



ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Dairy

What role does dairy farming play in Vermont's food system? What can be done to improve dairy farm viability over the next ten years?

Vermont is the largest dairy producing state in New England, and dairy products (milk, dairy beef, and forage crops grown for livestock) account for upwards of 83% (≈ \$584 million, adjusted for inflation to 2010 dollars) of the state's agricultural products' sales, and as much as 90% depending on market prices. Even though the number of dairy cows has declined, the average amount of milk produced per cow has increased, and total milk production has consistently exceeded 2 billion pounds of milk per year for the past 50 years.

Value added dairy products including ice cream, cheese, butter, cottage cheese, yogurt, powdered milk, and other products also provide profitable opportunities for Vermont dairy farmers. **Gross sales of Vermont's processed dairy products total about \$1.2 billion per year.**

Vermont's dairy-centric landscape also contributes to the desirability of Vermont as a tourist destination. The [Vermont Tourism Data Center](#) estimates that at least 10 million people visited the Green Mountain State in 2009, many of whom were attracted by the beauty of the landscape. These visitors spent over \$1.42 billion, generated about \$200 million in tax and fee revenues, and contributed to the employment of 33,530 people.¹

Dairy cows and dairy farms are recurring motifs in Vermont branding, artwork, and culture, from [Ben & Jerry's](#) packaging to Woody Jackson's and Warren

Kimble's folk art, from county fairs to the [Burlington Cow Parade](#). U.S. Senator Patrick Leahy has described dairyman-turned-actor-turned-Senate candidate [Fred Tuttle](#) as "the distilled essence of Vermonthood." **For over 100 years, dairy farming has had significant economic, ecological, and cultural impacts in Vermont.**



Young boy helps bring the cows in from the pasture, circa 1950s.

PHOTO CREDIT: UVM Special Collections

👉 Consolidation, Concentration, and Price Volatility

Vermont agriculture, which is 90% dairy farming, is very vulnerable to external forces. Rising costs, particularly of feed grains, petroleum and fertilizer, have not been matched by comparable milk prices. Inflated land prices, high interest rates, taxation and especially the decline in the number of entering farms all point to a steady decline in dairy farming unless remedial steps are taken. In the long term, the major problem facing Vermont agriculture is this lack of farmers...

The dairy industry accounts for 90% of commercial agriculture in Vermont. Vermont has shifted over the past 75 years from a diversified agriculture to a dairy monoculture because the soils and climate were highly favorable to raising the forage crops needed for dairy cows. The support systems in private industry and in government-sponsored agricultural services have encouraged this concentration and have fostered the growth of bigger farms, larger herds, increased mechanization and more debt to achieve so-called economies of scale. The federal government has intervened on behalf of dairy farmers to establish a price support system for milk which has insured survival, if not profitability, for the Vermont dairy farmer. The milk marketing cooperatives were formed to bargain for the best price for milk, and dairy farmers have contributed substantially, over the years, to efforts to market and sell more milk.

The dairy farmer now is caught in a tight cost-price squeeze which together with increased taxes of all kinds, the unavailability of long-term, low-interest money for entry or expansion, and rising land prices are threatening the survival of Vermont's dairy industry. When you add the fact that the average age of the Vermont dairy farmer is 52 and the difficulty young people have entering farming, the long-term prospects for agriculture, if these conditions continue, appear uncertain.

-Governor's Commission on Food,
Proposals for Vermont's Agriculture and Food Future, 1976

Despite the longstanding importance of Vermont's dairy industry, volatile conventional milk prices, concentration in the dairy industry, rising farm input expenses, and many other factors have impacted its perceived and actual sustainability for **at least the past 35 years**. As will be seen in this Section and *Appendix B: Revitalizing Vermont's Dairy Industry*, with a few language revisions (e.g., the average age of dairy farmers is 53 today), the findings of Governor Thomas Salmon's 1976 *Commission on Food* sound remarkably similar to the challenges facing Vermont's dairy industry in 2013.

Dairy Farm Consolidation: The USDA reports that major structural shifts are occurring in dairy farming across the country.² For example, farms with fewer than 200 cows accounted for two-thirds of the national milk cow inventory in 1992, but only 38% in 2006. Although dairy farms with fewer than 30 cows made up 28% of all dairy farms in 2006, they only produced a little more than 1% of the nation's milk. Farms with more than 2,000 cows made up less than 1% of dairy farms in the country, but accounted for over 23% of milk production in 2006. The number of dairy operations with 2,000 or more cows doubled between 2000 and 2006. The USDA cites a survey of dairy farmers conducted in 2000 that found that 39% of farmers with fewer than 50 cows expected to be out of business by 2005, and about 60% thought they would be out of business by 2010. When the survey was repeated in 2005, nearly 70% of very small dairy farmers thought they would be out of business in 10 years. While the data cited above are 5 years old, these trends have steadily continued.

Vermont dairy farms are significantly smaller than their national counterparts, with sizes ranging from a dozen cows to 2,000 cows, compared to farms with herd sizes of more than 15,000 found in other states (About 69% of Vermont dairy farms had fewer than 100 dairy cows in 2007). However, the decrease in the total number of dairy farms in Vermont over the past decade also reflects a hollowing out of the middle: The majority of Vermont dairy farms (55.2%) were 260 to 999 acres in size in 2007. From 1997 to 2007, the total number of dairy farms in this size range decreased 37.9%, from 1,014 farms to 630 farms. In fact, the number of dairy farms of all sizes, except 1 to 49 acres and 1,000 or more acres, decreased during this time period. Additionally, the number of dairy farms with between 10 and 199 dairy cows decreased a little over 53% from 1997 to 2007, while the number of dairy farms with 1 to 9 dairy cows and over 500 dairy cows increased 1,312.5% and 152.4% respectively.

Dairy Farm Spatial Concentration: The USDA reports that the dairy industry is also concentrating spatially. In 1969, 247 counties accounted for half of the nation's milk production. By 2002, only 95 counties accounted for half of production, a 61% decrease. The location of milk production has shifted west, with California, Colorado, Idaho, Washington, and Oregon accounting for 33% of national milk production. Western states also tend to have the largest dairy operations, and many of these operations depend on contracted production of forages from sites that are not part of the dairy operation. **Today, Vermont produces a little more than 1% of the nation's milk supply.**

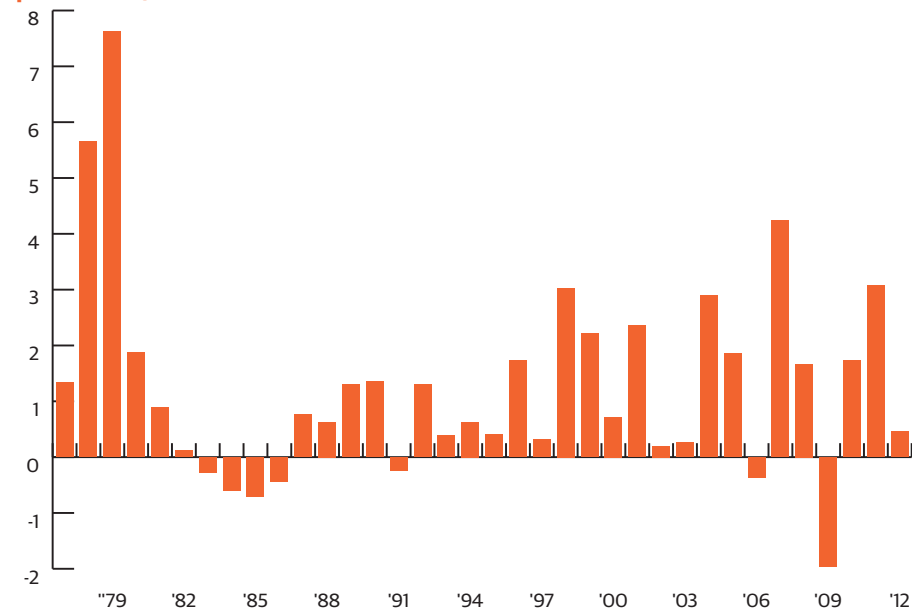
Rising Production Expenses: The USDA reports that while milk prices tend to be higher in regions with smaller dairies, any price advantage these small farms have will rarely be enough to offset their cost disadvantages. **The USDA found that, on average, farms with at least 1,000 cows realize costs per hundred pounds (cwt) of milk produced that are 15% lower than farms in the next largest class size (500–999 head) and 35% lower than farms with 100–199 head.**

Dairy farms accounted for 72% (\$417 million) of total Vermont farm production expenses in 2007, including 89% of feed purchased, and 64% of liquid fuel purchased. From 2006 to 2008 commodity food prices (including animal feed prices) rose by more than 60%.³ From 1998 to March 2011, the price of a barrel of crude oil increased 540% to an average of \$103.41 (See Section 3.2: *Farm Inputs* for more information about production expenses). **When this Section was first published in 2011, dairy producers saw the highest net cost of production, \$16.23 per cwt—up 2% from 2010—in the 32 year history of the Northeast Dairy Farm Summary (inflation adjusted to 2010 dollars, as are all figures in the F2P Strategic Plan). Draft data from the latest Northeast Dairy Farm Summary indicates that the cost of production reached record heights again—\$17.54 per cwt in 2012.**⁴ Increased production input costs have meant that, on average, many farmers are making less income now than they did in 1970.

Price Volatility: 2009 was a bad year for dairy farmers as milk prices dropped to their lowest level in the past 50 years: \$15.60 per cwt. *Farm Credit*, a major farm lender, reports that Northeast dairy farmers lost \$437 per cow and \$1.97 per cwt produced in 2009 (Figure B1). *Farm Credit's* 2011 Northeast Dairy Farm Summary indicates that

higher milk prices (\$19.30 per cwt) in 2011 meant that net earnings rose to \$3.07 per cwt, enough to return the average farms' financial positions to pre-2009 levels.⁵

Figure 3.3.1: Net Earnings per Hundredweight (CWT) of Milk, 1977-2012 (adjusted for inflation to 2010 dollars using the fresh processed milk producer price index)



Source: Farm Credit, *Northeast Dairy Farm Summary*, 2011 and 2012.

In 2001, a group of dairy industry stakeholders held a series of meetings to discuss the future of Vermont's dairy industry. One exercise asked these stakeholders to dream about what the dairy industry would look like in 2010 and to come up with newspaper headlines that would exemplify these dreams. Examples included "VT Dairy Industry: The Envy of the Nation," "VT Dairy Industry is Recognized as a Model," "Milk Shipped from Dairy Crescent Hits High," and "Dairying Dominates VT Economy." Instead, headlines like "The Sacrifice: VT Farm Sheds its Past to Save its Future" appeared on the front page of the Barre-Montpelier *Times Argus*.⁶ The article covers the multi-generation dairy farming story of the Robb family, which sold its milk herd in 2011:

The Robbs survived the "dairy crash" of 2009 when prices plunged to a decade low. Last year they joined the rest of the world in hoping for an economic recovery, only

to see their bills rise- not just for feed and fuel but as parts, power (now at \$700 a month) and, as Helen Robb sums up, "everything we touch."

Charles Robb Sr., listing IOUs on a legal pad, lately has crossed off one name, only to scribble on two others. His son doesn't need to write anything down to remember: "You lay awake at night trying to figure out how you're going to pull it all together."

The Robbs decided to do what many dairy farmers have done: switch to beef cattle, grow more hay, cut more firewood, and produce more maple syrup.

There is another side to the story, of course. Vermont's dairy industry continues to be the foundation of agriculture in the state and new opportunities continue to emerge (e.g., new value added processing facilities such as *Swan Valley Cheese*, *Commonwealth Dairy*, and *Kingdom Creamery of Vermont*). However, the acceleration of these trends raises the possibility of a tipping point: how many dairy farms can Vermont lose before the viability of production is compromised? How can the Farm to Plate planning process move beyond the 1976 findings that still impact the industry? What can be done to ensure that Vermont's dairy industry has a healthy future?

GETTING TO 2020

Many of the goals of the Farm to Plate Strategic Plan focus on increasing food production, including dairy production, for local and regional markets.

Goal 6: Farms and other food system operations will improve their overall environmental stewardship to deliver a net environmental benefit to the state.

Goal 7: Local food production—and sales of local food—for all types of markets will increase.

Goal 8: Vermont's dairy industry is viable and diversified.

Goal 9: The majority of farms will be profitable.

Goal 11: Vermont's food processing and manufacturing capacity will expand to meet the needs of a growing food system.

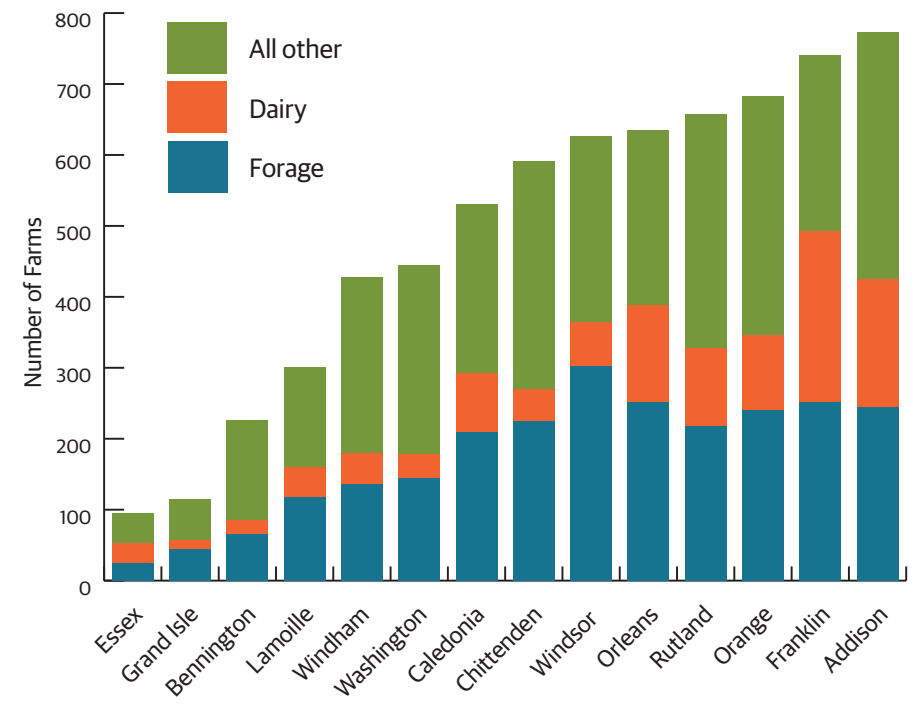
Goal 13: Local food will be available at all Vermont market outlets and increasingly available at regional, national, and international market outlets.

CURRENT CONDITIONS

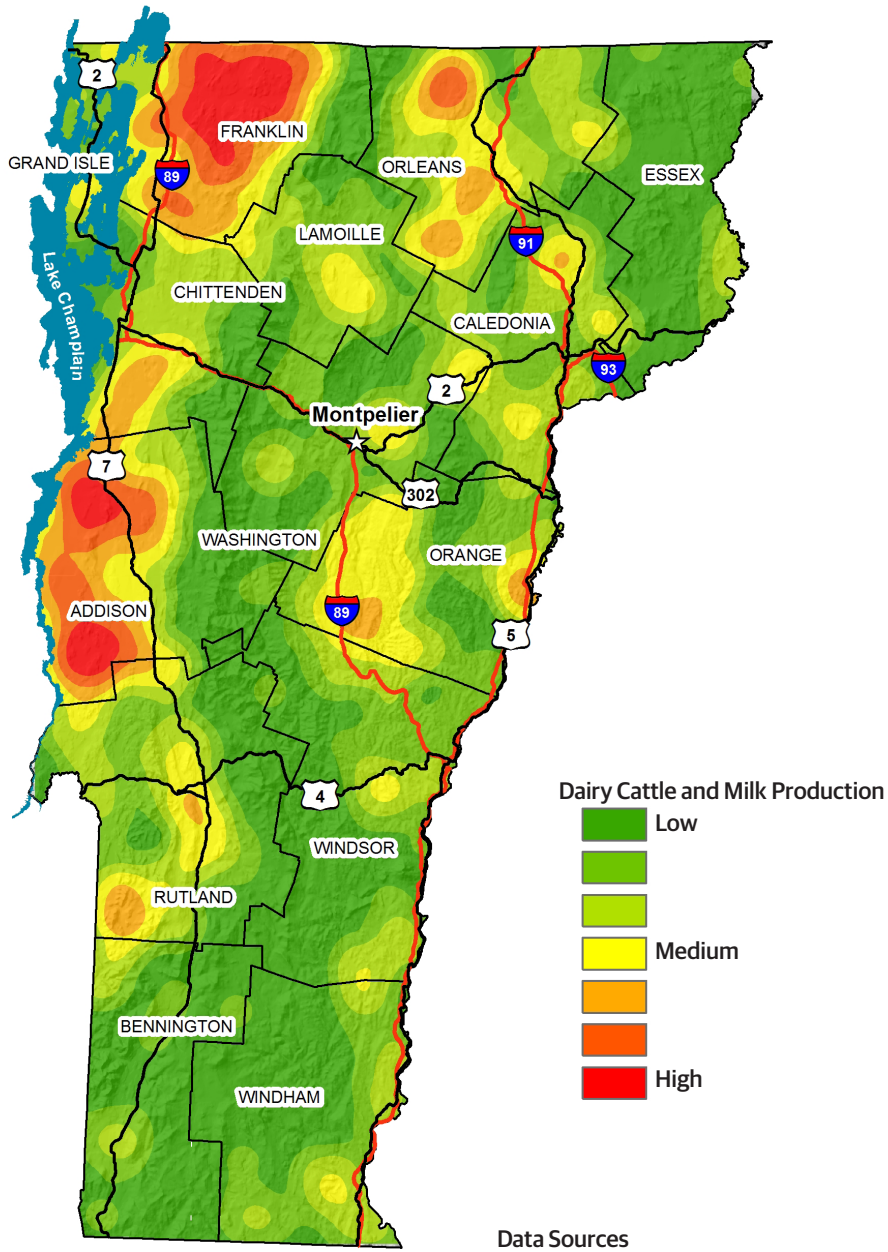
☛ Characteristics of Vermont Dairy Farms

Dairy farms and farms that grow forage to feed dairy cows are a significant percentage of all farms in most counties in Vermont (Figures 3.3.2 and 3.3.3). At the time of the last Census of Agriculture, dairy farms made up 16% ($n = 1,141$) of all farms in the state and operated about 44% (539,371 acres) of all land in agriculture, 60% of total cropland (309,002 acres), and 66% (287,772 acres) of harvested cropland.⁷ Dairy farms and farms growing forage to feed livestock made up 53% of all farms in Vermont.⁸ Franklin and Addison counties led the state with 421 dairy farms in 2007, equal to about 37% of all dairy farms. Franklin County had the highest percentage of dairy farms as a percentage of all farms (about 33%, $n = 241$), while Chittenden County had the lowest percentage (7.4%, $n = 44$).

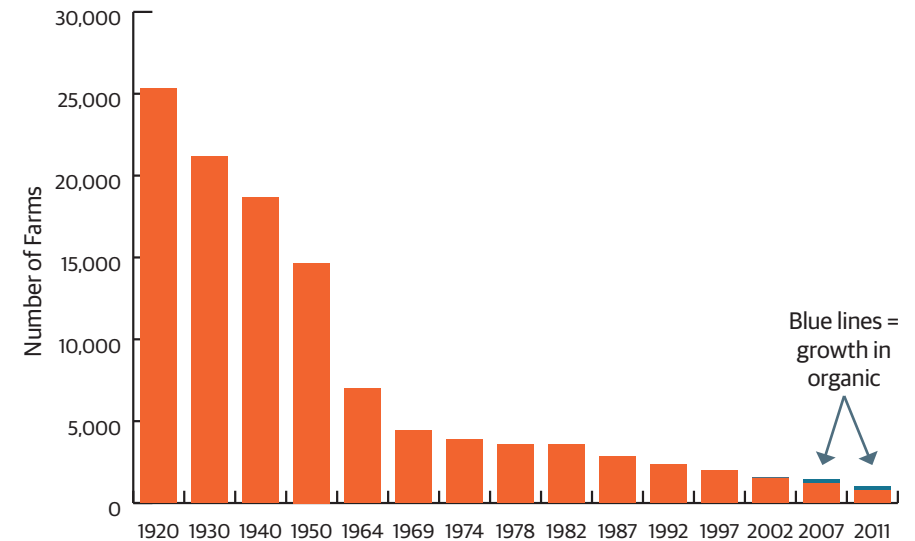
Figure 3.3.2: Dairy Farms and Non-Dairy Farms by County, 2007



Source: USDA 2007 Census of Agriculture, County Highlights, Table 45 page 329, www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/vtv1.pdf.

Figure 3.3.3: Density of Vermont Dairy Cattle and Milk Production Locations

Rising farm input costs, volatile milk prices, technology improvements, market consolidation, and many other societal shifts (e.g., from rural to suburban lifestyles) have impacted Vermont's dairy farmers: **The overall number of farms milking cows decreased by 96% over the last nine decades** (Figure 3.3.4). In 1920 there were 25,336 farms that milked cows. By 1950 that number dropped to 14,660 dairy farms (a 42% decrease). The number of dairy farms decreased to 3,585 by 1982 (about an 86% decline from 1920). By 2007 there were 1,423 dairy farms, dropping to 1,011 by November 2010, and then to 993⁹ by May 2011. In August 2011, the number of dairy farms in Vermont was down to 991.¹⁰ On a positive note, **from 1997 to 2010 the number of certified organic dairy farms increased 480%, from 35 farms to 203 farms.**¹¹ About 20% of Vermont dairy farms are now certified organic.

Figure 3.3.4: Vermont Cow Dairy Farms, 1920-2011

Source: USDA Census of Agriculture, many years. Organic farms: NOFA-VT, 2011 Statistics on Certified Organic Agriculture in Vermont, <http://nofavt.org/sites/default/files/December%202011%20Statistics.pdf>.

Vermont's dairy farms can be categorized in many different ways, including by production system (e.g., organic or non-organic, Table 3.3.1), end market (Table 3.3.1), size of farm (e.g., acres, number of dairy cows, Tables 3.3.2 through 3.3.4), sales (Table 3.3.7), net gains and losses (Table 3.3.6), and USDA's farm typology (Table 3.3.7).

Dairy production systems around the globe range from grazing systems where the animals spend all or the majority of their lives outside eating grasses, to mixed systems with a combination of grazing and stored forages, to “[animal feeding operations](#)” where the animals are confined in lots, buildings (pens), or combinations of these, and feed is brought to them.¹² The majority of dairy cows in Vermont, especially those in larger operations, are raised in housing and many of these animals are fed stored grains and forages year round.¹³ A growing number of Vermont farmers also raise their livestock outside on grasses during the growing season of the year and then winter their animals on stored forages for the remainder of the year.¹⁴

Eighty percent ($n = 789$) of dairy farms that milk cows in Vermont are conventional (i.e., non-organic farms). Most conventional (77.5%, $n = 610$) and organic farms (97.0%, $n = 196$) have fewer than 200 cows (Table 3.3.1). Ninety-nine percent of conventional farms produce milk that is processed and distributed locally and in the region, while 1% produce ([Monument Farms](#)) or aggregate ([Thomas Dairy](#)) milk for local processing and distribution only.

