hundredweight	$8.41	$10.90	$12.71
Total liabilities per hundredweight	$6.09	$8.12	$8.55
Total equity per hundredweight	$2.32	$2.78	$4.16
Cost of goods sold to total revenues	93.2%	93.1%	91.2%
Total expenses to total revenues	5.9%	5.7%	7.5%
Total costs and expenses to total revenues	99.1%	99.5%	98.6%
Net margin before taxes to total revenues	0.9%	0.6%	1.4%
Milk & dairy product sales per hundredweight	$27.13	$28.89	$26.44
Total revenue per hundredweight	$30.96	$37.48	$33.41
Cost of goods sold per hundredweight	$28.85	$34.88	$30.48
Total expenses per hundredweight	$1.82	$2.14	$2.50
Total costs and expenses per hundredweight	$30.68	$37.28	$32.93
Net margin before taxes per hundredweight	$0.28	$0.22	$0.48
Dairy co-ops with a NIBT[2] loss	14	22	16
Before-tax return on total equity	12.2%	8.0%	11.6%

[1] There were 94 dairy co-ops in analysis in 2007, 88 in 2012, and 86 in 2017.

[2] NIBT=net income before taxes.

margin of 28 cents per hundredweight. Milk and dairy sales per hundredweight were $25.77, total revenue was $25.90, cost of goods sold $24.19, total expenses $1.50, and total costs and expenses $25.62.

Comparisons to Past Studies — In 2017, current assets to total assets (59.8 percent) was down slightly from 61.9 percent in 2012 and 60.4 percent in 2007 (table 14). Total liabilities to total assets was lower at 67.2 percent, compared to 74.5 percent in 2012 and 72.4 percent in 2007. The amount of total member equity relative to total assets increased in 2017, finishing at 32.8 percent, up from 25.5 percent in 2012 and 27.6 percent in 2007.

On a hundredweight of member milk basis, total assets per hundredweight ($12.71) rose in 2017, from $10.90 in 2012 and $8.41 in 2007. Total liabilities per hundredweight ($8.55) also rose, from $8.12 in 2012 and $6.09 in 2007. Total equity per hundredweight was significantly higher in 2017 than in the previous two studies, at $4.16 per hundredweight, compared to $2.78 in 2012 and $2.32 in 2007.

Comparing some items on the income statement to total revenues shows that cost of goods sold declined from 93.1 percent in 2012 to 91.2 percent in 2017 (it was 93.2 percent in 2007). Total expenses to total revenue increased in 2017, rising from 5.7 percent in 2012 to 7.5 percent. Total costs and expenses declined slightly, from 99.5 percent in 2012 to 98.6 percent in 2017. Net margins before tax as a percentage of total revenue, was higher in 2017 (1.4 percent) over both 2012 (0.6 percent) and 2007 (0.9 percent).

Milk and dairy sales relative to member milk marketed dropped to $26.44 per hundredweight in 2017, down from $28.89 in 2012 and $27.13 in 2007. In 2017, total revenue per hundredweight ($33.41) also dropped from 2012 ($37.48), but was higher than in 2007 ($30.96). Cost of goods sold per hundredweight ($30.48) dropped from 2012 ($34.88), but was higher than it was in 2007.

Total expense per hundredweight was also higher in 2017, at $2.50 per hundredweight, compared to $2.14 5 years earlier and $1.82 10-years before. Total costs and expenses dropped to $32.93 in 2017, down from $37.28 (2012) to $32.93, but higher than the $30.68 of 2007.

Net income before taxes jumped in 2017, reaching 49 cents per hundredweight, compared to 22 cents in 2012 and 28 cents in 2007. Return on equity (before-tax net margin to equity) was 11.6 percent in 2017, up significantly from 8.0 percent in 2012, but lower than the 12.2 percent of 2007.

Of the dairy cooperatives analyzed, 16 (19 percent) experienced a pretax loss in 2017. This was down from 22 co-ops (25 percent) in 2012, but up slightly from 14 cooperatives (15 percent) in 2007.

Historical Statistics and Trends

Figures 2 through 9 illustrate some of the trends of dairy cooperatives in 5-year increments, from 1987 through 2017. The data in these charts can be found in 10 appendix tables that provide historical statistics compiled by USDA, in some cases back to 1936, 1957, or 1973. Five-year incremental data collection began in 1987.

Figure 2 shows that the number of dairy cooperatives that handle or bargain for milk of their member-producers has been on a steady downward trend. In 2017, there were 60 percent fewer dairy cooperatives than in 1987.

The number of member-producers delivering milk to cooperatives dropped by 73 percent since 1987, while the pounds of milk per producer delivered increased by 462 percent over the same period (figure 3).

FIGURE 2 — Number of dairy cooperatives, 1987–2017

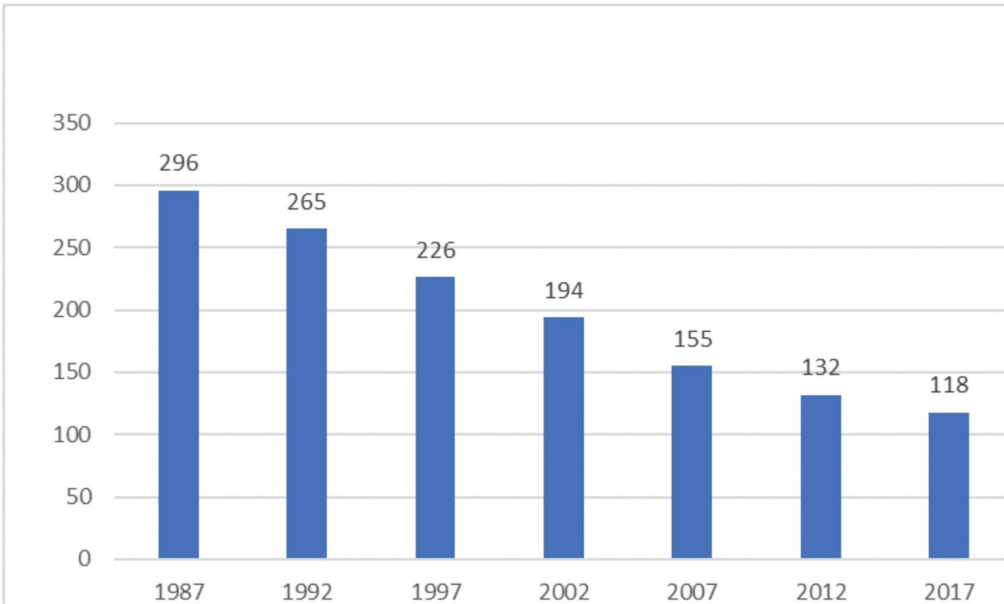


FIGURE 3 — Number of cooperative producrs and milk pounds per producer, 1987–2017

