FUTUREDAIRY

Partial budget

on the economics of implementing an Automatic Milking System (AMS)

When comparing the economics of converting from a conventional milking system to an automatic milking system there are several physical and financial factors which need to be considered. Use the following worksheets to record these considerations for your farm. Your financial advisor can incorporate them into a full economic evaluation.

This partial budget worksheet provides examples and extra information pertaining to the first year of operating an AMS (year 1) with an additional worksheet, examples and extra information for subsequent years. The reason for this is that the impact of converting to AMS is likely to vary between year 1 and subsequent, steady state years. The costs may be more and the benefits less during the first year while the farmer, farm staff and cows all gain a critical level of experience. You may find it useful to print a number of copies of the second worksheet if you expect significant changes in costs or income through subsequent years.

A cautious approach is best adopted to ensure economic viability. However, it is also recognised that some farmers manage to make the transition from conventional milking to automatic milking with much greater ease than others. In the best case scenario a farmer might expect some (but not necessarily all) of the following outcomes:

- An increase in milk production and therefore income within the first year of adoption. This would be mostly achievable if the majority of cows are trained during the late lactation period and calve back in as experienced cows within the first six months of operation.
- An increase in milk quality (particularly with regard to BMSCC) through detecting high SCC cows and either treating them to reduce their SCC or preventing their milk from entering the bulk milk tank.
- A significant decrease in animal health costs through reduced lameness.
- A significant drop in the cost of labour in year 1 of operation.

Whilst it is recognised that financial viability and affordability have a considerable impact on investment decision, there are a number of non-financial implications that may also influence decision making. With specific regard to AMS, some factors will have a financial implication while other factors will not have a dollar value, making it difficult to estimate the true value in financial terms. Just because a factor doesn't have a financial impact does not necessarily mean that it has no value at all or that it should not carry some weight in the decision.

Some non-financial and less predictable factors for consideration might include:

- Having AMS may make it easier to attract and/or retain staff or family members in the business.
- If AMS allows you to reduce the number of paid employees there may be a non-financial attractiveness associated with this.
- If you have an ability to spend more time on higher impact tasks rather than milking cows there is likely to be a financial benefit through improved productivity but it may be difficult to estimate the scale of this.
- The benefits of AMS may be harnessed through an improved lifestyle which may be very highly valued by some people even if the financial impact is negligible.
- In some circumstances AMS is seen as a way of building the business in a manner that would not otherwise be possible. For some farmers, AMS may result in an ability to continue dairy farming for the longer term by reducing the physical impact on the body from repetitive manual tasks associated with milking. Dairy farming is a business but for many farmers, it is "in their blood" and the thought of retiring is not attractive.

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Partial budget worksheet

Year 1

Please refer to the extra information that is provided on page 3 and which pertains directly to year 1 of operation.
Note: if you feel there is important information missing from a partial budget scenario make your own assumptions to fill these gaps.

Increased income	Decreased income
No direct increase in income is likely	**Production:**[3] 0-15% losses in season one may be expected. Calculate as litres/cow or kg MS/cow Farm average production pre conversion _____litres/cow x (e.g.) 15% x ____ total cows = _____total litres x $_____payout = $_____
A Total increased income $_____	**D** Total decreased income $ _____
Decreased costs	**Increased costs**
Animal Health[1] – 5% reduction in year one Current average $____ x (e.g.) 5% = $_____ **Labour**[2] – unless currently overstaffed this is unlikely to decrease in the first year.	**Labour**[2] – an increase in labour may be evident for at least part of year 1, particularly during the initial commissioning and adaptation period $/hr x _____ hrs = $_____ **Maintenance**[4] (service costs) $5 -10,000/unit = (e.g.) $7,500 x # units (1 unit = 60 - 90 cows) = $_____ **Interest**[5] – (assume 100% lending) (e.g.) $250,000/unit x # units _____ x 10% = $_____ **Farm Dairy**[6] (Incl electricity) 20% increase Current average $____ x (e.g.) 20% = $_____
B Total decreased costs $ _____	**E** Total increased costs $_____
(A+B) = C Total gains $_____	**(D+E) = F** Total losses $ _____
Net gain or loss (C-F)	

