



Technology in Dairy Cattle Farming: Automated Milking Systems, Internet of Things, and Artificial Intelligence

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Abstract

Global milk production has reached 965.7 million tons as of 2023. Dairy farming is dealing with multiple pressures at the same time. These primarily include labor shortages, tightening animal welfare regulations, and environmental targets. In the table of identified goals, advanced technologies such as automatic milking systems (AMS), Internet of Things (IoT) sensor networks, and artificial intelligence (AI) stand out in this field. AMS has been reported in many studies to increase milk yield per cow by 5–15% and to raise the milking frequency. The impact on milk quality, however, varies more with management conditions than with technology. While IoT enables real-time herd tracking, infrastructure inadequacies and data fragmentation in rural areas render much of this potential ineffective. AI is rapidly advancing in disease detection, production forecasting, and genomic breeding, but the shortcoming in this field does not seem to be capacity, but rather the inability of closed platforms to communicate with each other. The welfare aspect of all this is still under-researched for both animals and farmers. For the improvement of this sector, long-term sustainability assessments, open data standards, and innovations to make these technologies accessible to small producers are needed. If the sector remains under the dominance of large enterprises, while some of the industry's problems are solved, the deepening of inequality will continue.

Keywords: Automated milking systems, Artificial intelligence, Internet of Things, Dairy cattle, Precision livestock farming, Sustainability.

