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## **The Community Advantages of Family-Sized Dairies**

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Any policy proposal to promote family-sized dairies must address the question of “Why?” The review of academic literature presented here comes back with this answer: “For several reasons, family-sized dairies provide special benefits for rural communities.”

One of those reasons requires little explanation or research; dispersing animals over many farms in a broad area is safer than concentrating them all in one area. A senior dairy economist with CoBank put it this way: “The largest risk with a densely concentrated milk supply is disease or natural disaster. A disease outbreak or natural

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disaster could quickly impact a much larger share of dairy production when it is concentrated in fewer farms.”<sup>3</sup>

A second, and related, reason concerns the environmental impact of dairy farming. Concentrating the manure produced by, say, 100 80-cow dairies on the site of a single 8,000-cow dairy magnifies the environmental consequences of natural disasters and technical failures many times over. Furthermore, the manure from 100 80-cow dairies is often well balanced with crops grown for feed. The 8,000-cow dairy must transport manure more distant farms crop farms or treat manure as a disposal problem. In the words of a 2017 report, “Livestock waste in these systems becomes an environmental pollutant rather than a recyclable resource contributing to soil health and fertility.”<sup>4</sup>

A third reason is that family-sized dairies provide special economic benefits for local rural economies. A 1995 University of Minnesota economic study of Green Isle,<sup>5</sup> a rural community in Minnesota, could apply just as well to hundreds of other towns throughout dairy country:

A drive through town provides a good picture of how things have changed in

Green Isle’s economy over the last 25 years. The hardware store is vacant. The

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<sup>3</sup> CoBank. “Structural shifts in the dairy industry lead to a new era of price cycles.” News release. October 31, 2018.

<sup>4</sup> Hendrickson, M., P. Howard and D. Constance. “Power, food, and agriculture: Implications for farmers, consumers, and communities.” Division of Social Sciences, University of Missouri. Paper posted Nov. 1, 2017.

<sup>5</sup> Love, Patricia W. *The Impact of Changes in Dairy Farming on a Local Economy: A Case Study*. Plan B Paper, Department of Applied Economics, University of Minnesota, St. Paul. May 1995.

general store's brightly painted mural belies the fact that the store is now gone, and its space remains unused. The feed mill at the main intersection in town also stands empty. Weed grow along the farm machinery factory's corrugated metal walls. The meat market has closed as well.

Leading indicators of community economic vitality such as population and retail sales had fallen dramatically in Green Isle during the study period. And, to quote the study, "the grade school closed permanently."

Extensive interviews with local citizens and business owners led the study's author to conclude that Green Isle's economic decline was closely linked to changes in local dairy farming. The decline in dairy farming was significant by any measure: "Between 1974 and 1992, the number of dairy farms [in the county] declined 61 percent, from 413 to 162." During this time, remaining farms became larger, but the number of dairy cows nonetheless fell 39 percent. As smaller dairies left the business, their land was absorbed by larger cash crop operations. The countryside surrounding Green Isle therefore appeared as agricultural as ever, but it had become dominated by crop farming instead of dairy farming.

The local economic effects of these changes were negative for at least two important reasons. First, the remaining dairy farms in the Green Isle area had increased in size. The study concluded: "As dairy farms increase in size, their

dependence on the local economy declines. In particular, farmers that have expanded are often able to shop around for their feed and other inputs. Their large size allows them to negotiate more favorable prices with firms, in the case of Green Isle, outside the community.” Second, fewer dairy farms of any size led to more cash grain farms that contributed less to the local economy. According to a local banker interviewed in the study, “With a dairy operation you relied on the veterinarian, the creamery, DHIA [a dairy farm record service], artificial insemination, livestock equipment, and feed. The move from livestock to crops eliminated a lot of those needs. This causes people who owned the businesses to go elsewhere.” A former business owner put it more directly, saying that during winter months when a dairy farmer is working and buying locally, “the cash cropper is in Arizona.”

What have subsequent studies said about the economic issues surrounding dairy farm size and community economics? Have they supported the study’s conclusions or determined it was out of the mainstream? The answers to these questions are the subject of this review of academic literature.