Other factors to consider:

- **Time**[7]
- **Stress levels**[8]
- **System creep**[9]
- **Depreciation**[10]
- **Cow losses (culling)**[11]
- **Consultancy**[12]

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Partial budget

Extra Information - Year 1

[1]**Animal Health:** This is likely to incur a small saving due to a lower incidence of lame cows. Other animal health benefits particularly in the first season are insignificant. Precise management procedures will be required to ensure costs (such as mastitis, SCC and anoestrus) do not rise. If there is an existing animal health problem (in particular high SCC cows) the problem should be addressed before converting as the issue may be exacerbated under AMS. Farm management practices under AMS of other problems will need to be discussed further with the service merchant and your vet/advisor.

[2]**Labour costs:** These are unlikely to change significantly in the first year. Labour associated with the actual milk harvesting will decrease, however this may be required in other areas on farm during the transition stages and for the first 6-12 months. The focus on farm, and therefore tasks, will likely change: more time will be able to be spent on feed/pasture, animal health, reproductive and nutritional management.
It is possible that an increase in labour may be required during the initial 3-6 months of operation and that a decrease in labour may be achieved after the first 6 months – this could result in no net change in labour over year 1.

[3]**Production:** Production losses in the order of 0-15% during year one could be considered whilst the cows and you adjust and refine the system operations. This will vary significantly on individual farms and will depend on the stage of lactation at commissioning. Cows transitioning in early lactation will likely adjust to the new system easier but production losses could be higher. If you transition later in the season there will be cows that will not adjust in the time frame of that lactation and may dry themselves off but production losses should be relatively small.

[4]**Maintenance/service costs:** This will be one of the main expense changes on farm. Depending on access/availability to service merchants this could be as high as $10,000/unit/year. This will generally cover call outs and general servicing of the system but will be a negotiable factor during the sales/installation process. Farmers with higher levels of technical ability may have an opportunity to reduce routine maintenance and call out costs by taking on some of these responsibilities themselves.

[5]**Interest:** When analysing the financial implications of changing a system the opportunity cost of the capital outlay needs to be taken into account so even if full borrowing is not required it should be included in the budget. For this budget we have assumed the units cost $250,000 each, however this is extremely dependant on the number and brand of units being installed, the changes required to the current farm layout and infrastructure (including yarding and races) and location of sales and service merchants in relation to your property. For more information consult your local dealers.

[6]**Farm dairy:** There is currently insufficient data within Australia to be certain on the likely impact of AMS on farm dairy expenses (in particular electricity costs), however indications are to expect an increase of up to 20%. Consideration needs to be made for the fact that the dairy will operate 24 hours/day.

[7]**Time:** The time requirements and potential impact on the current farm performance during the commissioning phase needs to be considered and allowed for. When the system is functioning sufficiently, time available to spend on other farm practices is likely to be significantly increased due to minimal labour requirements and time constraints in the farm dairy.

[8]**Stress:** Expect stress levels to increase during the commissioning phases and throughout the first six months of converting to AMS. Long term, farmers report reduced stress, more flexibility and greater enjoyment from their work.

[9]**System creep:** Warning! Investing in AMS can lead to other changes in your farm system, examples include increased supplementary feeding and more spread calving pattern. Keep control of your system and carefully consider any subsequent system alterations and the associated impacts on cost of production. On the flipside AMS may force you to achieve higher levels of pasture utilisation to ensure regular and frequent cow traffic is maintained.

[10]**Depreciation:** The expected life of an AMS is 10-15 years. Therefore most models would depreciate at 6.7-10% annually.

