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Dairy Manufacturing Capacity and Milk Production: Results from Discussions and Interviews

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Dairy farms have many characteristics that make them unique. As an economic engine for a local economy, they also have a large economic impact factor because of the amount of upstream (e.g., feed, veterinarian, machinery, milking equipment and supplies) and downstream (e.g., hauling, processing, and marketing) industries they support. The desirability of dairy farms as economic drivers is reflected in the state and local economic incentive programs that exist across the country to attract these businesses. Similarly, cooperatives and other firms looking to invest in dairy product manufacturing facilities are often courted and offered tax breaks and other

Location and expansion decisions for milk production and manufacturing facilities are of critical importance as the investment in facilities is both large and essentially sunk with little salvage value. incentives. Raw milk from the farm is bulky and perishable resulting in a limited distance to which it can be economically transported for processing. Therefore, manufacturing capacity is particularly important to maintaining or attracting milk production. The result is that location of dairy farms and dairy manufacturing capacity are closely related.

This bulletin presents results of discussions, interviews and surveys regarding the location of milk production and dairy product manufacturing capacity and, more broadly, a SWOT (strengths, weaknesses, opportunities, and threats) analysis of the US dairy industry and the Northeast region dairy industry. Policy implications and responses are also discussed.

Methods

The factors, issues and results discussed here come from three different sources with closely related issues and questions. The first was the Northeast Dairy Policy Summit held in Binghamton, NY on December 9, 2022. The Summit largely focused on dairy markets policy as it was in the period prior to the Federal Milk Marketing Order reform, or modernization, hearings which took place from August 2023 until January 2024. That discussion included Class I price differentials, make allowances and pooling rules but those issues are not covered. This report considers the discussion about manufacturing capacity, impediments to investment, policy solutions and related industry issues.

The second was a series of detailed interviews with Northeast dairy industry participants (n=9) from June-September 2023. The third was an online survey of dairy economists (n=12) in November and December 2023. There was no overlap between the sets of respondents and discussants. All respondents and participants were active in the dairy industry many with decades of experience.

This reports aggregates and summarizes the results. The next section presents a SWOT analysis of the US and Northeast dairy industries drawing from all three information sets. The following section considers factors that were specifically discussed as impediments to investment in manufacturing capacity. The fourth section discusses rankings of factors that are important to determining where milk production and manufacturing capacity locate. The fifth section discusses policies that might facilitate investment in dairy manufacturing capacity.

SWOT Analysis

All three of the groups discussed above were queried about factors that constitute a SWOT analysis. SWOT stands for strengths, weaknesses, opportunities and threats. Strengths and weaknesses are from within the industry in this context while opportunities and threats come from external forces. The discussions and interviews point to a rather consistent set for the US dairy industry. Summary factors for the national dairy SWOT analysis are presented in Table 1.

Table 1. SWOT Analysis of US Dairy Industry

Internal Factors	External Factors
<p>Strengths</p> <ul style="list-style-type: none"> Size and efficiency/low cost of production Abundant land base and related resources Infrastructure Large domestic market Diversity of product mix Geographically dispersed 	<p>Opportunities</p> <ul style="list-style-type: none"> Domestic: Innovation particularly in value added fluid products (e.g., ESL), fractionated proteins, and nutritional ingredients Green practices/environmental aspects International: EU and NZ production cuts Cheese and value-added product exports
<p>Weaknesses</p> <ul style="list-style-type: none"> Labor shortages Market power asymmetries 	<p>Threats</p> <ul style="list-style-type: none"> Environmental regulations Labor and immigration issues Lack of new trade agreements Consumer perceptions/activist groups Substitute products

In terms of strength, the US dairy industry has large and very efficient dairy herds. The US is blessed with a large land base and abundant other resources in most regions. The country also has well-developed infrastructure including interstate highways and utilities to support business. With the third largest national population on the planet, the US has a large, wealthy domestic market to serve. Other strengths included that the US produces a wide variety of dairy products and ingredients and that the industry is geographically dispersed.