Milk is produced seven days a week, 365 days a year, yet processing facilities have milk needs that can vary by season of the year and even day of the week. There is no easy way to differentiate where most of the milk from conventional dairy farms goes for processing. For example, Vermont’s largest dairy cooperative, [St. Albans Cooperative Creamery](#), processes about 40% of its member’s milk into cream, skim, condensed, and powdered milk at a facility in St. Albans. About 60% of the milk processed at this facility goes to dairy processors in Vermont (e.g., [Ben & Jerry’s](#), [Vermont Butter and Cheese Creamery](#)), while the rest is distributed throughout the region. Of the 60% of member’s milk that does not go through the St. Albans facility, most goes to processing plants in Massachusetts, while some goes to the [Booth Brothers](#) facility in Barre.¹⁵

[Agri-mark Dairy Cooperative’s](#) membership includes about a third of the dairy farmers in Vermont. More than half of the milk produced by cooperative members is used at four dairy plants operated by the cooperative, with the balance being sold to fresh milk processing and other plants in its membership region. Agri-mark operates the two largest milk-using processing facilities in Vermont (in Middlebury and Cabot) that make cheese, whey protein concentrate, Greek yogurt, and other dairy products.¹⁶

Twenty percent ($n = 202$) of Vermont cow dairy farms are certified organic by [Vermont Organic Farmers](#), the certifying body of [NOFA Vermont](#). Dairy production in Vermont also includes:

- 🍏 organic and conventional production of raw milk for sales directly from farms (≈ 66 farms,¹⁷ total includes farms counted above); and
- 🍏 at least 27 goat milk dairies, including 1 organic goat dairy.¹⁸

Table 3.3.1: Number of Dairy Farms by Production System and Size of Farm, 2011

	Large Farm Operation	Medium Farm Operation	Small Farm Operation	Total
Cow’s Milk				
Conventional production for local and regional processing and distribution	20	152	610	782
Conventional production for local processing and distribution only		1	6*	7
Organic production for regional processing and distribution		6	192	198
Organic production for local processing and distribution			4**	4
Total	20	159	812	991
Goat’s Milk				
Conventional			26	26
Organic			1	1

Source: Conventional production: Vermont Agency of Agriculture, Food and Markets. Organic production: NOFA Vermont. Note: Large Dairy Farm Operations are farms with 700 or more mature animals. Medium Dairy Farm Operations are farms with 200 to 699 mature animals. Small Dairy Farm Operations have fewer than 200 mature animals. *Thomas Dairy sold its dairy herd but draws milk from 6 nearby farms. Collectively, these farms have less than 200 mature animals. **Two organic farms, [Strafford Organic Creamery](#) and [Butterworks Farm](#) sell their dairy products as organic. One certified organic farm sells its milk as conventional milk to Cabot Creamery Cooperative, and one certified organic milk sells raw milk.

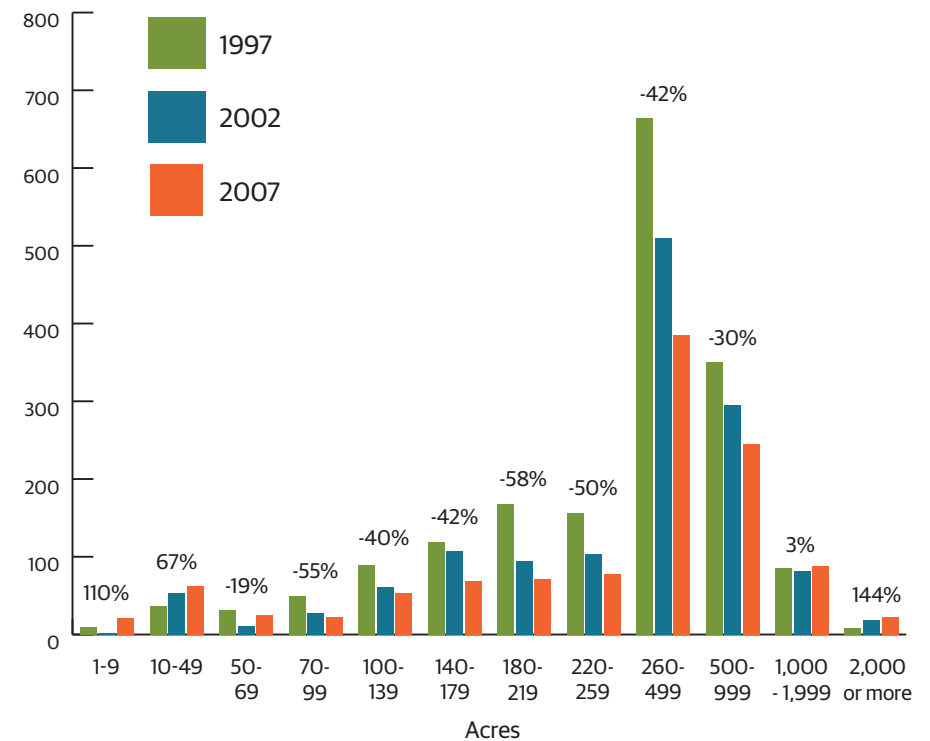
Another way to characterize Vermont dairy farms is by size in acres. In 1997, the mode dairy farm size was 260 to 499 acres (664 farms), while 1,014 dairy farms ranged from 260 to 999 acres (57.4% of dairy farms). In 2007, the mode dairy farm size was still 260 to 499 acres, but the number of farms in this category dropped 42.0%, from 664 farms to 385 farms, while the total number of dairy farms in the 260 to 999 acre range decreased 37.9%, from 1,014 farms to 630 farms (Tables 3.3.2, designated with orange bars). In fact, from 1997 to 2007, the number of dairy farms of all sizes, except 1 to 49 acres and 1,000 or more acres, decreased (Figure 3.3.5).

Table 3.3.2: Vermont Dairy Farm Size, 2007

Size of Farm (acres)	Number of Farms	Percent of Total	Cumulative Total	Cumulative Percent
1 to 9	21	1.8%	21	1.8%
10 to 49	62	5.4%	83	7.3%
50 to 69	25	2.2%	108	9.5%
70 to 99	22	1.9%	130	11.4%
100 to 139	53	4.6%	183	16.0%
140 to 179	69	6.0%	252	22.1%
180 to 219	71	6.2%	323	28.3%
220 to 259	78	6.8%	401	35.1%
260 to 499	385	33.7%	786	68.9%
500 to 999	245	21.5%	1,031	90.4%
1,000 to 1,999	88	7.7%	1,119	98.1%
2,000 or more	22	1.9%	1,141	100.0%
Total	1,141	100.0%		

Source: USDA 2007 Census of Agriculture, Table 62 page 175, http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/st50_1_062_062.pdf.

Figure 3.3.5: Vermont Dairy Farms by Size, 1997-2007



Sources: USDA, 1997 Census of Agriculture, Table 51 page 127, www.agcensus.usda.gov/Publications/1997/Vol_1_National_State_and_County_Tables/ac97avt.pdf, 2002 Census of Agriculture, Table 59 page 155, www.agcensus.usda.gov/Publications/2002/Volume_1_Chapter_1_State_Level/Vermont/VTVolume104, 2007 Census of Agriculture, Table 62 page 175, www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/st50_1_062_062.pdf.

The Census of Agriculture also identifies dairy farms by herd size. **About 69% of Vermont dairy farms had fewer than 100 dairy cows in 2007** (Table 3.3.3). The number of dairy farms with between 10 and 99 dairy cows *decreased* a little over 53% from 1997 to 2007. In contrast, the number of dairy farms with 1 to 9 milk cows and 200 or more dairy cows *increased* between 1997 and 2007 (orange rows indicate decreases). Overall, from 1997 to 2007 the number of dairy farms decreased about 35% and the number of dairy cows decreased nearly 14%.

Table 3.3.3: Vermont Dairy Farms by Herd Size, 1997-2007

Farm with Herd Size of:	Number of Farms			Percent Change (97-07)	As % of Total (2007)
	1997	2002	2007		
1 to 9	8	36	113	1,312.5%	9.9%
10 to 49	499	361	297	-40.5%	26.1%
50 to 99	779	548	374	-52.0%	32.8%
100 to 199	334	248	191	-42.8%	16.8%
200 to 499	108	130	111	2.8%	9.7%
500 or more	21	33	53	152.4%	4.6%
Total	1,749	1,356	1,139	-34.9%	100.0%
# of Dairy Cows	160,533	149,368	138,664	-13.6%	

Sources: USDA, 1997 Census of Agriculture, Table 51 page 127, www.agcensus.usda.gov/Publications/1997/Vol_1_National_State_and_County_Tables/ac97avt.pdf, 2002 Census of Agriculture, Table 59 page 157, www.agcensus.usda.gov/Publications/2002/Volume_1_Chapter_1_State_Level/Vermont/VTVolume104, 2007 Census of Agriculture, Table 62 page 177, http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/st50_1_062_062.pdf. Note: There are slight discrepancies between tables in the Census of Agriculture. For example, some tables indicate 1,139 dairy farms, while others indicate 1,141.

Although farms with fewer than 100 dairy cows constituted about 69% of Vermont dairy farms in 2007, they had only about 27% of the total number of dairy cows in the state. In contrast, the 53 dairy farms (4.6% of total) with 500 or more dairy cows had 32% of the state's dairy cows in 2007. From 1997 to 2007, dairy farms with herd sizes ranging from 1 to 199 dairy cows *decreased* their number of dairy cows (orange rows), while those with over 200 dairy cows *increased* 61% (Table 3.3.4).

Table 3.3.4: Vermont Dairy Farms by Number of Milk Cows, 1997-2007

Farm with Herd Size of:	Number of Cows			Percent Change (97-07)	As % of Total (2007)
	1997	2002	2007		
1 to 9	510	453	460	-9.8%	0.3%
10 to 19	667	505	590	-11.5%	0.4%
20 to 49	16,935	12,706	10,056	-40.6%	7.2%
50 to 99	54,166	38,958	26,561	-51.0%	19.0%
100 to 199	43,512	32,669	26,156	-39.9%	18.7%
200 to 499	31,018	37,998	31,296	0.9%	22.4%
500 to 999	16,060	18,772	24,509	177.7%	32.0%
1,000 or more		8,565	20,091		
Total	160,533	150,626	139,719	-14.2%	

Sources: Sources: 1997 Census of Agriculture, Table 29, www.agcensus.usda.gov/Publications/1997/Vol_1_National_State_and_County_Tables/Vermont/vt-45/vt1_29.pdf, 2002 Census of Agriculture, Table 17, www.agcensus.usda.gov/Publications/2002/Volume_1_Chapter_1_State_Level/Vermont/st50_1_017_019.pdf, 2007 Census of Agriculture, Table 17, www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/st50_1_017_019.pdf. Note: There are slight discrepancies between tables in the Census of Agriculture. For example, Table 17 of the 2007 Census of Agriculture indicates 139,719 milk cows, while Table 62 indicates 138,664 milk cows.

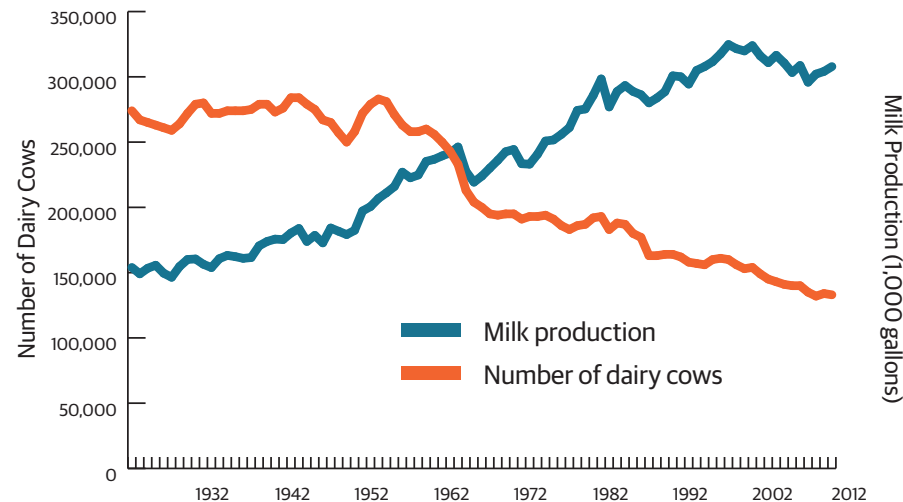
"On the dairy side of it, we talk about economies of scale. The 50-60 cow operation probably can't support a family just with the production of milk, they've probably got to have some maple syrup, logging, and something like that. Then you get into 100-300 cow dairy, where they have all the problems of a thousand cow dairy, but they don't have economies of scale. The family farm now is considered one with 300 cows, or in that area, and it's big enough so they can't just do it with family members, but it's not big enough to have some of the benefits of the economy of scale that a large, thousand cow dairy has."

—Bennington Focus Group participant, 2009

Milk Production in Vermont and the Northeast

In addition to the long-term decline in the number of dairy farms, there has been a 49% decrease in the number of dairy cows, from 274,000 dairy cows in 1924 to 134,000 dairy cows in 2012. **However, even though the number of dairy cows has declined, the average amount of milk produced per cow has increased** (Figure 3.3.6). In 1924, a Vermont dairy cow produced an average of 562 gallons a year. Forty years later, a Vermont dairy cow produced an average of 995 gallons a year – a 77% increase. By 2004, a Vermont dairy cow produced an average of 2,144 gallons of milk a year – a 281% increase from 1924. **In 2012, a Vermont dairy cow produced an average of 2,315 gallons per year.**¹⁹

Figure 3.3.6: Number of Vermont Dairy Cows and Milk Production, 1927-2012



Source: USDA National Agricultural Statistics Service, www.nass.usda.gov/Data_and_Statistics/Quick_Stats/. Note: Milk production in thousands of gallons (multiply by 1,000 to get value).

Advances in dairy cow genetics, feeding, housing methods, and other technologies (e.g., recombinant bovine growth hormone²⁰) have supported this increased yield.²¹ For example, while the number of milk cows decreased over 48% from 1960 to 2012, milk production increased about 37%. **Total milk production has consistently exceeded 2 billion pounds of milk per year for the past 50 years, and Vermont**

has produced between 2.5 billion and 2.8 billion pounds of milk per year over the last decade.

Although the number of certified organic dairy farms grew dramatically from 1997 to 2010, milk production from organic dairy farms makes up a small percentage of total Vermont milk production. For example, the Census of Agriculture indicates 156 million pounds of organic milk production in 2007, equal to about 6.2% of total Vermont milk production.²²

Fluid milk can be transformed into many different products, including: cheese, cultured products (e.g., yogurt, cottage cheese, sour cream, dips) and an umbrella category of cream, skim milk, condensed skim milk, and butter powder. This last category generally represents components used for additional processing and food manufacturing, such as *Ben & Jerry's* ice cream.

Table 3.3.5 shows classes of Vermont-produced milk processed in state in 2007. About 44% of the milk produced by Vermont's dairy cows remained as fluid milk, while 56% was turned into cheese, yogurt, butter, ice cream, and other products. **While over 54% of dairy products were processed in Vermont, only about 9% of fluid milk was processed in state.**

Table 3.3.5: Vermont Dairy Production Classes, 2007

Category	Total Pounds Produced	Percent of Total	Product Processed in Vermont (pounds)	Percent Processed in State
Fluid Milk	1,113,535,912	43.8%	96,511,815	8.7%
Cheese	598,011,529	23.5%	523,009,188	87.5%
Cultured Products	325,188,134	12.8%	257,445,744	79.2%
Cream / Skim / Skim Condensed / Butter / Milk Powder	504,650,052	19.9%	503,782,777	99.8%
Total	2,541,385,627	100.0%	1,380,749,524	54.3%

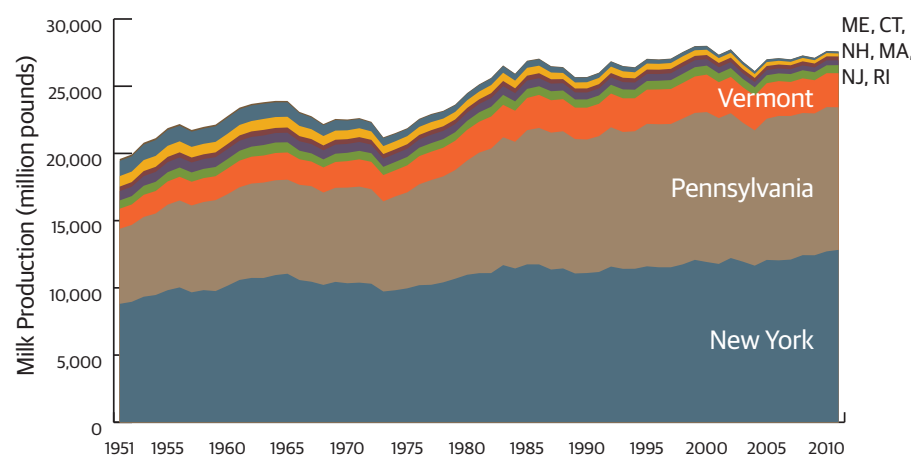
Source: Diane Bothfeld, Deputy Secretary, Vermont Agency of Agriculture, Food, and Markets.

Vermont accounted for over 62% of New England milk production in 2010.

Franklin and Addison counties also rank fourth and sixth, respectively, in milk production in the [Northeast Federal Milk Marketing Order](#).²³ Milk production in Vermont is up 51% since 1951, but it decreased in every other New England state during that time period. For example, milk production in Rhode Island decreased 107% and Massachusetts experienced a 66% decrease from 1951 to 2010.

Because of Vermont's small land area, milk production in Vermont is dwarfed by milk production in New York and Pennsylvania. When these two northeastern states and New Jersey are included, Vermont produces only 9.1% of the regional milk supply, while New York and Pennsylvania produce 46.0% and 38.9%, respectively (Figure 3.3.7). Milk production increased in New York (36%) and Pennsylvania (73%) from 1951 to 2010. In fact, from 2000 to 2010, Franklin and Addison counties went from being the third and fourth highest milk producing counties in the Northeast Federal Milk Marketing Order to the fourth and sixth, respectively, as two New York counties increased production.

Figure 3.3.7: Northeast Milk Production, 1951-2011



Source: USDA National Agricultural Statistics Service, Dairy Products Annual Summary, <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?sessionid=C08F5D097034400C0364A4071D606D?documentID=1054>.

While Vermont is the largest dairy producing state in New England, it has the smallest number of consumers, equal to 4.3% (625,741) of New England's population and 1.9% of the region's population when New York State is included.²⁴ **Regional markets for Vermont milk are essential to the viability of the industry.**

Meeting the Demand?

Many Vermonters are interested in whether we can feed ourselves with local food production. Unfortunately, no comprehensive data exist to indicate exactly how much and what type of food—including dairy products—is currently being consumed by Vermonters. While we do not know how much of the dairy products produced in Vermont are consumed in Vermont, throughout the F2P Strategic Plan we use the [food availability per capita estimates](#) of the [USDA Economic Research Service](#) and the [dietary guidelines](#) of the USDA to contextualize current Vermont production.

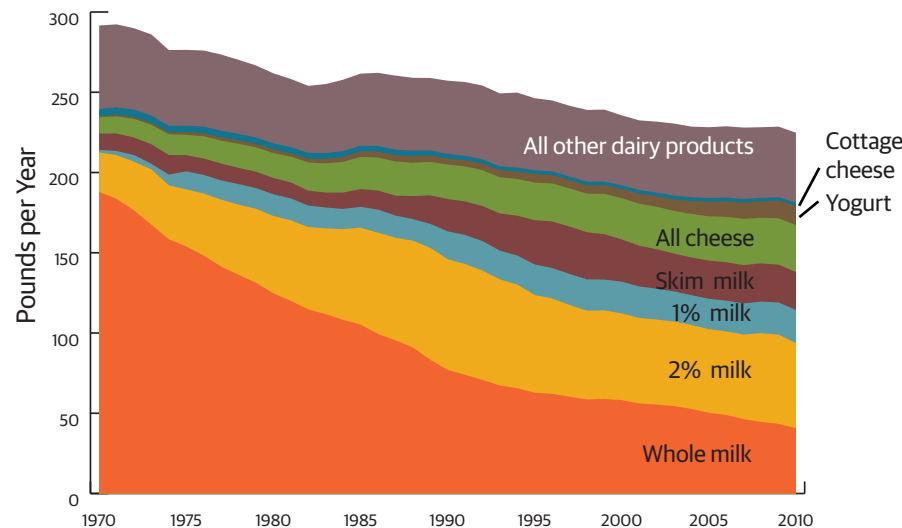
Food availability per capita is commonly used as a proxy for food consumption, even though it does not measure actual consumption. The ERS calculates food availability per capita by adding total annual national production, imports, and beginning stocks of a particular commodity and then subtracting exports, ending stocks, and nonfood uses. This number is then divided by population estimates for the area of interest to arrive at per capita estimates of available food for any particular year. The ERS also attempts to account for food losses, from farms to retailers to consumers (e.g., spoilage and waste). Across the F2P Strategic Plan we use the **consumer weight** to reflect the state of a product at the time of purchase.

The long-term trend in the per capita availability of "all plain milk" in the United States is down 38.5%, from 224.4 pounds (26.1 gallons) per year in 1970 to 138.0 pounds (16.0 gallons) in 2010. "All plain milk" is a summary category that includes whole milk, 2% milk, 1% milk, and skim milk. The overall decrease in all plain milk reflects a drop in whole milk availability (-78.3%), but also gains in the per capita availability of 2% milk (up 115.2%), 1% milk (up 1,193.6%), and skim milk (up 130.8%). Per capita availability of all cheeses (189.9%) and yogurt (1,531.4%) also increased, while total cottage cheese decreased (-54.1%) from 1970 to 2010. **The per capita availability of all dairy products decreased about 23% from 291.7 pounds in 1970 to 224.8 pounds in 2010** (Figure 3.3.8).

The downward trend in fluid milk availability may reflect competition from other beverages (e.g., soft drinks²⁵) and a more diverse U.S. population that does not normally drink milk.²⁶ Health concerns (e.g., concerns about cholesterol and saturated fats) may be behind the switch to lower-fat milk. Cheese consumption has increased for a variety of reasons, including the expanded use of cheese by pizza and other fast-food

restaurants, increased consumption of cheese-rich Mexican and Italian foods, and an increased use of cheese by food manufacturers and consumers at home.²⁷ According to one researcher, yogurt consumption in the United States has grown faster than any other food product from 2000 to 2010 as a result of its convenience, flavor, and health benefits.²⁸ Danone, the largest yogurt maker in the world, believes that yogurt consumption in the United States can double from 2010 to 2015.²⁹

Figure 3.3.8: U.S. Per Capita Availability of Dairy Products, 1970-2010



Source: USDA ERS, *Food Availability (Per Capita) Data System*.