### A Note on Farm Size

Studies relating farm size and community well-being go back many decades. Many of those studies are of limited relevance for this simple reason: dairy farming has rapidly become concentrated in ways that could hardly have been imagined a

generation ago. For example, a USDA analysis of dairy farms in 1979<sup>6</sup> put dairy farms into two main groups: those with approximately 15-40 cows and those with approximately 65-260 cows.<sup>7</sup> Compare that “very large” 260-cow farm to today’s 10,000-cow operations! As a second example, a 1979 survey of dairies in New York State<sup>8</sup> projected more growth in herds with 250 cows, but hardly any indication that farmers would pursue farms of 300 cows or more. For perspective, the 2012 Census of Agriculture found a group of 246 farms in New York with an average size of 1,098 cows.

In today’s dairy economy, the question is not one of comparing the relative advantages of 30-cow herds with 100-cow herds. The relevant inquiry compares family-sized herds to those having tens of thousands of cows. I found no study that strictly met this criteria; instead, I described and made inferences from the studies that came closest.

### Comprehensive Reviews of Academic Literature

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<sup>6</sup> Peterson, R.N. U.S. *Dairy Farmers in 1979: Financial Characteristics by Operator Age and Size*. USDA. 1985.

<sup>7</sup> The original report categorized dairies by sales rather than cows. Conversion by Levins based on price and production per cow figures obtained from *Agricultural Statistics 1979*.

<sup>8</sup> McGuire, D.P. and B.F. Stanton. *Are there limits to herd size on New York dairy farms?* Department of Agricultural Economics. Cornell University. August 1979.

I found two previously published reviews of academic studies relating to the community effects of industrialized farming. The first appeared in 2008<sup>9</sup> and analyzed 51 academic studies going back to the 1930's. The studies covered dairy as well as other livestock species. Of those studies, 29 reported largely negative effects of industrialized farming and 42 reported at least some negative effects. Only three of the studies reported largely positive effects. Of particular relevance here, this overall review of studies concluded that:

...communities that lose moderate-sized family farms, in part because of transaction cost advantages (e.g., volume buying-selling) and public incentives given to industrial farms, will lose a base of middle-class producers and experience population decline and rifts in social fabric. These communities are likely to have declines in other local businesses and the property tax base and may require state aid for social and public services.

The second of the comprehensive reviews appeared in 2012.<sup>10</sup> Like the first, it covered all types of farms, not just dairies. This study also found that: "Decades of empirical research support the conclusion that large-scale, industrial farms have, overall, a negative impact on surrounding rural communities." The study offers a caution, however. The concept of "industrial agriculture" goes beyond scale:

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<sup>9</sup> Lubao, L. and C.W. Stofferahn. "The community effects of industrialized farming: Social science research and challenges to corporate farming laws." *Agriculture and Human Values* (2008) 25:219-240.

<sup>10</sup> Carolan, Michael. *The Sociology of Food and Agriculture*. Taylor and Francis Group. 2012.

According to the research, features like absenteeism (where land is leased and the owner lives outside the community), contract farming, dependency on hired labor, and operation by farm managers (as opposed to owner-operator situations) seem far more likely to place communities at risk than if surrounding farms (even large ones) lack those characteristics.

In other words, a large family-owned farm can still have significant ties and interactions with a local community. An investor-owned farm will more likely lack such connections.

### Other Studies

I now turn to several academic studies that are more specific to dairy.

A 2011 study reported in *Journal of Dairy Science*<sup>11</sup> investigated economic conditions in the top 100 dairy counties for the year 2007. The study found that “having many dairy farms was associated more favorably with county economic socioeconomic conditions than having high dairy sales.” Put another way, it is better for rural economies to have more dairy farmers than more dairy cows. The study was not able to determine with certainty whether very large farms by their nature

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<sup>11</sup> Dechow, C.D. “Short communication: Farm and socioeconomic characteristics of the top 100 dairy farm counties in the United States.” *Journal of Dairy Science*. 94:2972-2976. 2011.

contributed to poor local economic conditions, or simply took advantage of poorer local economies as they sought out cheaper labor and land.

In a 2002 study of dairy farms in Wisconsin<sup>12</sup>, researchers posed the question, “Is there a relationship between farm size increases and local economic activity?” The results showed that “both the percentage of all farm input purchases and the percentage of feed bought locally are negatively related to herd size.” This negative effect, however, was termed “modest.” The research also indicated that “lower numbers of cows in the area—and not simply increases in farm size—may actually represent the biggest threat to small-town agribusiness.” In an important caveat, the authors of the study acknowledge that the research “does not include any of the largest types of dairy facilities now being constructed in the Upper Midwest.”