The most frequently mentioned weakness of the national dairy industry was the labor shortage realized throughout the country but that is most acute in rural areas. The lack of will or ability to address the immigration situation leaves the dairy industry at the farm and plant level continually challenged to fill labor needs. Another issue often mentioned was the asymmetric bargaining power between market participants in the supply chain (retailers, processors, cooperatives and farmers). This is one of the issues that Federal Milk Marketing Orders aim to address between farmers/cooperatives and processors but does not assist with other participants in the supply chain.

In terms of opportunities, product innovation was mentioned by many including extended shelf-life (ESL) fluid products and fractionated proteins. Other opportunities include addressing environmental concerns with appropriate compensation. International opportunities include the EU and New Zealand cutting back milk production—largely in response to environmental regulations—offering an opportunity for US dairy exports to gain market share in international markets. Related is the opportunity for the US to export higher value products including cheese rather than the more basic powders that have been the majority of exports to date.

Threats include environmental regulations—particularly air quality rules that may emerge in coming years. The patchwork of existing environmental regulations is a challenge for any cooperative or processor that operates across states. Labor and immigration issues are a particular challenge to the dairy industry which needs access to reliable workers year-round. The US has fallen behind other major dairy exporters including the EU and New Zealand in the past couple of decades as they have negotiated dozens of new trade agreements while the US has essentially stood pat other than the renegotiation of NAFTA. Consumer perceptions, especially regarding environmental impacts and animal welfare, are a threat as small groups of activists can drive larger market responses. Finally, the rise of plant-based products has cut into market share for dairy products such as milk.

The Northeast region faces virtually all of the opportunities and threats that were discussed for the US. Specific to the Northeast region of the US, the SWOT analysis revealed that strengths included the climate and availability of water for cattle and forages (Table 2). The Northeast also possesses an educated workforce and proximity to large domestic consumer markets on the Eastern seaboard.

Table 2. SWOT Analysis of Northeast Dairy Industry

Internal Factors	External Factors
<p>Strengths</p> <ul style="list-style-type: none"> Water and climate Educated workforce Proximity to large markets/customer base 	<p>Opportunities</p> <ul style="list-style-type: none"> Innovation Reinvestment in traditional brands Small and midsize specialty product manufacturing
<p>Weaknesses</p> <ul style="list-style-type: none"> Higher average cost of production Older processing facilities No centralized voice 	<p>Threats</p> <ul style="list-style-type: none"> Environmental regulations Labor and immigration issues

Weaknesses of the Northeast region dairy industry that were consistently mentioned include a higher cost of production because of labor expenses and regulations among other factors. Because the Northeast is a region where dairy production has existed for many decades, some of the facilities are older and perhaps less efficient. Finally, it was noted that the Northeast may not speak with a unified voice on policy matters.

Opportunities included the name brands from the region that consumers know and trust. Reinvesting in these brands can help grow production and markets. Finally, the most often mentioned threats were the environmental and other regulations that are, perhaps, more common and onerous in the region than many of the areas to the West which have been expanding recently.

Other threats discussed include environmental regulations which tend to be more stringent in the Northeast region compared to some of the states where milk production has been growing in the south and west. Labor issues also seem to be particularly difficult in the Northeast region.

Impediments to Investment in Dairy Manufacturing Capacity

Milk dumping has become fairly common in recent years (since 2015) particularly in the Northeast region (Figure 1). As cooperatives and processors work to find a market for milk before dumping, one natural conclusion is that there has been a lack of processing capacity relative to growth in milk production. The interviews and surveys included noting factors that may be impeding investment in dairy manufacturing capacity which are discussed below for the US dairy industry in general and then those that are more specific to the Northeast region.

