

Advances in AMS

by Kendra Kerrisk

Automatic milking systems (AMS)

For an AMS to be successful under Australian conditions, milking must be:

- Voluntary – most cows move to the dairy (and back from the dairy to pastures) by themselves.
- Distributed – cows are milked throughout the day and night.

To be profitable for Australian dairy farmers, an AMS must be able to operate efficiently, achieving high levels of milk production and high levels of pasture utilisation.

This information sheet addresses current AMS technology and a ‘new concept’ AMS, developed by DeLaval, which will be tested by the FutureDairy team from 2009.

Current AMS technology

FutureDairy has been evaluating the performance of existing AMS technology under Australian conditions. We have developed a farming system around the units which achieves high pasture utilisation as well as voluntary and distributed milking.

Our research to date has looked at many aspects of the farm system including farm layout, economics, management of incentives in the system, machine utilisation, the effect of the technology on labour and lifestyle and ways to optimise the performance of the cows, technology, pasture and the whole system. A series of information sheets is being prepared on these and other topics.

Keys to success

Attitude is probably the most important ingredient to success with AMS. To succeed, you’ll need to have:

- Realistic expectations of system performance;
- A desire and commitment to make it work; and
- An understanding of what contributes to a successful AMS operation.

From a farm point of view, you’ll need a well-designed cow traffic system and the necessary gates to allow controlled cow traffic. This does not necessarily require a whole new farm layout. Refer to FutureDairy Info Sheet *Farm layout for automatic milking*.

Some common issues raised by farmers considering investing in AMS include suitability for large herds and the economic viability for incorporating the technology into their farm system.

Farm layout

We believe most farm layouts could incorporate an AMS, although there are two key constraints – distance from the furthest paddocks to the dairy and road or rail crossings.

A layout that enables 3-way grazing makes it easier to achieve reliable voluntary and distributed milkings regardless of other system aspects.

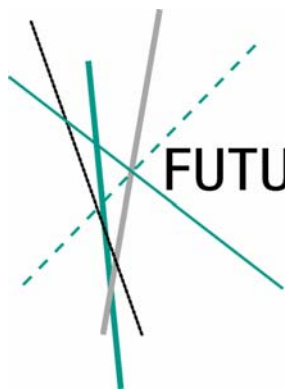
We don’t fully understand the impact of walking distance on feasibility yet but we expect that walking distances greater than about 1.2 km to dairy may have a significant impact on cows’ willingness to walk and therefore milking frequency.

Voluntary movement is not possible if the farm is divided by a road and there is no underpass (obviously cows could not move across a road without supervision). This would impact on the ability to milk off some remote paddocks.

Suitability to year round or seasonal systems

The FutureDairy team is often asked ‘is AMS and/or the new concept viable for any type of system? That is, is it more suited to a typical Victorian farm or a typical Queensland farm?’

Different systems operate differently and will use different incentives to encourage voluntary milking.



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There is a wealth of evidence of success with very intensive (indoor systems) such as in Europe. We now have evidence from Australia and New Zealand of success within extensive pasture-based systems.

The key to making a system work is understanding the cows and the incentives to ensure that incentives work for the cows and for the objectives/targets of the farm.

We also have an understanding of different calving patterns or distributions and their effects on the machine utilisation. Decisions regarding calving patterns need to be made with an understanding of the impact of this on the people, dairy operations, feed management and the cows themselves. Year-round calving may allow for more even distribution of the demands of the herd on the AMS units and may also allow for more cows to be milked per AMS. Research shows that an AMS can also operate efficiently with a seasonal calving pattern.

Large herds

Some dairy farmers with larger herds have expressed concern that the current technology may not be suitable for larger herds.

This is possible, but an economic evaluation would provide better insight into the feasibility of AMS. For large pasture-based herds, implementation may be hampered by maximum walking distances and some unknown impacts of herd dynamics.

For a large feedlot or indoor system it is feasible to replicate smaller modular herds without a huge impact on costs of implementation (i.e. no increase in area of barn, no replication of milk vats, no replication of farm office etc).

Economics

FutureDairy is currently doing an economic evaluation of the current AMS technology used at Camden which will provide insight into the impact of an AMS on dairy business profitability.

Some of the effects of AMS on productivity and sustainability are very difficult to quantify in financial terms. For example improved staff retention, lifestyle and having more time and energy to spend on pasture management or other areas of the farm business. Individuals may need to take these into account when considering investing in AMS.

The major AMS manufacturers (DeLaval and Lely) have comprehensive economic evaluation tools that may be helpful to some farmers to determine the annual productivity of the current AMS system versus a conventional system (based on operational costs).

