

Texas Dairy Matters

Higher Education Supporting the Industry



Production Efficiency in U.S. Dairy Farming

Jennifer A. Spencer, Ph.D. and Juan Piñeiro, DVM, Ph.D.
Extension Dairy Specialists
Department of Animal Sciences
Texas A&M AgriLife Extension Service
The Texas A&M University System

Over the last 60 years, dairy farming has shown a tremendous improvement in production efficiency – producing more milk with less resources – along with consolidation of the industry. From 1940 to 2019, the U.S. milk production had a two-fold increase while milk cow inventory decreased by 60% (from over 21 million to roughly 9.3 million cows; Figure 1)^{1,2,3}. Consequently, waste outputs and use of resources were reduced. This article will cover how production efficiency in dairy farming has made it more sustainable.

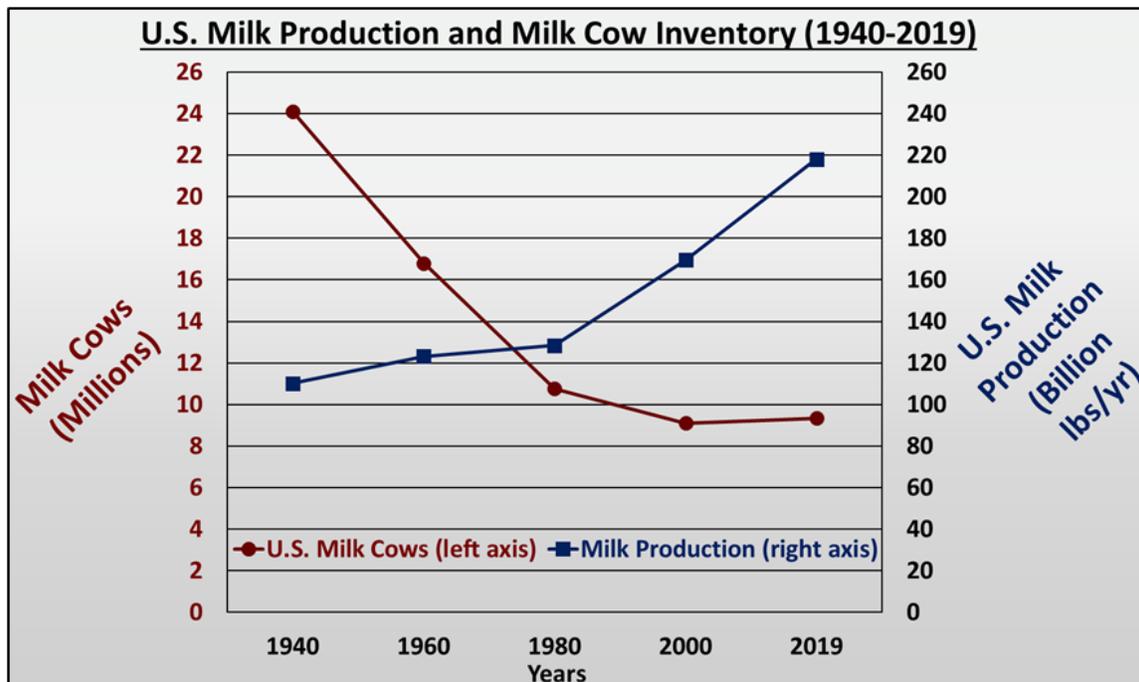


Figure 1. Cow inventory and U.S. milk production from 1940 to 2019. Increased productive efficiency allowed a decrease of over 60% of the milk cow inventory while milk production duplicated. Sources: Blayney et al., 2002; USDA Census of Agriculture various years; USDA, NASS, Milk Production, 2020.

Sustainability was defined by the U.N. World Commission on Environment and Development report (1987) as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” The remarkable increase in milk production per cow in the U.S. during the last six decades allowed us to produce more milk with less feedstuff and water while reducing cattle waste. This is explained by the “dilution of maintenance” effect: as milk production per cow increases, cows use proportionally more nutrients for milk production and less for maintenance requirement⁴.