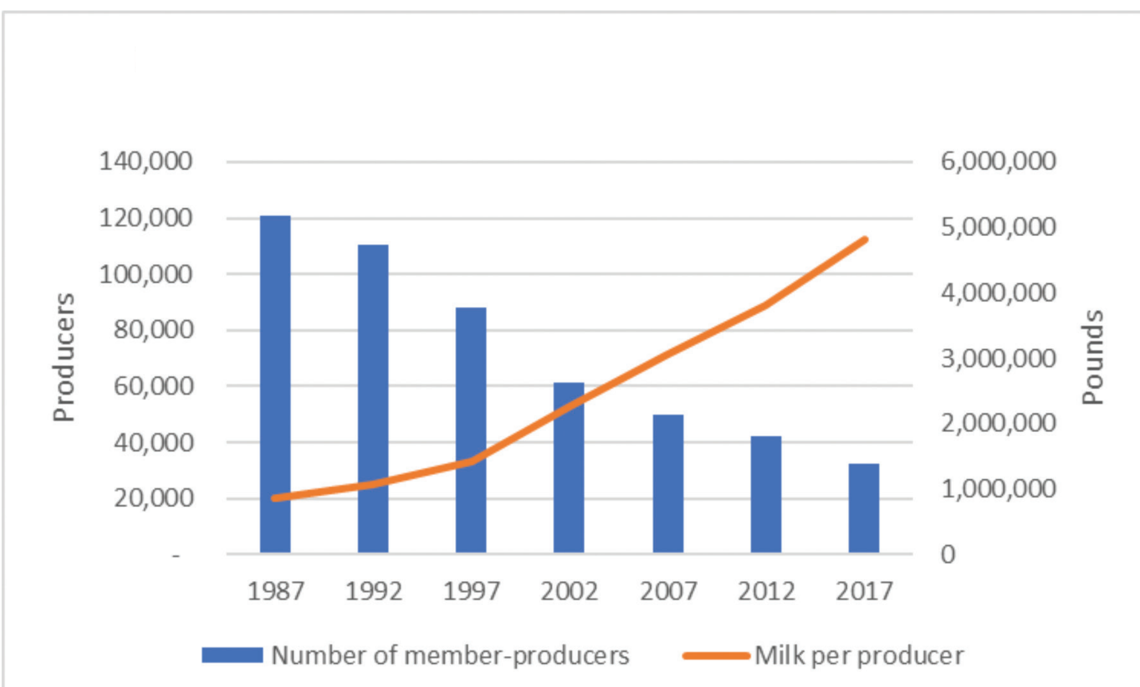


Figure 4 presents the co-op market shares of U.S. total milk production. Total milk handled by cooperatives hit highs of 85 percent in 2002 and 2017, while the high for member milk share was 82.6 percent in 2007, but dropped to 77.8 percent for 2017.

Total pounds of milk handled by cooperatives increased from 105.8 billion pounds to 181.9 billion pounds since 1987 (or by 76.1 billion pounds, 72 percent), while total U.S. milk increased by slightly less, 75.4 billion pounds (figure 5). Member-producer milk delivered to cooperatives is not shown in the figure, but those pounds increased by 63.8 million pounds (62 percent).

The portion of milk sold raw by cooperatives increased from 51 percent in 1987 to a high of 66 percent in 2012 (figure 6). The portion processed or manufactured dropped from a high of 49 percent in 1987 to 35 percent in 2017. The lowest portion was in 2012, when 34 percent was processed or manufactured by cooperatives.

