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# Development and Challenges of the Organic Dairy Industry

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## Introduction

The number of organic dairy producers in Minnesota and the Upper Midwest continues to grow. Over an eight year period from 2000 to 2008, the number of organic farms in Minnesota grew by 42 percent. Currently, there are over 150 organic dairy farms in Minnesota; ranking Minnesota #9 for organic dairy production in the United States. Between 2000 and 2005, the number of organic milk cows in the United States increased from 38,000 to more than 86,000 cows (ERS, 2010; McBride and Greene, 2009), thus slowing the decline of smaller dairy operations in the Upper Midwest. Despite the slow-moving economy over the past several years, consumers continue to purchase organic dairy products. Organic milk can cost considerably more than conventional milk; the national price premium for organic milk averages \$2.50 per gallon. Interest in organic dairying is on the increase because of the growing organic market, premium prices for organic milk, and a preference by consumers and some farmers for a less intensive production system. To maintain the viability of organic dairy operations, best management practices and a consistent season-long supply of high quality forage need to be provided to ensure animal health and milk production.

## What it means to be organic

Many people may be confused about the use of the term “organic”. Organic, unlike “natural” is defined by federal law and regulated through a certification process. According to the National Organic Program (NOP) of the USDA, organic is a production system that is managed to respond to site-specific conditions by integrating cultural, biological and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity. To sell milk as organic, a farm must be certified and inspected annually to verify that an organic plan is followed. Rules are incorporated in the NOP with oversight provided by a certification agency (Riddle and Gulbranson, 2010).

For dairy operations, organic certification requires an Organic Livestock Plan, outdoor access, pasture for all dairy animals over 6 months of age during the grazing season (at least 30% of dry matter intake from pasture for at least 120 days), no antibiotics, growth hormones or GMOs, 100% organic feed, and no rotation of animals between organic and conventional management. Furthermore, dairy cows are to have had one year of organic management prior to production of organic milk, and manure must be managed to prevent contamination of crops, water, and soil, and to optimize recycling of nutrients. According to the NOP rules, it is forbidden to withhold medical treatment from a sick animal in order to keep it organic (NOP, 2012).

Organic livestock must consume organic feed, and therefore, rules also apply to certified organic crop acres and pastures. Fields and pastures must have three years with no application of

synthetic fertilizers or pesticides prior to the first harvest of organic crops or pasture. A producer must use organic seeds and an organic systems plan must be followed to include proactive soil fertility, and weed and pest management. Land transition begins at the date of the last application of a prohibited substance, and there must be a buffer zone between organic and conventional land.

Organic crop and dairy producers must be certified, and certification is an evaluation system that validates the authenticity of products sold as organic. Certification is renewed annually. However, producers who sell less than \$5,000 per year in organic products do not have to be certified, but must follow the rules to use the organic label.

### Consumer use and retail sales

According to the Organic Trade Association, organic food encompassed 4% of the food market during 2011 (OTA, 2011). The growth of organic in the United States has garnered the attention of some of the largest food manufacturers and retailers in the country, and the organic industry is dominated by large corporations (Figure 1).