A 2004 report on research conducted at the Ohio State University<sup>13</sup> also explored the relationship between farm size and local purchasing. Comparing the value of local purchases between an average size herd studied (about 82) cows with those of the largest herds studied (about 700 cows) showed that “such a difference lowers the expected value of local purchases (given all other attributes of the farm and county are average) by 31 percentage points.” Closer analysis of the farms

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<sup>12</sup> Foltz, J.D., D. Jackson-Smith, and L. Chen. “Do purchasing patterns differ between large and small dairy farms? Economic evidence from three Wisconsin communities.” *Agricultural and Resource Economics Review*. April 2002. pp. 28-38.

<sup>13</sup> Roe, B. and A. Stockberger. “Explaining economic linkages between farms and local communities: Looking beyond farm size.” Paper presented at 2004 meetings of American Agricultural Economics Association, Denver, CO.

showed additional differences, both positive and negative, in local purchasing patterns depending on types of purchases and characteristics of local communities.

A 2005 University of Wisconsin study<sup>14</sup> examined the relationship between dairy farm size and local purchases and found that “the premise that small farms purchase more locally is not the general case.” Some communities had more options for purchases than others and this, too, was an important determinant of spending patterns. Data for the study was from 2003 and covered 141 dairy farms in three dairy-dependent Wisconsin counties. The farms ranged in size from 12 to 800 cows, but “most farms in each community have fewer than 100 cows.”

A 2005 study in the academic journal *Society and Natural Resources*<sup>15</sup> examined the effect farm size had on farmers’ social ties. The data used in this study were for nine dairy-dependent areas in Wisconsin, Minnesota, New York, Texas, Utah, Idaho, and New Mexico. The percent of local milk produced on farms with more than 200 cows ranged from 7 to 99 percent among the areas chosen for analysis. The study found that, “the operators of dairy farms with larger herds tend to know their neighbors less well and are more likely to have fielded complaints from their

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<sup>14</sup> Foltz, J. and K. Zeuli. “The role of community and farm characteristics in farm input purchasing patterns.” *Review of Agricultural Economics*. 27:4. Winter 2005. pp. 508-525

<sup>15</sup> Jackson-Smith, D. and G. Gillespie, Jr. “Impacts of farm structural change on farmers’ social ties.” *Society and Natural Resources*. (2005) 18:3. pp. 215-240. 2005.

neighbors.” Furthermore, “regardless of a dairy farm household’s social ties, building a large operation is likely to generate conflicts with neighboring property owners.”

A 2015 study<sup>16</sup> examined how the size of dairy farms in Wisconsin affected the quality of jobs available for hired workers on those farms. Only farms large enough to have hired workers were included; the 83 farms selected for study were characterized as small (fewer than 300 cows), medium (301-600 cows), and large (more than 600 cows). Entry-level milking jobs were judged undesirable on all sizes of farms, but milkers hired on larger farms had better chances for promotion to better jobs on the farm. Those promotion benefits, however, were almost exclusively available to U.S.-born white workers; “the overwhelming majority of the immigrant workers we surveyed are located in entry-level milking positions.” In general, larger farms “fared better than or no worse than their smaller-scale counterparts in terms of most job quality metrics in our studies.”

In 2002, researchers found, “The most striking aspect of this paper’s results is that herd size is such a strong predictor of rBST adoption on dairy farms across states with very different average herd sizes.”<sup>17</sup> The largest farms are therefore most likely

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<sup>16</sup> Harrison, J.L and C. Getz. “Farm size and job quality: mixed-methods studies of hired farm work in California and Wisconsin.” *Agriculture and Human Values*. (2015) 32:617-634.

<sup>17</sup> Barham, B.L. et al. “rBST Use Among U.S. Dairy Farmers: A Comparative Analysis from Six States.” Paper presented at meetings of the American Agricultural Economics Association Annual Meetings, Long Beach, CA. 2002.

to drive up per-cow yields that drive down milk prices and frustrate efforts to balance milk supply and demand.