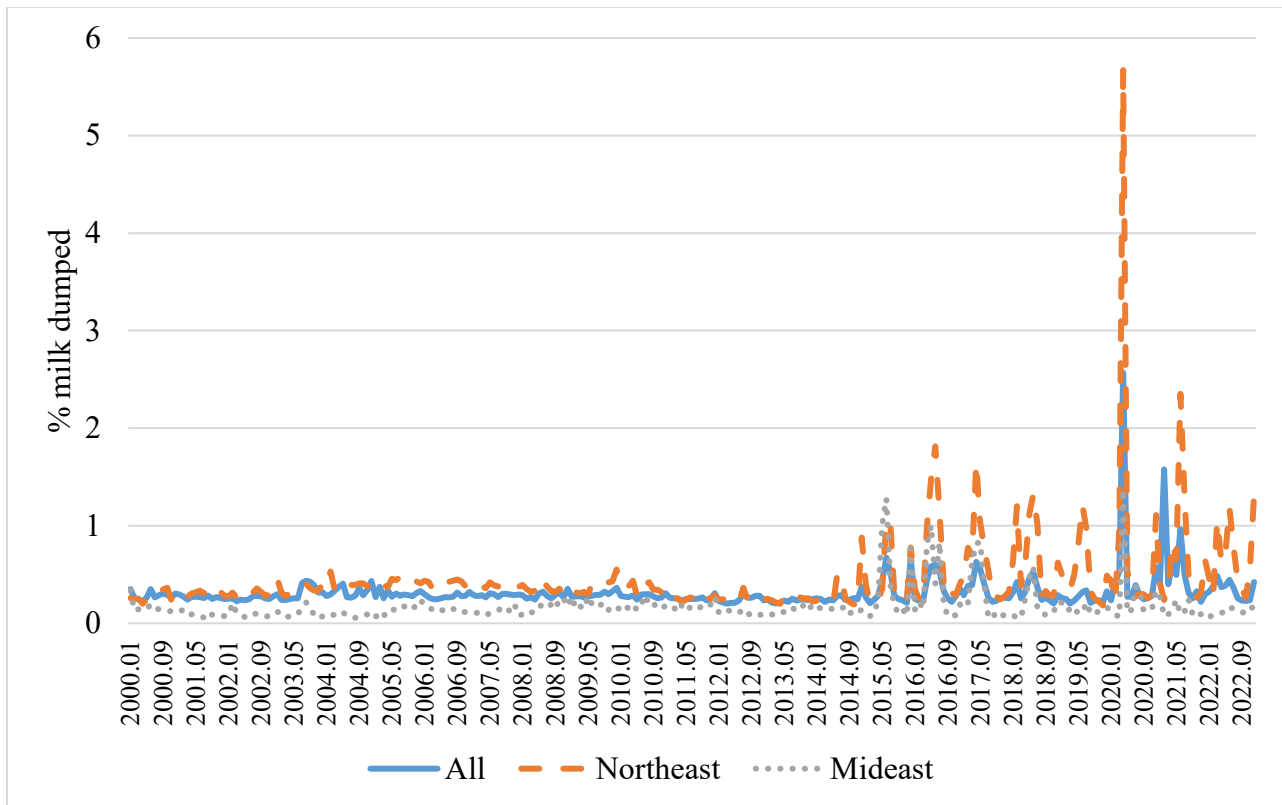


Figure 1. Percent of Milk Dumped, All, Northeast, and Mideast Orders, 2000-2022

Impediments to Dairy Plant Investment at National Level

Impediments to plant investment—especially in reference to a specific location—are largely impacted by the availability and cost of inputs, proximity to markets, and regulations.

New dairy plants that produce commodity products and must compete in national and international markets. These plants need to operate at a profitable level which means that a milk supply must be available. Processors considering location will often require contracts that promise a minimum amount of milk to that new plant. Thus, local milk supply and ability to expand to meet these plant needs is an important factor in plant locations.

Similarly, plant location will consider whether the local area has labor available that meets technical requirements and training at an economically viable cost.

High land cost in some locations can make both the investment in plants and the required expansion in milk production prohibitively expensive.

Environmental regulations—and the threat of environmental regulations can limit investment. In particular the uncertainty of more stringent regulations and enforcement mechanisms can make the discounted expected cash flows inadequate to justify investment.

Recent years, particularly since the pandemic, have been characterized by challenges in transporting goods. Raw milk has little margin for error in making in from the farm to plant in a timely manner. Cost and availability of qualified drivers as well as rules including weight limits and other logistics factors may make dairy product manufacturers hesitant to invest.

Federal Milk Marketing Order regulations apply with few exceptions to fluid processors. Other types of plants may pool on FMMOs although re-pooling takes a few months in the Northeast so de-pooling decisions are more significant than in other regions. It is a fairly common contention that FMMOs limit the incentive to innovate and invest with their class use and minimum price structure.