FIGURE 4 — Cooperative milk shares of total U.S. milk, 1987–2017

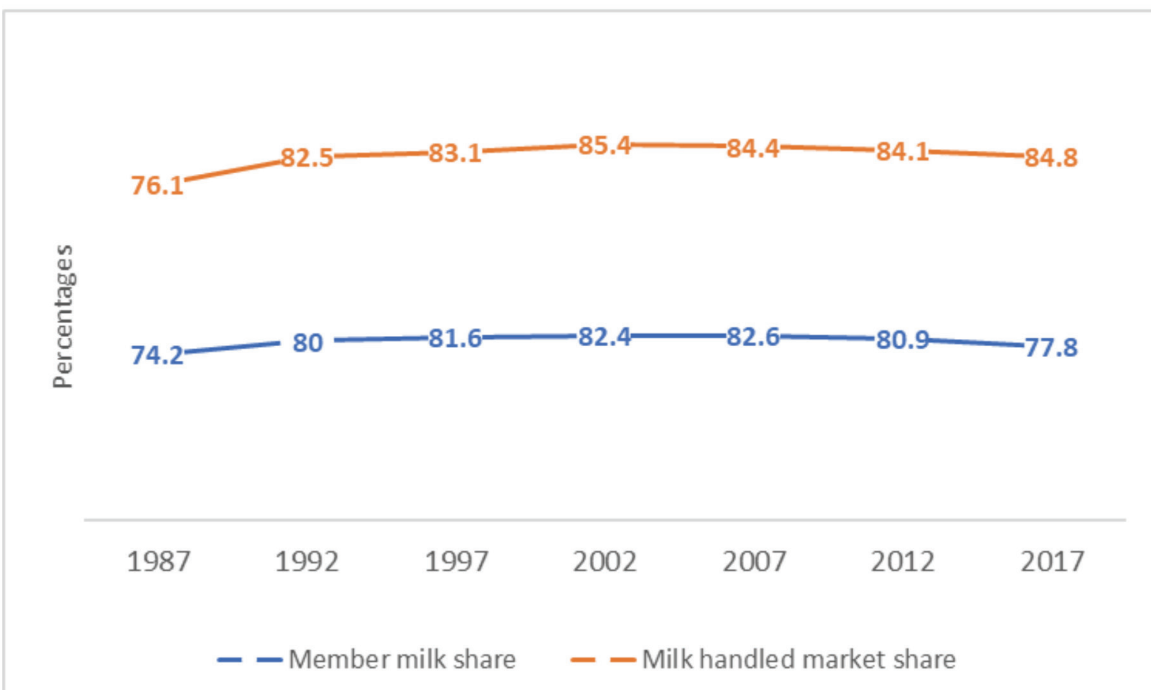


FIGURE 5 — Total milk handled by cooperatives and U.S. total milk, 1987–2017

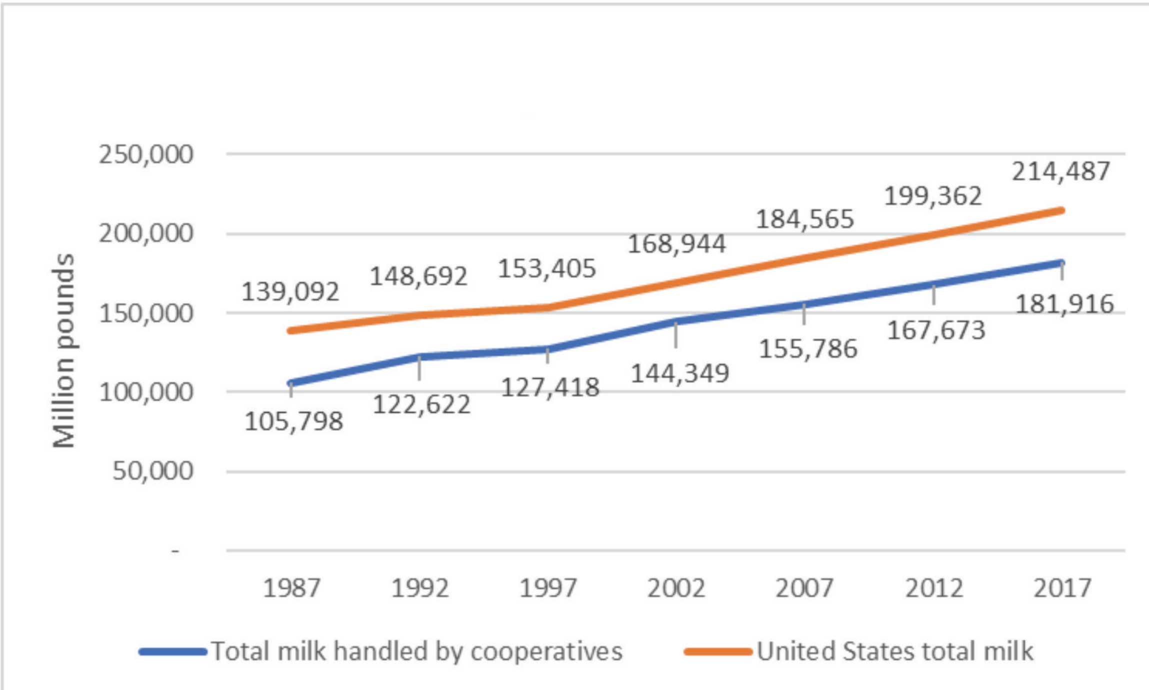
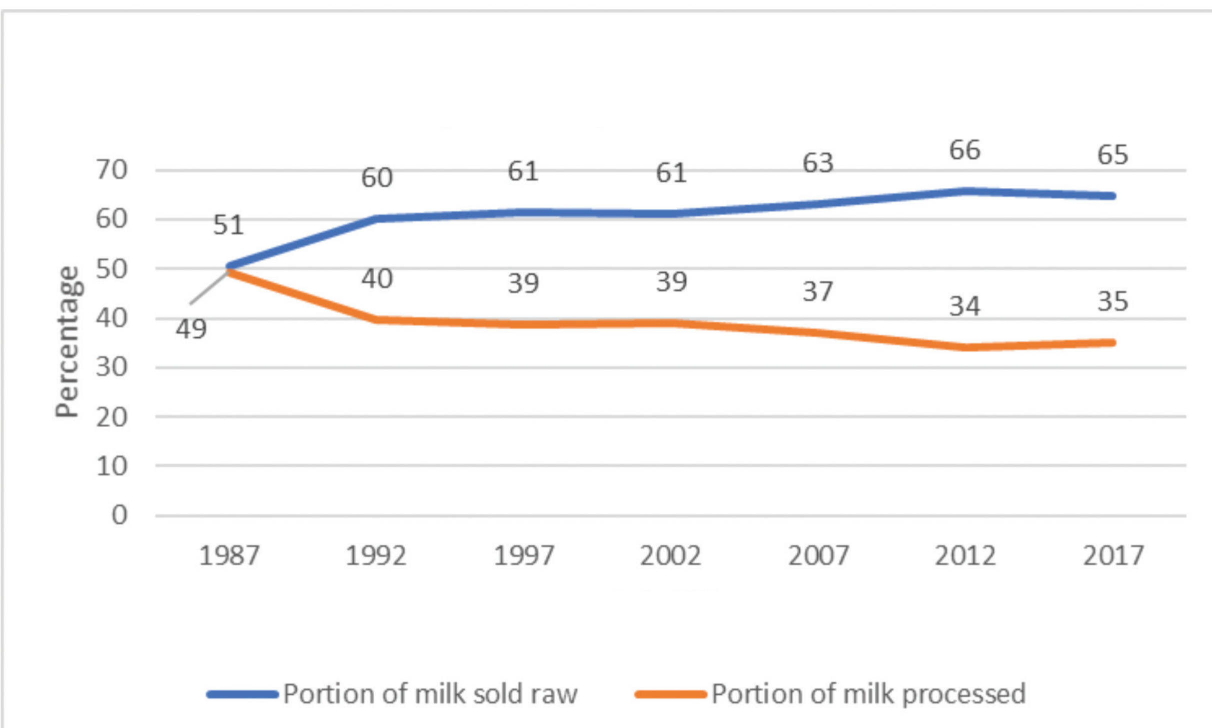


