KEEPING AN EYE ON THE FUTURE

With all the effort that goes into planning a new dairy, it is hard to accept that the new system will have a limited lifespan. Ten or 15 years down the track, the whole process may need to begin again to ensure profitability is maintained.

Successful, long-term businesses periodically scan the horizon to gauge the impact that developments in new technology and milk harvesting research may have on future operations. The benefits of keeping an eye on the future include:

- continuous improvement to labour efficiency;
- improved financial forecasting;
- improved work practices and safety; and
- strategic and cost-effective use of new technology.

To develop a clear picture of how the business will fit into a changing dairy industry, consider the following:

- **Future trends** p236
  Cows, people, facilities, challenges for the future.
- **Automatic milking installations** p238
  The possibilities, cost estimates, challenges.

This chapter outlines developments on the milk harvesting horizon and provides some insight into milk harvesting in the future.

Future trends

Milk harvesting has moved a long way in the past 10 years and several trends are already apparent.

Cows

Cows will change in terms of size and production.

- Average cow and udder size is gradually increasing, due to the predominance of North American genetics.
- Changes in cow size will change the specifications for future milking facilities.
- Production increases will change the time required to milk them and affect the number of clusters a single operator can handle.
- Continued research into cow physiology and behaviour will lead to better facility design for improved cow-flow.

People

As costs of labour increase and advances in automation reduce the need for repetitive milking tasks, labour will be used differently on many farms.

- A division is emerging between the physical tasks of milking and milking management tasks.
- Many farms now employ specialist milkers and have 2 or 3 shifts working through the day and night.
- Milking management tasks are increasingly relying on reports generated by sensors and computers, with actions being applied to groups of cows rather than individuals.
- Farmers face the challenge of dealing efficiently with large numbers of cows while still maintaining the comfort of individual cows within the herd.
- Milking managers will require skills in managing people and computer information systems, as well as the cows.

Facilities

Technology has invaded the dairy in a big way and automation is increasingly being used to increase the productivity of milking labour.

- Automatic milking installations (robots) currently milk 10% of the Dutch herd and are installed on many other commercial farms around the world.
- Traditional milking equipment and facilities are getting high tech, often being controlled by sophisticated computer management systems.
- The trend to automate repetitive tasks will continue and should result in major changes to milking tasks, farmer lifestyle and even impact on dairy farming communities as a whole.

Challenges for the future

Some of the challenges that lie ahead include:

- applying automation effectively;
- skilling up the workforce for their new roles in milk harvesting;
- the segregation and handling of milk for specialist uses;
- ensuring product quality and integrity; and
- making sense of the huge amount of data that can be automatically captured at milking time.

No doubt, there will be plenty of others that haven't even been considered yet.

The only thing certain about the future is that it will continue to change, probably at a faster rate than in the past.

Automatic milking installations

The first milking 'robots' were installed on commercial dairy farms in The Netherlands in 1992. Ten years later, automatic milking installations (also known as voluntary milking systems or robotic milking systems) are operating on about 1200 farms in 22 countries, including 1 in Australia and 1 in NZ.

- More than 90% of automatic milking installations are located in north-western Europe, where small family farms predominate, labour is relatively expensive and herd sizes are smaller than those in Australia.
- Automatic installations are also milking cows on at least 20 Canadian farms – Canada has relatively high labour costs, limited flexibility to increase herd sizes on family farms, and limited opportunity to graze cows on pasture.
- As an indication of the profound changes just around the corner in an entirely different market, some of the largest industrial farms in the United States are starting to look seriously at automatic milking for herds of 2000-3000 cows.

Figure 11.1: Several cows waiting their turn at the automatic milking unit.
Source: National Milk Harvesting Centre.

The possibilities

As the differences between costs of automatic and conventional systems are reduced, an increasing number of Australian farmers may opt for these systems due to:

- improvement in lifestyle, with more time for family and leisure activities;
- less physical work, especially for older farmers or those with physical health problems;
- increased opportunities for attracting and keeping skilled labour;
- personal choice for innovators who want to try new ideas; and
- increased profitability based on increased milk production and lower labour costs.

An international conference was held in Canada in March 2002 to discuss automatic milking installations. To stimulate further discussions in Australia and to develop a realistic set of expectations, consider the following table outlining what automatic milking installations can and cannot do.

Table 11.1: Automatic milking installations.