A principle conclusion of research reported at the 2007 meetings of the American Agricultural Economics Association<sup>18</sup> was:

Results show large dairy farms still experience significant scale economies that do not dissipate. They grow at a faster rate than medium-sized farms. This suggests that size distribution is not approaching a stable steady state equilibrium. Results also show that new entrants are generally large. This indicates that the minimum farm size below which dairy production is no longer profitable without a niche market is getting larger.

These findings prompted the researchers to observe, “Because such a concentrated industry would also adversely affect the viability of rural communities and the quality of the environment, policies to facilitate small business growth and diversification could achieve multiple policy objectives.” The researchers also caution against “policies and political access that inadvertently give preferential treatment to large farms” because they can “undermine the competitive nature of agriculture.”

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<sup>18</sup> Melhim, A., E. O’Donoghue, and C. Shumway. “Do the Largest Firms Grow the Fastest? The Case of U.S. Dairies.” Selected paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Portland, OR, July 29-August 1, 2007.

In a paper presented at the 2013 meetings of the Agricultural and Applied Economics Association<sup>19</sup>, researchers saw continued consolidation in dairy farming as virtually inevitable. Economies of scale, especially efficiencies in buying and operating farm assets, were principal drivers of this trend. The paper concluded by saying that, because of continued growth in size of dairy farms, “environmental impacts associated with manure management and the effects of rural communities with fewer family farms will need to be addressed by policymakers.”

### Interpretation of Studies

Most of the studies reviewed here might be seen as asking the wrong question. The question is not, “Which type of dairy is better for a particular rural community?” Instead, we should be asking, “What about the increasing number of rural communities that have no dairy farms at all?” For example, if all dairies were 10,000 cows, only 900 such dairies would remain in the United States.<sup>20</sup> Very few rural communities would have even one dairy under such a scenario.

Consider this hypothetical example of 10,000 dairy cows. Suppose we have 200 50-cow dairies spread over an area served by three rural communities. Say those dairies are roughly located so that a third of them serve each of the three

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<sup>19</sup> Dong, F., D. Hennessy, and H. Jensen. “Size, productivity and exit decisions in dairy farms.” Selected paper presented at the Agricultural and Applied Economics Association’s 2013 AAEA and CAES Joint Annual Meeting. Washington DC. August 4-6, 2013.

<sup>20</sup> Levins, R. “Give farmers a fighting chance.” *Hoard’s Dairyman*. October 10, 2018. p. 599.

communities; that is, each community has 67 dairies contributing to its economic vitality. Now say that time goes on and that each of the 200 dairy farms has either expanded to 100 cows in size or left dairy farming altogether. The total number of cows remains unchanged, but now each community is served by 33 dairies milking the same number of cows. It would be an interesting academic project to determine the pros and cons the structural change had on the economies of the three communities.

Now continue with the hypothetical example and assume that an absentee investor has established a 10,000-cow dairy in the region and that none of the other dairy farms remains in business. The new dairy could be in one of the three communities; if so, academics might look at the community impacts of going from many smaller dairies to one very large dairy. Two of the communities, however, would have no dairies at all. Or, maybe the new dairy opens nearer to a processing plant outside of the area and all three communities have no dairies to support their local economies.

From an economic development standpoint, dairy cows on any size farm are better for local communities than no dairy cows at all. As the number of dairy farms gets very large, the number of communities with virtually no dairies at all increases. Those communities will suffer in ways that the studies reviewed here do not directly

address. The principal advantage for family-sized farms in today's world of giant dairy farms is this: the more milk produced on family-sized farms, the more likely it is that rural communities will be supported by dairy farms of any size. The alternative is a rural landscape in which most communities have no dairy farmers or cows at all.

### Conclusion

There is considerable evidence for a general conclusion that communities that see fewer, larger dairy farms will experience reduced economic vitality, and virtually no evidence that larger farms improve community vitality. We must also be careful not to forget what one of the studies reviewed here said: “lower numbers of cows in the area—and not simply increases in farm size—may actually represent the biggest threat to small-town agribusiness.”<sup>21</sup> Family-sized dairies not only provide special advantages over their very large counterparts—they also assure that more rural communities will enjoy the economic benefits of dairy farming on any scale.

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<sup>21</sup>Foltz, J.D., D. Jackson-Smith, and L. Chen. “Do purchasing patterns differ between large and small dairy farms? Economic evidence from three Wisconsin communities.” *Agricultural and Resource Economics Review*. April 2002. pp. 28-38.