

Small-Scale Pumping Solutions That Power Smart Farming

A comprehensive guide by Xylem



Across the agricultural sector, rising production costs and static commodity prices are pushing farmers to do more with less. Whether it's boosting milk yield, improving animal hygiene, or automating routine tasks, the right equipment—powered by the right pump—makes all the difference. This guide details pump applications in four critical agricultural areas:

1. Automated milking systems and teat hygiene
2. Calf feeding and milk delivery systems
3. Barn cleaning and sanitation
4. Precision crop spraying and feed treatment

Part 1: Automated milking systems (AMS) and dairy hygiene

What are automated milking systems?

Automated milking systems (AMS), also called milking robots, are robotic systems that automatically milk dairy cows without human intervention. These systems are reshaping modern dairy farming. As labor shortages grow and herd sizes increase, more producers are adopting automation to reduce manual workloads, improve consistency, and support herd health.

Adoption is rising rapidly across global markets, and in countries like the Netherlands, Denmark and Sweden, up to 60% of dairy farmers use AMS. These systems don't just save time. By enabling more frequent milking and precision-controlled hygiene routines, they help lower mastitis risk, improve udder health, and increase overall yield.

Did you know?

AMS can boost yield by up to **10%** and save **6 hours** of labor per day. Farms using automated hygiene see up to **30% fewer mastitis cases**.

Key components of AMS requiring pumping solutions

- Teat spraying systems (pre-milking and post-milking)
- Line cleaning and sanitization
- Milk transfer systems
- Chemical dosing for hygiene products

Application: Teat spraying for udder health

In any dairy operation—automated or conventional—udder health is non-negotiable. While milking robots support consistent hygiene through automated routines, one of the most effective and widely adopted practices to protect cows from infection is teat spraying. Applied before and after milking, teat dips help reduce mastitis risk, promote healing, and keep cows more comfortable during and after milking. Whether built into an automated milking system or deployed through a dedicated sprayer, these applications rely on pumps that can safely and consistently handle disinfectants near animals.

Xylem product solution: Flojet air operated diaphragm pumps

Xylem's Flojet air operated diaphragm (AOD) pumps are trusted across dairy operations, from line cleaning inside milking robots to delivering teat sprays that support udder hygiene. These pumps are powered by compressed air, making them safe to use around animals and suitable for locations without electrical access.

They offer strong chemical compatibility, are easy to install in mobile or automated systems, and are built for reliable performance with low maintenance needs.



Part 2: Calf feeding systems and milk delivery

Feeding calves at scale requires more than just transporting milk, it calls for precision, consistency, and hygiene to support healthy growth.

What is a milk taxi?

A milk taxi is a mobile calf feeding system that prepares, pasteurizes, and delivers warm milk to multiple calves efficiently across a farm. By automating what was once a labor-intensive chore, these systems help farmers save time, reduce feed waste, and ensure every calf receives the right nutrition.

As herds expand and skilled labor becomes harder to source, more operations are turning to milk taxis to keep calf care both reliable and cost-effective. From balanced feeding to efficient pasteurization, these systems are designed to strengthen calf health while easing the daily workload.

Application: High-volume milk transfer in mobile feeding systems

Calf feeding systems like milk taxis require pumps that can move large volumes of milk quickly and cleanly while maintaining hygiene standards. The pumps must handle milk, colostrum, and milk replacer solutions without contamination or clogging.

Xylem product solution: Jabsco Cyclone pumps

While diaphragm pumps like Xylem's Flojet AOD models are ideal for controlled dosing and hygiene functions within milking robots, Xylem's Jabsco Cyclone pumps are engineered for a different task: moving larger volumes of milk solution quickly and cleanly. With its stainless-steel construction and anti-clog impeller, Cyclone pumps are built for fluid transfer at scale, making it a dependable choice for milk taxis and calf feeding systems where hygiene, throughput, and durability are essential.





Part 3: Barn cleaning and sanitation systems

Did you know?

Clean, dry barns reduce the risk of lameness – a leading cause of production loss – **by as much as 25%.**

The impact of barn cleanliness on herd health

Clean, dry barns are essential for maintaining cow comfort, reducing lameness, and minimizing exposure to bacteria and pathogens. Yet in many operations, traditional barn cleaning remains a labor-intensive process—often requiring manual scraping, pressure washing, or inconsistent use of water. These methods can increase stress for animals and strain limited labor resources.

Modern dairy farms are increasingly turning to automated barn cleaning systems to improve sanitation while saving time and effort. Whether integrated into robotic floor cleaners, flush systems, or high-pressure sprayers, these systems depend on pumps that can withstand frequent use, handle chemical cleaning agents, and deliver consistent flow rates in challenging environments.

