



Learnings around Automatic Milking System adoption on-farm

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Introduction

Whilst Automatic Milking Systems (AMS) are being adopted around the world and Australia with >10,000 commercial dairy farms now in operation in more than 32 different countries, on-farm adoption in Australia is still in its infancy.

In the past 12 months we have seen 9 commercial dairy farms install and commission AMS units. In addition to these nine farms there are another three farms in the process of installing AMS at the time of the study tour presented here. The first commercial AMS farm in Australia has been operating since 2001 and was therefore not included in this study tour. The confidence that has been developed with regard to operating AMS in a pasture-based environment has undoubtedly had some impact both on the willingness of manufacturers to sell their technology and the interest that has been generated in the industry with regard to on-farm adoption. At least one contributor to this growing confidence has undoubtedly been the results of the AMS farm systems research that has been carried out at Camden in New South Wales. As a voluntary and distributed milk harvesting system (i.e. cows milk themselves voluntarily throughout the 24-hour period with no distinct milking session times) it is accepted that this is not only a new way of milking cows but a new way of farming. Given this, it is expected that there would be a clear benefit for us to try to capture learnings from the commercial farms whilst the planning, installation and commissioning periods are still fresh in the minds of the farmers involved.

To capture some of these learnings a study tour was carried out which involved 7 of the 9 commercial farms.

The remaining two commercial farms were not included for the following reasons:

- i. One commercial farm opted out of the study for undisclosed reasons
- ii. The remaining farm commissioned the machines and started milking cows within the four week period prior to the study being carried out.

The study tour was carried out in late January 2010 seven farmers being interviewed solely by Mr Bevan Ravenhill - five of the seven farmers were interviewed in person whilst the remaining two were included by phone interview. The results of the seven farms have been collated but no indication of the source of individual results will be presented here.

It is generally expected that it should take farmers 12 months of operation to really have an understanding of the system and the impacts it will have on labour, lifestyle and productivity. The 12-month period allows the farmer to experience all seasons and a full annual cycle of his operation with the new milk harvesting equipment. It also allows for the whole herd to calve back into the system as experienced animals (regardless of their stage of lactation at start-up). Given this it is important to keep the findings of this study tour in context and to understand that the results presented here are from a group of farms that are still in their infancy of AMS adoption. Despite this the timing of the study tour was relevant to maximise the learnings whilst memories are still fresh.

The farms had been commissioned between three and nine months prior to the interview being conducted and

ranged from 93 to 310 cows with between 2 and 4 AMS units. The number of cows milked per AMS ranged from 50 to 78 at the time of the study and was determined by a range of factors including farm capacity, target milking frequency of the cows (and machine capacity) and plans for herd expansion. It should be noted that an individual AMS unit can only carry out around 150 milkings per day, depending on the target milking frequency, stage of lactation, production levels and many other factors. For example 75 cows milked twice a day would result in a similar utilisation as 50 cows milked three times per day.

The interview comprised of 40 questions, and was generally conducted over a 2-3 hour period. The questions were categorised under the following headings and will be presented in the same order.

1. General farm information and decision making
2. Farm system management
3. The planning and installation period
4. The commissioning period
5. Post commissioning

All interviews were carried out in the absence of any representatives of the company supplying or servicing the on-farm AMS equipment and involved only the interviewer and the farmer (and/or spouse). Some interviews also had other family members involved in the farm business present for the interview.

General farm information and decision making

The majority of the seven farms have maintained a similar herd size to that which they were milking prior to installing AMS. Approximately half of the farmers were planning to increase the herd size within the first 12 months of operation.

Six of the seven farms are operated as complete farm systems with no interactions or transfer of cows between the AMS and any conventional milking systems (CMS). All but two of the farms had previously milked dairy cows on the property with the AMS being an upgrade of the existing milk harvesting system rather than a new conversion from a dry stock farming operation.

Interestingly (and in line with overseas findings) the key drivers for investing in AMS were around labour and lifestyle issues and were not necessarily driven by financial reasons. Most farmers had a number of key drivers for investing in AMS. Two of the interviewed farmers responded that in investigating the cost of a new dairy the AMS was very cost comparable to a conventional milk harvesting system with a high level of automation. In addition and more specifically the key factors contributing to the decision to adopt AMS included (frequency of answer in brackets):

- Opportunity to increase milking frequency without increasing labour (1)
- Capture efficiencies of inputs and scale of operation (1)
- Perceived advantages in individual cow feeding (based on production level) (1)
- Sustainability of operation (environmentally and with regard to labour and lifestyle) (6)
- Farm succession (2)

- Appeal of technology (2)
- More appealing to return to dairy industry or to remain in industry without having to milk cows (2)
- Age, need to slow down and reduce physical labour (1)

Surprising, despite the size of the investment and limited commercial adoption in Australia to date, there was a common trend that farmers carried out only a limited amount of homework prior to deciding to invest in AMS. Five of the seven farmers visited less than six (four visited only one or two) commercial installations before committing to invest in AMS and only four of the interviewed farmers had visited the Camden AMS research farm prior to commissioning. The key source for information was the commercial suppliers of the technology.

