# Climate change shifts dairy farming practices, altering milk quality and cheese flavour



Climate change is reshaping the dairy industry in profound ways, particularly through its impact on the availability and nutritional quality of grass. As temperatures rise, many dairy farmers are grappling with diminished pasture quality, leading them to modify their cows' diets to maintain production levels. This has significant repercussions not only for the quantity of milk produced but also for the quality and character of dairy products such as cheese.

In a recent study led by Dr. Matthieu Bouchon from INRAE – National Research Institute for Agriculture, Food and Environment, researchers explored how shifts in feeding practices, particularly an increased reliance on alternative feeds like corn-based silage, influence milk yield and cheese profiles. Drought conditions weaken grass growth, compelling farmers to seek out more concentrated feeds to ensure their herds remain healthy. However, this shift has been shown to negatively impact the milk's nutrient composition. As Dr. Bouchon observed, "the more grass the cows ate, the richer the milk and cheese were in omega-3 fatty acids, which are beneficial to human health."

The relationship between cow feed and the nutritional profile of milk has become increasingly critical. Farmers are acutely aware that maximising the nutrient content in their products not only benefits health but can also be a marketing advantage. The nutritional benefits derived from pasture-based feeding are evident; cheese produced from cows that graze freely tends to exhibit a more appealing shade and texture. “Cows fed on grazed grass produced smoother, yellower, more aromatic cheeses, while cows fed little to no grass produce whiter, firmer cheeses with milder flavours,” Dr. Bouchon explained. Such quality distinctions are vital for consumers who seek artisanal products that boast distinctive characteristics.

The ongoing climate crisis is exacerbated by extreme weather conditions that threaten the economic viability of small dairy farmers, as highlighted by the experiences of Jason Schmidt, a Kansas dairy farmer. He reported a 15-20% decrease in milk production linked to mounting operational costs and harsh climate conditions. This financial strain underscores a broader trend where many farmers are forced to sell off assets or livestock, heightening the urgency for sustainable practices that can help mitigate environmental impacts and preserve profitability.

Different strategies to adapt to climate stresses include exploring new grass varieties resilient to drought and implementing advanced grazing techniques. Furthermore, the role of supportive government initiatives is crucial, with many farmers looking to programs under the Farm Bill and the Inflation Reduction Act to find relief from the compounded pressures of market instability and climate change. Efforts to educate farmers on optimal feed ingredient ratios aim to sustain both productivity and product quality amidst these challenges.

Interestingly, while grass-based diets enhance flavour and nutritional profiles, the industry is concurrently observing a rise in the popularity of plant-based alternatives. Companies are increasingly considering the economic implications of shifting consumer preferences towards these alternatives. The livestock sector, a major contributor to methane emissions, faces pressure not only from climate-related impacts but also from evolving market demands for more sustainable practices. Adapting to these changes is paramount for both traditional dairy producers and new entrants into the market.

Innovative approaches are also gaining traction, with initiatives like the integration of farmed red algae to reduce methane emissions in cattle. This evolving landscape reflects broader trends within the agricultural sector to address environmental concerns, including rising greenhouse gas emissions and diminishing nutritional quality in dairy products due to changed feeding practices. As marketing and regulation evolve, dairy producers must engage creatively with both the challenges and opportunities presented by climate change.

Farmers appear divided on the implications of climate change; while some look towards integrating sustainability into their practices, others find uncertainty in fluctuating regulations stifling investments needed for adaptive infrastructure. Amidst these debates, maintaining a balanced approach between traditional grass-fed methods and innovative feeding strategies remains essential for preserving the rich heritage of cheese production linked to high-quality pasture lands.

In conclusion, the intersection of climate change, dairy production, and consumer preferences paints a complex picture. As the industry faces inevitable shifts, understanding these dynamics will be crucial for farmers striving to produce dairy products that not only meet market demand but also adhere to emerging standards of sustainability and nutritional quality. Future research and collaboration will undoubtedly play pivotal roles in navigating these evolving challenges while ensuring that traditional values in dairy farming are not lost along the way.

### Reference Map

1. [[1]](https://www.earth.com/news/grass-scarcity-alters-cow-feed-and-dairy-products/)
2. [[2]](https://time.com/6303858/extreme-weather-farmers-effects/)
3. [[3]](https://www.reuters.com/sustainability/sustainable-finance-reporting/food-brands-investors-scramble-stave-off-risk-stranded-assets-2024-08-22/)
4. [[4]](https://apnews.com/article/375e373a4b55e604c474cd2189546180)
5. [[5]](https://www.ft.com/content/5261df64-35dd-4d52-a331-bc5dad748c1b)
6. [[6]](https://time.com/6199318/milk-alternatives-microbes-perfect-day/)
7. [[7]](https://www.ers.usda.gov/amber-waves/2014/november/greater-heat-stress-from-climate-change-could-lower-dairy-productivity)

