

## **An epidemiological approach to promoting sustainable dairy production**

The Swedish dairy sector is undergoing significant structural change, characterized by a trend toward larger but fewer farms. Modern technology is increasingly being integrated into new production facilities with the aim of reducing labour costs while simultaneously increasing milk production, animal welfare, and profitability. Since the 1990s, the number of dairy farms has decreased by approximately 90%, largely due to tight economic margins.

Epidemiological studies serve as essential tools for measuring disease occurrence and promoting health and welfare across both human and animal populations. By systematically examining the distribution and patterns of determinants affecting health conditions within populations, it is possible to identify risk factors and develop preventative strategies in order to improve overall wellbeing.

My work primarily focuses on applying epidemiological methods to investigate how farm characteristics and management practices influence the health and welfare of dairy cows. Data registers are crucial in this research, providing a unique opportunity to study the Swedish cattle population. To supplement these data, I often collect additional information from questionnaires and interviews, which capture valuable insights not routinely recorded.

One key area of my research is exploring the factors contributing to on-farm cow mortality in dairy herds. While most Swedish dairy cows are sent to slaughter at the end of their lives, approximately one in six adult cows die on the farm and are subsequently sent for destruction. This raises animal welfare concerns and results in beef losses, both of which conflict with the goals of a sustainable production system. Moreover, it represents an inefficient use of resources and has considerable financial implications for farmers.

Looking ahead, my research aims to explore how improved welfare practices can contribute to more sustainable dairy farming. This includes assessing the economic impacts of welfare improvements on farms and addressing the challenge of extending cow longevity. Culling decisions made by farmers are influenced by a range of factors, including health status, milk yield, fertility, the availability of replacement heifers, and prevailing market conditions. An increased cow longevity would reduce both rearing costs and environmental impact per kilogram of product, provided that older cows remain healthy and productive. In a newly initiated project, we aim to develop a metric for more accurately measuring and managing herd longevity. This metric will involve evaluating key events throughout a cow's life that have positive or negative effects on her welfare.

With growing public interest in animal welfare and sustainability, my research seeks to offer evidence-based solutions that benefit animals, farmers, and society as a whole.