Farm system management

Six farms in the study were considered as pasture-based operations with cows allowed to graze for at least 300 days per year and estimated diet composition being in excess of 60% grazed pasture. Supplementary feed was made available to cows either in the paddock or in a designated feeding area/feed pad. Five of the seven farms were predominantly using three way grazing – cows were provided three pasture allocations per day, rather than the standard two allocations that would normally be provided in a twice-a-day conventional milk harvesting system. Three-way grazing has been promoted to the AMS industry as a means of gaining more regular and predictable cow traffic than two-way grazing.

The level of concentrate feeding varied considerably between farms and across the lactation. Only two of the installations included some form of out-of-parlour feeders to allow for higher daily intakes of concentrates. It would be fair to expect that feeding in the milking bail alone restricts the level of concentrate feeding that can be implemented due to the reduced “bail-time” of most cows – in an AMS the time available for consumption of concentrates is dictated by the milking frequency and speed of milking of each individual cow rather than the row speed or platform rotation speed in a CMS. Despite this a number of farmers were reporting daily concentrate feeding levels in the order of 8-10 kg concentrate/cow/day for cows in early lactation. All farms interviewed indicate that they are comfortably using the individual cow feeding tools that are incorporated into the AMS support software.

All of the pasture-based installations were using a controlled cow traffic system whereby cows must pass through pre-milking drafting gates that restricts access to the milking stations using a variety of selection criteria that can be changed by farm staff.

It is recognised that not all cows will always move themselves around the farm system and some will require encouragement from farm staff. Whilst the interviewed farms are still within the first six months of operation it was encouraging to note that all interviewees indicated that they spend only 10-60 minutes per day fetching cows for milking (average around 20 minutes) and that this task was generally carried out 2-3 times per day prior to setting up new pasture breaks.

All but one farmer felt that the monitoring tools built into the system gave them the ability to reliably detect and treat mastitis and all appear to have managed to maintain a reasonably high to excellent level of bulk milk quality. However, one farmer indicated that they found conductivity to be an unreliable indicator of clinical mastitis and one reported that on-line somatic cell counting devices were less reliable than they would like. There was also some comment made by one farmer that the development of feasible working routines regarding the timing of treatment for mastitis and other ailments presented some issues on farm. In an AMS cows can be automatically drafted for attention after milking and a good draft yard location and design will allow for those cows to be attended to just twice a day. However, if these cows do not have ready access to quality feed or a non-concreted area they may require more prompt attention.

Two of the AMS farmers interviewed were not incorporating AI into their reproduction management plan and were instead using bulls for natural mating. Of the remaining farmers that were practicing AI there was a general indication that the activity devices were useful as an aid to more conventional oestrus detection tools and visual observations. Only one farmer reported concerns with reproductive management pertaining particularly to the AMS farm system and the workload with oestrus detection.

Most of the farms had mixed breeds with the predominant breed being Holstein Friesian. The general comment was that all breeds seemed to adapt to the system well. However, it was also noted though that the smaller breeds and/or younger cows can pose some minor attachment problems during settling if they move around in the crate too much.

The planning and installation period

There was a general consensus that farmers had a considerable amount of knowledge and support to allow them to contribute to decisions regarding the layout of the dairy and other aspects of the farm system. One farmer said that whilst the layout worked well he would likely change some aspects if he were to repeat the exercise. There was also a clear indication that most farmers contributed considerably to the technical aspects of the installation and three commented that the traditional installation designs (for indoor systems) would have at least some unsuitable aspects had they been incorporated into a pasture based system. Some farmers felt that the original dairy layout designs were clearly intended for barn/indoor systems and required modifications to ensure they were more suited to the pasture-based cow trafficking system.

When asked about the hurdles and adherence to target deadlines with regard to commissioning of the new AMS dairy many of the interviewed farmers indicated some level of at least minor displeasure. Two farmers indicated installation and commissioning delays occurred with one reporting that power supply to the site was the cause whilst the other reported that shipment arrival timing was the key cause combined with an undesirably low level of technical capability. There was also some concern around communication from the technical installation crew and farmer expectations surrounding commissioning dates. Two farmers expressed that the workload they had imposed on themselves by co-ordinating the service providers and carrying out construction was perhaps too great. Local councils also created some issues for two farmers.

All farmers were clear that they have experienced very limited challenges with regard to industry level regulations. Although most felt that the industry is not yet well prepared for the incorporation of AMS into industry and are yet to modify the wording of regulations to accommodate AMS installations/operations. Two farmers mentioned that local councils had created some hurdles/difficulties prior to the commissioning and two farmers reported some minor issues with dairy inspectors/auditing regulations. There were three comments made around the lack of knowledge within the government extension bodies and that this needed addressing by the industry.