FIGURE 6 — Portions of cooperative milk sold raw and processed, 1987–2017



Cooperatives operated 508 milk plants in 1987 but that has dropped 61 percent since then (figure 7). The number of cooperatives operating plants dropped from 121 (41 percent of all dairy cooperatives) to 41 in 2017 (35 percent of all dairy cooperatives). In 2002, there were 45 cooperatives operating milk plants, which was only 23 percent of all dairy cooperatives.

Figure 8 shows some select products manufactured by cooperatives from 1987 to 2017. Figure 9 shows the market share of those same products over the same period. Butter market share fluctuated, with 1997 being the low year, at 61 percent, while 2017 was the high year, at 86 percent. The high year for dry milk products was 2007, when cooperatives had a 94-percent share.

Cheese production share dropped from 45 percent in 1987 to a low of 22 percent in 2012, but increased to 25 percent in 2017. Dry whey products dropped from 63 percent in 1987 to 37 percent in 2017. However, the volume of pounds of those products marketed by cooperatives all increased over the period. Dry milk product production increased by 1.1 billion pounds, butter by 804 million pounds, cheese by 462 million pounds, and dry whey products by 131 million pounds.

FIGURE 7 — Number of plants operated by cooperatives and number of cooperatives operating plants, 1987–2017

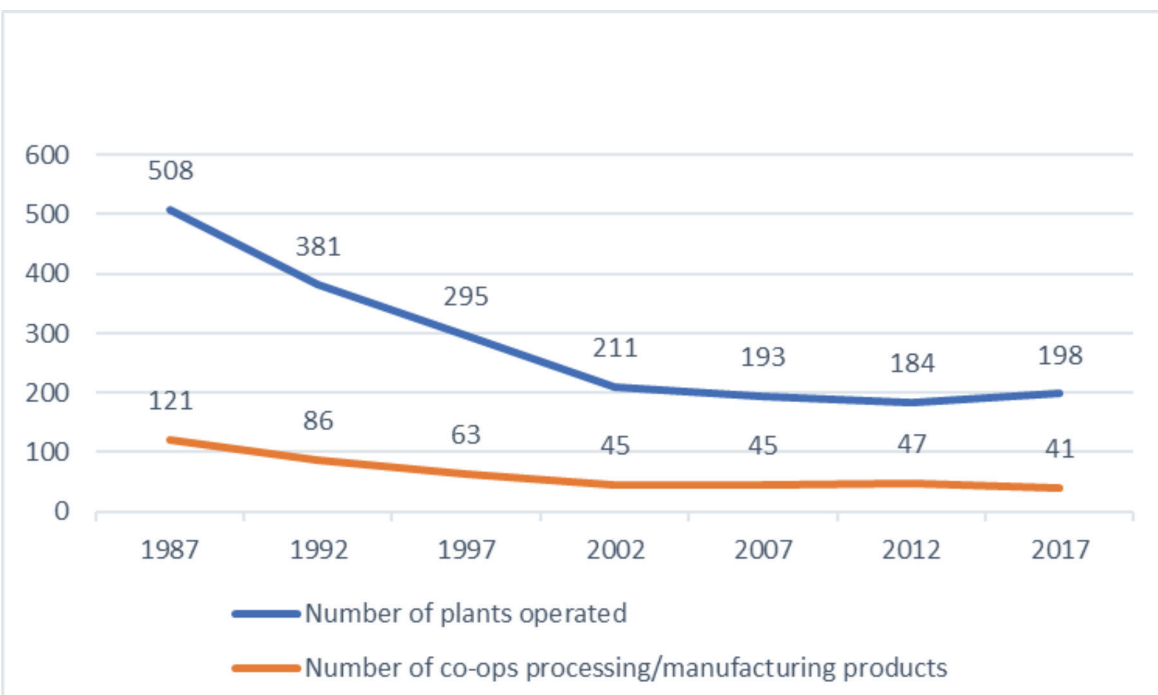


FIGURE 8 — Volume of select products marketed by cooperatives, 1987–2017

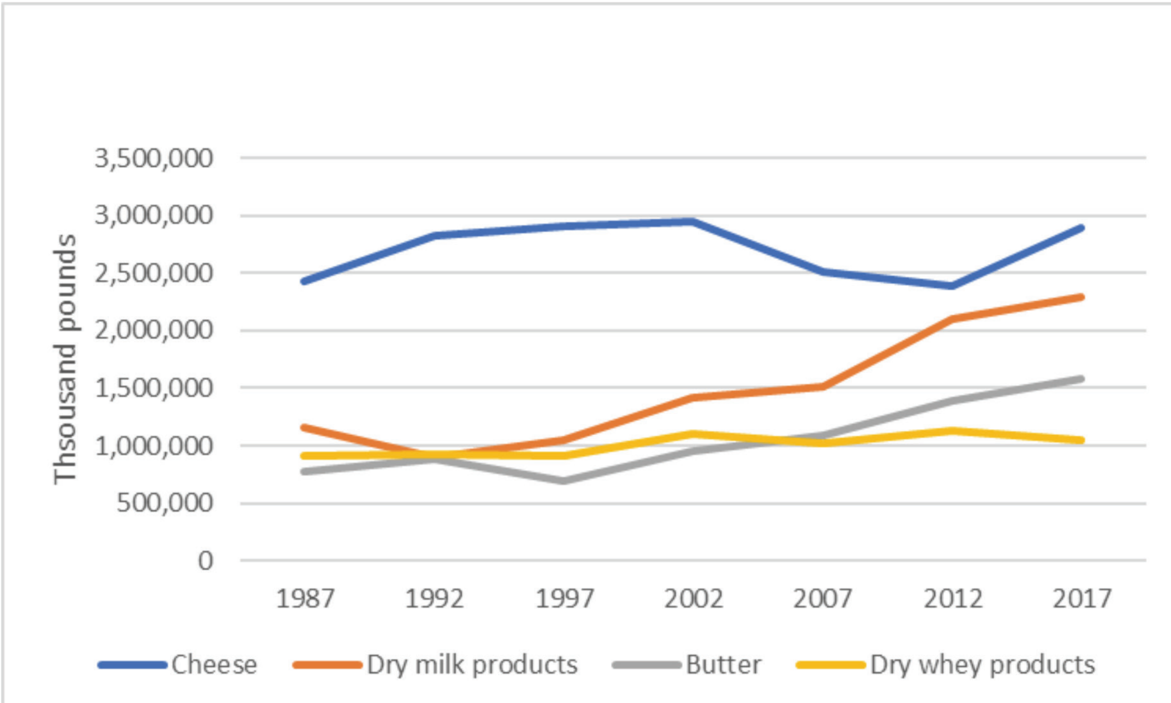
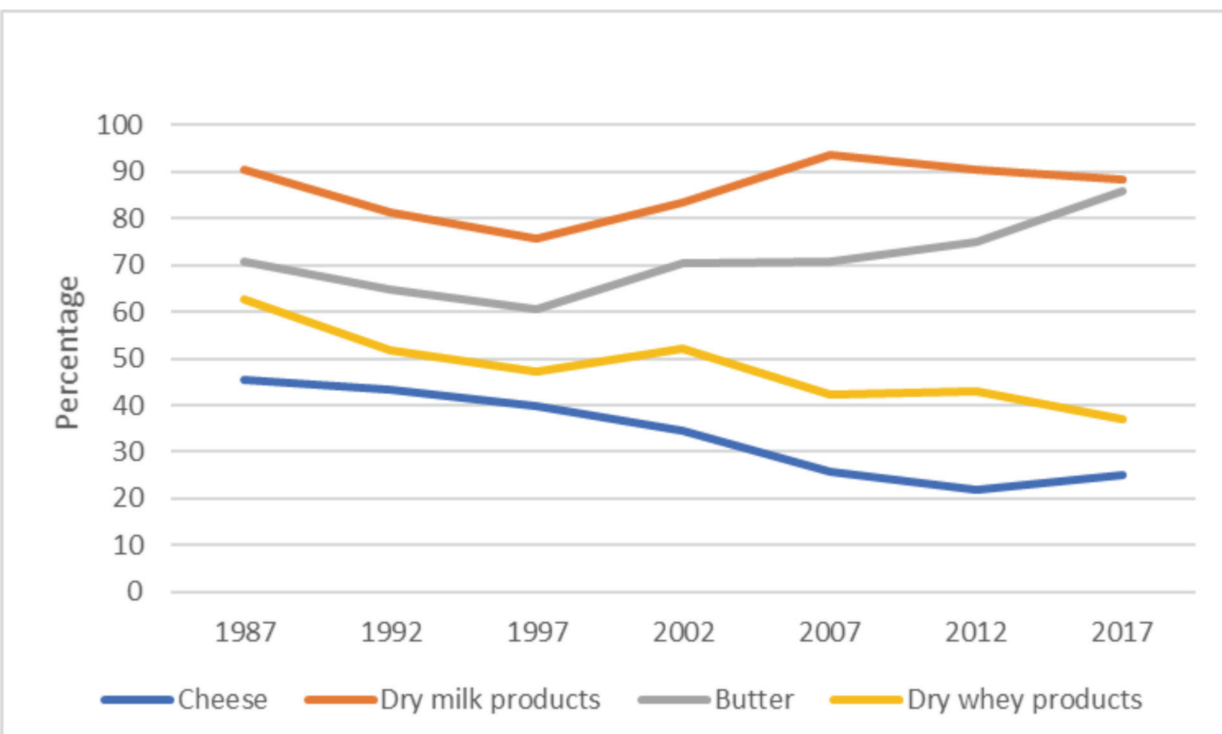


FIGURE 9 — Cooperative share of select products, 1987–2017



APPENDIX

This section includes notes pertinent to the study and appendix tables 1 through 10 (figures 2 through 9 were created from these tables).

NOTES

1. The major data source for this study was USDA's annual cooperative survey for 2017, including addendum questions for dairy cooperatives about their milk marketing operations. Other sources used included: (1) previous USDA dairy cooperative marketing studies (see note 6); (2) cooperative websites; (3) Hoard's Dairyman magazine, T*op 50 Co-ops Handle 81 Percent of U.S. Milk*, (October 15, 2018); Dairy Foods 2018 *Dairy 100*, *the top 100 dairy companies*, https://www.dairyfoods.com/2018-Dairy-100; (4) Dairy Foods: *Dairy Plants USA Directory*, https://www.dairyfoods.com/directories/7376-dairy-plants-usa; (5) Cooperative Programs' internal records; and (6) U.S. production statistics obtained from USDA's National Agricultural Statistics Service: *Milk Production, Disposition and Income, 2017 Summary, April 2018; Dairy Products, 2017 Summary, April 2018*; and also by USDA Agricultural Marketing Service: *Estimated Fluid Milk Product Sales Report, EFMS-0818, October 2018*.