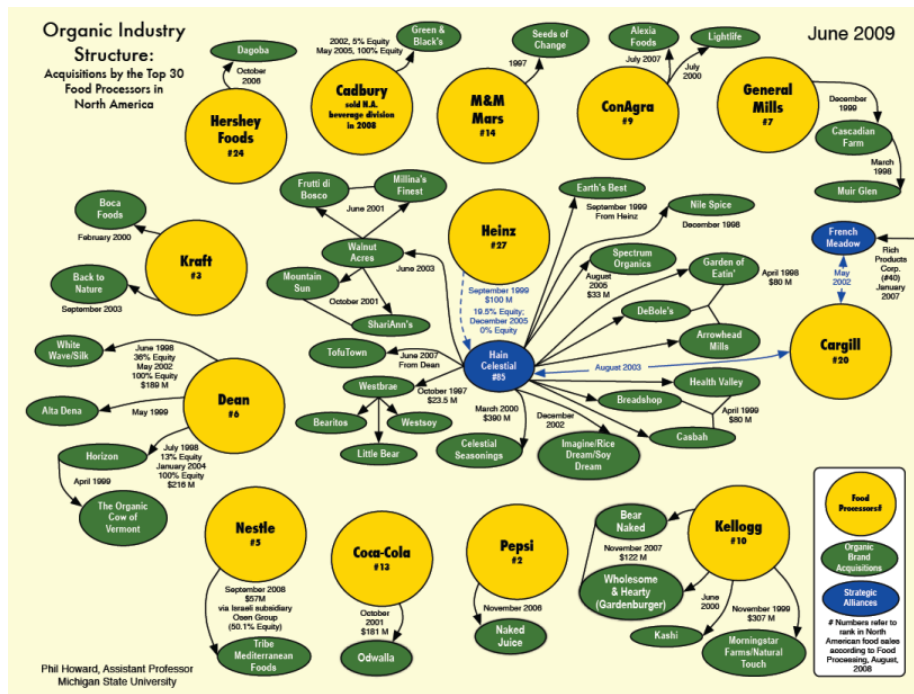


Figure 1. The organic industry structure in North America. (Howard, 2009)

The organic dairy segment has been one of the fastest growing segments of the organic food industry. However, this growth has been fraught with organic milk shortages, such as those experienced in 2005 and 2006 (Dimitri and Oberholtzer, 2009), and more recently 2011 and 2012. During 2012, the organic milk shortage was caused by increasing consumer demand coupled with lower organic dairy cow production. High organic grain prices triggered dairy producers to lower grain consumption, and thus lowering milk production of organic dairy cattle.

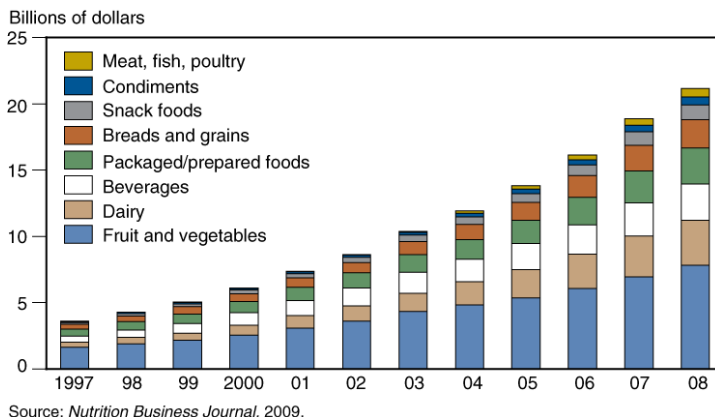


Figure 2. United States retail sales of organic food products from 1997 to 2008 (Dimitri and Oberholtzer, 2009).

Retail sales of organic products from 1997 to 2008 found dramatic increases for dairy products across the 12 years (Figure 2). Approximately 10 to 15% of the organic market in the United States is from dairy products.

Organic milk can cost considerably more than conventional milk; the national price premium for organic milk averages \$2.50 per gallon (AMS, 2011). However, consumer demand continues to grow at an annual rate approaching 10 to 20 percent. According to the Hartmann group, 75 percent of consumers are choosing organic products, at least occasionally, and 35 percent of those consumers purchase organic products monthly (Hartmann Group, 2010). Most consumers purchase organic products because of concerns associated with pesticide, growth hormone, and antibiotic use. Only 22% of consumers buy organic because they support family farms and 18% buy organic because organic means better treatment of animals. Furthermore, consumers purchase organic products because of the perception that they are more nutritional, safer, and taste better than conventionally raised agricultural products. Most (73%) consumers purchase organic products at a grocery store (Hartmann Group, 2010). Farmers markets, natural foods stores, and discount retailers (Wal-Mart, Target, etc.) are also outlets for consumers to purchase organic products. In a study conducted in 2011 by the Organic Trade Association, 41% of parents are buying more organic food than one year ago. These parents are choosing to buy organic food because they believe organic products are safer, more nutritious, better for the environment, and support rural communities. The main reason for people not to purchase organic products is because the perception that they are too expensive (OTA, 2011).

## Organic dairy production in the Upper Midwest and United States

A survey of United States organic dairy producers found that they were most interested in best management practices for organic rotational grazing, pasture fly control, and prevention and treatment of mastitis, along with improving profitability (Riddle, 2004). Similarly, a 2010 survey of organic farmers by the Minnesota Department of Agriculture reported that 42% of respondents ranked economics of organic farming a high priority and 36% ranked livestock health and management very high (Moynihan, 2010). Organic dairy producers transitioned from conventional to organic because of the price premiums, environmental benefits, and because they believe that organic food is healthier and of higher quality. Additionally, organic producers like farming organically more than conventionally.