Northeast Region Investment Issues

Specific to the Northeast region, the relatively large number of smaller, higher cost farms supplying milk may be an impediment to attracting large, commodity product plants that necessarily operate on tight margins. The lack of growth, particularly in the fluid market, is also viewed as an impediment—although that may be overcome to some extent by product innovation.

The cooperative base programs and closed membership status are common in the Northeast region. Growth in farm level milk production requires new processing capacity for many cooperatives. The existence and impacts of cooperative base programs is jointly determined with lack of market so that should market growth be available, the cooperatives would be expected to change these policies.

The Northeast region has higher wages, and minimum wages in some states, than areas to the south and west. Rural areas in the Northeast region often also lack rental housing and daycare in areas where potential plants might locate.

Environmental regulations in the Northeast region are often more stringent than many other competing areas which increase farm and plant production costs.

Milk and Manufacturing Location Decision Factors

The flip side of the impediments to locating milk production and manufacturing capacity are which factors are most important factors in attracting milk and manufacturing capacity. Discussion and past research that suggested key factors. Abdalla et al. (1995) suggested that agricultural operation location was driven, in part, by environmental regulations and rural population growth. Winkler Stirm and St-Pierre (2003) used a large, national survey of dairy farmers and found that availability of water, availability of land for manure disposal, and milk price received were the most important factors. Wolf et al. (2015) found that availability of water and local forage supplies were the most important factors in large dairy farm location decisions.

Feed is the largest single expense in milk production accounting for 80% of operating costs and more than 50% of total cost of production. Long-term profitability in the dairy industry is driven by controlling costs and, thus, profit margin. Forage feed costs are a function of local supplies—particularly in times of adverse weather events. Concentrate feed costs are also a function of

proximity to major corn-producing states and basis. The increase in feed cost levels and volatility have focused many dairy farmers on feed cost. Water is necessary for cattle, pasture and crop growth, and cleaning milking facilities. Land availability can be an issue for feed growth, manure disposal, and construction. Farmers also generally pay the hauling costs to the processor or handler, and access and proximity to a processor may keep hauling costs to a manageable level. Environmental regulations and the permitting process can be onerous and steer location decisions. Farmers may need to trade off isolation from potential neighbor conflicts with proximity to input and output markets.

Respondents were asked rank location decision factors which included: proximity to manufacturing, labor cost/availability, feed cost, supply of locally grown forages, available water, availability/price of land, state and local taxes, environmental regulations, proximity to consumers, and mailbox milk price.

Table 3 displays the results and rank of those factors. Proximity to dairy manufacturing which was the top factor by a considerable margin. Given the difficulty in finding a home for milk across the country in the past few years, it is not surprising that this was the highest ranked factor. Available water was the second ranked factor reflecting the need for water for cattle and forages. In third was labor cost and availability. The challenges with finding and retaining labor for dairy farms is of paramount importance around the country but nowhere more than in the Northeast region. Environmental regulations were ranked fourth by these respondents. There is increasingly a patchwork of state and local environmental regulations which affect the costs of doing business and growth of dairy farms. Feed cost was the fifth ranked factor being the single largest expense in milk production. The milk price received by farmers, referred to as the mailbox milk price was sixth. Supply of locally grown forages was seventh. Proximity to consumers eighth. Availability and price of land ninth and state and local taxes last among these factors.

Table 3. Most important factors in determining milk production location

	Average rank	Rank
Proximity to dairy manufacturing	2.5	1
Labor cost/availability	4.3	3
Feed cost	5.0	5
Proximity to consumers	7.7	8
Available water	3.2	2
State and local taxes	8.4	10
Environmental regulations	4.7	4
Supply of locally grown forages	6.0	7
Mailbox milk price	5.5	6
Availability/price of land	7.8	9

Similar to dairy farm location, respondents were asked to rank factors by importance to attract dairy manufacturing capacity (Table 4). For manufacturing capacity factors included proximity to ports or railroads permitting process, and proximity to milk production as well as labor cost and availability, tax incentives, environmental regulations, and taxes.