2. For the 2012 study, cooperatives were asked about organic milk handled, but that question was not included in the 2017 study. In 2012, 24 cooperatives received 2,997 million pounds of organic milk (1.8 percent of total cooperative milk handled). An estimate for 2017, is 3,249 million pounds (1.9 percent of total cooperative milk handled) received by 21 cooperatives. This estimate is likely on the conservative side.

3. More information on Federal Milk Market Orders can be found on the AMS Website: https://www.ams.usda.gov/rules-regulations/moa/dairy and https://www.ams.usda.gov/resources/marketing-order-statistics.

4. The Dairy Foods "2018 Dairy 100" published list, identified 101 of the largest dairy processing companies in North America. There were 20 cooperatives in the list operating 167 plants. The total list identified 763 plants operated by the largest dairy processors. https://www.dairyfoods.com/2017-Dairy-100

5. Some cooperatives reported the value of the milk they bargained for as sales in the income statements, while others did not. For this latter group, an estimated value of the milk that was bargained for was included in the milk and dairy products sales in order for the cooperative sales figures to be consistent. The estimated value is offset by the equal amount of the cost of goods sold and, therefore, does not affect the $779 million net savings reported. Milk and dairy product sales may also include some inter-cooperative transactions, but they are also netted out to arrive at the total net savings of dairy cooperatives as a group.

6. Previous dairy marketing studies by USDA are available online at the USDA RD Web site: https://www.rd.usda.gov/publications/publications-cooperatives:

   a. Research Report 230, *Marketing Operations of Dairy Cooperatives*, 2012, USDA Rural Development, May 2014.

   b. Research Report 218, *Marketing Operations of Dairy Cooperatives*, 2007, USDA Rural Development, July 2009.

   c. Research Report 201, *Marketing Operations of Dairy Cooperatives*, 2002, USDA Rural Development, February 2004.

   d. Research Report 173, *Marketing Operations of Dairy Cooperatives* (1997), USDA Rural Development, June 1999.

   e. Research Report 133, *Marketing Operations of Dairy Cooperatives* (1992), USDA Agricultural Cooperative Service, April 1994.

APPENDIX TABLE 1 — Dairy cooperatives by type of operation and by headquarters region, select years 1936-2017

Region[1]	1936	1957	1964	1973	1980	1987	1992	1997	2002	2007	2012	2017
Processing and manufacturing dairy products[2]:												
North Atlantic			40	24	22	16	12	8	7	6	4	3
South Atlantic			31	13	9	6	4	3	1	2	2	2
East North Central			258	133	93	55	35	24	20	20	21	20
West North Central			453	85	42	24	19	14	10	9	12	10
South Central			16	5	3	3	3	1	0	1	1	1
Western			58	31	23	17	13	13	7	7	7	5
All regions	2,168[3]		856	291	192	121	86	63	45	45	47	41
Share of total cooperatives	93%		69%	49%	44%	41%	32%	28%	23%	29%	36%	35%
All co-ops that operated milk plants or receiving facilities	2,224		1,025	421	289	165	130	88	64	57	47	41
Share of total cooperatives	95%		82%	71%	66%	56%	49%	39%	33%	37%	36%	35%
Not operating milk plants or receiving facilities:												
North Atlantic			115	108	94	80	77	72	77	48	41	39
South Atlantic			16	8	7	5	8	5	2	3	4	4
East North Central			31	23	18	17	17	19	16	12	13	9
West North Central			20	2	5	18	17	26	24	25	20	18
South Central			13	7	6	3	3	5	1	2	1	1
Western			24	23	16	8	13	11	10	8	6	6
All regions	114		219	171	146	131	135	138	130	98	85	77
Share of total cooperatives	5%		18%	29%	34%	44%	51%	61%	67%	63%	64%	65%
Total number of dairy cooperatives:												
North Atlantic			193	148	122	100	95	83	85	55	45	42
South Atlantic			58	21	16	12	12	9	3	5	6	6
East North Central			310	167	118	75	53	44	41	35	34	29
West North Central			564	184	124	77	72	60	44	39	32	28
South Central			36	15	13	7	7	6	3	3	2	2
Western			83	57	42	25	26	24	18	18	13	11
All regions	2,338	1,746[4]	1,244	592	435	296	265	226	194	155	132	118
Share of total cooperatives	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

[1] Figure 1 shows states by region.

[2] Including 6 cooperatives that operated milk receiving facilities only in 2012, and 5 cooperatives in 2017.

[3] Comprises 240 milk marketing cooperatives, 1,385 cooperative creameries, and 543 cheese factories.

[4] From Farm Marketing, Supply and Service Cooperative Historical Statistics, Cooperative Information Report 1, Section 26, August 2004.

APPENDIX TABLE 2 — Number of cooperatives marketing selected dairy products, select years 1936-2017[1]

Item	1936	1964	1973	1980	1987	1992	1997	2002	2007	2012	2017
						Number					
Bulk raw milk	408	730	458	352	251	230	204	168	136	114	96
Butter	1,444	740	207	148	82	68	36	19	19	15	14
Nonfat dry milk	139	212	57	48	31	26	24	17	14	16	14
Skim milk powder										9	8
Dry whole milk						9	6	4	5	7	6
Dry buttermilk						21	16	11	10	13	12
Casein	88										
Natural cheese[2]	562	294	187	157	94	75	42	32	31	25	28
American cheese						59	33	24	18	16	18
Italian cheese						27	12	6	6	8	8
Swiss cheese								5	4	4	5
Other cheeses						23	12	11	15	14	13
Cottage cheese	14	126	64	42	23	22	13	9	6	6	6
Sour cream								8	8	6	6
Packaged fluid milk products	200	215	85	60	34	29	21	16	13	10	11
Ice cream	57	143	60	38	21	20	13	7	6	6	2
Ice cream mix								8	6		6
Yogurt						19	12	6	6	6	6
Bulk condensed milk	8							14	15		11
Condensed buttermilk								6	4		5
Dry whey products						17	16	13	11	12	12
Whey protein concentrates and isolates									6	11	8
Lactose									4	6	5
Bulk Cream	1,080[3]	420	208	122	70	40		22	21	22	23

[1] A cooperative may market several products.