All things being equal, if it were considered desirable or possible for Vermonters to match the per capita availability totals, over 143 million pounds of dairy products, including over 89 million pounds of fluid milk, would be required. This amount is equal to 71% of Vermont's dairy production in 2007. Or, to put it another way, **if no dairy products had been exported in 2007, Vermont dairy farmers would have produced enough milk for every Vermonter to have over 4,000 pounds of dairy products and dairy fats, including 1,780 pounds of milk, 956 pounds of cheese, 520 pounds of cultured products, and 806 pounds of butter and other products—all well above the national per capita availability estimates.**

The MyPlate dietary guidelines for dairy products differ from other food categories because the suggestions—3 cups per day—are the same for all men and women over 9 years old (suggestions for children under 9 are 2 to 2.5 cups per day). The MyPlate dietary guidelines for dairy products indicate that it is desirable for Americans to consume more dairy products than are available on a per capita basis. That is, 3 cups from the dairy group are recommended per day for everyone 9 years old or older. This is equal to 547.5 pounds of dairy group products for anyone 9 years old or older per year, compared to a total per capita availability of 230.0 pounds of all dairy products for Americans in 2007.

If it were desirable or possible for every Vermonter to match the USDA's dietary guidelines for dairy group products, then 336,515,401 pounds of dairy products would be required. This suggested requirement is equal to 16.5% of Vermont's total dairy production in 2007.

Of course, some Vermonters are lactose intolerant, some are vegan, and some may not consume dairy products because of a taste preference or any number of other reasons.

Although it is unrealistic to expect all Vermonters to consume the per capita amount of food available to them or to meet the dietary guidelines of the USDA, it is clear that Vermont produces significantly more dairy products than can be consumed in the state. Interestingly, Vermont's biggest agricultural commodity is also the food category that has seen the largest per capita availability decreases.

Dairy Per Capita Availability

Surplus: ≈2,397,465,197 pounds

MyPlate Dietary Guidelines for Dairy Products

Surplus: ≥1,700,220,174 pounds

See *Chapter 3, Section 1: Understanding Consumer Demand* for more information.

Table 3.3.6: Dairy Product Availability per Capita and Dietary Guidelines For Vermonters, 2007

	2007 U.S. per capita availability (consumer weight adjusted for loss)	Amount required if VT matched 2007 per capita availability	How much does Vermont produce? (2007)*	2007 Vermont per capita availability (adjusted for loss)
	Pounds	Pounds	Pounds	Pounds
Total dairy products	230.0	143,920,430	≈2,541,385,627	≈4,061
Selected dairy products				
All plain milk	142.3	89,042,944	≈1,113,535,912**	≈1,780
Plain whole milk	46.3	28,971,808		
2% milk	52.7	32,976,551		
1% milk	19.4	12,139,375		
Skim milk	23.9	14,955,210		
All cheese	28.7	17,958,767	≈598,011,529	≈956
Cultured products	12.4	7,759,188	≈325,188,134***	≈520
Yogurt	10.1	6,319,984		
Cottage cheese	2.3	1,439,204		
USDA MyPlate dietary guidelines	Annual recommendations	Amount required if Vermont matched guidelines	How much does Vermont produce? (2007)	Surplus or deficit?
	Pounds	Pounds	Pounds	Pounds
Vermonters (Ages 10+)	547.5	306,126,413	2,036,735,575	≥1,700,220,174 surplus
Vermonters (birth to age 9)	456.25	30,388,988		
Subtotal		336,515,401	≥2,036,735,575	≥1,700,220,174 surplus

* Based on Table B6 in Appendix B, we assume 43.8% of dairy production was liquid milk, 23.5% was all cheeses, and 12.8% was cultured products. A more recent percentage breakdown is not available.

** Vermont fluid milk production; may not include skim milk.

*** Vermont cultured products; may contain more than yogurt and cottage cheese.

Value of Dairy Production in Vermont

Dairy's role in Vermont's food system economy and the overall state economy is striking. In 2007, milk and other dairy products made up 74% (\$519 million, adjusted for inflation to 2010 dollars) of sales of Vermont's agricultural products (Figure 3.3.9), and about 80% (≈\$566 million) of sales of Vermont agricultural products when the value of dairy cattle raised for meat is included. Finally, when the value of hay/forage grown to feed livestock is included, dairy product sales are about 83% (≈\$584 million) of the value of all sales of agricultural products in Vermont (not shown).

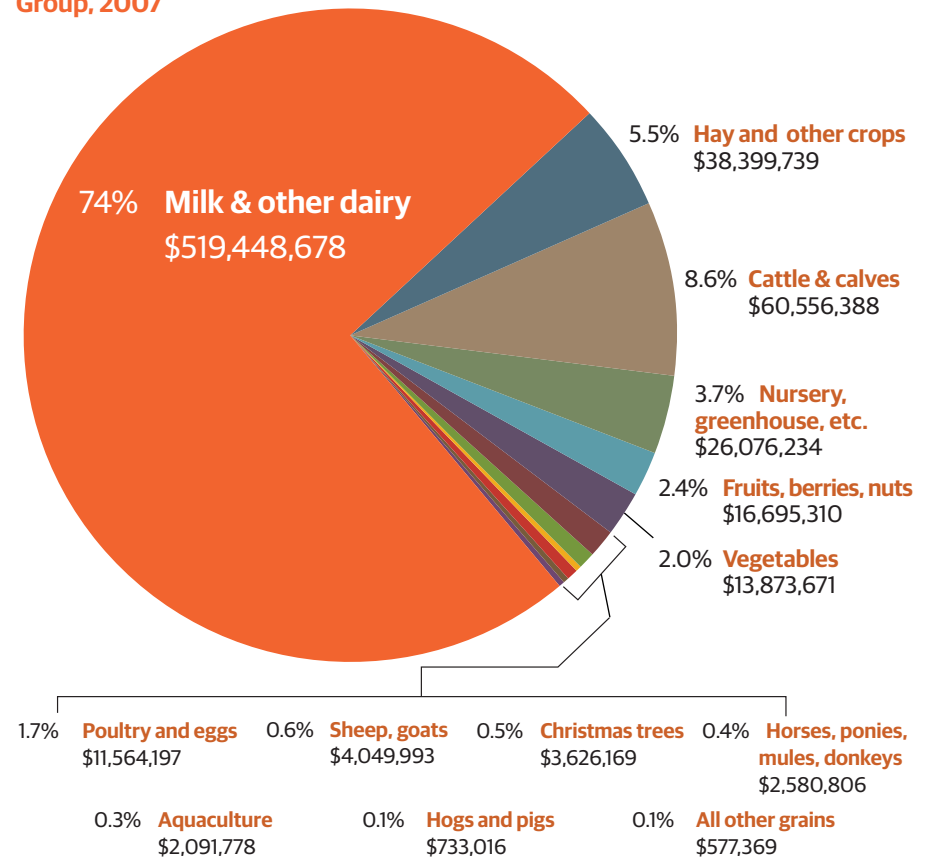
The market value of agriculture products is composed of sales and government payments. Government payments equaled about 1% of the market value of Vermont's agricultural products in 2007. About 79% ($n = 903$) of dairy farms received government payments in 2007. Although dairy farms made up about 67% of all farms ($n = 1,351$) that received government payments, they received 84% (\$6,013,467, adjusted for inflation to 2010 dollars) of these payments in 2007.³⁰

The value of Vermont's dairy products increases with value-added processing. **Gross sales of Vermont's processed dairy products (e.g., ice cream, cheese, fluid milk and milk powder) total about \$1.2 billion per year.** There are more than 60 value added dairy producers in Vermont, including makers of cheese (e.g., *Cabot Cheese*, *Shelburne Farms*), yogurt (e.g., *Butterworks Farm*, *Millborne Farm Drinkable Yogurt*), ice cream (*Strafford Organic Creamery*, *Island Ice Cream*, *Ben & Jerry's*), cream cheese (*Franklin Foods*), kefir (*Doe's Leap*), and cottage cheese (*Cabot*), as well as goat dairy products (*Fat Toad Farm*). Dairy product manufacturing employs over 1,700 people per year, with gross wages of \$70 million. Additionally, these dairy products have local, regional, and national consumer bases. Dairy products import approximately \$1 million per day back into the Vermont economy.³¹

Milk and dairy cattle production accounted for 97% (\$162,978,829, adjusted for inflation to 2010 dollars) of net farm income in 2007 even though dairy farms only made up 32% ($n = 970$) of all farms that reported net gains. About 15% ($n = 171$) of dairy farms reported net losses in 2007 and these farms made up a little more than 4% ($n = 3,940$) of all farms reporting net losses (Table 3.3.7).³²

The *Economic Research Service* of the USDA has developed a classification system to delineate small and large farms. Small farms are divided into 5 categories, but share

Figure 3.3.9: Total Sales of Vermont's Agricultural Products by Commodity Group, 2007



Source: USDA 2007 Census of Agriculture, Table 2, www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/st50_1_002_002.pdf. Adjusted for inflation to 2010 dollars. Note: "Hay and other crops" includes maple syrup, but likely undercounts the contribution of maple syrup. For example, the value of maple syrup produced in Vermont was \$32,821,678 in 2009. "Cattle and calves" includes cattle raised for dairy herd replacement.

the characteristic of having less than \$250,000 in sales. Other farms are classified as large or very large family farms (with sales greater than \$250,000) or non-family corporate farms or farms operated by hired managers. Large farms made up 12% ($n = 856$) of all farms in Vermont in 2007, and large dairy farms accounted for 64% ($n = 545$) of large farms (Table 3.3.8). Large farms generated 79% (\$539 million) of

the sales of agricultural products in Vermont and large dairy farms generated about 81% (\$432 million) of the sales of all large farms. **In fact, 545 large dairy farms generated 64% of the sales of all agricultural products in Vermont in 2007.**

Table 3.3.7: Vermont Dairy Farm Gains and Losses, 2007

Dairy Farms Reporting:		
	Gains of-	Losses of-
Less than \$1,000	1	11
\$1,000 to \$4,999	44	32
\$5,000 to \$9,999	36	29
\$10,000 to \$24,999	101	45
\$25,000 to \$49,999	181	17
\$50,000 or more	607	37
Total	970	171

Source: USDA 2007 Census of Agriculture, Table 62 page 165, www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/st50_1_062_062.pdf.

Just 222 very large family owned dairy farms (3% of all farms) generated over 43% of sales of all agricultural products in Vermont in 2007. Large dairy farms also accounted for about 45% (*n* = 545) of all dairy farms and 86% of the market value (sales plus government payments) of all dairy farms.

In contrast, small farms made up 88% of all farms in Vermont, but only generated 21% (about \$139 million) of sales. Dairy farms made up 11.0% (*n* = 677) of all small farms and generated 44.3% (\$61 million) of all small farm sales. Small dairy farms generated just 14% of the sales of all dairy farms and 9.1% of the sales of all agricultural production in 2007.³³

Dairy farming is the only kind of farming in Vermont in which the majority of farm operators generated most of their household income from farming. That is, 55.5% of dairy farm operators made 75 to 100% of their income from farming in 2007. About 70% of dairy farms make 50 to 100% of their household income from farming. **For every other kind of farming in Vermont the majority of operators made less than 25% of their household income from farming.**³⁴

Dairy farms held 34% (over \$1.4 billion) of the total estimated value of land, buildings, machinery, and equipment used for agricultural production in 2007.³⁵ As the number of dairy farms has decreased, the value of land and buildings held by dairy farms has decreased: from 44% of the total market value of land and buildings in 1997, to 39% in 2002, and 33% (over \$1.2 billion) in 2007. The estimated total market value of machinery and equipment held by dairy farms has also decreased, from 58% in 1997 to about 50% in 2002, and 44% (over \$240 million) in 2007.³⁶

Finally, Vermont’s dairy-centric working landscape also contributes to the desirability of Vermont as a tourist destination. The *Vermont Tourism Data Center* estimates that at least 10 million people visited the Green Mountain State in 2009, many of whom were attracted by the beauty of the landscape. These visitors spent over \$1.42 billion, generated about \$200 million in tax and fee revenues, and contributed to the employment of 33,530 people.³⁷ **Market research conducted by *Resource Systems Group, Inc.* in New York City, Massachusetts, and Canada found that the image most associated with Vermont in summer was a scene of cows grazing with a red barn in the background.**³⁸



Iconic red barn on a fall morning in Woodstock, Vermont.

PHOTO CREDIT: Kirsten Elin

Table 3.3.8: Value of Production by Farm Typology, 2007

	Small Family Farms					Large Family Farms	Very Large Family Farms	Non-family Farms	Totals
	Limited Resource Farms	Retirement Farms	Residential / Lifestyle Farms	Farming Occupation Lower Sales	Farming Occupation Higher Sales				
	Sales <\$100k and HH income <\$20k	Sales <\$250k; operator retired	Sales <\$250k; farming not primary occupation	Sales <\$100k; farming is primary occupation	Sales = \$100k-\$249k; farming is primary occ.				
All Farms	1,277	1,162	2,340	974	375	289	247	320	6,984 total farms
	6,128 farms (88% of total)					856 farms (12% of total)			
All Acres	144,690	150,810	218,486	137,774	111,039	125,232	233,105	112,177	1,209,313 total acres
	762,799 acres (63% of total)					446,512 acres (37% of total)			
Average Size	113	130	93	141	296	433	944	351	177
Total Market Value	\$13,924,152	\$18,800,760	\$22,496,339	\$27,073,220	\$66,422,620	\$105,996,027	\$369,252,936	\$91,683,808	\$715,649,860
	\$148,717,090 (21% of total)					\$566,932,770 (79% of total)			
Total Sales	\$13,614,960	\$18,559,927	\$22,025,189	\$26,421,183	\$65,421,427	\$104,890,718	\$366,712,093	\$90,880,329	\$708,525,827
	\$156,401,760 (21% of total)					\$562,483,141 (79% of total)			
Dairy Sales	\$3,668,236	\$5,098,511	\$3,946,929	\$7,118,775	\$44,821,255	\$77,643,972	\$311,681,196	\$65,471,908	\$519,450,782 (73% of total sales)
	\$64,653,706 (12% of dairy sales)					\$454,797,076 (88% of dairy sales)			
# of Dairy Farms	99 (8.1% of dairy farms)	59 (4.8% of dairy farms)	95 (7.8% of dairy farms)	137 (11.2% of dairy farms)	287 (23.5% of dairy farms)	244 (20.0% of dairy farms)	222 (18.2% of dairy farms)	79 (6.5% of dairy farms)	1,222 (17% of all farms)
# of Dairy Farms as Percent of...	Limited Resource Farms	Retirement Farms	Residential / Lifestyle Farms	Farming Occupation Lower Sales	Farming Occupation Higher Sales	Large Family Farms	Very Large Family Farms	Non-family Farms	
	7.7%	5.1%	4.1%	14.1%	76.5%	84.4%	90.0%	24.7%	

Source: 2007 Census of Agriculture, Table 64 page 212 and 213, www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1_Chapter_1_State_Level/Vermont/vtv1.pdf.

🔑 Dairy Production Expenses

Farms that produced milk and dairy cattle accounted for 16% of Vermont farms with production expenses, but 72% (\$417 million, adjusted for inflation to 2010 dollars) of total Vermont farm production expenses in 2007, including:

- 🍷 90% of custom work and custom hauling expenses,
- 🍷 89% of feed purchased,
- 🍷 82% of cash rent for land, buildings, and grazing fees,
- 🍷 79% of rent and lease expenses for machinery, equipment, and farm share of vehicles,
- 🍷 77% of fertilizer, lime, and soil conditioners purchased,
- 🍷 71% of utilities (i.e., electricity) purchased,
- 🍷 70% of supplies, repairs, and maintenance purchased,
- 🍷 68% of hired labor expenses,
- 🍷 64% of liquid fuel purchased,
- 🍷 64% of chemicals purchased,
- 🍷 63% of interest expenses,
- 🍷 60% of livestock and poultry purchased,
- 🍷 52% of seeds, plants, vines, and trees purchased
- 🍷 48% of contract labor expenses
- 🍷 23% of property taxes paid, and
- 🍷 74% of all other production expenses.³⁹

A significant portion of these supplies and services are purchased from local and regional farm supply establishments (e.g., businesses that rent, sell, and repair equipment; wholesale merchants of farm supplies, such as animal feeds, fertilizers, agricultural chemicals, pesticides, and plant seeds; as well as veterinary services). Production expenses for Vermont farmers are reviewed in detail in *Chapter 3, Section 2: Farm Inputs*. To take one example, total animal feed expenses in Vermont were over \$151 million in 2007, equal to over 26% of total farm production expenses. Dairy farms accounted for 89% (\$135 million) of feed purchases, equal to 32% of total production expenses for dairy farmers in 2007. Animal feed purchases in Vermont take place in the context of short- and long-term domestic and international trends that are increasing the prices of food commodities.

From 2006 to 2008 commodity food prices (including animal feed prices) rose by more than 60%.⁴⁰ Since the Census of Agriculture takes place every five years (i.e., 1997, 2002, 2007) it does not capture this three-year window. However, the total amount spent by Vermont farmers on animal feed increased 15% from 2002 to 2007 (from \$132 million to \$151 million, adjusted for inflation to 2010 dollars) even though the number of dairy cows in Vermont decreased by 9% during that period. One indicator of animal feed costs—the benchmark Central Illinois price for a bushel of corn—increased 124% from 2006 to 2008 (adjusted for inflation to 2010 dollars).⁴¹

The *Economic Research Service* of the USDA reports that the index of average commodity prices closely parallels the prices of four major crops (wheat, corn, rice, and soybeans).⁴² Recent increases in commodity prices and retail prices reflect a variety of short-term and long-term factors impacting these four major crops, including:

- 🍷 Rising fossil fuel prices
- 🍷 Economic growth and population growth in developing countries (e.g., China) has increased demand for energy
- 🍷 Economic growth in developing countries has increased demand for meat
- 🍷 Agricultural production of four major commodities—corn, wheat, rice, and soybeans—has slowed
- 🍷 Adverse weather has impacted production yields
- 🍷 Policy responses have been enacted to reduce exports
- 🍷 Increased corn-based ethanol production⁴³

Taken together, slower growth in production, increased global demand, increased energy consumption and fossil fuel prices, increased ethanol production, adverse weather events, and other factors have recently tightened the world's supply of food commodities (including animal feed ingredients), leading to higher prices and lower stocks of grains.

Vermont dairy farmers have very little control over these trends. For example, when high feed prices intersect with low milk prices, as they have in recent years, the impacts ripple through Vermont's food system, affecting dairy farmers and the support organizations (e.g., feed dealers) that depend on the success of Vermont's dairy industry. See *Section 3.2 Farm Inputs: Animal Feed* for more information.

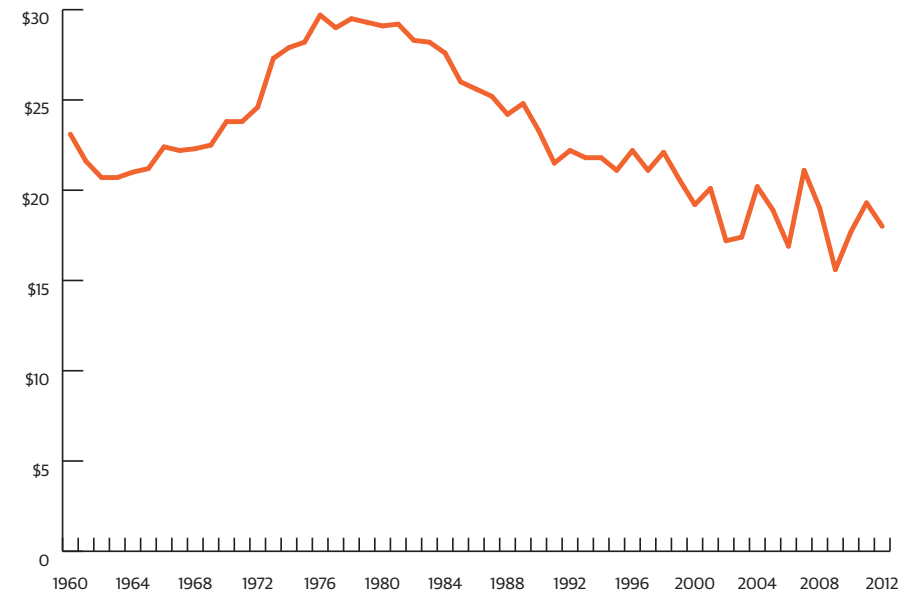
In summary, dairy farms and farms that grow feed for dairy cows continue to make up a significant percentage of the working landscape in every county in Vermont. Vermont dairy farm characteristics correspond to national trends toward spatial concentration and dairy farm consolidation. For example, the decrease in the total number of dairy farms in Vermont over the past decade largely reflects a hollowing out of the middle: the number of medium sized dairy farms decreased, the number of small and large dairy farms increased, and the number of dairy cows managed by large dairy farms increased. Dairy farms, particularly large dairy farms, generate the majority of the market value of Vermont agricultural products, and dairy farming is the only type of farm in Vermont where the majority of farm operators earn most of their household income from farming. Dairy farms also accrue the majority of production expenses and are vulnerable to global fluctuations in feed and energy costs.

🍌 Milk Pricing

For the dairy farmer, the issues are how to get a good price for his [sic] product and how to sell more of it. Raising the price of milk much beyond present levels would depress the sales, and so once a reasonable price has been achieved, the best solution is to sell more milk. Once a person is out of infancy, milk becomes an item of choice in his [sic] diet and despite milk's high nutritional value, the consumer buys non-nutritional beverages instead which are frequently more expensive. This is largely the result of the millions of dollars spent on food advertising by soft drink and beer companies to promote their products.⁴⁴

With many products—including value-added dairy products processed in the state—Vermont businesses have been able to parlay the state's small size, high production standards, and brand into premium pricing. This strategy is difficult for fluid milk, particularly conventional fluid milk produced in Vermont but processed out-of-state, because customers usually don't distinguish between the tastes of different milks, and segregating Vermont milk from other milk sources in processing facilities is difficult. Despite a bewildering array of programs and policies aimed at helping dairy farmers, as well as decades of federal and state assistance, **the all-milk price (i.e., the average price received by dairy farms) paid to Vermont dairy farmers has steadily decreased over the past five decades** (Figure 3.3.10) and the spread between retail milk prices and farmgate prices has increased.⁴⁵

Figure 3.3.10: Vermont All-Milk Price per CWT, 1960-2012 (adjusted for inflation to 2010 dollars using the fresh processed milk producer price index)



Source: Brian Gould, University of Wisconsin-Madison, Understanding Dairy Markets, http://future.gae.wisc.edu/data/annual_values/by_area/10?tab=prices.

