



Structure, Costs, and Technology Used on U.S. Dairy Farms

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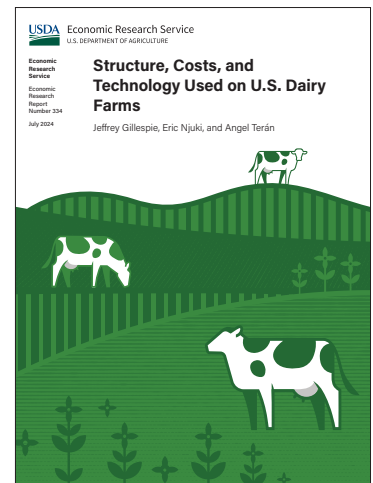
What Is the Issue?

Over the past two decades, the U.S. dairy industry has evolved, with fewer dairy farms producing more milk. This raises questions about how dairy farms have changed in size, diversification, location, use of advanced technology, and cost of production. Questions also arise about economies of scale in the dairy industry and the structure of larger versus smaller dairy farms. Shifts in the location of milk production lead to questions about how dairy farm size, diversification, use of technology, and cost of production differ by U.S. region. This report addresses issues of how the dairy farm structure has changed over the past two decades and how the structure differs by size of the operation and by U.S. region.

What Did the Study Find?

Highlights of study findings include:

- Consistent with long-term trends, the number of U.S. dairy farms has fallen (while milk production has risen), with larger dairy farms emerging that produce more milk per cow. The number of farms with fewer than 1,000 cows has fallen, while the number of farms with 1,000 or more cows has risen over the past two decades.
- Moderate shifts in the location of dairy farms occurred between 2002 and 2022, with Texas and Idaho gaining production share and California losing production share.
- Dairy farm usage has trended upward for several advanced technologies, management practices, and production systems: automatic take-offs, computerized milking systems, use of a milking parlor, and milking cows three or more times daily. The use of bovine somatotropin (bST) has decreased.
- Over the period 2000–22, the average U.S. dairy farm covered operating costs in most years, operating and ownership costs in about half of the years, and total economic costs in only 2 years.
- Relative to smaller dairy farms (those with fewer cows), larger dairy farms in 2021, on average: (1) were more specialized in dairy production; (2) were greater adopters of most advanced technologies, management practices,



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and production systems; (3) had lower total costs per unit of milk sold (due primarily to lower ownership costs of buildings and equipment, and lower unpaid labor costs); (4) had higher purchased feed costs, lower homegrown feed costs, and lower grazed feed costs per unit of milk sold; and (5) had higher paid labor costs relative to unpaid labor costs per unit of milk sold.

- In 2021 (relative to eastern U.S. dairy farms), western U.S. dairy farms: (1) were generally larger, more specialized in dairy production, and more likely to use advanced technologies, management practices, and production systems; (2) on a per unit of milk sold basis, tended to incur lower ownership costs and lower total economic costs; and (3) depended more on purchased feeds and less on homegrown feeds.

How Was the Study Conducted?

This study relies on data from several sources, primarily the USDA's Agricultural Resource Management Survey (ARMS) and various agricultural data sources reported by the USDA, National Agricultural Statistics Service (NASS). The five most recent ARMS dairy surveys (2000, 2005, 2010, 2016, and 2021) allow for analysis of costs and returns, farm structure, and the adoption of various technologies, management practices, and production systems on dairy farms over the past two decades. The study reports on primarily farm-level means (using ARMS data), with differences in means tests conducted using the delete-a-group jackknife procedure. Econometric estimation of cost functions to further examine economies of scale and farm efficiency uses stochastic frontier methodology. Separate cost functions are run for different farm size categories, as well as a model including all farm sizes.