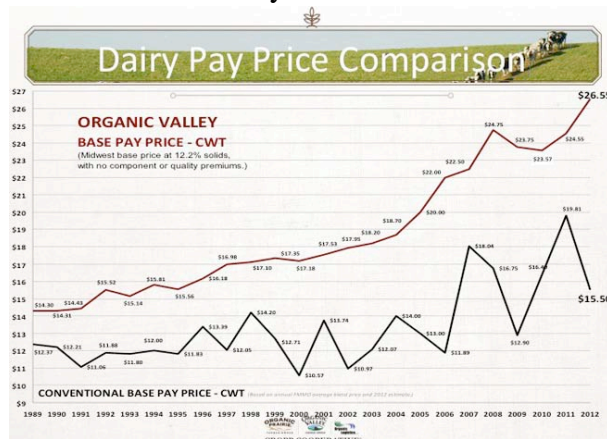


Figure 3. Organic Valley Dairy Pay Price Comparison (www.farmers.coop)

Organic milk price is the biggest incentive for producers to transition from conventional to organic production. Based on spring 2012 prices, conventional milk base price was about \$16 versus \$26/cwt. for organic milk (Figure 3). Therefore, organic dairy production is very attractive to producers when the milk price spread is high. During the summer of 2011, the milk price spread between conventional and organic ranged from \$3 to \$5/cwt. making organic production not that attractive. However, supply management and a sustainable and persistent milk price for dairy producers are two incentives for producers to consider organic production.

For 2012, Midwest pay price data (Figure 3) from CROPP cooperative (aka Organic Valley, [www.farmers.coop](http://www.farmers.coop)) reports a base component price of \$26.55/cwt. which is based on 3.5% fat, 3.05% protein, and 5.65% other solids. Organic processors also pay significant premiums for somatic cell count, standard plate count (SPC), preliminary incubation count (PI), and lab pasteurization count (LPC). For somatic cell count, there is an adjustment of \$0.48 cents per 100,000 cells. The limit for somatic cell count is 350,000. The deduction is \$0.48 per 100,000 over 350,000 cells. The payment charts from Organic Valley show the incentives for organic dairy farmers to produce high quality milk. The organic payment information for all regions of the United States is available at the Organic Valley website at <http://www.farmers.coop/producer-pools/dairy-pool/pay-price/>

SPC CROPP payment chart			PI CROPP payment chart			LPC CROPP payment chart		
SPCx1000	\$		PI x1000	\$		LPCx1000	\$	
1-10	0.25	Premium	0-15	0.50	Premium	0-50	0.50	Premium
11-20	0.10	Premium	16-30	0.25	Premium	51-100	0.25	Premium
21-30	0.00		31-50	0.00		101-250	0.00	
31-100	(0.10)	Deduct	51-100	(0.25)	Deduct	251-300	(0.75)	Deduct
100+	(0.25)	Deduct	101-200	(0.50)	Deduct	301+	(1.00)	Deduct
			201-750	(1.00)	Deduct			
			750+	(2.00)	Deduct			

Finally, organic processors incorporate a seasonal pay price premium to provide an incentive for persistent milk production across the year. Typically, most organic producers calve animals in the spring, and therefore, this incentive is in place for more production during the winter months.

### Organic compared to conventional dairies

McBride and Greene (2009) conducted a survey of organic dairy farms in the United States and compared them to conventional dairy farms. They reported organic dairies had fewer cows compared to conventional farms (82 versus 156 cows), and they produced 30 percent less milk than conventional dairies (13,061 versus 18,983 lb./cow). The organic dairies also used more pasture-feeding, and 68% of forage fed came from pasture compared to only 17% forage fed on conventional farms.

Table 1 has the organic dairy averages for Minnesota and for all herds processed through Dairy Records Management System (DRMS) in Raleigh, North Carolina. Data is from the 2011 Minnesota DHIA annual summary of herds (MN DHIA, 2011). The average number of cows in Minnesota herds was 101 and production per cow was 13,011 lb., which was considerably lower than the all Minnesota average of 20,522 lb. per cow. Somatic cell count and fertility traits were similar for organic herds and all herds in Minnesota.