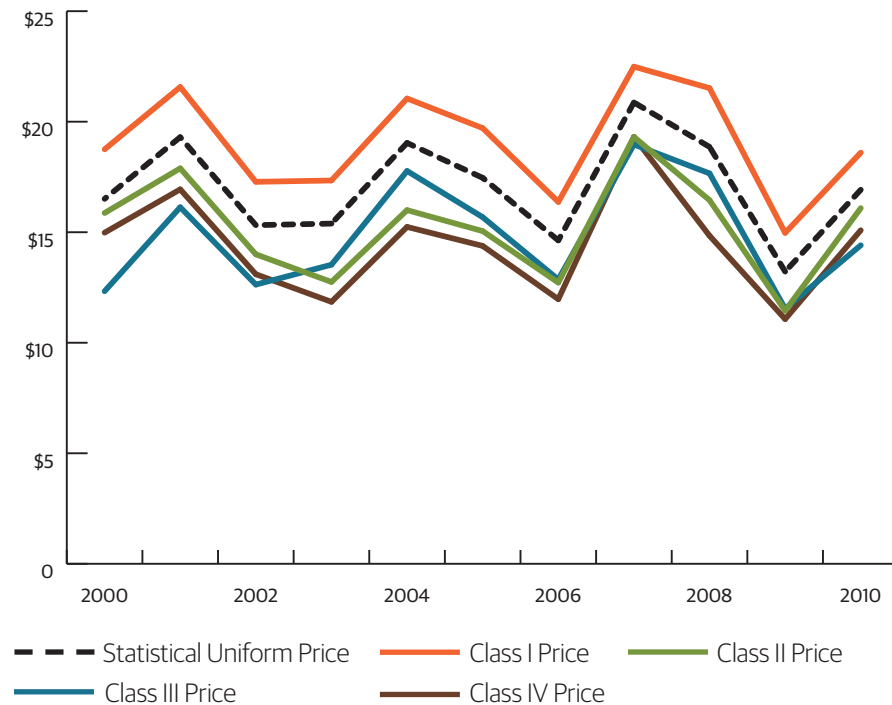
Price instability and a drop in demand for milk during the Great Depression led to a variety of federal and state programs and policies that support the price of milk.⁴⁶ The different prices of milk (e.g., the all-milk price, the minimum class prices as defined under federal and state milk marketing orders, the milk support price, as well as wholesale and retail prices) are all influenced by these federal and state programs and policies, as well as regional, national, and global events.

🍌 Federal Milk Marketing Order

The Federal Milk Marketing Order (FMMO) was established in 1935 to ensure that all Americans have access to fresh milk and that milk producers receive an adequate price for their product. An FMMO refers to fluid milk demand in a geographical area. Federal reform in 1996 reduced the number of FMMOs from 33 to 11 geographical areas (e.g., Vermont is in the Northeast milk marketing order). A major function of

FMMOs is “setting minimum prices for raw fluid-grade milk that regulated handlers, often processors, must pay to dairy farmers usually through dairy cooperatives.”⁴⁷ The minimum price that must be paid to dairy farmers or their cooperatives is a blend of the prices of *four different classes of milk* (Figure 3.3.11, adjusted for inflation to 2010 dollars). Class I prices are the highest and refer to milk used in all beverage milks; class II prices refer to milk used in fluid cream products, yogurts, and other perishable products (e.g., ice cream); class III prices refer to milk used to produce cream cheese and hard cheeses; and class IV prices refer to butter or milk in any dried form.⁴⁸

Figure 3.3.11: Class I-IV Prices per CWT for Northeast Milk Marketing Order, 2000-2010



Source: Northeast Milk Marketing Area, www.fmmone.com/.

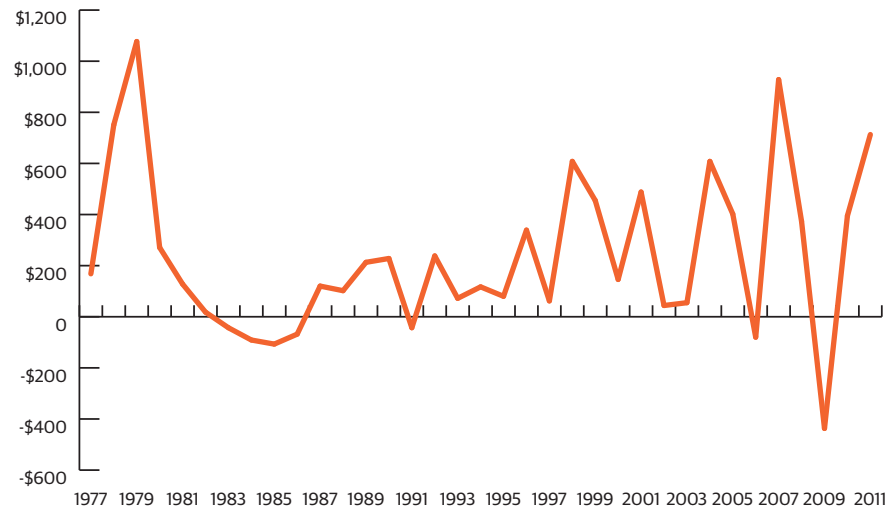
— Dairy Product Price Support Program

In 1949 the federal government also began to provide price support for milk used in dairy product manufacturing. The Milk Price Support Program authorized the Commodity Credit Corporation (CCC) to buy surplus cheddar cheese, butter, and nonfat dry milk. The CCC also has the authority to sell previously purchased manufactured dairy products back to the market to dampen price increases. In effect, the DPSP acted as a floor under wholesale milk product prices and the price of milk used to manufacture these products.⁴⁹ As indicated in Figure 3.3.7 (page 215), the long-term trend in dairy production in the Northeast has been an *increase* in milk production. The government’s formula for calculating the support price did not account for this increase in farm productivity. As a result, the federal government found itself buying surplus milk (in the form of cheese, butter, and nonfat dry milk) equal to over 10% of the nation’s milk supply. From 1981 onward, the U.S. Congress decided to set the support price instead of having the USDA set it. **Congress consistently ratcheted down the support price: from \$13.10 per hundredweight (cwt) in 1981 to \$9.90 per cwt in 1999. Because \$9.90 per cwt is well below what it costs most dairy farmers to produce milk, federal purchases have been minimal over the past 10 years.** Today, the prices CCC pays are no longer linked to the support price for a cwt of milk (i.e., \$9.90), but rather the prices of cheddar cheese, butter, and nonfat dry milk.

“The biggest concern right now is the pricing of milk. It has gotten to the point that nobody, I don’t care how big they are or how efficient they are, can pay their bills with the money they’re being paid for their milk, so they’re borrowing or losing equity and this seems to happen in a six-month cycle. There’s always been cycles, but the cycles have gotten very dramatic. Now we are in this 36-month cycle, and we won’t be able to replace the equity loss in the high times before we go into another down cycle. We’ve got to learn to control it. It only takes a 1½ to 2% surplus amount to put the price right into a tailspin, so there are proposals around supply management—even though everybody shudders when you say that word.”

—Bennington focus group participant, 2009

Figure 3.3.12: Northeast Net Earnings per Cow (adjusted for Inflation to 2010 dollars using the fresh processed milk producer price index)



Source: Farm Credit, Northeast Dairy Farm Summary, 2011.

— Northeast Interstate Dairy Compact

The federal government has instituted some supplemental measures to address the mismatch in production and sales costs for Northeastern dairy farms compared to dairy farms in other parts of the country. From 1996 to 2002 the Northeast Interstate Dairy Compact allowed New England states to work collaboratively on setting the minimum price for milk. Congress did not renew its authorization in 2002. One study found that milk prices and milk production were up during the first year of minimum price regulation of the Compact, but that the increase in milk production was not significantly different from long-term trends.⁵⁰ Today, the [Milk Income Loss Contract](#) program pays dairy farmers a direct subsidy when the cost per hundredweight falls below \$16.94 in the Boston market (this has happened [11 times in the past 33 months](#)). Large dairy farms feel disadvantaged by MILC since it capped annual production eligible for payment at 2.4 million pounds (revised to 2.985 million pounds in 2008). Additionally, there was some concern that the MILC program and the DPSP were at odds (i.e., that MILC would end up encouraging increased production and require

additional removal of dairy products to stabilize prices). To date, however, there does not appear to be a supply response attributable to the MILC program.⁵¹

— Supply Management

Milk pricing systems need producer prices to remain high enough to maintain production, but not so high that they encourage surplus production.⁵² In spite of the protections that government milk support programs were intended to provide, they have not significantly improved the prices received by American dairy farmers. For example, although FMMOs began as a way to support farmers, they do not guarantee dairy farmers that their compensation will increase as retail prices of milk increase, or that the price paid to farmers will meet a reasonable cost of producing milk. The pricing formulas did not take into account the vast differences in production costs among various regions as dairy farming developed in different ways since 1935. The formulas also do not accurately reflect the new and emerging markets for milk, such as powdered milk drinks, drinkable yogurt, and ingredient uses for milk (e.g., lactoferrin from whey that is used in muscle-building drinks). Most Vermont dairy farmers believe that a fundamental restructuring is required.

The federal government has briefly operated two voluntary supply management programs to reduce milk production and to reduce herd sizes. Congress approved the Milk Diversion Program from 1984 to 1985 and the Dairy Termination Program (Whole Herd Buyout) from 1986 to 1987. The Milk Diversion Program cut milk production sharply in 1984 but had no long-term impact in milk production. The Dairy Termination Program moderated national milk production trends but was implicated in impacting beef prices, angering cattle producers. A program created by the [National Milk Producers Federation](#), [Cooperatives Working Together](#), has also worked to reduce the number of dairy cow by using a fee applied to milk marketed by participating members to buy the retirement of herds.⁵³

Today, the U.S. government does not use supply management or production management strategies for conventional milk, such as the quota system used in Canada, to balance supply and demand. Larger states, such as California, have instituted a state-controlled milk marketing order to be more responsive to local conditions for farmers than the federal system. New England, on the other hand,

does not have that option because payments between producers and processors commonly occur across state lines. Only the federal government can regulate interstate commerce unless Congress enacts a special dispensation, such as the one that allowed the Northeast Interstate Dairy Compact. The state of Maine supports an active Maine Milk Commission that regulates milk pricing through a state milk marketing order for Maine-produced milk. Pennsylvania also sets minimum prices for milk produced and marketed in the state.

Many people argue that the decline in price support provided by the federal government has meant that milk prices are now governed mainly by market factors, including dairy cow numbers, milk production per cow, total milk production, milk and dairy product sales, the level of dairy stocks, the cost of inputs (e.g., feed and energy), ethanol production in the Midwest, and global markets for milk.⁵⁴ **A 36-month boom and bust cycle has emerged since the 1990s** (Figures 3.3.10 through 3.3.12). The 36-month cycle appears to reflect the fact that many dairy farmers increase their herd size when the market price for milk is high (e.g., 2007 and 2008), in an effort to recoup losses from the years when they received low milk prices (e.g., 2006). Oversupply then depresses prices and larger herd sizes become liabilities when farms once again are accumulating debt for every cow milked (i.e., while the increased herd may raise income for an individual farm in good years, it exacerbates the overall problem of over production depressing prices).

2009 was a bad year for dairy farmers as milk prices were the lowest they had been in the past 50 years (\$15.60 per cwt, adjusted for inflation to 2010 dollars).

Farm Credit, a major lender to farms, surveys dairy farms in the Northeast every year to analyze their financial health. In 2009, *Farm Credit* reported that Northeast dairy farmers lost \$437 per cow (Figure 3.3.11) and \$1.97 per hundred pounds of milk (cwt) produced. The 2010 Northeast Dairy Farm Summary indicated that net earnings rose to \$1.73 per cwt of milk produced thanks to higher milk prices (2010 average equaled \$17.70 per cwt). Despite this gain, higher production expenses meant that many farmers were unable to achieve their pre-2009 financial positions.⁵⁵

Of course, a higher average milk price in 2010 is still a low milk price compared to averages from 1960 to 2000. The average all milk price was \$21.8 per cwt for the 1960s, \$27.3 per cwt for the 1970s, \$26.8 per cwt for the 1980s, \$21.8 per cwt for the 1990s, and \$18.6 per cwt for the 2000s.

The organic dairy industry historically practiced supply management to maintain price minimums. When supply got too high for demand, producers were required to cut back by a certain percentage. The ability to control supply and match it with demand in the market prevented overproduction from bringing down the price received by farmers. As a result, it also prevented the cycle of farms taking heavy losses in a year of low prices, increasing production to recoup money when prices go higher—flooding the market with a higher supply—and then suffering once again from low prices. Recently, the two major organic milk processors, [*CROPP Cooperative*](#) (Organic Valley) and [*WhiteWave Foods/Dean Foods \(Horizon Organic\)*](#), have lifted quota or contract restrictions on production and are looking for more organic producers in the eastern part of the country.⁵⁶

Recent efforts to adopt production or supply management policies for conventional milk are gaining some traction. As of March 2011, the USDA's [*Dairy Industry Advisory Committee*](#) tentatively endorsed exploring the adoption of a growth management program to reduce price volatility.

A number of dairy organizations recently commissioned a report on dairy pricing.⁵⁷ The study, conducted by Charles F. Nicholson and Mark W. Stephenson, projected dairy prices for the next 10 years using four scenarios, including a do-nothing scenario and three dairy price stabilization programs being considered by the U.S. Congress (Table 3.3.9).

Table 3.3.9: Dairy Price Stabilization Programs

Proposal	Key Points
Dairy Price Stabilization Program: Federal legislation introduced by U.S. Representative Jim Costa (D-California) and U.S. Senator Bernie Sanders (I-Vermont)	Growth management plans that penalize farmers for making more milk than prescribed by the program and paying the money collected for overproduction to farms that do not produce in excess.
Marginal Milk Pricing program: Agri-Mark	The Marginal Milk Pricing program pays very little or even zero on milk that is not needed to supply the marketplace. Expectation is that not getting paid for a portion of milk would be a strong signal to farmers to reduce production.
Foundation for the Future: National Milk Producers Federation	A proposal that would have farmers manage risk through milk price insurance, marginal milk pricing, growth management, and government-sponsored risk management on a portion of milk.

The Nicholson and Stephenson study found that all three of these proposals would decrease milk price volatility on a national level (the analysis did not explore the effect of these programs on milk prices in the Northeast region). Volatility would not be completely eliminated but would be moderated to a smaller price range. Table 3.3.10 outlines outcomes of each program for several categories, including reducing milk price volatility.

Table 3.3.10: Results of Three Proposed Milk Price Stabilization Programs

Category	Result
Milk price volatility	All three programs reduce volatility of the milk price.
Cumulative milk production	MMP and FFTF would decrease milk production 0.4 to 0.7%, while the Costa-Sanders legislation would increase milk production 0.6 to 0.8%. MMP and FFTF provide stronger price signals to reduce milk production than the Costa-Sanders legislation does.
Government expenditures	All three programs reduce federal government expenditures on dairy programs.
All-milk price (nationally)	MMP and FFTF increase the average all-milk price. These two programs enhance price because excess production is provided to government programs at no cost and cleared from the market—bringing supply and demand into balance more quickly.
Exports of dairy products (Export markets continue to grow for national dairy products; 8 to 10% of national milk production goes to exports.)	The MMP and FFTF programs reduce the growth of exports slightly as a result of slightly lower milk supply and the removal of dairy products to the domestic feeding programs. The Costa-Sanders legislation results in a greater amount of exports because of a greater increase in milk supply.

The results of this research do not conclusively point to one program over another. All three programs have a positive effect in one arena or another, showing that the mitigation of milk price volatility is possible.

Many dairy industry stakeholders understand, especially after the historic 2009 milk price crisis, that year-to-year price and input cost fluctuations are unsustainable. Vermont dairy farmers have demonstrated unprecedented unity around support for change in dairy pricing policy. In February 2010, the organization *Dairy Farmers Working Together* took a lead in organizing nearly every Vermont dairy industry representative, including all Vermont dairy cooperatives, to encourage federal support

of supply management. Vermont presented this statement to USDA Secretary of Agriculture Vilsack with a request that he support the passage of supply management legislation to stabilize milk prices and deliver fair milk prices to dairy farmers nationwide. This legislation has since been introduced by Vermont's congressional delegation and has won some support from dairy leaders in the Northeast and in California; however, it faces opposition from other regions of the country.

If the 36-month boom and bust cycle in milk prices holds, 2012 could be another down year for dairy prices. Regardless of whether the Class I milk price increases, Vermont's dairy industry and dairy technical assistance providers should explore a tailored approach to dairy product market development (e.g., based on size of operation, stage of development, and potential market outlets) that focuses on local solutions, including reducing production expenses, facilitating transitions, and encouraging diversification, and improving marketing, while simultaneously pursuing federal dairy policy reform.

✱ Climate Change Impacts on the Dairy Industry

The [USDA](#) and the [U.S. Global Change Research Program](#) indicate that climate change will produce detrimental effects on most crops, livestock, and ecosystems that will vary somewhat by region in the century ahead. Crop sector impacts from weather are likely to be greatest in the Midwest, and these impacts will likely expand due to damage from crop pests. Decreased yields in the major corn and soybean supplying region of the country will, of course, have ripple effects, including impacting the cost and availability of animal feed in Vermont—already the largest production expense for dairy farmers.

Livestock production systems are vulnerable to temperature stresses, rapidly changing weather conditions, and exposure to different diseases and parasites. The direct effect on dairy cows and dairy management systems may include lowered feed efficiency, reduced forage productivity, reduced reproduction rates, and costs associated with modifying livestock housing to reduce thermal stress. Temperature stresses can be mitigated for animals raised indoors but hotter summer temperatures may require new thermal environment control systems and the cost and availability of animal feed will likely be a problem in the years ahead. Many dairy farmers are interested in expanding grass-

fed livestock production to reach regional markets for organic milk. It is unclear how temperature stresses will impact the expansion of livestock production in Vermont, but the USDA states that the negative effects of hotter summers will likely outweigh the benefits of warmer winters. More rain in the Northeast and a longer growing season may lead to an expansion of forage production in Vermont, but increased concentrations of carbon dioxide in the atmosphere effect plant nitrogen and protein content, impacting the quality of the forage.⁵⁸

ANALYSIS

Dairy Market Development Needs

Dairy production currently drives Vermont's food system economy, whether measured by the value of production and sales, number of farms and farm assets, role in the regional food system, number of local jobs, supporting businesses, and households reliant on dairy income, or the degree to which land that supports dairy farms define both our working landscape and the Vermont brand. At the same time, increased dairy farm consolidation and concentration (e.g., the number of dairy farms in Vermont has decreased 96% over the last nine decades), rising production expenses (e.g., higher animal feed and energy costs), and price volatility (e.g., the 2010 all-milk price per cwt is down 40% from its peak in 1976, adjusted for inflation to 2010 dollars) have negatively impacted dairy farm profitability. **How can remaining dairy farmers make a living with continued price volatility and escalating production expenses? What could or should Vermont's dairy industry look like in 2020?**

In October 2011, the [Farm to Plate Network](#) was established to activate the F2P Strategic Plan. The F2P Network is composed of "Working Groups" that represent leverage areas for achieving the goals of the F2P Strategic Plan. A "Dairy Development Working Group," made up of members of Vermont's dairy industry and associated technical assistance network, was tasked with advancing strategies identified in this Section and Appendix B, as well as developing new objectives and strategies over time. **To accomplish Goals 6 through 9, the Dairy Development Working Group will focus its efforts on local, regional, and national solutions that navigate through the complex system that delivers dairy products to markets.**

In particular, the Dairy Development Working Group is considering how to maximize the ability of “Dairy Management Teams” (i.e., a network, or pool, of dairy industry experts) to provide the kind of peer-to-peer mentoring necessary to solve problems locally, including reducing production costs, improving nutrient management, improving forage management, facilitating transitions to organic production or intergeneration farm transfers, encouraging other forms of diversification, and so on. Based on dairy industry feedback during the past two years, including at the October F2P Network Gathering event, the F2P team has assembled a set of local, regional, and national solutions as a starting point for the Dairy Development Working Group.

LOCAL SOLUTIONS

🍎 Expand the Number of Active Dairy Management Teams

Dairy Management Teams have been around for years, but the concept was formally launched in October 2007 as a facilitation service for Vermont dairy farmers. As Tony Kitsos, Farm Management Educator at UVM Extension, explains, the Dairy Management Team concept is not “open a suitcase and experts jump out of it.” Rather, dairy farmers are encouraged to select 5 to 8 advisors that are invested in the success of their farm, including family members, animal nutritionists, veterinarians, accountants, bankers, agronomists, feed dealers, and other experts. Staff from UVM Extension, the Farm Viability Program, VtSBDC, and VAAFM help these Dairy Management Teams by arranging for a skilled facilitator that keeps each team functioning at a high level.⁵⁹

Dairy Management Teams are encouraged to commit to the following:

- 🍎 Focusing on single issues in the advising session, instead of developing a general business or marketing plan.
- 🍎 Taking a team approach, which allows advisors to discuss and debate solutions from their multiple perspectives.
- 🍎 Using a facilitator to manage the conversation.

Dairy farms participating in the program must be willing to do the following:

- 🍎 Share herd and basic financial information (e.g., balance sheet, financial ratios) with the team.
- 🍎 Maintain a formal record keeping system for the herd (e.g., milk, reproduction, mastitis, replacements).
- 🍎 Consider implementing the advice of the team.
- 🍎 Participate in the program for one year, including a minimum of six meetings.
- 🍎 Complete an assessment for the farm at the beginning of the program, six months into the program, and at the end of the program.⁶⁰

Over 40 dairy farms of all sizes and production methods (e.g., conventional and organic) have participated in the program to date. Dairy Management Teams work to improve production and profitability, reduce dairy production expenses (e.g., livestock feed and energy), facilitate transitions (e.g., farm transfers, organic milk certification, and farmland conservation), encourage diversification (e.g., raising heifers as replacements), and solve nutrient management issues. Advisors encourage their clients to use monitoring tools to measure success (e.g., income over feed costs), but also help dairy farmers put together plans to work through the down times. All information shared with Dairy Management Team members is kept confidential.

Dennis Kauppila, a UVM Extension Farm Business Management Specialist, described the benefits of the program: “All the farmer’s usual advisors get together at the same time in the same place for a discussion led by a trained facilitator about the issues important to that particular farmer. They are all hearing the same information at the same time and the collective thinking of the group delivers solutions and advice that would likely not otherwise be generated. The teams have been very successful.”⁶¹

Expanding the number of active Dairy Management Teams that exist in the state and including a larger number of farms, advisors, participating organizations, topics, and facilitators was widely viewed by dairy industry stakeholders as a key tool for helping dairy farmers maintain more stable and viable business operations.