New concept AMS

DeLaval is developing a 'new concept' AMS for voluntary and distributed milking under Australian conditions.

DeLaval is not disclosing technical details or launch dates at this stage. The final solution is to some extent unknown and will depend on the outcomes from the next six to 12 months of on-farm testing.

It is an evolution from current AMS units in that the new concept will milk many more cows. Costs should be comparable with conventional milking equipment. The level of automation may be somewhat reduced and to keep costs down, the new concept will not have all of the functionality of the current AMS technology.

FutureDairy's role

Although the technology development has been fully funded by DeLaval, FutureDairy has had input into the specifications and functionality of the new concept.

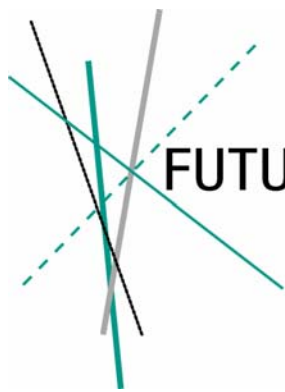
FutureDairy's data from the Camden AMS research farm has contributed to DeLaval's understanding of AMS in Australia's pasture-based system, particularly in terms of the throughput, cow traffic and animal behaviour.

From mid-2009, FutureDairy will carry out on-farm testing of DeLaval's the new concept with a herd of 240 cows in a pasture-based grazing system.

While DeLaval is a major sponsor of FutureDairy, our team remains independent and is happy to share information and advise AMS farmers around Australia, regardless of the brand of AMS they have invested in, or plan to purchase.

Invest in AMS now, or wait?

The FutureDairy team is often asked 'should I hold off investing in current AMS technology in anticipation of the new concept or further developments in AMS?'



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We don't have an answer for this – it is the individuals' responsibility to weigh up the pros and cons and make a personal decision based on their own situation.

FutureDairy does not recommend holding off investing in current technology. We don't know when new developments will be available to the market or even what the final technical solution will be. There is nothing surer than the fact that milk harvesting equipment will continue to develop into the future including enhancement of current technology.

Some people will always be waiting for the latest technology or for the price of technology to come down. Others will decide to jump on the AMS 'train' sooner rather than later in a bid to remain sustainable (given their circumstances). Some larger farms may never invest in the current technology if they don't see a place for it within their scale of operation.

Aside from economics some people will never invest in AMS because it simply is not suited to them or their business.

For more information

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About FutureDairy

FutureDairy aims to help Australia's dairy farmers manage the challenges they are likely to face during the next 20 years. The challenges are expected to be related to the availability and cost of land, water and labour; and the associated lifestyle issues.

Our activities are structured around two priority areas – Precision farming (including automatic milking and innovations) and Feedbase (forages and feeding). These are the areas where there are opportunities to address the challenges related to water, land and labour resources.

For **Precision Farming** we are investigating technologies with potential to improve farm productivity, efficiency, labour management or lifestyle. FutureDairy is pioneering the development of pasture-based farming systems that use robotic milking for larger herds. Our research is conducted at Australia's first automatic milking system (AMS) research farm, at the NSW Department of Primary Industries' Elizabeth Macarthur Agricultural Institute at Camden. From mid-2009 we will be testing a new concept automatic milking system designed specifically for Australian conditions, while continuing to further develop the farming system around the milk harvesting equipment.

Our **Feedbase** goal is to develop sustainable dairying systems for the future, with the intensification of home-grown feed to enable more efficient use of land, water and grain. Our trials are being conducted at the University of Sydney's Corstorphine dairy farm and Mayfarm. The investigation is complemented with modelling and component field research in areas of forage production and utilisation.

We are investigating a complementary forage system (CFS) that involves triple cropping on 35% of the farm area and growing pasture on the remaining 65%. Our target is to produce more than 25t DM/ha/y over the whole farm area, in a sustainable way. The three crops include:

- a bulk crop (eg maize);
- a legume for nitrogen fixation (eg clover); and
- a forage to provide a pest/disease break and to improve soil aeration (eg a brassica).

FutureDairy is now in its second phase. During the first phase, we used existing technology for automatic milking to test the feasibility of robotic milking in a pasture based system. The promising results paved the way for testing a new prototype AAMS with a larger herd during phase 2.

In the first phase, our Feedbase studies tested the feasibility of a complementary forage rotation grown on a small area, both under research and commercial conditions. Phase 1 combined technical research with social research and extension research. During phase 2 we are drawing upon that learning experience to improve our linkages with major extension groups.

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