**Table 1. Organic and all herd averages for Minnesota dairies during 2011.**

	Minnesota organic	DRMS organic	Minnesota all herds
Number of herds	32	152	2,009
Cows per herd	101	78	121
Milk (lb.)	13,011	14,892	20,522
Fat (lb.)	520	601	783
Protein (lb.)	407	466	636
Fat (%)	4.0	4.1	3.8
Protein (%)	3.2	3.1	3.1
Somatic cell count	337	272	306
Removals -1 <sup>st</sup> lactation (%)	8.6	8.1	10
Calving interval (mo)	14.6	14.1	15
Days to first breeding (d)	92	89	94
Days open (d)	165	149	161
Pregnancy rate (%)	12.1	17.3	15

Minnesota DHIA 2011 Annual Summary

### Profitability of organic dairy production

Very little research has been conducted on the profitability of organic dairying, and understanding the costs of production on an organic dairy farm can be a challenge. However, this information can be significant to organic dairy producers, as well as conventional producers, looking to improve the financial situation of their dairy herd. Producers who have a handle on the economics of their organic dairy production system can make decisions that reduce financial loss. Organic dairy farming may be a profitable alternative for dairy farmers who want to use a less intensive production system that supplies a growing organic market.

The University of Vermont (Parsons, 2006; 2011) and the Minnesota Department of Agriculture and the University of Minnesota have collected financial data from organic dairy farms for the past few years. The Minnesota financial information presented in this paper is from the recently published report “2010 Organic Farm Performance in Minnesota” from the Minnesota Department of Agriculture (Nordquist and Moynihan, 2010).

Table 2 shows the performance data of organic and non-organic dairy farms in Minnesota and Vermont during 2010. For Minnesota, organic dairy herds had 8,900 lbs. less production than non-organic herds; however, the lower production was a result of lower inputs for cows (i.e. feeding less grain). Additionally, organic herds in Minnesota had less feed cost and less total costs per cow than non-organic herds. Organic herds had less feed costs because they fed less grain whereas non-organic herds had high grain prices and high prices on protein and vitamins and minerals. Organic herds in Minnesota also had less veterinary costs (\$72.57 less per cow). Bottom line, organic dairy herds in Minnesota during 2010 had more net income per cow (+\$544) than non-organic herds.

**Table 2. Performance of organic and non-organic dairy herds in Minnesota and Vermont in 2010.**

	Minnesota		Vermont	
	Organic	Non-organic	Organic	Non-organic
Cows per herd	79	137	55	66
Milk price (\$/cwt.)	26.19	16.26	30.40	13.30
Milk production (lbs.)	12,819	21,732	13,116	19,909
Income (\$/cow)	3,102	3,278	4,469	4,199
Feed cost (\$/cow)	1,210	1,569	1,065	1,005
Total cost (\$/cow)	2,346	3,057	3,555	3,286
Net income (\$/cow)	756	212	914	925

What about Vermont, where 21% of dairy farms are organic? Total costs per cow were slightly more for Vermont organic dairy farms than non-organic dairy farms. During 2010, net income per cow was similar (\$914 versus \$925) for organic and non-organic dairy farms in Vermont. Veterinary costs were similar (\$102 versus \$91) for organic and non-organic herds, respectively, in 2010. These values are for the average farm in Vermont, which indicates that some organic farms are doing quite well and others are not as profitable.

There are some key points that the University of Vermont economic comparison reported. First, an organic production model fits the small size dairy farms of New England well, because most Vermont farms are located in the hills where pasture is abundant and farmers don't grow much



corn for grain. Second, an overwhelming number of organic dairy producers are satisfied with their decision to go organic, plan on milking 10 years or more, and think organic dairying is more profitable in the long run. Lastly, most of the organic producers in Vermont indicated they would not be in business if it was not for organic (Parsons, 2011). For both Minnesota and Vermont the organic milk price may likely need to be higher, depending on the continued increase of feed and fuel, for organic dairy farms to survive.

Financial information compared organic and conventional herds in California during 2010, and found organic herds produce less milk, have lower culling rates, a higher milk price, but higher feed costs (Table 3). Organic herds had \$4.16/cwt. more profit than conventional herds in California.