Table 4. Importance to attract new dairy manufacturing capacity

	Average rank	Rank
Tax credits/cost sharing programs	4.9	4
Labor availability	2.6	2
Labor cost	4.3	3
Permitting and licensing process	6.5	8
Proximity to milk production	2.0	1
Proximity to customers	5.5	6
Proximity to ports or railroads	5.8	7
Environmental regulations	5.1	5
State and local taxes	8.2	9

Note: Respondents ranked all factors from 1 to 9.

Considering factors to attract dairy manufacturing capacity, revealed multiple tiers of rankings. Proximity to milk production had the highest rank closely followed by labor availability in the first tier. Labor cost was next followed by tax credit programs in fourth. Environmental regulations, proximity to costumers, and proximity to ports or railroads all had similar average rank between five and six. Permitting and licensing was second to last while state and local taxes were the lowest ranked factor of the factors considered. Of course, there are many factors not considered here so that even relatively low ranked factors may be significant in attracting processing investment.

Policy Implications and Suggestions

Given the discussion about the US and Northeast dairy industry including SWOT analysis, investment impediments, and location preferences, implications for policy solutions are a natural concluding point. Respondents and participants discussed a wide range of policy preferences and potential solutions from state to federal level. The policies were not necessarily discussed considering political will or budget realities. The most commonly discussed policies are presented here. They are broadly categorized as: public funding and investment, training and technical assistance, reducing costs and uncertainty due to policy, and safeguarding dairy product roles in nutrition programs.

In terms of public funding and investment, issues discussed were for grants and tax related subsidies to be available for revitalizing or expanding existing firms and facilities as well as new

ventures. While it may be headline grabbing to announce an all new facility, modernizing an existing facility can improve the economic viability of an existing operation for years to come. This is particularly important in the Northeast region that has been a traditional dairy producing area and, as such, has a large number of aging facilities. Similarly, public investment in infrastructure can set the stage for dairy manufacturing investment by having sites shovel ready. Infrastructure investment would include roads, rail and ports but also water and waste water handling. Public investment may also be appropriate in addressing housing and transportation issues that assist with labor supply.

Training and technical assistance programs can alleviate labor issues through workforce education. These programs can raise awareness of career opportunities in the dairy industry as well as decrease the cost of training workers for increasingly technical careers. Training and technical assistance could also help firms deal with permitting and environmental aspects of building new capacity. At the farm level, educational programs to deal with price risk and assistance for farm transitions can help enable a reliable milk supply.

Labor availability can be increased by considering public transportation to facilitate effective commutes from nearby urban centers. Housing and daycare investments also promote labor availability for plants and farms.

Regulation imposes costs in a couple of different ways. One cost is direct in terms of prohibitions or requirements that raise the cost of production. An example of a direct cost of regulation affecting the location of dairy manufacturing might be the road weight limits which increase the transportation cost and logistics if they are at lower levels than other states.

The other cost of regulations is the threat of or uncertainty around policy including new or more expansive restrictions or requirements as well as changing interpretations and enforcement. Uncertainty about the implications and incidence of policy inhibits investment. For example, the lack of certainty around immigration policy and labor availability may reduce the expected returns and inhibit investment. The uncertainty of environmental regulations also inhibits investment both at the farm and the plant level at the current time. While the EU and New Zealand have moved forward with policies that have resulted in direct cutbacks in milk production, the US has chosen to use more of an incentive laden set of policies to date (with the notable exception of California). However, there is a general concern that these policies may be imminent and that changes required might be cost prohibitive for some production systems. A clearly defined set of state and federal policies would help alleviate this uncertainty.

Finally, the longer-term decline in beverage milk consumption is a concern. Participants agreed that decreasing restrictions on milk and dairy products in programs such as school lunch and WIC.

References

Abdalla, C.W., L.E. Lanyon, and M.C. Hallberg. (1995). What we know about historical trends in firm location decisions and regional shifts: Policy issues for an industrializing animal sector. *American Journal of Agricultural Economics* 77:1229-1236.

Winkler Stirm, J.E., and N.R. St-Pierre. (2003). Identification and characterization of location decision factors for relocating dairy farms. *Journal of Dairy Science* 86:3473-3487.

Wolf, C., M. Bozic, M. Stephenson, and K. Behnke. (2015) Where the Grass is Always Greener: Dairy Farmer Location Preferences. *Choices* 30.

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