The Commissioning period

The approach taken to adaptation of cows and heifers to the AMS was quite farm-specific and depended on the timing of commissioning in relation to the calving dates and patterns of the herd. Despite this there was an outstanding agreement from all of the farms that the herd adapted well to the AMS system. However, where additional cows had been bought into the system after commissioning there was a tendency for these cows to behave with a herd mentality which took some time to break. These later groups of cows were largely self-trained (after initial training and encouragement by dairy staff) by following the experienced cows. It was also a common comment that late lactation cows did not adapt to the system particularly well and were often remaining in the paddock requiring fetching for milking. However it was recognised that whilst late lactation training required more effort the cost in reduced milk production was minimised. When these cows calved back into the system they have been seen to perform exceptionally well to date.

When queried about the proportion of the herd that had been removed from the farm due to unsuitability with the AMS the answers ranged from 2-3% with just one farmer reporting 10-15% of the herd being unsuitable. The key reasons for unsuitable cows included udder conformation, slow milkers and some undesirable behaviour.

When farmers were asked the question – “what came as the biggest surprise, what did they not expect that could have better prepared them for being an AMS farmer” they responded with a range of answers (both positive and negative) including:

- Management of sick and mastitic cows more difficult than expected
- More alarms than expected during initial weeks
- Less alarms than expected during initial weeks
- Efficiency of machines and entire AMS farm system was much higher than expected
- Didn't expect to have contribute so much to maintenance and servicing of the machines
- Impressed with decreased bulk milk somatic cell count and increased production/cow
- Surprised at speed and ease of cow learning
- Surprised at the intensity of the first few weeks and how much effort was required in helping cows to adapt
- Should have been encouraged to allow cows to explore more – found it somewhat frustrating to walk away from cows and give them that opportunity
- Paddock and grazing management impacts largely on cow traffic and milking frequency/production more than expected

Post commissioning

When asked about the impact that AMS has had so far on labour and lifestyle (despite the infancy of the installation) the majority of farmers felt that AMS had impacted largely on the flexibility of daily routines compared to CMS. There was also an indication from most that they are starting to capture true labour or lifestyle benefits with reduced stress/pressure on both cows and people, more frequent sleep ins, increased confidence in leaving the farm, reduced physical labour requirements and reduced total labour for operation.

Most farmers involved in the study felt that they had received a reasonable amount of training in regard to understanding the technology and development of daily routines. However, there was also an indication that farmers continued to learn about the capabilities of the system and software well after the cows had adapted.

Five of the seven farmers felt that they had developed a good understanding of how to motivate cows around the system within one to two months of commissioning. However, one farmer suggested that he has not yet stopped learning and one believed that had taken as long as 3 months to really understand the motivating factors. As farmers entered different seasons and climatic conditions they felt that their knowledge and learning continued to be challenged and developed.

The time taken to feel that farmers were managing their system in such a way as to achieve an adequate level of voluntary and distributed cow movement was dependent on the stage of lactation and the feed availability at start-up. However, most responded that within less than three months after commissioning they felt they had a reasonable handle on this. Some farmers indicated that whilst they were comfortable with the cow traffic they are achieving they will continue to learn and understand more in this area over the coming months.

Aside from milk price the key hurdles experienced on farm post-commissioning tended to be related to seasonal and climatic impacts on feed quality, availability and cow traffic. There were also individual comments about AMS reliability, wet weather cow traffic management, milk quality caused by technical difficulties, hot weather cow traffic management, finance with banks unfamiliar with AMS technology and oestrus detection.

The majority of farmers indicated they were very positive about the technical reliability and performance of the entire AMS installation (including surrounding infrastructure) even though two mentioned some technical reliability issues during the early start-up period. It was also found that all farmers interviewed felt that they are already well placed to make system management decisions that will allow them to achieve target performance levels.

Interestingly, all but two of the interviewed farmers indicated that they are not in regular contact with any other AMS farmers (although two felt that they should be) and are focussed on their own operation. This may be a reflection of the infancy of commercial AMS within the Australian industry and the lack of experienced farmers – the two that are in regular contact are only taking regularly to the farmer who adopted AMS in 2001.

Conclusion

Whilst AMS installations around the world are now commonplace, on an international level there is only limited expertise regarding operating AMS within the bounds of pasture-based grazing systems. With this in mind, the early adopting farmers have a lot to learn and will pave the way for the industry. In addition to farmer learnings the commercial companies will also further develop their expertise around pasture-based AMS and specifically expertise within Australia allowing improved support to farmers through the planning, installation and commissioning processes. Despite the hurdles that have to be expected during the early adoption of such a technology and the infancy of on-farm adoption of AMS in Australia, the farmers involved in the study tour presented here are extremely positive about the steps they have taken to secure their future in the dairy industry. Overall the farmers spoke highly of the technical ability of the milk harvesting equipment and the speed at which the cows adapted to the system. The first 12 months of such a “new way of farming” will surely be a challenge but the results presented here indicate that those farmers that have taken the plunge are already reaping the rewards. Whilst the farmers are still learning (and will continue to for some time) it seems that the cows are much quicker learners!!

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