**Table 3. California cost of production during 2010**

	California, organic	California, all herds
Number of herds	11	2,009
Cows per herd	422	1,289
Milk (lbs.)	50	69
Fat (%)	3.9	3.7
Solids-non-fat (%)	8.9	8.9
Cull rate (%)	28	38
Mailbox price (\$/cwt)	25.84	14.80
Grain & mineral cost (\$/ton)	398.15	233.71
Feed cost (\$/cow/day)	6.09	5.11
Total cost (\$/cwt)	20.58	13.70
Profit (\$/cwt)	5.26	1.10
Investment per cow (\$)	2,547	2,684

Adapted from the California Cost of Production 2010 Annual

### Organic grain prices

Currently, in 2012, the biggest factor affecting the profit and bottom line of organic dairy herds in the United States is the high price of organic grains. During 2010, organic corn prices hovered around \$6/bushel. However, in 2011 organic corn and soybean price rapidly climbed to \$14/bushel, and 2012 prices indicate that organic corn will be high. Speculation is that most of the organic corn is going to the western United States for organic poultry production. Figure 4 and 5 are from the April 4, 2012 National Organic Grain and Feedstuffs report of the USDA.

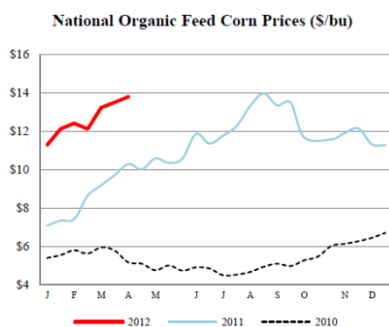


Figure 4. National Organic Corn Price 2010 - 2012

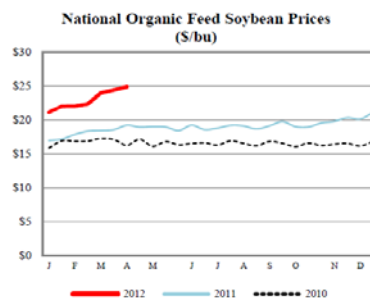


Figure 5. National Organic Soybean Price 2010 - 2012



## **National Organic Program**

All organic products must comply with Federal regulations. The USDA regulates the production and labeling of organic livestock dairy products under the Organic Foods Production Act of 1990 and the National Organic Program (NOP). All state and private certifying agencies must be accredited by the USDA (NOP, 2012). Certifying agencies may have more strict requirements for organic certification than the NOP regulations but they can never establish exceptions to the organic rule (Riddle, 2008). All organic dairy operations must maintain high quality records, demonstrate compliance with NOP regulations, and make them available to organic inspectors. Along with records, producers must complete an Organic Systems Plan that describe their production practices; list and describe all substances used and planned for use by the operation; describe the monitoring practices used to assure that the operation follows the requirements; describe their recordkeeping system; describe steps taken to prevent contamination; and provide other information requested by the certification agency.

Organic dairy products must be from animals that have been under continuous organic management at least 1 year prior to the production of the milk. Once a dairy herd is converted, all future dairy production animals must originate from animals that were managed organically from at least the last third of gestation. The animals must be fed and managed organically at all times in order to produce organic milk (Riddle, 2008). Organic dairy animals lose their organic status if they are removed from the organic farm and managed on a conventional operation, and therefore, cannot be moved back into organic production.

The NOP regulations require 100% organic feed for all organic livestock. All components of the ration must be certified organic. Fields, including pastures, used to grow feed for organic livestock, must be certified. Records must be kept of all farm-raised and purchased feed and feed additives. Crop producers who grow livestock feed for sale to organic livestock producers must be certified. Livestock feed used for organic production must not contain animal drugs, including hormones, feed supplements or additives in amounts above those needed for adequate nutrition and health maintenance.

Organic dairy producers must establish and maintain animal living conditions which accommodate the health and natural behavior, including: access to the outdoors; pasture for ruminants during the growing season; clean, dry bedding (which must be organic); and shelter designed to allow for opportunity to exercise.