— Reduce Dairy Production Expenses

Vermont farms that produced milk and dairy cattle had 72% (\$397 million, adjusted for inflation to 2010 dollars) of total Vermont farm production expenses in 2007, as well as the following:

- 🍷 89% of feed purchased
- 🍷 77% of fertilizer, lime, and soil conditioners purchased
- 🍷 71% of utilities (i.e., electricity) purchased
- 🍷 64% of liquid fuel purchased
- 🍷 64% of chemicals purchased

See *Chapter 3, Section 2: Farm Inputs* for more information on farm production expenses.

Livestock Feed

Feed for dairy cows and other livestock is the largest production expense for Vermont farmers, and crops grown for animal feed represent the largest category of crop production in the state. Animal feed purchases in Vermont take place in the context of short- and long-term domestic and international trends that are increasing the prices of food commodities. Vermont farmers have very little control over these trends. For example, when high feed prices intersect with low milk prices, as they have in recent years, the impacts ripple through Vermont's food system, affecting dairy farmers and the support organizations (e.g., feed dealers) that depend on the success of Vermont's dairy industry. **However, Vermont farmers *can* manage the production and storage of *high quality forage* and *grains* to minimize feed expenses.** Including VPN, VGFA, or other organizations with related expertise on Dairy Management Teams can increase the quantity and quality of resources available to farmers to reduce feed expenses and increase profitability.

Increased Local and Regional Grain Production: Although the 20-year trend in the total inventory of Vermont livestock and cropland devoted to growing animal feed is down, **many of the livestock producers, distributors, and retail outlets interviewed during the F2P process identified a strong and growing local and regional demand for Vermont produced meat.** Local and regional markets for Vermont-produced meat may provide an important option for diversification on dairy



Cows grazing fresh spring grass.

PHOTO CREDIT: Lindsay Harris

farms because dairy farmland, equipment, and buildings are more easily adapted to other forms of animal-based production. **As one way to reduce their dependency on imported animal feed and pursue local and regional premiums for organic meat, milk, or grains, Vermont dairy and livestock farmers could investigate and expand organic grain production.**

Increased Local Grazing: Encouraging *grazing* on well-managed pasture could also reduce feed costs for Vermont's small and medium dairy and livestock farms while opening up new opportunities for premiums on grass-fed meat and milk.⁶²

Improved Forage Management: Finally, the majority of dairy animals and livestock in Vermont are raised in housing, and many of these animals are fed stored grains and forages year round. Many Vermont farms grow conventional corn and forage for animal feed, and a growing number are producing organic corn and forage, but Vermont farms also lose a significant portion of their stored feed to unnecessary spoilage. **Management of stored forages to avoid losses (e.g., as a result of poorly managed silage in bunks, deterioration of baled hay left in fields,**

spoilage resulting in mycotoxins⁶³) offers major opportunities for feed preservation, reduced feed production costs, and a better quality of feed, thus reducing the cost to produce milk and meat.

See Chapter 3, Section 2, *Farm Inputs: Animal Feed*, for more information.

Energy Efficiency and Renewable Energy Production

The amount of money Vermont farmers spent on fuel increased 83% from \$18.7 million in 1997 to \$34.3 million in 2007, even though less fuel was purchased in 2007. Vermont dairy farms spent nearly \$22 million (64% of total farm expenses for fuel) on liquid fuel in 2007. Between 1984 and 2009, total Vermont annual on-farm diesel consumption fluctuated quite a bit, from a high of 8.2 million gallons in 1992 to a low of 3.1 million gallons in 1984. The annual average over that period was 6,074,462 gallons of diesel fuel. Data about on-farm electricity and thermal energy consumption are not readily available.

On-farm energy efficiency and renewable energy production can offer multiple cost savings and revenue streams for dairy farms, including the generation and sale of renewable electricity, the production of renewable liquid fuel, the sale of renewable energy credits, reductions in electricity costs, the displacement of bedding costs, the sale of solids, and the displacement of water heating costs for the milking parlor (through using waste heat).

Additionally, the returns from renewable energy production are not directly connected to milk prices and therefore can counterbalance the volatility of that market. **The addition of energy efficiency and/or renewable energy experts to the pool of Dairy Management Team members can facilitate an understanding of the range of feedstocks, technology systems, and financing arrangements possible for increased on-farm energy efficiency and renewable energy development.**

On-farm energy production has blossomed in Vermont in a number of forms: from oilseed crop (e.g., sunflower) production to make biodiesel as a petrodiesel replacement, to solar photovoltaic panels and wind turbines to generate electricity, or pellet stoves to heat greenhouses. Vermont dairy farms generate a feedstock—cow manure—that can also be used to generate electricity, heat, and other valuable co-products through anaerobic digestion.

Facilitate Transitions

Organic Milk Certification

Organic milk has increased in popularity among producers and consumers.⁶⁴ Organic milk sidesteps the lack of distinction that customers make in the taste of milk by offering a different set of criteria (i.e., organic production methods) to draw a premium price in the marketplace. According to the [Northeast Organic Dairy Producers Alliance](#) (NODPA), the price gap between organic milk and conventional milk has been over \$2 since October 2008.⁶⁵

The USDA conducted its first major census of organic agriculture in 2008 and estimated that organic milk production equaled 1.45% of total national fluid milk production. The top five organic milk-producing states—California, Wisconsin, Texas, Oregon, and New York—account for nearly 58% of national production and 47% of organic dairy farms (Table 3.3.11). The comparatively small number of organic farms in Western states coupled with their large production volumes is indicative of a national trend toward larger dairy farms and regional concentration in organic production.⁶⁶

The USDA Agricultural Marketing Service indicates that organic milk production grew over 70% from 2006 to 2010, while total fluid milk production decreased 1% during the same time period. From 2006 to 2010, organic milk production increased from 1.9% of total fluid milk products to 3.3%.⁶⁷ Except for a dip in 2009, organic milk sales grew by over 10% per year from 2006 to 2010.

Vermont ranked sixth in organic milk production and fourth in the number of organic dairy farms in 2008. Over 6% of fluid milk produced in Vermont in 2008 was organic, even though organic dairy farms made up 20% of all dairy farms. Most organic dairy farms in Vermont are small: The average herd size is about 63 cows.⁶⁸ From 1997 to 2010 the number of organic dairy farms in Vermont increased 480%, from 35 farms to 203 farms (equal to 20% of all dairy farms in Vermont).

About 65% (129 farms) of Vermont's organic cow milk is processed by *Organic Valley Cooperative* (based out of Wisconsin) and about 35% (69 farms) is processed by *Horizon* (owned by *Dean Foods*). Five other dairy farms are certified organic: *Strafford Organic Creamery* and *Butterworks Farm* process their own organic milk, another farm

sells its organic milk as conventional milk to *Cabot Creamery Cooperative*, one of the farms sells raw milk, and one farm is a goat dairy. No processing of pooled organic milk is done in Vermont.

Organic milk production, processing, and distribution differs from conventional milk in several notable respects. For example, a multiyear study of Vermont and Maine organic dairy farms found that revenue from organic dairy farms and conventional farms were similar in 2004 and 2005, but revenue from organic dairy farms was 36% higher than that from conventional dairy farms in 2006. The researchers found that although organic dairy farmers produce 30% less milk per cow than their nonorganic counterparts, they earn a similar or higher amount of revenue from each cow because of higher organic milk prices. Organic dairy farms tended to get most of their income from milk sales, whereas conventional dairy farms received a higher concentration of their income from crop and livestock sales. The researchers indicated that it is difficult to delineate which system

Table 3.3.11: Top Organic Dairy Producing States, 2008

State	Number of Farms	Quantity (lbs)
California	92	501,814,954
Wisconsin	479	328,948,355
Texas	9	284,153,648
Oregon	50	261,106,791
New York	316	211,526,128
Vermont	179	156,006,369
Pennsylvania	225	150,677,325
Washington	41	136,419,180
Idaho	20	122,076,294
Minnesota	109	93,100,000
New Mexico	7	81,134,065
Ohio	127	79,033,425
Maine	61	47,054,889
Iowa	82	43,868,829
Indiana	55	32,518,012
Maryland	11	19,173,267
Michigan	42	18,150,933
North Carolina	9	11,149,596
Illinois	10	9,330,135
Total	1,924	2,587,242,195

80 farms from several states accounted for another 169,849,426 pounds. USDA National Agricultural Statistics Service <http://quickstats.nass.usda.gov/results/16D2E7AD-0365-336A-9B06-70D3985A9408>

is more expensive, but conventional dairy farmers spend more on fuel, chemicals, and marketing, as well as medicine, veterinary bills, and breeding services.⁶⁹

In 2005, *SJH & Company* (now *HighQuest Partners*) conducted a market assessment of organic/grass-fed dairy and meat products from Vermont for VAAFM and the Vermont Department of Economic Development. The consultant surveyed dairy producers and buyers throughout New England and found that the benefits of a regional demand for organic milk, higher milk prices and price stability, personal satisfaction, environmental stewardship, and herd health outweighed the costs (e.g., transitioning from conventional to organic dairy production can be expensive).⁷⁰

Unlike the cooperatives that manage conventional milk, the organic industry has historically used supply management systems. These systems produce a stable price and maintain that price above the average cost of production. When supply gets too high, producers are required to cut back by a certain percentage. For example, in 2009—for the first time in 25 years—sales of organic milk went down and organic dairy farmers reduced milk production. As the market rebounded in 2011, *Organic Valley* and *Horizon* have both lifted production restrictions and farmers are allowed to produce as much milk as they want.⁷¹ John Cleary, New England Dairy Pool Coordinator for *Organic Valley*, indicates that it is much easier for organic dairy cooperatives to manage production because the industry continues to grow.⁷²

In contrast to *Agri-mark* and *St. Albans Cooperative*, the organic cooperatives in Vermont own very little infrastructure. For example, *Organic Valley* credits much of its early success to contracting out the key parts of its processing and distribution systems rather than sinking money into bricks and mortar and performing these supply chain functions itself. Today, *Organic Valley* owns only one processing facility. It operates its own distribution center in the Upper Midwest and may build additional distribution centers in the East and West. Its distribution capacity is also available to smaller organic food enterprises across the country.

The standard arrangement followed by *Organic Valley* is to have milk processed on contract with dairy manufacturing plants located close to the regionally organized milk pools. *Organic Valley* prefers working with family-owned independent processors when possible. It also contracts for the transportation of both its raw milk and finished products. *Organic Valley* owns some trucks, but the bulk of its milk hauling is done by



Organic Valley member Tyler Webb at Stony Pond Farm in Fairfield.

independent trucking companies, many of which are smaller, family-owned firms.⁷³ In Vermont, *Organic Valley* also partners with local cooperatives for certain tasks, such as milk testing and bacteria counts.

Despite these differences, organic dairy producers are as susceptible to rising energy and organic feed costs as conventional dairy farmers. The *New York Times* recently reported that there is an organic milk shortage in the United States, particularly on the East Coast, due to high production expenses.⁷⁴ Although milk supplies are always lower in January and February, John Cleary indicated that the industry needs to expand the amount of organic acreage to address feed costs. Three years ago, *Organic Valley* created a category of membership for grain producers and tried to develop long term stable prices and stable contracts. The program has been somewhat successful in that *Organic Valley* does have growers that have signed long term contracts, but they do not have enough to feed all of their member's cows. After the lower priced grains from co-op members are used up *Organic Valley* has to buy feed off the spot market to fill the gap. *Organic Valley* members in Maine recently bought a former *Blue Seal* mill,

which gives the cooperative a better ability to contract and process grain at reasonable prices, but it may be several more years before the supply of organic feed in the region is adequate.

Organic dairy farming may make sense for conventional dairy farms, says John Cleary, particularly for the 78% of conventional dairy farms in Vermont that are small and that have the acreage to graze their cows. *Vermont Organic Farmers, LLC* (VOF), the organic certification branch of *NOFA Vermont*, provides a set of *guidelines*, technical assistance, and resources covering such topics as field buffer requirements, purchasing a herd, and feed policy for farmers considering transitioning to organic production. For example, for a field to be considered organic, three years need to have passed since the application of pesticides, herbicides, or synthetic fertilizers. **Adding organic certification professionals to the pool of Dairy Management Team members can improve dairy farmer access to certification information.**

Preserve Farmland

As dairy farms go out of business, the land can be permanently lost from farming. A wide variety of land conservation programs, including conservation easements, cooperative land management arrangements, and matchmaking services, provide opportunities to reduce the loss of farmland. F2P focus group participants noted that confusion still exists about how easements work, and that farmers need more technical assistance on this issue. Additionally, there is a need for more financial and technical assistance tools to help with farm transfers, farmland access, farmland conservation, and affordability.

The *Vermont Land Trust* (VLT), *Vermont Housing and Conservation Board* (VHCB), *UVM Center for Sustainable Agriculture's* Land Access Program, and other land conservation organizations should be involved with Dairy Management Teams to encourage and facilitate contact with farmland protection organizations when dairy farmers are considering expansion, closure, transfer, or transition plans. Additionally, land conservation organizations should encourage and help lending institutions and rental agents advertise widely before dairy farms are transferred or sold so that other farmers or conservation organizations can consider acquiring the land. See *Chapter 3, Section 2: Land Access and Availability* for more information.

— Encourage Diversification

As indicated in earlier, dairy farming is the only kind of farming in Vermont in which the majority of operators generated most of their household income from farming. However, Figures 3.3.10 through 3.3.12 demonstrate that the prices that conventional dairy farmers receive for their products are declining and volatile. Dairy product diversification is an avenue that a small number of Vermont farmers have pursued to realize higher prices for their products. But diversification is not necessarily a straightforward solution. On one hand, the value-added processors operate on vastly different scales. The majority of the value-added processors are artisan or farmstead cheese makers, along with a few ice cream and cultured product manufacturers. These processors handle small volumes of milk but can essentially name their price in the marketplace. On the other hand, Vermont also has a few large processors of value-added products (e.g., *Cabot Cheese*, *Ben & Jerry's Ice Cream*, *Swan Valley*, *Commonwealth Dairy*) that take large volumes of Vermont (and regional) milk but offer Class II, III, or IV prices, which can at times be well below the farmer's cost of production.

Depending on the product, diversification can require farmers to invest in equipment, new buildings, learning new skills, managing a much more complex overall farm business, finding and funding additional labor, complying with new regulations, marketing, and sometimes new delivery systems. There is risk involved with these investments. Some changes (e.g., moving from commodity milk production to farmstead cheese making) drastically reduce the amount of milk required and leave excess land, equipment, and buildings on the farm. From a policy perspective, helping dairy farmers transition to more diversified production requires technical assistance in choosing which product and services to pursue, setting up the equipment and labor for the new business, learning technical skills for this business, and building a funding package to support a new enterprise. **Consequently, the expansion of Dairy Management Teams should also include experts and organizations familiar with on- and off-farm processing and diversification issues.**

Cheese Making and Value Added Processing

However, the high retail prices that these specialty cheeses command should provide the incentive for at least a study of the manufacture of specialty cheeses. More milk for cheese making could be produced and processed in Vermont by both dairy and goat milk producers if profitable markets could be developed to justify increased production. At the present time, goat's milk producers, like cow's milk producers, can get more money for their milk as fluid milk than if they convert the milk to cheese.⁷⁵

In contrast to fluid milk processing, over 87% of the cheese made from Vermont milk was processed in-state in 2007. Over the past 15 years, Vermont has earned a reputation for producing high-quality artisan cheese (i.e., cheese made in small batches) and farmstead cheese (i.e., cheese made by the farmers who raised the animal), garnering consistent first-place finishes from the [American Cheese Society's](#) annual competition. Although some regions of the world have benefited from centuries of serious artisan cheese making, Vermont's modern cheese revival is quite recent. Only a handful of cheese-making facilities existed in Vermont in 1995, but with the development and support of the [Vermont Cheese Council](#), that number grew to 44 by 2011, including Vermont's largest premium cheese producer, *Cabot Cheese*, and other notable producers such as [Grafton Village Cheese Company](#), *Vermont Butter & Cheese Company*, [Champlain Valley Creamery](#), *Franklin Foods*, and [Crowley Cheese](#). Vermont's farmstead cheese makers use cow's milk, goat's milk, and sheep's milk to produce over 150 varieties of cheese.

A 2006 report on Vermont's farmstead cheese industry declared that farmstead cheese represented Vermont's entrance into the slow food movement of handcrafted foods that are commanding the "attention and pocketbooks" of consumers worldwide. The report indicated an average retail price of \$14.70 per pound, with some cheeses going for \$25 per pound.⁷⁶ In contrast, prices for Class I fluid milk in the Northeast ranged from a low of \$14.97 in 2009 (year average, adjusted for inflation to 2010 dollars) to a high of \$22.49 in 2007 (year average, adjusted for inflation to 2010 dollars) for every 100 pounds of milk.

Every farm has a unique approach to developing a farmstead cheese-making business. However, there are some common characteristics of this value-added business opportunity.



Jasper Hill cheese cave.

Starting a farmstead cheese-making operation, or transitioning from other forms of dairy to cheese making, requires an investment in equipment and training in how to make a high-quality cheese product. Vermonters have sought this training through universities and apprenticeships at home and abroad, and more recently from the [Vermont Institute for Artisan Cheese](#) (VIAC). VIAC is a center for scientific research and training in artisan cheese making and has been housed at the University of Vermont since 2004. The 2006 Vermont Dairy Task Force surveyed on-farm dairy processors about their preferred source of processing assistance and found that they looked to VAAFM and VIAC for their technical assistance needs. The new [Vermont Food Venture Center](#) in Hardwick will offer additional facilities for new cheese makers in a long-term tenancy agreement with the [Cellars at Jasper Hill](#).

One advantage of farmstead cheese making is the ability to create a unique product in a highly differentiated marketplace. The difference between cheese characteristics can translate into price differences of as much as \$17.50 per pound.⁷⁷ Crafting a cheese

from milk production through to final sales allows a cheese maker to carefully shape the character of each product line so that it will stand out from its competitors. It takes years for a producer to develop the skills, product recipes, and techniques to achieve not only the desired taste but also consistency in that taste from batch to batch.

A new twist in maintaining the consistent character of a particular variety of cheese has emerged in recent years. As Vermont's farmstead and artisan cheeses have become more popular and entered more markets nationwide, the volume of cheese needed to adequately serve larger markets far exceeds this handcrafted capacity. The question for producers is whether, and how, to expand their cheese lines without losing the premium quality that created demand in the first place. A solution that has worked in the past for other niche products is for a group of small farmers to work collectively. However, a cheese's taste can respond to changes in everything from the type of soil the herd's grass is growing on, to the bacteria naturally present in any given cheese cave. Thus, two farms using exactly the same recipe will not necessarily produce the same product. Scaling up volume for a premium marketplace in a way that creates inconsistency in the product can quickly hurt Vermont's cheese-making reputation and, by extension, its marketability. Several efforts (e.g., the *Cellars at Jasper Hill*, research at UVM, and the [Taste of Place](#) initiative at VAAFM) have been looking at models developed in Europe and Quebec to learn techniques for producing identical cheeses sourced from multiple farms.

One of the principal reasons for cheese makers to go to the trouble of reaching out-of-state consumer markets is to avoid saturating the in-state market. Each cheese needs to command a premium price to generate a profit, and the segment of buyers willing to pay that price on any given day is small. Even if local demand for artisan cheese grows, it may not grow quickly enough to use all the local cheese being produced. Larger concentrations of consumers, especially those who are used to paying gourmet prices for premium-quality foods, offer an outlet for cheese that won't be consumed in Vermont. Within the regional market, these cheeses can also benefit from a "local" label, as retailers in Boston and New York City regularly classify Vermont as local. Farmstead cheese makers need to constantly cultivate new high-end markets, which requires a particular skill set and leaves each operation vulnerable to economic downturns; however, it can also lead to higher profits.

Farmstead cheese demonstrates a successful, vertically integrated business model for Vermont agriculture. These cheeses promote Vermont's food brand reputation nationally. They transform milk from a commodity competing in a marketplace defined by homogeneity and low prices into a specialty food in a marketplace defined by uniqueness and premium prices. However, entering this marketplace requires a significant investment in training, patience for product development of a slow-aging food, a skill set that ranges from milking to aging to marketing, and the ability to ride out economic downturns.

See *Chapter 3, Section 4: Food Processing and Manufacturing* for more information.

Beef Cattle and Veal Production

In contrast to the small number of dairy farms that process their fluid milk in to value-added products, nearly every Vermont dairy farm sold cattle and calves as replacement animals or for meat.⁷⁸ Dairy farmers typically cull cows from their herd as they age, due to an inability to reproduce, when they no longer produce a sufficient quantity or quality of milk to be kept as a milk cow, or when economic downturns require a reduction in the size of their herd. These culled cows are often sent to slaughter for use as “dairy beef.” According to a recent article, upwards of 40,000 Vermont dairy cows are culled each year. Most of these cows are sent to Pennsylvania for slaughter and processing.⁷⁹ Many dairy farmers would prefer to use a local option to minimize travel costs, earn a greater return, and lessen the travel stress on the animals. And consumer interest in source-verified, organic and/or grass-fed meat produced using specific standards creates a significant advantage for Vermont livestock farms.⁸⁰

Dairy beef is one local meat option that can compete in low-priced markets such as institutional cafeterias. Because many processors blend cattle beef and dairy beef together, the term ground beef is commonly used. Dairy beef is mostly processed and sold as ground beef at lower prices to markets seeking large quantities or to larger institutions. In 2006, the *Vermont Farm Viability Program* hired consultant [Rose Wilson](#) to conduct a study exploring the use of Vermont dairy beef cows as ground beef in Vermont schools and other institutions. Wilson found that Vermont-sourced ground beef would need to be priced very closely to ground beef available from other sources (however, Wilson does report a potential for Vermont meat products to command a premium above commodity pricing for ground beef) and that no one-size-fits-all pre-

Choiniere Family Farm

When the economy lagged in 2010 and *Organic Valley* told its dairy farmers to cut production by 7%, Guy Choiniere could have dumped his excess milk down the drain or culled a few of his 65 cows.

Instead, the Highgate dairy farmer decided to try something new: feeding the excess milk to half a dozen bull calves. The idea was to turn those calves into veal—not the white-meat kind, raised in extreme confinement in crates, but the pink, or rosy, kind, known to many consumers as humanely raised veal.

Choiniere took six bull calves born on his farm and put them out on pasture with their mothers. The calves happily drank from their moms for up to six months, reaching between 250 and 350 pounds hanging weight. Then they were turned into cuts of pink veal that were eagerly snapped up by locals.

“I really didn’t want to market it myself,” Choiniere says. So he joined with dairy farmer Tyler Webb (who also raises veal) to have Webb sell the meat for him, but eventually Choiniere got a license to sell his veal off his farm.

Getting a good price for the meat meant that Choiniere made as much money on the 7% of excess milk as he would have made by shipping it to *Organic Valley*. He could maintain the premium he’d been getting on his milk since transitioning to organic production four years before.