The increased production efficiency in dairy farming is noticeable when assessing the five-fold increase in milk production per cow that occurred from 1944 to 2019^{2,5}. As a result, modern dairy farms require less resources and have reduced waste outputs per pound of milk produced compared with farms in 1944. In fact, by 2007, it required 79% less cows, 77% less feedstuffs, 65% less water, and 90% less land to produce a billion pounds of milk compared to dairy farming in 1944⁴. Furthermore, waste outputs to produce a billion pounds of milk were reduced. Modern dairy farms produce 76% less manure and emit 57% less methane and 44% less nitrous oxide (greenhouse gases) compared with dairies in 1944⁵. This progress was a result of advances in genetic selection, nutrition, reproduction and management practices adopted by dairy farmers to maximize production efficiency.

In addition, a noticeable consolidation in the U.S. dairy industry has been occurring for over a century; it is characterized by fewer farms with milk cows and increased herd size. In 1910, over 5.1 million farms (81% of U.S. farms) reported having milk cows with an average herd size between three to four milk cows (mostly for personal consumption)¹. By 1977, farms with milk cows decreased to 333,620, and by 2017, there were 54,599 dairy farms with an average herd size of 175 cows⁶ (Figure 2).

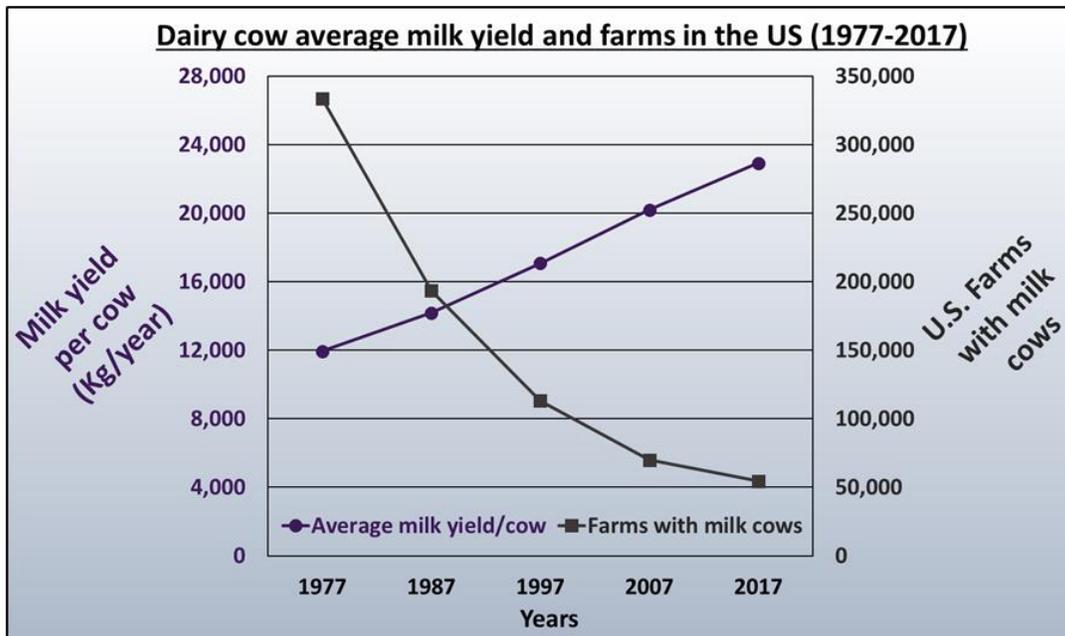


Figure 2. Cow average milk production and farms with milk cows in the U.S. (1977-2017). Source: USDA Census of Agriculture, various years.

Similarly, commercial dairy farms licensed to sell milk decreased from 74,100 in 2002 to 40,199 in 2017 at a rate of a 4% decrease per year. This consolidation accelerated to a rate of decline of roughly 7% in 2018 and 9% in 2019, reaching 34,187 licensed herds⁷.

In the last three decades, the consolidation in U.S. dairy farming coincided with a shift in dairy production location to the West and Southwest regions of the U.S. Farm practices also have changed due to the use of precision technologies. These technologies require less labor, and the hired labor is performed by a migrant workforce⁷.

In conclusion, improved technologies and practices allowed dairy farmers to make significant progress for over a century producing more milk while using less resources and producing less animal waste and greenhouse gases. This trend will likely continue and is one of several practices dairy farmers use to promote environmental stewardship.

References

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