For health care, organic dairy producers must establish preventative livestock health care practices. When preventive practices and veterinary biologics are inadequate to prevent sickness, a producer may administer synthetic medications, provided that such medications are allowed under the National List. Livestock producers must not, “withhold medical treatment from a sick animal in an effort to preserve its organic status. All appropriate medications must be used to restore an animal to health when methods acceptable to organic production fail. Livestock treated with a prohibited substance must be clearly identified and shall not be sold, labeled, or represented as organically produced (Riddle, 2008). Examples of allowed synthetic substances include: aspirin; flunixin; vaccines; chlorhexidine for surgical procedures and as a teat dip; iodine; oxytocin for emergency therapeutic use; copper sulfate; and lidocaine.

For a more complete review of the NOP standards please visit the NOP web site at <http://www.ams.usda.gov/nop/>

## **Animal health**

Many dairy farmers are leery of organic production because of concerns that restrictions on the use of antibiotics and other drugs may have a negative impact on herd health. But research indicates that a high level of herd health can be maintained in organic management systems. Mastitis is a costly disease that is frequently treated with antibiotics in conventional production systems. Organic dairies treat mastitis with a range of tactics varying from frequent milk-out to homeopathy to utilization of a variety of organic medications such as garlic or antibody blends.

University of Wisconsin researchers Pol and Ruegg studied herd health (Pol and Ruegg, 2007) on 20 organic farms and 20 conventional dairies. Reported cases per year on conventional farms, as a percent of total cows were: mastitis, 40.9%; respiratory, 3.3%; metritis, 15.3%; and foot infection, 19.7%. Organic dairies reported: mastitis, 20.5%; respiratory (4 farms), 0.8%; metritis, 9.3%, and foot infection (12 farms), 24.6%. An earlier Wisconsin study compared 99 conventional herds with 32 organic herds (Zwald et al., 2004). Average production per cow per day was 68 lb for conventional farms and 50 lb on organic farms. Herds with somatic cell counts < 200,000 were 31.3% conventional, and 9.4% organic, while SCC > 400,000 were 8.1% conventional and 15.6% organic. These results indicate a wider range of effectiveness in controlling mastitis in organic herds than in conventional herds.

Medication with antibiotics is strictly controlled in Scandinavia where all treatments must be done by veterinarians and recorded by the vet when treated. A Norwegian study of 93 conventional and 31 organic herds found that organic herds had longer production life (121%), and less clinical mastitis (14%), ketosis (36%) and milk fever (59%); similar SCC counts (102%); but lower production (82%) while feeding less concentrate (46%).

## **Veterinary use on Midwest organic farms**

Organic producers and Iowa veterinarians were questioned about the existing veterinary systems and care available to organic livestock producers. Researchers wanted to determine how well the current system of veterinary care fits the needs of organic livestock producers and how it may be improved (Wells and O'Neill, 2011).

The results showed most producers were satisfied with the availability of veterinary services and reported a lot of independence in dealing with herd health challenges. In contrast, the veterinarians pointed out a variety of health concerns possible on organic farms and stressed the importance of regular veterinary involvement in those systems. They also indicated that organic health care information was either unavailable or difficult to access.

The authors concluded that organic producers were satisfied with the veterinary services available to them. Most organic producers prefer to handle most routine health treatment without consulting outside help and report few health problems as the primary reason to not consult with veterinarians. Veterinarians expressed confusion about how to best serve organic producers and

where to acquire reliable information. Most veterinarians expressed some hesitations about organic production; however, a majority indicated interest in organic production. A smaller number of veterinarians favor incorporating organic livestock education into veterinary medicine programs, and several expressed the need for research on alternative treatment options.

## Conclusions

The dairy segment of the organic food industry is rapidly growing. More consumers are choosing organic dairy products and organic dairy consumption on the increase. These consumers are buying organic products because of their concern with pesticides, growth hormones, antibiotics and GMOs. For organic dairy production, feed must be 100% organic, antibiotics and hormones are not allowed, pasture is mandated, and extensive records must be maintained on feed and animal health. There are many challenges associated with organic dairy production and extensive planning is needed for producers considering a transition to organic dairy production. Some challenges include fewer health products allowed, higher costs of feed, less research information available on organic dairy production, high costs of certification (\$500 to \$1,500 per year), and the extensive paperwork and records that must be maintained on all aspects of the farm. Despite the challenges, organic dairy production may be more profitable than conventional dairy production. Regardless of organic or conventional, dairy producers must have the best management practices that will positively impact the profitability of their dairy operations.

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