[2] Other than cottage cheese; a cooperative may market more than one type of cheese.

[3] Total number of cooperatives selling cream for manufacturing and cooperatives selling "market cream as a side-line product." A small number of cooperatives may have been double-counted.

APPENDIX TABLE 3 — Cooperative share of milk marketed by producers, select years 1957-2017

Year	Milk from member-producers	Milk from sources other than cooperatives[1]	Total milk handled by cooperatives[2]	United States total	*Cooperative share of U.S. Total*	
					Member milk	Total milk handled
1957	-	-	58,038	98,378	-	59
1964	-	-	76,743	113,935	-	67
1973	82,532	695	83,227	109,823	75	76
1980	94,439	1,195	95,634	124,717	76	77
1987	103,142	2,656	105,798	139,092	74	76
1992	118,883	3,739	122,622	148,692	80	82
1997	125,103	2,315	127,418	153,405	82	83
2002	139,205	5,144	144,349	168,944	82	85
2007	152,514	3,272	155,786	184,565	83	84
2012	161,222	6,451	167,673	199,362	81	84
2017	166,978	14,938	181,916	214,487	78	85

[1] Milk from nonmembers and noncooperative firms.

[2] Handled either by physical receipt or by bargaining or servicing transactions. Excludes inter-cooperative shipment.

APPENDIX TABLE 4 — Utilization of cooperatively marketed milk,[1] select years 1936-2017

Year	Sold Raw[2]	Processed or manufactured	Total milk handled by cooperatives	Portion sold raw	Portion processed or manufactured
1936	15,632[3]	15,940	31,572	50	50
1957	36,213	21,825	58,038	62	38
1964	43,443	33,300	76,743	57	43
1973	52,180	31,047	83,227	63	37
1980	52,495	43,139	95,634	55	45
1987	53,640	52,158	105,798	51	49
1992	73,934	48,688	122,622	60	40
1997	78,234	49,184	127,418	61	39
2002	88,073	56,276	144,349	61	39
2007	98,288	57,498	155,786	63	37
2012	110,481	57,192	167,673	66	34
2017	118,080	63,836	181,916	65	35

[1] Excludes inter-cooperative volume.

[2] Includes milk shipped to plants which cooperatives invested in but did not directly operate.

[3] Whole milk equivalent of "market milk," "market cream," and "cream for manufacturing" and may include some packaged fluid milk.

APPENDIX TABLE 5 — Cooperative member milk by farm location, number of producers, and milk per producer,[1] select years 1936-2017

Region[2]	1936	1957[2]	1964[2]	1973	1980	1987	1992	1997	2002	2007	2012	2017
					Cooperative member-producer milk in million pounds							
North Atlantic		13,239	16,956	14,980	15,414	15,803	16,502	18,330	19,826	20,428	22,078	26,271
South Atlantic		3,299	4,176	6,376	7,343	7,516	8,994	8,273	8,448	7,350	7,362	7,476
East North Central[3]			25,017	30,129	31,413	34,813	32,583	34,210	37,675	42,923	43,795	
West North Central[3]	35,538	47,812	17,265	17,938	18,980	18,500	18,294	17,893	19,192	20,238	20,101	
South Central[3]				9,004	9,437	9,468	9,326	11,383	9,752	9,788	9,266	8,996
Western		5,962	7,799	9,890	14,178	19,962	30,748	36,240	49,076	58,081	59,356	60,338
All regions	31,572	58,038	76,743	82,532	94,439	103,142	118,883	125,103	139,205	152,514	161,222	166,978
					Cooperative regional share (percent)[4]							
North Atlantic		67	75	74	66	61	62	69	69	76	80	87
South Atlantic		50	56	78	79	81	92	90	90	94	92	89
East North Central[3]			80	85	80	90	90	90	91	92	83	
West North Central[3]	60	69	83	84	86	85	94	94	97	97	84	
South Central[3]				78	79	76	67	89	89	83	71	60
Western		47	53	56	62	66	80	73	73	76	72	72
All regions	40	59	67	75	76	74	80	82	82	83	81	78
					Number of member-producers delivering[5]							
North Atlantic						20,015	17,559	15,394	12,886	12,078	10,693	10,700
South Atlantic						4,772	4,124	3,501	2,770	2,118	1,709	1,307
East North Central					47,378	49,015	35,240	24,314	20,255	17,323	10,780	
West North Central					33,361	27,376	22,343	14,199	10,135	8,165	6,014	
South Central						9,357	7,188	7,613	3,617	2,353	1,629	1,268
Western						5,720	5,178	3,847	3,604	2,736	2,480	2,096
All regions	656,894	777,400	561,085	281,065	163,549	120,603	110,440	87,938	61,390	49,675	41,999	32,165
					Million pounds of milk per producer							
North Atlantic						0.8	0.9	1.2	1.5	1.7	2.1	2.5
South Atlantic						1.6	2.2	2.4	3.0	3.5	4.3	5.7
East North Central					0.7	0.7	0.9	1.4	1.9	2.5	4.1	
West North Central					0.6	0.7	0.8	1.3	1.9	2.5	3.3	
South Central						1.0	1.3	1.5	2.7	4.2	5.7	7.1
Western						3.5	5.9	9.4	13.6	21.2	23.9	28.8
All regions	0.05	0.07	0.14	0.3	0.6	0.9	1.1	1.4	2.3	3.1	3.8	4.8

[1] Milk from member-producers only and by farm location, except 1957 and 1964.

[2] For 1957 and 1964, milk was by cooperative headquarters region and included receipts from other firms but net of inter-cooperative volume.

[3] For 1957 and 1964, West North Central represents all three central regions.

[4] Cooperative member milk volume as a percentage of regional volume sold to plants and dealers.