Barn cleaning methods requiring pumping solutions:

- Robotic floor cleaners
- Automated flush systems
- High-pressure spray washers
- Mobile cleaning units

Application: Chemical delivery for automated barn cleaning

Modern automated barn cleaning systems require pumps that can deliver consistent pressure for effective cleaning, handle a range of agricultural detergents and disinfectants, and operate reliably with minimal downtime. The pumps must work in challenging agricultural environments with exposure to water, chemicals, and waste materials.

Xylem product solution: Flojet motor driven diaphragm pumps

Xylem's Flojet motor driven diaphragm (MDD) pumps are built for barn cleaning systems that require reliable, consistent flow and chemical compatibility. These pumps are ideal for use in robotic cleaners, flush systems, or mobile sprayers.

They deliver steady pressure for high-coverage cleaning, handle a range of agricultural detergents and disinfectants, and are designed to reduce maintenance over time.





Part 4: Precision crop spraying and feed treatment

Crop and feed treatment is a vital part of farm productivity, whether it's protecting silage from spoilage, applying pesticides to pasture, or treating seeds before planting. But these tasks bring their own challenges—working with harsh chemicals, managing varying flow requirements, and operating in mobile or remote conditions.

Spraying equipment types:

- Backpack sprayers (manual and motorized)
- Drone-mounted spraying systems
- Quad-bike mounted rigs
- Tractor-mounted boom sprayers
- Portable tank systems for silage treatment

Did you know?

Precision spraying can cut chemical use by **up to 30%** while improving application consistency – saving costs and reducing environmental impact.

Regardless of the spraying equipment type, farms need pump solutions that are reliable, chemical-compatible, and easy to maintain across a range of field and feed applications.

Application: Mobile chemical delivery for crop and feed treatment

Crop and feed treatment applications require pumps that are lightweight, portable, chemically compatible with diverse agricultural inputs, and capable of consistent flow control for even dosing. The pumps must be easy to clean between different chemical applications and reliable in field conditions.

Xylem product solution: Flojet motor driven diaphragm pumps

Beyond barn cleaning, Xylem's Flojet MDD pumps are also well-suited to crop and feed treatment tasks, offering the same reliability and chemical compatibility in mobile field environments. These pumps are lightweight and compact, making them easy to integrate into backpack sprayers, drone-mounted rigs, or quad bike systems.

They can also handle a wide range of agricultural inputs—from herbicides and foliar nutrients to silage inoculants and seed coatings – with consistent, controllable flow that ensures even application and minimal waste. Built for durability and ease of use, MDD pumps are designed to clean quickly and service easily between treatment cycles, helping farmers stay productive without sacrificing precision.

Part 5: Choosing the right agricultural pumping solution

Powering productivity across the farm

Today's farms demand more from every piece of equipment. Whether it's automating hygiene, improving feed efficiency or protecting crop yields, Xylem's pumping solutions are designed to meet the daily demands of modern agriculture, safely, reliably and efficiently.

Every agricultural application is different, and selecting the right pump means balancing a range of technical and operational requirements. As the examples throughout this guide demonstrate, factors such as chemical compatibility, flow rate, operating environment and duty cycle all play an important role in choosing the right solution.

When selecting a pump for agricultural applications, consider:



Chemical compatibility: Ensure pump materials are compatible with the specific chemicals, disinfectants, or dairy products being handled



Flow rate requirements: Match pump capacity to application needs (low flow for dosing, high flow for transfer)



Pressure requirements: Select pumps that can deliver the required pressure for spray patterns or system needs



Power source availability: Choose between air operated (requires compressed air) and motor driven (requires electricity) based on infrastructure



Environmental conditions: Consider ambient temperature, humidity, exposure to water, and cleaning requirements



Maintenance accessibility: Evaluate ease of service and parts availability for your location



Integration requirements: Ensure physical dimensions and connections are compatible with host equipment



Duty cycle: Match pump design to expected operating hours and cycling frequency



Sanitary requirements: For dairy applications, ensure pumps meet food-grade standards and are easy to clean



Total cost of ownership: Consider not just purchase price, but also energy consumption, maintenance costs, and reliability over time



OEM support: For equipment manufacturers, evaluate supplier's capability for co-development, technical support, and global distribution



Regulatory compliance: Verify pumps meet relevant food safety, electrical, and environmental regulations in your markets

With a broad portfolio that includes air operated diaphragm, motor driven diaphragm and centrifugal pumps, Xylem supports equipment manufacturers and farm operators with solutions that are trusted across the entire agricultural landscape. Xylem's Flojet and Jabsco pumps are built to perform in real-world farm conditions, handling tough fluids, harsh chemicals and demanding duty cycles without compromising animal health or operational uptime.

As agriculture continues to evolve, Xylem remains committed to helping customers do more with less because smarter, more sustainable farming starts with the right tools for every task.

Let's work together to power what's next in agriculture.