A year later, in 2011, *Organic Valley* lifted its request for farmers to limit production, but Choiniere decided to keep raising veal. Instead of putting bull calves on their mothers, he now puts them out with retirement cows that aren’t able to walk to the far pastures.

Choiniere says the diversification is good for his farm, for local consumers, and for the animals. “We all know what calves look like in those little confinement crates,” Choiniere says. “Mine are living a very happy life. There’s no comparison in the quality of life between the two. And the taste is better, and I’d imagine it’s better for you, too.”



Guy Choiniere and friends.

made ground beef size exists (i.e., restaurants, fast-food outlets, institutions, and stores all had different requirements). Wilson also found that many restaurants, fast-food outlets, distributors, food service companies (e.g., Sodexo), and country stores were interested in stocking Vermont meat.⁸¹

In 2009, the Vermont legislature passed [Act 51](#) to explore the feasibility of increasing local beef and milk in schools, where large amounts of ground beef are consumed. VAAFM allocated \$25,000 to do a full regional market analysis of the institutional demand for ground beef. Additional funding was leveraged from each of the New England states to increase overall budget of this research initiative. Results from the analysis indicate that there are opportunities for growth in the use of local beef in institutional markets in all six New England States, particularly for raw, bulk ground beef, with no additional processing (e.g., pasteurizing, cooking, spicing, shaping, or scoring) required.⁸² The authors found that hospitals, higher education institutions, and private establishments tended to have more autonomy and higher price thresholds for local meat purchases, while buyers with more constraints tended to be K-12 schools, food service management companies, and the distributors that serve them. Producers, processors, and distributors interviewed for the study faced different barriers and described different motivations for accessing institutional markets. For example, many of the producers interviewed want local meat to be sold at institutions, but many also feel that the value proposition for engaging institutions is only marginally better or equivalent to markets they already access, hence, not worth the effort.

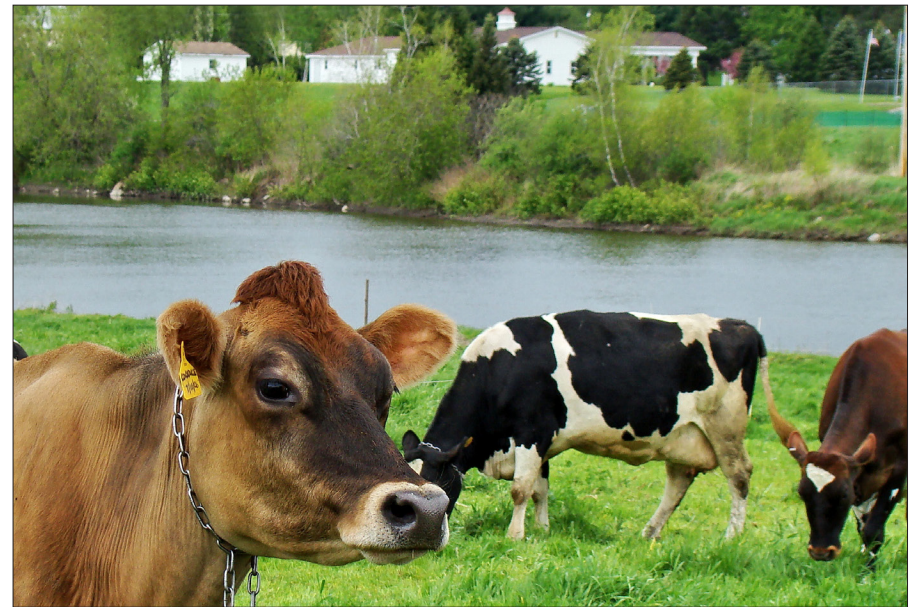
The authors recommend using VAAFM staff or a different organization to provide matchmaking/facilitation services for producers, processors, distributors, and institutions. **Widening the composition of Dairy Management Teams to include organizations knowledgeable about meat production and marketing (e.g., by including the F2P Network Meat Processing Task Force) could fulfill this recommendation.**

See *Appendix E: Meeting the Demand* for more information.

— Solve Nutrient Management Issues

According to the [U.S. Geological Survey](#), widespread application of artificial nutrients—nitrate, ammonia, total nitrogen, orthophosphate, and total phosphorus—and livestock manure has polluted more than 90% of 190 sampled streams draining agriculture and urban watersheds in the United States. High levels of phosphorus or nitrogen can lead to algal blooms and accelerated plant growth that depletes available oxygen, squeezes out fish and other aquatic species, and can pose a risk to human health (the [dead zone](#) in the Gulf of Mexico, which can cover between 6,000 to 7,000 square miles, is the poster child for excess nutrient runoff).⁸³

The use of inorganic (i.e., fossil fuel or mineral based) fertilizers has increased dramatically in the United States. From 1960 to 2008, total fertilizer use increased about 188%, the use of nitrogen increased 359%, the use of phosphates increased 65%, and the use of potash (i.e., potassium-based) fertilizers increased 116%. Corn is the largest U.S. crop, and corn appears to receive the most fertilizer of any crop in the United States, with over 95% of the corn planted in the country receiving nitrogen, over 80% receiving phosphate, and over 60% receiving potash in 2008.⁸⁴



Cows grazing along the Missisquoi River in Enosburg, Vermont.

PHOTO CREDIT: Martha Macy

Vermont dairy farmers grow animal feed in addition to importing it: in 2007, Vermont dairy farmers accounted for about 60% of Vermont's total cropland, 66% of harvested cropland. Corn for grain (5,368 acres) and silage (87,403 acres) made up 18% of total cropland in Vermont in 2007, the largest amount of any field crop after all types of hay. Vermont dairy farmers accounted for 77% of fertilizer, lime, and soil conditioners purchased in 2007, and operated 77% of all agricultural acres treated with commercial fertilizers, lime, and soil amendments.⁸⁵

In addition, following the methodology described by Jeffrey E. Fehrs in the [Vermont Methane Pilot Project Resource Assessment](#) (2000), F2P researchers estimate that Vermont livestock produced about 4.3 million tons of manure in 2007.⁸⁶ Not all of the manure generated can be "captured", since some livestock spend a significant amount of time outside. We estimate that 3.1 million tons of manure are "available" for spreading, composting, or as a feedstock in anaerobic digesters, and that dairy cows generate about 99% (3 million tons) of this available manure. Animal manure is commonly integrated into the nutrient cycle of Vermont's farms (e.g., through spreading on corn fields), and dairy farms operated 83% of all acres treated with manure in 2007. This manure is applied according to nutrient management plans (NMPs), which are required for [Medium Farm Operations](#) (dairies with 200-699 mature animals) and [Large Farm Operations](#) (dairies with more than 700 mature animals) in Vermont. NMPs cover about 14% of dairy farms in Vermont, which manage about 54% of the total number of dairy cows in the state.

The [Lake Champlain Basin Program](#) (LCBP), a multi-agency, multi-state (and Quebec) effort to protect Lake Champlain, monitors pollution levels from wastewater treatment plants and nonpoint sources. The LCBP reports that the 96 wastewater treatment facilities (60 of which are in Vermont) in the Lake Champlain Basin account for 10% of the phosphorus entering the lake. The remaining 90% is generated from nonpoint sources: Urban and suburban development (e.g., increased impervious surfaces, pet waste, and over-fertilizing of lawns and gardens) accounts for 46% of total nonpoint phosphorus pollution, the largest source of phosphorus inputs to Lake Champlain.

Agricultural activities (e.g., soil erosion, manure and fertilizer runoff, livestock access to waterways) account for an estimated 38% of total nonpoint phosphorus pollution.⁸⁷

LCBP has measured considerable variation in phosphorus levels and pollution sources in various sections of the lake. For example, northern sections (Missisquoi Bay, St. Albans Bay) and southern sections of Lake Champlain were eutrophic (i.e., excessive algae growth and low water visibility) and exceeded water quality criteria every year from 1990 to 2003. Most of the rest of the lake was mesotrophic (i.e., moderate algae growth and water visibility), while only Mallets Bay was considered oligotrophic (i.e., low algae growth and high water visibility) from 1990 to 2003. According to LCBP, agricultural activities are responsible for a majority of phosphorus runoff into Missisquoi Bay, a portion of the southern lake, and around Isle La Motte, while the urban and suburban landscape is responsible for the majority of phosphorus runoff for every other section of the lake.⁸⁸

The health of Lake Champlain and Vermont's other water bodies is a major concern, and Vermont's food system participants need to do their part to reduce water pollution. The EPA's recent rejection⁸⁹ of Vermont's 2002 water quality plan on the grounds that its levels for phosphorus reduction do not satisfy the Clean Water Act opens the door to improvements in technical assistance programs, financing strategies, and regulations. The Clean Water Act requires that states develop a [Total Maximum Daily Load](#) (TMDL) plan for water bodies not meeting federal standards. The [Agency of Natural Resources](#) (ANR) has already prepared a revised implementation plan for phosphorus TMDL that includes recommendations for expansions of technical assistance programs, new positions at VAAFM and UVM Extension, as well as financial incentives.⁹⁰ Many other recommendations for addressing this issue have been made, including improving cover cropping and crop rotation practices, preventing soil erosion, expanding strip till or no-till cultivation, increasing composting, transitioning to organic production, and doing a better job of recycling nutrients. Vermont's dairy farmers also need to address their dependency on animal feed sources grown with fertilizers that are ultimately derived from nonrenewable feedstocks and that have been implicated in water pollution.

VAAFM, in cooperation with ANR, regulates agricultural practices and their impacts on water quality. This role consists of setting standards, providing financial and technical support to assist farms in complying with standards, and conducting enforcement action when necessary. When enforcement is needed, VAAFM takes action according to the authorities vested by state statute. If the violation results in a direct discharge,

VAAFM collaborates with ANR as outlined in a memorandum of understanding between the two agencies. The current versions of [Vermont agricultural water quality laws](#) can be viewed online. VAAFM organizes and implements [at least 10 programs](#) to reduce food system pollution:

- 👉 [Accepted Agricultural Practices regulations](#) set baseline practices that all farms in Vermont must comply with (e.g., setbacks around surface water and wells, manure management). VAAFM reports that the majority of complaints received are related to manure, although the number of violations identified by on-farm investigations has remained pretty low (about 20 a year), while the number of investigations has increased.
- 👉 The [Best Management Practices Program](#) provides farmers with technical assistance, including engineering assistance, for constructing manure storage facilities, fencing, and leachate treatment systems. The USDA Natural Resources Conservation Service's [Environmental Quality Incentives Program](#) (EQIP) provides federal funding for Best Management Practices infrastructure.
- 👉 The [Conservation Reserve Enhancement Program](#) (CREP) provides funding and technical assistance to encourage farmers to install conservation buffers around streambanks to trap sediment, pesticides, and fertilizers in runoff.
- 👉 The [Alternative Manure Management Program](#), a joint effort of VAAFM and the NRCS office, provides funding and technical assistance for projects that propose alternative technologies for managing on-farm animal manure including anaerobic digester projects. Vermont ranks fourth in the nation for installed digesters.
- 👉 The [Large Farm Operations Program](#) (LFO) requires farms with more than 700 dairy cows, 1,000 beef cattle or cow/calf pairs, 1,000 youngstock or heifers, 500 horses, 55,000 turkeys, or 82,000 laying hens to have structures in place for manure management and nutrient management plans for dealing with this manure. Each LFO must receive a permit from VAAFM, and LFO regulations are stronger than Medium Farm Operation regulations. In addition to water quality protection measures, the permits for LFOs also establish standards for noise, odor, flies, traffic, and insects and other pests. Because these state regulations meet or exceed federal regulations, LFOs need only acquire the state permit. To date, VAAFM staff has visited all 20 LFOs in the state for compliance.
- 👉 The [Medium Farm Operations Program](#) (MFO) requires farms with 200-699 mature dairy cows, 300-999 cattle or cow/calf pairs, 300-999 youngstock or heifers, 150-499 horses, 16,500-54,999 turkeys, and 25,000-81,999 laying hens to have structures in place for manure management and nutrient management plans for dealing with this manure. At least 152 farms in Vermont qualify as MFOs, and very few notices of alleged violations and corrective action letters have been issued to date.
- 👉 The [Nutrient Management Plan Incentive Grants](#) (NMPIG) provide financial and technical assistance for nutrient management plan development and implementation (up to \$14,000). All MFOs and LFOs are required to have a nutrient management plan. Since 2005, VAAFM has provided at least 239 grants so far, covering more than 137,000 acres statewide. An approved nutrient management plan includes, but is not limited to, soil testing, appropriate field application rates of nitrogen and phosphorus, setbacks from water resources, and erosion loss requirements.
- 👉 The [Farm Agronomic Practices Program](#) (FAP) provides financial and technical assistance for soil conservation practices, such as cover cropping and crop rotation.
- 👉 The [Vermont Agricultural Buffer Program](#) takes CREP one step further to allow for harvestable grasses to be used as buffers around croplands.
- 👉 The [Pesticide and Groundwater Monitoring Program](#) takes samples from wells on farms and tests for contamination from pesticides. VAAFM reports that elevated nitrate levels at sampled wells are decreasing statewide.

In addition, the [Ecosystem Restoration Program](#) (formerly the Center for Clean and Clear at the Agency of Natural Resources) is a major initiative to reduce pollution in Lake Champlain and Vermont's water bodies. The [Vermont Natural Resources Conservation Service](#) (NRCS) office provides a wide range of technical assistance, education, and financing programs for manure management and soil conservation activities. The [Vermont Association of Conservation Districts](#), representing 14 NRCS

Districts, also provides technical assistance and education to farmers and landowners, including the Agricultural Resource Specialist Program, which provides technical assistance for manure management and water quality management.

Vermont has at least one nonprofit organization that works with dairy farmers to address environmental issues. The [Franklin and Grand Isle Farmer's Watershed](#) (FWA) was established to support farmers in improving farm practices to minimize runoff from farm fields adjacent to the Missisquoi watershed. The organization provides farm assessments to help farmers develop water quality protection plans. With NRCS assistance, FWA purchased six soil aerator tools to be used by area farmers to maximize the amount of rainfall moving vertically into the soil, minimizing horizontal water runoff and erosion.

According to Roger Rainville, chair of the FWA board,

The FWA bought six machines and aerated 13,000 acres [in 2009]. Our goal was to show farmers that if you aerate your land before applying liquid manure, you can significantly reduce the potential for surface runoff. It did, and many other benefits were noticed also, such as better utilization of nitrogen. It goes in the soil and does not all volatilize into the air. The aerator breaks up compaction and loosens the top eight inches of the soil for better water absorption. Many farmers saw up to a 100% crop yield increase. The aerators are being used for a \$2.00-per-acre fee by farmers. There are two machines in Addison County that are administered by the Conservation District and three here in Franklin and Grand Isle and one in Orleans County that the FWA oversees. All six are the responsibility of FWA.

In 2000, Ben & Jerry's, the St. Albans Cooperative, UVM, and several feed dealers initiated the [Vermont Dairy Farm Sustainability Project](#) (VDFSP). VDFSP collected or measured baseline data (e.g., manure composition, soil quality, crop yields, manure and fertilizer application rates, feed intakes, forage quality, and milk production rates and quality) at eight dairy farms and then provided improved nutrient management plans to each farm. VDFSP found several common areas requiring improvement, including excess nutrient application on crops on many fields. Significant improvements were recorded during the second year of the project after the nutrient management plans had been activated.⁹¹ Ben & Jerry's has continued this initiative as the [Caring Dairy](#) program.

The VDFSP and FWA efforts demonstrated that multi-stakeholder collaboration and peer-to-peer learning can lead to significant nutrient management improvements. Using Dairy Management Teams as a vehicle for this kind of technical expertise and experience can likely yield similar results.

Increase Dairy Consumption by Public and Private Institutions

In some ways, Vermont milk is an ideal starting point for bringing more local foods to institutional purchasers, such as schools and colleges. Milk is one of the few Vermont food products sold primarily into a commodity market, making its price point much closer to what institutional buyers are used to paying. The current milk marketing system also has a consistent milk supply, which means that large-scale purchasers can be confident that volume will exist to fill their orders at any time of year. On the other hand, Vermont beverage milk typically goes through several steps off the farm before it reaches a retail location, which means that buyers can't easily make the kinds of direct connections to a farmer, or even a local distributor, typical of many local-food-to-local-institution arrangements. It also means that the farmers themselves can't actively market their own milk to institutions. Additionally, the all-local-milk brands available do not always have the type of packaging required by institutional purchasers.

Several Vermont dairy producers have had success selling to institutional buyers. Monument Farms, for example, has been [Middlebury College's](#) sole source of milk since 1950. The [Vermont Department of Corrections](#) recently ended its contract for Thomas Dairy fluid milk, because of budget constraints, but did pick up a contract with St. Albans Co-op for powdered milk. The University of Vermont (UVM) was one of the early partners of [Keep Local Farms](#), donating 10 cents from every single-serve milk purchase to support dairy farms in New England. [St. Michael's College](#) followed shortly afterward. Before the Keep Local Farms program, UVM had already started purchasing from seven Vermont cheese makers as part of the local foods purchasing initiative it started in 2005. [Fletcher Allen Health Care](#) began its own local foods purchasing initiative around the same time as part of signing the Healthy Food in Health Care Pledge. They purchase Vermont cheeses, [Stonyfield](#) yogurt, and local ice cream.

The most common approach to institutional purchasing is to use large agricultural businesses and distributors headquartered outside of our region. However, technical assistance does exist to help buyers who want to transition toward local dairy sourcing.

The [Vermont Fresh Network](#), which connects farmers and chefs in Vermont, has started to work more actively with institutional purchasers. Several Farm-to-School programs work with schools to source dairy along with other local products. The Local Foods Matchmaker event is an efficient way for institutions to explore local foods purchasing. Challenges will continue to include costs (particularly in places where premiums can't be passed on to customers, such as correctional facilities), whether the Vermont dairy products are packaged in the necessary form, in-state processing and distribution capacity, and whether producers are interested in targeting institutions. **Dairy Management Teams can play a crucial role as matchmakers, or facilitators, by connecting producers, processors, and distributors with institutional purchasers.**

— Explore Opportunities for Raw Milk

Raw milk is available in Vermont from one licensed dealer. Farmers are allowed to sell up to 20 quarts a day at their farms. The recent brucellosis epidemic has created some sentiment that the sale of raw milk should be prohibited. Doing this would deprive the consumer of the freedom choice he [sic] has in a case of other risk bearing consumer items.⁹²

Some farmers choose to sell their milk, or a percentage of their milk, without any processing as raw or farm fresh milk. [Rural Vermont](#), a farmer advocacy organization, has worked to develop public policies that support the sale of raw milk, including [Act 62](#), the "Unpasteurized (Raw) Milk Bill," a law enacted on July 1, 2009, to allow for increased sales of raw milk in Vermont. Rural Vermont views raw milk as a source of increased revenue for dairy farmers either impacted by low milk prices or seeking a more traditional direct sale operation. Act 62 created a tiered regulatory system that defined the quantity of raw milk that can be sold, where it can be sold, and specified standards for sanitation, animal health, and labeling.

For example, Tier 1 producers can sell up to 50 quarts (12.5 gallons) of milk per day from the farm, while Tier 2 producers can sell up to 40 gallons per day between on-farm sales and home delivery to prepaid customers. *Rural Vermont* reports that there are currently three registered Tier 2 producers. Many more farmers are interested in transitioning to Tier 2 production, but have cited VAAFM regulations regarding milk testing requirements as the biggest barrier to becoming certified.

According to the law, farmers are required to label each container holding raw milk with "Unpasteurized (Raw) Milk. Not pasteurized. Keep Refrigerated." and "This product has not been pasteurized and therefore may contain harmful bacteria that can cause illness particularly in children, the elderly, and persons with weakened immune systems and in pregnant women can cause illness, miscarriage or fetal death, or death of a newborn." A warning sign with the same phrase must also be prominently displayed where customers pick up their milk. Full [guidelines](#) are provided on the VAAFM website, and Rural Vermont's website provides a comprehensive Seller's Guide for producers, as well as [tips](#) for consumers interested in purchasing raw milk.

Rural Vermont estimates that there are at least 150 raw milk producers in the state, but the [Weston A. Price Foundation's Raw Milk Producers Directory](#) identifies just 66 milk raw milk producers. Most of these farms sell many different kinds of products and have a small number of dairy cows. In 2011, *Rural Vermont* surveyed 39 of the 62 (at the time) raw milk producers listed in the Raw Milk Producers Directory. Survey respondents indicated 2010 sales of 37,322 gallons of raw milk, valued at about \$239,000. The average sale price was \$6.52 per gallon, with a high of \$15 a gallon and a low of \$4 a gallon.⁹³ In comparison, the average all-milk price paid to Vermont farmers in 2010 was \$1.52 per gallon.⁹⁴

The raw milk law gives VAAFM the authority to create animal health standards, and the agency has promulgated rules to require that all raw milk producers annually test every animal in their herds for tuberculosis and brucellosis, as well as vaccinate them for rabies. The [Centers for Disease Control and Prevention](#) argues that Americans should not drink raw milk and provides many resources on the dangers of foodborne illness caused by raw milk.

In short, raw milk has been a contentious topic for many years. To date, a small number of farmers have sold a small amount of raw milk. **Since prices for raw milk can be well above prices for conventional and organic milk, Dairy Management Teams should be prepared to discuss the pros and cons of this option with their clients.**

Expand the Number of Goat Dairies

Vermont had 197 farms with 4,480 milk goats in 2007, up from 71 farms with 1,471 milk goats in 1997,⁹⁵ but not all of these farms are classified as goat dairies. According to Dan Scruton, Dairy and Energy Chief at VAAFM, Vermont had 27 goat milk dairies as of July, 2011, including one organic goat milk dairy farm. The *Vermont Cheese Council* indicates that Vermont has at least 10 goat dairies making cheese. Goat's milk products present a growing opportunity for Vermont farms because of high local and regional demand, as well as higher price points.⁹⁶

Goat milk and cheese production in Vermont is led by *Vermont Butter & Cheese Creamery*, *Oak Knoll Dairy*, and smaller producers such as *Blue Ledge Farm*, *Twig Farm* and *Fat Toad Farm*. *Vermont Butter & Cheese Creamery*, Vermont's largest goat dairy operation, has indicated that it could use milk from an additional 6,000 goats over the next 10 years. A production increase of this scale would be most successful with specialized technical assistance and education for prospective goat farmers that covered goat genetics and goat production protocols to meet high quality milk standards.

Goat dairies in Vermont also face a challenge with marketing male animals as meat. As described in *Appendix E*, goat meat is being featured at high-end restaurants in Vermont and large cities within the region. Unfortunately, the small animals are extremely challenging to produce profitably, because slaughter fees are spread over a very small carcass yield. The potential increased demand for goats most likely mirrors the demand for lamb—to meet the requirements of an ethnic market.