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

1. <https://www.earth.com/news/grass-scarcity-alters-cow-feed-and-dairy-products/> - Please view link - unable to able to access data
2. <https://time.com/6303858/extreme-weather-farmers-effects/> - Extreme weather conditions, such as heat waves and prolonged droughts, are significantly affecting small farmers in the U.S., leading to financial instability and operational challenges. Jason Schmidt, a dairy farmer in Kansas, has seen a 15-20% reduction in milk production, which, coupled with soaring feed and operational costs, has impacted his farm's financial viability. Farmers are struggling to maintain crop yields and livestock health as temperatures rise, and precipitation becomes more inconsistent. The drought conditions in Kansas have led to reduced wheat harvests, with yields dropping drastically. Industrial agriculture practices have also degraded soil health over the years, compounding current problems. As small farmers sell land and livestock due to financial pressures, the need for integrated conservation practices and more resilient agricultural systems becomes critical. Farmers seek support from government programs, including provisions in the Farm Bill and initiatives funded by the Inflation Reduction Act, to sustain their operations and adapt to changing climatic conditions.
3. <https://www.reuters.com/sustainability/sustainable-finance-reporting/food-brands-investors-scramble-stave-off-risk-stranded-assets-2024-08-22/> - The food industry faces significant risks due to climate change, and it significantly contributes to methane emissions. The Smith School for Enterprise and the Environment at Oxford University warned a decade ago about agricultural facilities' risk of becoming stranded assets. The risks include physical impacts like drought, heatwaves, and flooding, and transition risks like stricter regulations and changing consumer tastes. The livestock sector, a key methane emitter, is highly susceptible to volatile feed prices and emerging plant-based meat alternatives, with up to half of the largest companies potentially running at a loss by 2030. Companies and investors are currently struggling to address these challenges due to a gap in understanding and complacency, as noted by experts like Isobel Rosen from FAIRR and Nusa Urbancic from Changing Markets Foundation. However, some companies, like Mars, are proactively mitigating these risks through sustainable sourcing and emission reduction commitments. The potential for new regulations and frameworks, like the EU Deforestation Regulation and Sustainable Markets Initiative's blended finance framework, could drive more significant change. Investors show interest in technological advancements, although more comprehensive measures are needed to address the systemic volatility induced by climate change.
4. <https://apnews.com/article/375e373a4b55e604c474cd2189546180> - In Honolulu, Hawaii's Parker Ranch is pioneering the use of farmed red algae, or limu kohu, to dramatically reduce methane emissions from cattle, cutting these emissions by an average of 77% in a six-month trial conducted by Symbrosia. This innovative approach to mitigating greenhouse gases has spotlighted Hawaii in the growing international seaweed farming industry. Anticipated to be worth $12 billion by 2030, this sector is garnering significant public and private investments, including over $2.2 million in federal grants for Symbrosia to scale its operations. The algae, Seagraze, is being incorporated into the diets of cattle, potentially reducing methane emissions globally. The initiative is also supported by other major dairy and beef producers like Organic Valley and Ben & Jerry’s. The broader implications include not only environmental and economic sustainability but also enhanced livestock productivity. Hawaii’s favorable year-round climate is advantageous for seaweed growth, promising frequent harvests and regular product shipment. As researchers continue to explore the multifaceted benefits of seaweed, the industry represents a significant opportunity for both environmental progress and economic gains.
5. <https://www.ft.com/content/5261df64-35dd-4d52-a331-bc5dad748c1b> - Peder Tuborgh, CEO of Arla, Scandinavia's largest dairy producer, states that uncertainty about European environmental regulations is hindering investment in food production, raising prices, and causing a drop in milk production. Arla, a cooperative of over 12,500 dairy farmers, experienced a 1% decrease in European milk production last year. Tuborgh warns that continually unclear long-term farming regulations prevent farmers from investing in new infrastructure, contributing to supply-demand imbalances and potential inflation. The EU's ambitious greenhouse gas emission reduction goals, including possible emissions taxes for the agricultural sector, remain undefined. Denmark has already imposed a carbon tax on farming, charging cattle owners for emissions. Farmers’ protests against stringent environmental rules have led the European Commission to relax some targets and standards. Meanwhile, the UK's post-Brexit farming subsidy system focuses on environmental incentives, potentially reducing food production. Arla continues to implement its own model, rewarding environmentally friendly practices. Despite rising dairy prices boosting revenue forecasts, Tuborgh notes the potential negative impact on demand. Additionally, a UK boycott over Arla’s methane-reducing feed additive trial did not affect revenues.
6. <https://time.com/6199318/milk-alternatives-microbes-perfect-day/> - Global milk production is growing, but it significantly impacts the environment through deforestation, polluted waterways, and greenhouse gas emissions. As an alternative, precision fermentation—a process using genetically modified microbes to produce proteins similar to those in cow's milk—offers a solution. Lizanne Falsetto's Betterland Milk, utilizing this process, will launch soon. Perfect Day, a food technology company, produces whey protein through precision fermentation, reducing greenhouse gas emissions by up to 97% and water usage by 99% compared to traditional methods. Betterland Milk promises to offer the same functionality as cow's milk without lactose, cholesterol, or methane, appealing to environmentally conscious consumers despite its higher price. With increasing investments and technological advancements, alternative proteins could significantly reduce global emissions and promote sustainable food production.
7. <https://www.ers.usda.gov/amber-waves/2014/november/greater-heat-stress-from-climate-change-could-lower-dairy-productivity> - In many parts of the United States, climate change is likely to result in higher average temperatures, hotter daily maximum temperatures, and more frequent heat waves, which could increase heat stress for livestock. Heat stress can reduce meat and milk production and lower animal reproduction rates. Livestock producers can mitigate heat stress with shade structures, cooling systems, or altered feed mixes, but these methods increase production and capital costs. Dairy cows are particularly sensitive to heat stress; higher temperatures lower milk output and milk quality. A recent ERS study quantifies the costs of climate change-induced heat stress to the U.S. dairy industry. The study used operation-level economic data coupled with climate data to estimate how the local thermal environment affects milk output. The results indicate modest heat stress-related production declines over the next 20 years, with the largest declines occurring in the South.