Automatic milking installations **can:**	Automatic milking installations **cannot:**
Admit a cow to the stall	Bring cows into the milking area
Identify a cow	Clean up grossly soiled cows
Decide whether a cow is due to be milked, as per operator settings	Distinguish teats from dirty lumps of hair on the udder
Dispense feed, as per operator settings	Milk cows with unsuitable udder conformation
Clean teats	Make decisions on the nutrional needs of the cow
Attach clusters and remove them when milk flow falls to a pre-determined level	Know if a cow is completely milked
Spray post-milking disinfectant	Treat sick cows or call the veterinarian
Allow a cow to leave the stall	Order semen or get cows in calf
Reject milk, as per operator settings	Cure cows already infected with mastitis
Record milk yield	Refill chemical containers
Raise alarm lists, as per operator settings	Replace worn or damaged rubber components
Page the operator in an emergency, as per operator settings	Become angry

Source: Based on John Baines – Fullwood, UK.

Automatic milking installations, p178.

It is still too early to tell if these systems will increase or decrease milk production in cows on Australian farms. Some increase in milk yield could be expected if the cows are well fed and milk voluntarily more than twice daily. Questions about milk quality have been raised, but recent reports suggest:

- On-farm management tends to be the major factor determining the quality of milk harvested from farms using automatic milking installations overseas – the AMI system should not significantly decrease milk quality.
- There is little information on milk quality parameters from farms using these systems in pasture-based enterprises.

Overseas studies have shown a 3-11% increase in milk production on farms where the cows are allowed to milk more than twice daily. Studies in New Zealand are progressing, which will give some indication of the impact of miking cows by 'robots' less than twice daily.

Figure 11.2: View of robotic milking system.
Source: National Milk Harvesting Centre.

Cost estimates

The following estimates are based on assumptions developed by a group of Australian specialists in conventional milking systems for the DRDC's 2001 Milk Quality and Harvesting Business Plan.

- The estimated cost of automatic milking is about 12 cents per litre, although this will largely depend on how much milk is harvested by each 'robot'.
- This is about twice the cost of milking a herd of 250 cows in a conventional, 24-unit, swingover herringbone shed.
- This calculation assumed that a single box robot is capable of milking no more than 55-65 cows per day, and costs around $250,000.

In the meantime, researchers in New Zealand are investigating a changed pattern of use for automatic milking installations that may bring costs down to levels equal to the more conventional alternatives.

The NZ goal is to milk 200-240 cows using only 2 'robots'. The research goals are that cows should get most of their nutritional requirements from pasture and, on average, they will be milked less than twice per day. Perhaps this approach could offer a cost-effective alternative for Australian farmers?

Perhaps other, more cost-effective solutions will be developed by innovative farmers or researchers.

Figure 11.3: This view shows the brushes in position to begin teat preparation.

Source: National Milk Harvesting Centre.

Challenges

Farmers who have changed from conventional systems report the biggest implementation challenges have been:

- Learning to let go of the task of milking, and learning how to utilise the extra time to manage the farm as a business and to monitor the herd in other ways.
- Leaving the cows alone to learn from other experienced cows about how to enter the milking system voluntarily.
- Learning to be competent with computers and learning how to access and understand the information needed to manage the herd.

Because milking is changed to a 24-hour operation, system failures can occur at any time of the day or night.

- Good maintenance will decrease the number of failures, but someone still needs to be on-call at all times.
- Clearly, the successful deployment of automatic milking systems in Australia will need to be supported by a regional network of skilled technicians who have been trained overseas or in new local training programs for installation, service and maintenance.

Quick Note 5.8 Automatic milking installations.

Figure 11.4: This view shows the brushes being cleaned after they have prepared a cow's teats.

Source: National Milk Harvesting Centre.

Rounding up ...

Keeping up with the latest in milk harvesting technology and research will support informed decisions for future upgrades.

Automated milking installations should not be dismissed as far-fetched and too expensive – they may be the way of the future.

Further information ...

Proceedings of the First North American Conference on Robotic Milking, Toronto, Canada, March 2002, especially the following papers:

Automatic milking experience and development in Europe. Kees de Koning, Yvonne van der Vorst and Albert Meijering, Research Institute for Animal Husbandry, Lelystad, The Netherlands.

Global acceptation of robotic milking systems. A. van't Land, Lely Industries, The Netherlands.

Evolution of automated milking in the USA. Douglas J. Reinemann, University of Wisconsin, USA.

Managing the change to a robotic milking system. John Baines, Fullwood Ltd, UK.

Managing the milk harvest – A prospectus for the milk quality and harvesting sub program of the National Dairy Alliance. Dairy Research and Development Corporation, Melbourne, Australia, 2001.