This challenge was recently chronicled in a *Burlington Free Press* story that followed *Sterling College* students who raised goats as they brought live animals raised in Vermont to a live animal market, and cuts of meat slaughtered in Vermont to a butcher and deli in New York City.⁹⁷ The transaction with the live animal market went smoothly, the butcher shop did not regularly carry goat (he preferred to stock lamb), while the deli was excited to experiment with goat meat in sausage but found the results disappointing. By the end of the trip, the students had experienced firsthand the importance of price points matching their time and effort. The New York City establishments had several suggestions for increasing the success of this kind of endeavor, including donating goat meat to culinary institutes so that chefs are more familiar with the meat, and aggregating goat meat from many farms to provide the scale, consistency, and availability needed to make the trip worthwhile.

In summary, a network of Dairy Management Teams can serve as an ideal vehicle for addressing the suite of challenges facing Vermont dairy farmers.

Such a network, organized by the Dairy Development Working Group, could address several interrelated issues, including encouraging the efficient use of limited resources, improving communication and coordination among service providers and dairy farmers, achieving consensus on best practices for improving dairy farm profitability, and increasing accountability for positive results over time. On one hand, a Dairy Management Team network could become the place for one-stop shopping for help with business planning, risk management, nutrient management, reducing production expenses, planning transitions, creating diversification strategies, and so on. On the other hand, each Dairy Management Team would be activated based on the unique characteristics of a single dairy farm or a set of dairy farms sharing similar characteristics. In a sense, each dairy farm technical assistance organization would still perform its everyday duties; it would just be doing that work in collaboration with other organizations to address the unique needs of individual dairy farms or those that have similar characteristics.

Several market development categories (e.g., research) that the Dairy Development Working Group can tackle to improve the success of Dairy Management Teams were identified during the F2P research process. Following are some examples.

Consolidate Basic Research: Basic research on dairy farm diversification (e.g., cheese and yogurt production), on-farm renewable energy production, livestock and dairy product marketing needs, and other issues needs to be expanded, replicated, consolidated, and shared with dairy industry stakeholders. For example, grass-fed dairy production is a growing segment of Vermont's dairy industry. According to Jennifer Colby, outreach coordinator for the *Vermont Pasture Network* (VPN), research on pasture management, including soil amendments for pastures, pasture compaction, microbial activity in pasture soils, herd management techniques, and milk quality analysis are all needed. VPN would like to conduct a feasibility study for ramping up rotational grazing in Vermont and New England to minimize feed costs and reduce imports from Midwest.

Research completed by UVM and the [University of Maine](#)⁹⁸ compared organic dairy production to conventional milk production over a three-year period and identified other hypotheses to explore, including the level of experience in managing feed and other costs. The *Farm Viability Enhancement Program* also has in-depth information on organic and conventional dairy farm clients that could be used for comparative purposes.

Assembling this research material and making it publicly available could be low-hanging fruit for the Dairy Development Working Group. Additionally, the Dairy Development Working Group could compile a database of dairy industry technical assistance providers and make it publicly available.

Reexamine Current Education Offerings: School-based programs and programs for midcareer transitions to farming are two emerging avenues for providing the practical skills needed to successfully manage dairy farms. Additionally, programs pitched toward a younger audience, such as Farm to School, build a culture that celebrates farming as a potential career path.

The *University of Vermont* (UVM) and *Vermont Technical College* (VTC) offer training in agriculture from associate's degree to graduate degree programs. Enrollments in the [University of Vermont College of Agriculture and Life Sciences](#) have increased 40% in the past five years as a result of both freshmen enrollments and intra-university transfers. VTC offers associate's degrees in Dairy Farm Management and Agribusiness Management and offers a four-year degree in Diversified Agriculture. VTC and UVM have a formal Farms and Agricultural Resource Management program (or 2+2 Program) that allows up to 20 VTC graduates to transfer into a four-year program at UVM with a full scholarship after completing the two-year [Dairy Farm Management Technology](#) degree at VTC. UVM students can participate in the Cooperative for Real Education in Agriculture Management (CREAM) program, a two-semester program in which students learn to manage a dairy herd. A recent article on 2+2 graduates indicates that they are cognizant of the difficulties facing the dairy industry but are eager to step in and continue the family business.⁹⁹

In the fall of 2010, UVM launched the [Dairy Center of Excellence](#). Funded through the sale of the University's dairy herd, the Center engages Vermont farmers as research partners. The mission is to increase the economic viability of Vermont agriculture through partnerships between UVM scientists and local private farms. Two of Vermont's

private colleges, Sterling College and [Green Mountain College](#), also offer hands-on experience with farming and academic study of best farming practices.

The Dairy Development Working Group could review these educational programs and determine whether they are meeting the needs of current and future dairy farmers and processors. As a point of comparison, New Zealand has developed a website, [Get Ahead](#), that describes a variety of on- and off-farm careers, including dairy farming. The website profiles young people working in New Zealand's food system and describes what their day-to-day work is like. Additionally, the Dairy Development Working Group could examine opportunities for providing scholarships to dairy farmers, employees of dairy processors, and other Vermonters to attend educational programs at Vermont institutions (e.g., the *Vermont Institute of Artisan Cheese*).

Understand Milk Volume and Infrastructure Requirements: As the number of dairy farms has decreased, a particular concern of the now defunct Vermont Dairy Task Force has been the volume of milk available for Vermont processors. The new *Swan Valley* and [Commonwealth Dairy](#) yogurt facilities are using large volumes of milk, and many Vermonters are curious about expanding in-state dairy processing capacity. Dairy industry stakeholders need to ensure that sufficient milk production, processing infrastructure, and storage are available for on- and off-farm value-added dairy processing, fluid milk bottling, and other value-added products. Working with industry leaders and VAAFM, the Dairy Development Working Group could project milk production volumes out to 2020 and plan infrastructure accordingly.

Expand the Number of Anaerobic Digesters and Other Renewable Energy Technologies: Although anaerobic digester technologies are commercialized, each project presents its own set of challenges (e.g., funding sources and regulatory issues may change during the three-plus-year development process). VAAFM, CVPS, NRCS, USDA Rural Development, and private consultants provide a well-established technical assistance network, but except for Avatar, all of the system manufacturers are based out of state. If a problem arises with a digester, it may be difficult to secure immediate assistance to address the issue. Including renewable energy and energy efficiency experts (e.g., VAAFM, the [Vermont Department of Public Service](#), CVPS, [USDA Rural Development](#), NRCS, [Renewable Energy Vermont](#)) in the pool of Dairy Management

Team members can ensure thoughtful investigations of the feasibility of various technology systems as well as provide support for troubleshooting problems.

REGIONAL SOLUTIONS

Regional (e.g., improving and expanding dairy branding and marketing) and national solutions (e.g., reforming guest worker programs) may have to be addressed by different coalitions of organizations with different skillsets.

New England's dairy industry must navigate a context of changing fluid milk and processed dairy product consumption habits. From 1970 to 2009, the per capita availability of plain whole milk decreased 77%, while the per capita availability of 1% milk, 2% milk, and skim milk increased 1,149%, 126%, and 131%, respectively, possibly indicating a long-term trend toward consumer interest in low-fat dairy products. The per capita availability of all plain milk decreased 36% during this time period. That is, even with upticks in the availability of 1% milk, 2% milk, and skim milk, the overall availability of plain milk was down, possibly reflecting a long-term trend of decreased fluid milk consumption. At the same time, the per capita availability of yogurt and all cheeses increased 1,406% and 182%, respectively, indicating a long-term trend of increased consumption of processed dairy products.

Although Vermont is the largest dairy producer in New England, accounting for 62% of the region's fluid milk production, it has the smallest number of consumers. Vermont dairy farmers depend on the approximately 14 million consumers in the New England market to consume Vermont milk. A significant challenge for Vermont dairy farmers is marketing milk as Vermont milk. Most conventional and organic fluid milk produced in Vermont is blended with milk from surrounding states when it is processed, and then marketed under brand names such as *Garelick* and *Hood*. **Even if regional consumers considered Vermont milk to be "local," they would have no easy way of selecting a Vermont brand.**

The F2P team repeatedly heard from dairy industry professionals about the role they play in supporting the working landscape so valued by Vermonters and visitors to the state. For example, dairy industry professionals feel that they receive very little credit for keeping this land open. However, in contrast to well-known examples of marketing campaigns such as [Real California Milk's Happy Cow](#) campaign or [Real California Cheese](#),

it is unclear what message Vermont's dairy industry wants to portray. The Dairy Development Working Group is going to explore consumer education opportunities.

🍌 Improve Dairy Branding and Marketing

Rhode Island, Maine, and Connecticut have succeeded with local brand development with *Rhody Fresh*, *MOOMilk*, and *The Farmer's Cow* milk produced entirely within their respective states (*Rhody Fresh* and *The Farmer's Cow* are bottled by *Guida's in Connecticut*). *Organic Valley* sells [New York Fresh](#) and [Northeast Pastures](#) (from Vermont, New Hampshire, Maine) branded milk for the New England region. The four brands of milk currently produced and processed in Vermont (i.e., *Strafford Organic Creamery*, *Monument Farms*, *Thomas Dairy*, and *Booth Brothers*) supply small distribution areas almost entirely within Vermont and do not capitalize on the Vermont brand in the regional milk market.

In 2007, VAAFM hired [Resource Systems Group, Inc.](#) (RSG) to study the market potential of "domestic fair trade" milk (i.e., trade that fairly compensates American farmers and food producers) sold in the Northeast market. RSG found that there is a market for domestic fair trade milk, especially if it is free of artificial growth hormones, among two segments of the population they dub "Social Stewards" (e.g., two-person households in rural or suburban areas that value local products) and "Idealists" (e.g., young urbanites who aren't brand loyal but tend to buy organic, hormone-free milk). About two thirds of the Social Stewards and half of the Idealists surveyed (n = 2,947) in New England and New York would buy fair trade milk every time they shop for milk and would pay more to do so.¹⁰⁰

In 2008, VAAFM and RSG followed up the fair trade market assessment with a study to identify a name, logo, messaging, and price point for a fair trade branded milk product. The name "Keep Local Farms" was highest ranked.¹⁰¹ In 2009, *Keep Local Farms* was launched to raise awareness of the dairy industry challenges and the benefit the dairy industry brings to Vermont



and New England. However, this program does not refer to a brand of milk; rather, it encourages consumers to pledge support for dairy farmers online or by purchasing a coupon when checking out from stores. That is, consumers are not buying a brand of milk called “Keep Local Farms”, but rather are pledging money to support local dairy farms. Some of these consumers are large-scale buyers who voluntarily make a per-unit contribution, such as \$0.10 per single serving of milk at UVM. The [Co-op Food Store](#) in Hanover, New Hampshire added \$0.15 per gallon of milk and raised over \$40,000 for the program. Dairy farmers belonging to the *New England Family Dairy Farms Cooperative* (including over 80% of Vermont dairy farms) receive 100% of the pledged support.

Organizations within Vermont are supporting other regional initiatives. VAAFM works closely with the [New England Dairy Promotion Board](#) to implement regional marketing programs such as the *New Look of School Milk* to promote increased consumption of milk at schools in New England states. The *Vermont Cheese Council* works collectively with cheese makers to grow their markets both in and beyond Vermont. The Local Foods Matchmaker event, organized by VAAFM, the [Vermont Hospitality Council](#), the [Vermont Grocers' Association](#), the *Vermont Fresh Network*, and [Health Care Without Harm](#) connects interested farmers with buyers who have a regional presence.

Another brand challenge occurs when dairy businesses start to grow. Sometimes they outgrow the Vermont milk supply they've been using (particularly specialty milks such as goat or sheep), their Vermont-based processing facilities, or both. As companies blend in non-Vermont ingredients or begin to use out-of-state processing facilities, they run up against Vermont's consumer protection laws that clearly delineate when a product loses its claim to be made in Vermont. A practical implication of this has been to avoid the word Vermont in a company's name unless there is a clear intent to remain a Vermont-based, Vermont-ingredient-sourcing business.

Branding Vermont dairy products is easier for value-added products such as cheese and yogurt that stay closer to home for processing. For example, *Cabot Cheese* (owned by Agri-Mark) has partnered with the [Vermont Department of Tourism and Marketing](#) (VDTM) to augment promotion for the state. A 2006 study requested by *Cabot Cheese* and VDTM explicitly investigated visitor perceptions of Vermont and of *Cabot Cheese*.¹⁰² Survey respondents indicated that maple syrup, ice cream,

and cheese are the products most associated with Vermont. Seventy-five percent of respondents reported knowledge of the *Cabot* brand, and visitors also reported higher loyalty to *Cabot* after spending time in Vermont. Sampling *Cabot* cheese while in Vermont improved the level of loyalty after leaving the state.

Develop a Marketing Campaign: The Keep Local Farms program became a kind of regional milk marketing campaign that originally intended to place fair trade-type stickers on milk containers. Market research conducted for the Keep Local Farms program found that many types of consumers were willing to pay more for a Keep Local Farms milk product (especially growth hormone-free milk). Instead of stickers placed on milk containers, however, the Keep Local Farms program has coupons, or donations, that people can make when checking out at stores or online. If the ultimate goal is to return more dollars to Vermont dairy producers through premiums on milk purchases, Vermont's dairy industry should (1) evaluate the effectiveness of Keep Local Farms to date, (2) consider exploring the application of Keep Local Farms fair trade stickers as intended, and (3) evaluate new options for marketing Vermont dairy products (e.g., hiring a marketing firm to develop a comprehensive multimedia campaign for Vermont dairy products).

Delivering Vermont fluid milk may, in some cases, require structural changes to the way milk is pooled, to ensure that the finished product can be identified as sourced from Vermont. In other cases (e.g., the *Booth Brothers* plant), the problem may be solved by simply altering the label to indicate that the milk comes from New England farmers.

Expanding markets for Vermont dairy products is potentially easier for value-added products such as cheese and yogurt that stay closer to home for processing, and that can be labeled with Vermont brands. Although our own Buy Local movement has centered on Vermonters selling to Vermonters, a visit to almost any Boston specialty food store will show Vermont products labeled as “local” in that setting as well. Generating a greater relationship between Vermont farmers and those urban consumers opens new possibilities for marketing Vermont products under a value-added “Vermont” label of origin.

NATIONAL SOLUTIONS

Dairy industry representatives from Vermont and many other states believe that a new federal policy to create more stable and fair milk prices is essential to the future of the dairy industry. To accomplish Goal 10, Vermont's congressional delegation and dairy industry will have to continue to rally support for federal pricing reform and a national production management policy. For example, on February 13, 2010, representatives of Vermont's dairy industry¹⁰³ sent a letter to USDA Secretary Vilsack that included a recommendation for milk production management. A review of three production management proposals conducted by Nicholson and Stephenson found that all three would decrease milk price volatility on a national level.¹⁰⁴

👉 Adjust Milk Pricing Policy

During the F2P process dairy industry stakeholders offered several recommendations for adjusting the federal milk pricing system, including the following:

- 👉 A more transparent price-setting mechanism
- 👉 Weekly electronic reports of product prices and quantity
- 👉 Adjustments to the pricing system to alert farmers to price changes
- 👉 A floor price for fluid milk
- 👉 A pricing system that severely discounts or charges a fee to producers who supply excess milk, which would incentivize supply management
- 👉 Ensuring that prices are set at a level that covers the cost of production and returns more of the retail price margin to the farmer.

Although there is currently not a national consensus on dairy policy reform, the [*Dairy Security Act of 2011*](#), introduced by Representative Peterson (D-MN), or some version of the Dairy Security Act, has attracted support and may be included in the next Farm Bill.¹⁰⁵ The Dairy Security Act introduced by Representative Peterson has three main components that meet many of these recommendations:

- 👉 The **Dairy Producer Margin Protection Program** would replace MILC and the dairy price support program. It would essentially act as an insurance program by providing payments to participating producers when the national margin price (farm milk price minus feed costs) drops below \$4 per cwt.

- 👉 The **Dairy Market Stabilization Program** is essentially a production or supply management program that would be mandatory for dairy farmers participating in the Margin Protection Program. Under this program, dairy farmers would be discouraged from producing milk above a base level established for their farm when margins are low (e.g., when national margins are below \$6 for two months farmers would receive revenue for only 98% of their base milk production). The Congressional Budget Office has calculated that this program would save \$131 billion over 10 years compared to existing law.

- 👉 Finally, the Dairy Security Act would simplify the Federal Milk Marketing Order Class III pricing formula for cheese to a market based formula.¹⁰⁶

👉 Reform Guest Worker Program

Vermont's dairy industry currently depends on guest workers from Mexico and other Latin American countries. Media attention has recently focused on the unintended consequences tough anti-immigration laws (e.g., those of the state of Alabama) are having on farms. Vermont Governor Peter Shumlin has made bias-free policing the official state policy, and Vermont's federal delegation supports comprehensive immigration reform, including reforming the H-2A guest worker program. For example, U.S. Senator Patrick Leahy (D-VT) and U.S. Senator Kirsten Gillibrand (D-NY) introduced the H-2A Improvement Act in 2010 to allow dairy farmers to hire guest workers. However, it is unlikely that guest worker reform will occur outside of broad reform of national immigration policy.

GETTING TO 2020

For over 100 years, dairy production and processing has had significant economic, ecological, and cultural impacts in Vermont. Despite the longstanding importance of Vermont's dairy industry, volatile conventional milk prices, concentration in the dairy industry, rising farm input expenses, and many other factors, have impacted its perceived and actual sustainability for decades. Vermont's dairy farmers have responded to these pressures in many ways. Some dairy farms have grown by transitioning away from traditional commodity production into unique, high end products such as farmstead cheese. Other dairies are finding ways to make fluid milk profitable, sometimes by growing in scale and efficiency, sometimes by hedging against price drops for their milk by developing new revenue sources, including energy production, cattle production, agricultural tourism, and on-farm production of inputs like feed and bedding. The Dairy Development Working Group is focusing its efforts on local, regional, and national solutions that navigate through the complex system that delivers dairy products to markets.

Table 3.3.12: Objectives and Strategies for Revitalizing Vermont's Dairy Industry

OBJECTIVE	STRATEGY
Research Strategies	
To help Vermont farmers and technical assistance providers adapt to climate change.	Climate change will directly impact Vermont's dairy industry through 1) feed-grain production, availability, and price; 2) change in pastures and forage crop production and quality; 3) animal health, growth, and reproduction; and 4) disease and pest distributions. Farmers and technical assistance providers (including educational institutions) should begin exploring adaptation strategies.
To make accessible all basic research on dairy industry opportunities for reducing production expenses, diversification, solving nutrient management issues, dairy beef, and goat dairies.	The Dairy Development Working group should compile and disseminate research aimed at improving the ecological and economic sustainability of Vermont's dairy farms.
	Write and disseminate best practice case studies about dairy farms that examine different stages of development and scales of operation, as well as products and markets, on such topics as manure management, animal housing options, human resources, on-farm energy production, diversification strategies, business practices and the use of management teams, etc.
	Update the economic impact analysis of the dairy industry in Vermont (2008) and re-publish the results.
To conduct and consolidate research on local grain and forage production and management.	Conduct, compile, and disseminate additional research on conventional and organic forage and grain management, including information on soil fertility and amendments, reducing soil compaction, ways to enhance microbial activity in soils, harvest timing, management of stored feed to avoid losses, herd management techniques, and milk quality analysis.
To assess the state of the artisan cheese industry in Vermont.	Coordinate with Vermont Institute of Artisan Cheese, Vermont Cheese Council and key Vermont cheese makers to conduct a regional market demand analysis for artisan cheese in order to assess if existing processing, aging and storage facilities are sufficient to meet market demand for the next 10 years.
	Conduct an economic impact assessment of the size and importance of the cheese industry to the Vermont economy in 2012 to establish a baseline. Assess what the economic impact would be if the cheese industry doubled its sales within five years (2017).
Natural Resource, Physical Infrastructure, and Technology Strategies	
To increase the amount of Vermont produced fluid milk that stays in state for consumption by Vermonters and/or value-added processing.	Increase the number of on-farm dairy processing facilities over the next ten years to expand production of valued added or milk-component (i.e., protein powder) products for local consumption and for export.
	Increase Vermont's overall cow herd size to match anticipated demand by large value-added processors in the region.
To improve access to viable and affordable agricultural land and secure tenure for farmers.	Support VLT, VHCB, and other farmland conservation partners to set aggressive targets for conserving farmland for dairy, fruit and vegetables, livestock, grains, beans, oilseed, and other crop production.
To increase the usage of aerators while spreading liquid manure throughout the state.	Provide funding and logistical support to triple the number of aerators that are strategically dispersed around the state within 3 years, with particular focus on those those farm fields which perennially flood and/or are near significant water bodies that flow into Lake Champlain or the Connecticut River.
To double in-state goat milk production to serve the value-added cheese industry.	Provide matching funds and production technical assistance to at least 10 goat dairies to allow them to scale up to a 600-goat herd. Improve production practices and herd genetics.

OBJECTIVE	STRATEGY
<i>Sales and Distribution Strategies</i>	
To increase institutional purchases of Vermont dairy products.	Support Farm to School, Farm to Hospital, and other such efforts to increase local dairy product purchases by schools and institutions with food service.
To increase the use of milk component parts in other manufactured products.	Support efforts by other food manufacturers to include Vermont dairy products in their products (e.g., Vermont cheese for pizza).
<i>Marketing and Public Outreach Strategies</i>	
To expand marketing campaigns for Vermont dairy products.	Work with the Northeastern Association of State Departments of Agriculture to pool resources for regional marketing.
	Identify key marketing strategies for developing cheese, yogurt, sour cream, kefir, and other value-added dairy products, including nonfood dairy-based products.
	Increase dairy industry exposure as the foundation of Vermont's agricultural economy through print articles, radio talk shows and other outlets. Ads for Vermont dairy products and their origin stories should be regularly placed in Vermont and regional publications.
	Organize an annual Dairy Summit to assess and celebrate the state of the industry.
<i>Technical Assistance and Business Planning Strategies</i>	
To increase the number of farmers participating in technical assistance and business planning services, (e.g., relating to diversification strategies, farm transfers, and retirement planning).	Increase number of Dairy Management Teams with skilled facilitators to support farm businesses on a regular basis to improve farm viability. Increase outreach and education to farmers about tools to minimize business risk and help with price/cost stabilization in the commodity market (e.g., insurance, contracts for forward pricing, livestock gross margin insurance, futures options, etc.).
To protect farmland currently in dairy production. Encourage and help facilitate contact with farmland protection organizations when dairy farmers are considering expansion, closure, transfer, or transition plans.	Encourage lending institutions and realtors to provide notice to farmland conservation organizations before dairy farms are transferred or sold.
	Advertise and encourage using USDA's Transition Incentives Program (TIP)—a new program under the Conservation Title of the 2008 Farm Bill—to encourage retired or retiring owners or operators to transition Conservation Reserve Program land to beginning or socially disadvantaged farmers or ranchers. Coordinate outreach with USDA Farm Service Agency (FSA) county offices.