[5] For 1957-80, number of members as recorded in Statistics of Farmer Cooperatives, selected years.

APPENDIX TABLE 6 — Number of dairy plants owned and operated by cooperatives performing various marketing functions, select years 1973-2017

Marketing function	1973	1980	1987	1992	1997	2002	2007	2012	2017
Receive and ship milk[1]	876			292	255	125	123	95	130
(Receiving stations only)	(419)	(242)	(279)	(81)	(91)	(35)	(17)	(13)	(10)
Churn butter	170	95	69	48	36	25	24	24	30
Make dry milk products	105[2]	122	108[3]	52	43	43	39	35	46
Make American cheese	177[4]	174[4]	132[4]	80	61	48	34	32	31
Make Italian cheese				46	30	21	17	17	19
Make other cheeses						18	18	18	29
Package fluid milk	142	123	92	75	54	42	49	49	52
Make cottage cheese[5]	60	44	32	25	14	15	11	15	23
Make ice cream	44	49	42	37	22	20	11	8	15
Make condensed products	71	73	61	76[6]	60[6]	66[6]	4[7]	2[7]	1
Make dry whey products				40	40	28	24	24	20
Other activities[8]		40	70	56	42	18	26	47	45
Total[9]	894	698	508	381	295	211	193	184	198

[1] Most plants performing these functions also perform manufacturing functions, but some were receiving stations only as depicted in figures in parenthesis in next line.

[2] Reported as making nonfat dry milk.

[3] Reported as including making dry whey products.

[4] Reported as making natural cheese.

[5] Reported as including making cultured products since 2002.

[6] Reported as including making condensed whey products.

[7] Plants that only condensed milk as final products without further processing onsite.

[8] Other marketing functions not separately listed for the survey year.

[9] Number of plants do not add to totals because some perform more than one function.

APPENDIX TABLE 7 — Volume of butter marketed by cooperatives compared with U.S. production, select years 1936-2017

Year	Marketed by cooperatives	United States total production	Cooperative share of U.S. total
	Thousand pounds		*Percent*
1936	635,445	1,629,407	39
1957	815,680	1,412,848	58
1964	938,569	1,442,447	65
1973	604,717	918,618	66
1980	733,146	1,145,254	64
1987	781,738	1,104,135	71
1992	885,321	1,365,164	65
1997	697,639	1,151,250	61
2002	956,211	1,355,147	71
2007	1,087,012	1,532,717	71
2012	1,396,363	1,859,554	75
2017	1,585,778	1,847,473	86

APPENDIX TABLE 8 — Volume of dry milk products[1] marketed by cooperatives compared with U.S. production, select years 1936-2017

Year	Marketed by cooperatives	United States total production	Cooperative share of U.S. total
	Thousand pounds		*Percent*
1936[2]	174,531	349,550	50
1957	1,006,983	1,765,219	57
1964	1,709,027	2,378,013	72
1973	894,365	1,047,562	85
1980	1,125,401	1,294,222	87
1987	1,157,358	1,278,108	91
1992	904,411	1,111,470	81
1997	1,054,896	1,394,252	76
2002	1,422,545	1,705,801	83
2007	1,513,760	1,617,124	94
2012	2,103,733	2,322,177	91
2017	2,296,107	2,600,086	88

[1] Includes nonfat and skim milk powders, dry buttermilk, and dry whole milk.

[2] Dried/powdered skim milk.

APPENDIX TABLE 9 — Volume of natural cheese[1], by type, marketed by cooperatives compared with U.S. production, select years 1936-2017

Cheese type	1936	1957	1964	1973	1980	1987	1992	1997	2002	2007	2012	2017
Cooperative member-producer milk in million pounds												
American types						2,008,456	2,094,551	2,119,394	2,112,011	1,698,485	1,513,174	1,925,824
Italian varieties						299,338	646,241	687,646	765,426	742,830	732,572	797,500
Swiss cheese						63,000	50,000	69,611	39,509	36,921	31,363	34,875
Other cheeses						53,543	29,183	30,796	31,138	34,477	108,871	128,121
Total	160,158	252,945	365,902	926,447	1,873,235	2,424,337	2,819,975	2,907,447	2,948,084	2,512,713	2,385,980	2,886,320
U.S. production in thousand pounds												
American types						2,716,659	2,936,561	3,285,558	3,690,978	3,877,214	4,358,477	5,071,991
Italian varieties						1,799,770	2,508,577	2,881,445	3,470,014	4,198,800	4,633,627	5,383,864
Swiss cheese						227,241	237,304	207,583	254,096	313,689	320,599	316,653
Other cheeses						600,694	805,849	955,828	1,132,179	1,387,082	1,577,441	750,597
Total	642,274	1,407,429	1,730,573	2,685,350	3,984,266	5,344,364	6,488,291	7,330,414	8,547,267	9,776,785	10,890,144	11,523,105
Cooperative share (percent)												
American types						74	71	65	57	44	35	38
Italian varieties						17	26	24	22	18	16	15
Swiss cheese						28	21	34	16	12	10	11
Other cheeses						9	4	3	3	2	7	17
Total	25	18	21	35	47	45	43	40	34	26	22	25

[1] Includes all types of natural cheese except cottage cheese. Prior to 1987, data were not reported by cheese variety.

APPENDIX TABLE 10 — Volume of dry whey products[1] marketed by cooperatives compared with U.S. production, select years 1973-2017

Year	Marketed by cooperatives	United States total production	Cooperative share of U.S. total
	Million pounds		*Percent*
1973[2]	433	772	56
1980[2]	560	883	63
1987	913	1,453	63
1992	920	1,781	52
1997	907	1,925	47
2002	1,104	2,116	52
2007	1,027	2,420	42
2012	1,125	2,621	43
2017	1,044	2,823	37

[1] Dry and modified dry whey including reduced lactose and minerals, whey proteins, and lactose.

[2] Dry and modified dry whey.

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Research Report 234