OBJECTIVE	STRATEGY
<i>Technical Assistance and Business Planning Strategies</i>	
To increase technical assistance for best practices in soil enhancement and grazing.	Coordinate with NRCS, VACD, Farmer's Watershed Alliance, and other Vermont agricultural organizations to invest in skilled land managers and experienced farmers to work directly with other farmers to increase topsoil fertility and minimize soil erosion.
	Expand the Farm Agronomic Practices and Nutrient Management Programs to support the increased use of soil erosion reduction practices and alternative manure application techniques, such as soil aeration.
	Increase the number of VAAFM and UVM Extension specialists, Agricultural Resource Specialists, and other personnel (engineers, soil scientists) available for on-farm technical assistance, education and support.
To increase technical assistance and business planning services for dairy farmers, cheese makers, and other value-added dairy processing professionals.	Develop detailed enterprise plans/budgets (including timeline and needed investment) for different diversification strategies including transition to organic, on-farm liquid milk processing / energy / forage, and wood, maple, livestock, value added dairy products, and grains. Create detailed enterprise plans (including timeline and investment) for different diversification strategies including value added processing such as cheese and yogurt at different scales, on and off farm.
<i>Financing Strategies</i>	
To support efforts to transition conventional dairy farms to organic production.	Create a special multi-year farm transition fund and provide appropriate technical assistance to farmers that want to transition from conventional milk production into organic milk production.
To support consolidating debt into single payments for dairy farms.	Explore, and if feasible, establish bonding capacity through VEDA/VACC which would allow dairy farms to consolidate their loans into 1 monthly payment and allow for larger sized loans when expansion plans warrant it.
To support dairy cooperative reinvestment and processing plant expansion.	Adopt H.21, Mutual Benefits Corporation enabling legislation, to enable dairy and other cooperatives to access non-producer member equity (non-voting rights) to help finance expansion projects.
To increase funding to organizations which support technical and business assistance needs of the dairy industry.	Increase funding to VHCB's Farm Viability Program in order to increase the number of dairy farms with up-to-date business plans and active dairy management teams.
To improve water quality, soil fertility, and organic matter and reduce erosion.	Leverage USDA and other funding to purchase additional equipment to share among farmers to facilitate soil aeration, no-till, strip-till and zone-till cultivation, and state-of-the-art soil quality monitoring and analysis.
	Provide financial incentives to achieve a minimum width (10 feet) of buffer zone along intermittent streams and ditches that pass through annual cropland.
	Provide financial and regulatory incentives to install fencing (temporary and permanent), watering systems, and stream crossings to improve the management of animals in and around streams and rivers.
	Broaden the conservation purposes of and annually expend all funds made available through the Wetland Reserve Program (WRP) and Farmland Protection Program (FRPP) to permanently protect and restore wetlands and stream corridors.

OBJECTIVE	STRATEGY
<i>Financing Strategies</i>	
To create market-based incentives to improve soil and water quality.	Incorporate into food sector financial transactions the high economic value of environmental services provided by stewarding healthy soils (e.g., erosion control, flood plain absorption capacity).
To provide financial incentives to farmers to implement best practices (cover cropping, crop rotation, midfield buffers, strip tillage, aeration, on-farm composting of manure, and use of composted manure on fields) and meet performance targets.	Increase outreach by farmers to farmers to communicate the benefits of CREP and EQUIP grants, nutrient management plans, and the implementation of best practices to increase organic matter in soils.
	Explore options for developing a program to financially incent best management practices for increased ecosystem services by dairy farms.
<i>Network Development Strategies</i>	
To expand the number and composition of Dairy Management Teams.	The Dairy Development Working Group should compile a database of dairy industry technical assistance providers and disseminate this list widely.
	Annually sponsor a gathering of dairy management team members to learn from one another (peer to peer learning).
	Update and repackage dairy management team curriculum and materials and make them available to interested farms.
<i>Education Strategies</i>	
To review existing educational programs for current and future dairy farmers and processors.	The Dairy Development Working Group should review educational programs offered at Vermont institutions and analyze whether they are meeting the needs of current and future dairy farmers and processors. If not, make recommendations for improvements.
	Organize workshops and other educational offerings on ways to improve dairy management practices and profitability.
To continue to support Vermont's artisan cheese education institutions.	Provide scholarships for dairy farmers, employees of dairy processors, and other Vermonters to attend the Vermont Institute of Artisan Cheese.
<i>Regulation and Public Policy Strategies</i>	
To improve access to qualified farm labor.	Improve the system for hiring migrant farm workers/guest workers and the visa/H-2A program.
To support the passage of the Dairy Security Act or similar federal legislation.	Encourage Vermont's congressional delegation to work hard to pass the Dairy Security Act of 2011, or similar legislation that establishes a dairy producer margin protection program and a production management program.

End Notes

- 1 Vermont Travel & Tourism Industry, *Fact Sheet*, 2009.
- 2 James M. MacDonald et al., *Profits, Costs, and the Changing Structure of Dairy Farming*, USDA Economic Research Report Number 47, September 2007.
- 3 Ronald Trostle, *Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices*, USDA ERS, July 2008.
- 4 Farm Credit East, "Northeast Dairy Cost of Production Reaches Record High," Knowledge Exchange Partner, 7(3) March 2013, www.farmcrediteast.com/en/News-and-Events/KXP/2013/March.aspx#DairyCOP.
- 5 Joanna Lidback (Farm Credit East), *2010 Northeast Dairy Farm Summary*, May 2011. Joanna Lidback and Chris Laughton (Farm Credit East), *2011 Northeast Dairy Farm Summary*, May 2012.
- 6 Kevin O'Connor, "The Sacrifice: Vt. Farm Sheds its Past to Save its Future," *Barre-Montpelier Times Argus*, May 15, 2011.
- 7 United States Department of Agriculture, 2007 Census of Agriculture, [Table 62](#).
- 8 United States Department of Agriculture, 2007 Census of Agriculture, [Table 45](#).
- 9 Andrea Suozzo, *"State Dairy Industry Dips Below 1,000 Farms."* Addison County Independent, July 7, 2011.
- 10 Kevin O'Connor, "'End of an Era': Vt. Dairy Farm Count Keeps Falling," *Barre-Montpelier Times Argus*, August 5, 2011.
- 11 Vermont Organic Farmers, LLC, *Statistics on Certified Organic Agriculture in Vermont 2010*. Includes one organic goat dairy.
- 12 Cees de Hann, Henning Steinfeld, and Harvey Blackburn, *Livestock & the Environment: Finding a Balance*.
- 13 Personal communication, Louise Calderwood, *Vermont Feed Dealers and Manufacturers Association*.
- 14 Personal communication, Jennifer Colby, Outreach Coordinator, *Vermont Pasture Network*.
- 15 Tom Gates, Cooperative Relations Manager, *St. Albans Cooperative Creamery*, November 2011.
- 16 Personal communication with Robert Foster, *Foster Brothers Farm*, December 2011.
- 17 Weston A. Price Foundation, *"Where Can I find Real Milk?"* 2000.
- 18 Dan Scruton, Dairy and Energy Chief at VAAFM, July 2011, and Nicole Dehne, Certification Administrator, NOFA Vermont, November 2011.
- 19 USDA NASS, *Milk Production, Vermont*, 2007.
- 20 The United States is one of the few industrialized countries to allow rBGH. Canada, the European Union, Japan, and Australia have all banned the use of rBGH in milk for human consumption, source: http://en.wikipedia.org/wiki/Bovine_somatotropin. Most Vermont dairy cooperatives have disavowed the use of rBGH. However, Agri-Mark, Inc., a Massachusetts-based dairy cooperative that operates under the name of Cabot Creamery Cooperative, recently *settled a claim* with the Vermont Attorney General's Office for misrepresenting the rBGH-free status of its products. Sustainable Table has compiled a *list of rBGH-free dairy products* available in Vermont.
- 21 Bob Parsons, *"Vermont's Dairy Sector: Is There a Sustainable Future for the 800 lb. Gorilla?"* Opportunities for Agriculture Working Paper Series, Volume 1, Number 4.
- 22 United States Department of Agriculture, 2007 Census of Agriculture, [Table 30](#).
- 23 A territory that includes Vermont, Connecticut, Delaware, Massachusetts, New Hampshire, New Jersey, Rhode Island, Washington D.C., and portions of Maryland, New York, Pennsylvania, and Virginia.
- 24 U.S. Census Bureau, *Population Finder*, 2010.
- 25 Brian K. Kit, Margaret D. Carroll, and Cynthia L. Ogden, *"Low-Fat Milk Consumption Among Children and Adolescents in the United States, 2007-2008."* NCHS Data Brief, U.S. Centers for Disease Control and Prevention, September 2011.
- 26 Judy Putnam and Jane Allshouse, *"Trends in U.S. Per Capita Consumption of Dairy Products, 1909 to 2011."* *Amber Waves*, June 2003.
- 27 Christopher G. Davis et al., *Long-Term Growth in U.S. Cheese Consumption May Slow*, USDA Economic Research Service, August 2010.
- 28 National Public Radio, *"Yogurt Dominated Palates in the Aughts."* January 2010.
- 29 David Jones and Brad Dorfman, *"Danone: US Yogurt Consumption to Double."* Reuters, March 16, 2010.
- 30 United States Department of Agriculture, 2007 Census of Agriculture, [Table 62](#).
- 31 Diane Bothfeld, Deputy Secretary, Vermont Agency of Agriculture, Food, and Markets
- 32 United States Department of Agriculture, 2007 Census of Agriculture, [Table 62](#).
- 33 United States Department of Agriculture, 2007 Census of Agriculture, [Table 64](#).
- 34 United States Department of Agriculture, 2007 Census of Agriculture, [Table 62](#).

- 35 United States Department of Agriculture, 2007 Census of Agriculture, [Table 46](#).
- 36 Ibid.
- 37 Vermont Travel & Tourism Industry, [QuickFacts](#), 2009.
- 38 Resource Systems Group, Inc., [Leveraging the Vermont Brand](#), 2010.
- 39 United States Department of Agriculture, 2007 Census of Agriculture, [Table 62](#).
- 40 Ronald Trostle, [Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices](#), USDA ERS, July 2008.
- 41 USDA Economic Research Service, Feed Grains Database, [www.ers.usda.gov/Data/FeedGrains/](#), 2011.
- 42 Trostle, op. cit., page 3.
- 43 Ibid.
- 44 Governor's Commission on Food, [Proposals for Vermont's Agriculture and Food Future](#), 1976, pages 36-37.
- 45 A recent [U.S. General Accounting Office report](#) describes an increase in the spread between farm and retail milk prices in 12 of the 15 markets studied from 2000 to 2004. In 9 of the 15 markets retail price increases were statistically significant. During this same period, farm prices decreased in 12 of the 15 markets. The GAO found that wholesale processors and retailers received between 33.6% and 60.1% of the value of a gallon of 2% milk, depending on the market, while dairy farmers received between 36.0% and 58.6% of the value.
- 46 Alden C. Manchester and Don P. Blayney, [Milk Pricing in the United States](#), USDA Economic Research Service, 2001, page iii.
- 47 Manchester and Blayney, Op. cit., page 7.
- 48 Manchester and Blayney, Op. cit., page 17.
- 49 Manchester and Blayney, Op. cit., page 6. See also, The University of Wisconsin-Madison and the Food and Agricultural Policy Research Institute, Dairy Policy Issues for the 2012 Farm Bill, [www.fapri.missouri.edu/outreach/publications/2010/Dairy_Policy_Issues_April2010.pdf](#), April 2010.
- 50 Henry L. Bryant, Joe L. Outlaw, and David Anderson, ["Aggregate Milk Supply Response to the Milk Income Loss Contract Program."](#) *Journal of Agribusiness*, 25/2 (Fall 2007): 133-146.
- 51 Ibid.
- 52 Manchester and Blayney, Op. cit., page 17.
- 53 Bob Cropp and Jelle Zijlstra, [Factors Causing Fluctuations in All Milk Price Received by U.S. Farmers](#), 2008. See also The University of Wisconsin-Madison and the Food and Agricultural Policy Research Institute, Dairy Policy Issues for the 2012 Farm Bill, [www.fapri.missouri.edu/outreach/publications/2010/Dairy_Policy_Issues_April2010.pdf](#), April 2010, and Bob Parsons, ["Vermont's Dairy Sector: Is There a Sustainable Future for the 800 lb. Gorilla?"](#) Opportunities for Agriculture Working Paper Series, Volume 1, Number 4.
- 54 Cropp and Zijlstra; Parsons; Manchester and Blayney, p. iv.
- 55 Joanna Lidback (Farm Credit East), [2010 Northeast Dairy Farm Summary](#), May 2011.
- 56 Northeast Organic Dairy Producers Alliance, [Pay Price & Organic Milk Market](#), March 2011.
- 57 Charles F. Nicholson and Mark W. Stephenson, [Analysis of Proposed Programs to Mitigate Price Volatility in the U.S. Dairy Industry](#), September 2010.
- 58 USDA, [Climate Change and Agriculture in the United States: Effects and Adaptation](#), USDA Technical Bulletin 1935. Washington, DC, 2012, [www.usda.gov/oce/climate_change/ef-fects_2012/effects_agriculture.htm](#). Scott Malcolm et al., [Agricultural Adaptation to a Changing Climate: Economic and Environmental Implications Vary by U.S. Region](#), USDA Economic Research Service, Economic Research Report No. (ERR-136), July 2012, [www.ers.usda.gov/media/848748/err136.pdf](#).
- 59 Personal interview with Tony Kitsos, UVM Extension Farm Management Educator, 2012.
- 60 Vermont Milk Commission, A Final Decision and Report on the Proceedings of the Vermont Milk Commission, [www.vermontagriculture.com/milkcommission/documents/FinalReportVermontMilkCommission.pdf](#), January 15, 2008.
- 61 Personal interview with Dennis Kauppila, UVM Extension Farm Business Management Specialist, 2010.
- 62 The Census of Agriculture indicates that cropland used for pasture or grazing decreased 64%, from 131,686 acres in 1997 to 46,686 acres in 2007. During this same period, the amount of land described as permanent pasture or rangeland increased from 86,835 acres in 1997 to 137,165 acres in 2007. The Census of Agriculture defines permanent pasture or rangeland as grazable land (e.g., meadow, prairie, or range consisting of various types of grasses) of variable quality. However, the decrease in cropland acreage devoted to pasture or grazing and the increase in permanent pasture appears to reflect a question order change in the Census of Agriculture. For example, in the 2002 (and earlier years) Census report forms, the Cropland Pasture question was included in item 1a. In 2007, it was moved to item 2c. The Permanent Pasture question was included in item 3 in 2002 (and earlier years), but in 2007 it was moved to item 2a, above Cropland Pasture. Consequently, it is unclear how to read this trend. Personal interview with Ty Kalaus, Deputy Director, New Hampshire Field Office, USDA/NASS, July 2011.
- 63 Alan Gotlieb, ["Mycotoxins in Silage: A Silent Loss in Profits."](#) University of Vermont.

- 64 Carolyn Dimitri and Kathryn M. Venezia, [*Retail and Consumer Aspects of the Organic Milk Market*](#), USDA, Economic Research Service, Washington, D.C., 2007.
- 65 Northeast Organic Dairy Producers Alliance, [*Pay Price & Organic Milk Market*](#), March 2011.
- 66 James M. MacDonald et al., [*Profits, Costs, and the Changing Structure of Dairy Farming*](#), USDA Economic Research Report Number 47, September 2007.
- 67 USDA, [*Fluid Milk Sales Data*](#), 2011.
- 68 Interview with Nicole Dehne, Certification Administrator, NOFA Vermont, November 2011.
- 69 Timothy Dalton et al., [*"A Comparative Analysis of Organic Dairy Farms in Maine and Vermont: Farm Financial Information from 2004 to 2006"*](#), Maine Agricultural and Forest Experiment Station Bulletin Number 851, University of Maine, July 2008.
- 70 SJH and Company, *Economic Analysis of Agricultural Markets in Vermont: Organic/Grass-fed Dairy and Livestock for Meat*, August 26, 2006.
- 71 Northeast Organic Dairy Producers Alliance, [*Pay Price & Organic Milk Market*](#), March 2011.
- 72 Personal interview with John Cleary, New England Dairy Pool Coordinator, *Organic Valley*, 2012.
- 73 Steve Stevenson, [*"Values-Based Food Supply Chains: Organic Valley"*](#), Wisconsin Center for Integrated Agricultural Systems, Research Brief #80, June 4, 2009.
- 74 William Neuman, "As Supplies Dwindle, Organic Milk Gets Popular," *The New York Times*, www.nytimes.com/2011/12/30/business/rising-production-costs-cause-organic-milk-shortage.html?partner=rss&emc=rss&pagewanted=all, December 29, 2011.
- 75 Governor's Commission on Food, [*Proposals for Vermont's Agriculture and Food Future*](#), 1976, pp. 34-35.
- 76 Jane Sakovitz-Dale, [*Vermont Farmstead Cheese Marketing Study*](#), 2006.
- 77 Ibid.
- 78 United States Department of Agriculture, 2007 Census of Agriculture, [*Table 62*](#).
- 79 Elizabeth Ferry, [*"Older Dairy Cows Could Become Steady Source of Local Beef"*](#), *Local Banquet*, 2010.
- 80 SJH and Company, *Economic Analysis of Agricultural Markets in Vermont: Organic/Grass-Fed Dairy and Livestock for Meat*, August 26, 2006.
- 81 Rosalie J. Wilson, [*Vermont Ground Beef Marketing Study*](#), 2006.
- 82 Rose Wilson, Charlene Andersen, and Louise Calderwood, [*New England Beef-to-Institution Marketing Study*](#), October 2011.
- 83 Neil M. Dubrovsky and Pixie A. Hamilton, [*Nutrients in the Nation's Streams and Groundwater: National Findings and Implications*](#), U.S. Geological Survey Fact Sheet 2010-3078.
- 84 USDA Economic Research Service, [*Fertilizer Use and Price*](#), 2011.
- 85 United States Department of Agriculture, 2007 Census of Agriculture, [*Table 62*](#).
- 86 See Chapter 3, Section 7: Nutrient Management.
- 87 Lake Champlain Basin Program, [*Issues in the Basin: Phosphorus Non-Point Sources*](#), 2004.
- 88 Austin Troy et al., [*"Updating the Lake Champlain Basin Land Use Data to Improve Prediction of Phosphorus Loading"*](#), LCBP Technical Report #54, May 2007, Page 45, Table 2-11.
- 89 U.S. Environmental Protection Agency, [*EPA Takes Step to Improve Lake Champlain Water Quality*](#), January 2011.
- 90 Vermont Agency of Natural Resources, [*Revised Implementation Plan: Lake Champlain Phosphorus TMDL*](#), 2010.
- 91 Laura Hanrahan and Bill Jokela, [*The Vermont Dairy Farm Sustainability Project: Reducing Environmental Risk While Maintaining Profitability*](#).
- 92 Governor's Commission on Food, [*Proposals for Vermont's Agriculture and Food Future*](#), 1976, p. 35.
- 93 Rural Vermont, [*Raw Milk Report to the Legislature*](#), 2010-2011.
- 94 Brian Gould, [*All Milk Prices: Vermont*](#), University of Wisconsin-Madison.
- 95 United States Department of Agriculture, 2007 Census of Agriculture, [*Table 31*](#).
- 96 Lisa Rathke, [*Demand For Goat Cheese Spurs Growth Of Goat Dairies*](#), AP, 2011.
- 97 Melissa Pasanen, [*"A Hard Lesson in Sustainability: Goat Dairies Have Little Use for Male Kids"*](#), *Burlington Free Press*, May 15, 2011.
- 98 Timothy Dalton et al., [*A Comparative Analysis of Organic Dairy Farms in Maine and Vermont: Farm Financial Information from 2004 to 2006*](#), Maine Agricultural and Forest Experiment Station Bulletin Number 851, University of Maine, July 2008.
- 99 Kirk Kardashian, [*"Passing on the Pasture"*](#), *Seven Days Vermont*, December 2009.
- 100 Resource Systems Group, Inc., *"Fair Trade" Milk Market Research Study*, prepared for the Vermont Agency of Agriculture, Food, and Markets, September 2007.

101 Resource Systems Group, Inc., *"Keep Local Farms" Logo, Name, Message, and Pricing Study*, prepared for the Vermont Agency of Agriculture, Food, and Markets, December 2008.

102 Research conducted by a UVM senior seminar in business administration; results posted at: www.uvm.edu/tourismresearch/publications/Cabot_VDTM.pdf.

103 Agri-Mark; Dairy Farmers of America, Northeast Council/Dairylea; Dairy Farmer's Working Together; Farm Bureau of Vermont; Holstein Association USA; St. Albans Cooperative Creamery, Inc.; Vermont Agricultural Credit Corporation; and the Vermont Secretary of Agriculture, Food, and Markets.

104 Charles F. Nicholson and Mark W. Stephenson, *Analysis of Proposed Programs to Mitigate Price Volatility in the U.S. Dairy Industry*, September 2010.

105 Dennis A. Shields, Dairy Farm Support: Legislative Proposals in the 112th Congress, <http://farmpolicy.com/wp-content/uploads/2011/11/CRS-DairyProps-11Oct28.pdf>, October 28, 2011.

106 Ibid.



ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Dairy

Credits

3.3 Food Production: Dairy was prepared by Scott Sawyer, Louise Calderwood, Diane Bothfeld, and Kit Perkins.

Special thanks to reviewers for helpful comments: Len Bull, John Cleary, Jane Clifford, Robert Foster, Willie Gibson, and Dr. Robert Parsons.

Special thanks to Carrie Abels for supplying vignettes.

Maps: Dan Erickson, [Advanced Geospatial Systems, LLC](http://www.advancedgeospatial.com)

Copyediting: Patsy Fortney

Layout and Design: Scott Sawyer, and Katie-Marie Rutherford, www.katierutherford.com

For more information:

Vermont Sustainable Jobs Fund

www.vtfoodatlas.com

www.vsjf.org

3 Pitkin Court, Suite 301E

Montpelier, VT 05602

info@vsjf.org



Vermont Sustainable Jobs Fund

farm to plate
STRATEGIC PLAN

farm to plate
NETWORK



The information contained in 3.3 Food Production maps was derived from a variety of sources. *Advanced Geospatial Systems, LLC* (AGS) compiled these maps, using data considered to be accurate; however, a degree of error is inherent in all maps. While care was taken in the creation of this product, it is provided “as is” without warranties of any kind, either expressed or implied. AGS, the *Vermont Sustainable Jobs Fund* or any of the data providers cannot accept any responsibility for errors, omissions, or positional accuracy in the maps or their underlying records. These maps are for informational purposes only. For the most up to date maps, please visit the Vermont Food System Atlas at www.vtfoodatlas.com.