[11]**Cow losses:** Experience on both research and commercial farms have indicated that between 2-5% of cows will need to be culled/sold. Factors such as udder shape and size, temperament and simply not “adapting” to the new system will need to be considered. You may consider not culling any cows prior to commissioning as it is difficult to accurately predict which cows are suitable.

[12]**Consultancy:** Consider budgeting for an increase in consultancy support costs in the first 6 months. The need for this will depend on the existing skill levels within the team. A common area requiring increased support is pasture/feed management.

Other: It is important to note that these values have potential to vary significantly between farms as would occur on a conventional farm. This partial budget is designed to be used to help you analyse the potential financial and non financial changes that are likely to occur when converting your current system to AMS. The data generated for this worksheet should be used in developing a full economic analysis with your financial advisor.

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Partial budget worksheet

Subsequent years (steady state)

Information recorded here should be in comparison to current situation rather than comparison with year 1 of operation. Please refer to the extra information that is provided on page 5 and which pertains directly to years subsequent to year 1 of operation.

Note: if you feel there is important information missing from a partial budget scenario make your own assumptions to fill these gaps.

Increased income – subsequent years	Decreased income – subsequent years
Production:[3] Anticipated increases in production can be calculated as litres/cow or kg MS/cow Farm average production pre conversion _____litres/cow x (e.g.) 15% x ____ total cows = _____total litres x $_____payout = $_____	No anticipated reductions in income are expected
A Total increased income $_____	**D** Total decreased income $ _____
Decreased costs – subsequent years	**Increased costs – subsequent years**
Animal Health[1] – 5% reduction compared to pre-conversion Current average $____ x (e.g.) 5% = $_____ **Labour**[2] – a reduction in labour may be anticipated and can be calculated as $/hr or proportions of FTE (full-time equivalent) $/hr x _____ hrs = $_____	**Maintenance**[4] (service costs) $5 -10,000/unit = (e.g.) $7,500 x # units (1 unit = 60 - 90 cows) = $_____ **Interest**[5] – (assume 100% lending) (e.g.) $250,000/unit x # units _____ x 10% = $_____ **Farm Dairy**[6] (incl electricity) 20%increase Current average $____ x (e.g.) 20% = $_____
B Total decreased costs $ _____	**E** Total increased costs $_____
(A+B) = C Total gains $_____	**(D+E) = F** Total losses $ _____
Net gain or loss (C-F)	

Other factors to consider:

- **Time**[7]
- **Stress levels**[8]
- **System creep**[9]
- **Depreciation**[10]
- **Cow losses (culling)**[11]
- **Consultancy**[12]

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Extra Information - Subsequent years (steady state)

[1]**Animal Health:** The savings resulting from a reduced incidence of lame cows should continue after year one (compared to current situation). Other animal health benefits are likely to continue to be insignificant. Precise management procedures will be required to ensure costs (such as mastitis, SCC and anoestrus) do not rise in subsequent seasons. A well managed system may allow for an increase in the quality of bulk milk through early treatment of mastitis cows and management of high somatic cell count cows.

[2]**Labour costs:** These may decrease after year one but will depend on you current situation and how you capture the benefits of AMS. In practice some commercial farmers reduce the number of labour units, others reduce the number of hours worked and others spend more time focussing on higher impact tasks e.g. feed/pasture management, animal health, reproductive and nutritional management.

[3]**Production:** This will vary significantly on individual farms. There is potential to increase production (particularly in early lactation) through increased milking frequency but this will depend on the system management, ratio of cows to AMS units and throughput capacity of the AMS units. Remember that an increase in production will require an increased level of feeding and that increased production (through increased milking frequency) will only be realised if it is milking frequency that is currently limiting production rather than energy availability (through both energy consumption and body condition).

[4]**Maintenance/service costs:** This is unlikely to change from year 1 to the steady state but confirmation of this should be established during the sales/installation process.

[5]**Interest:** This is unlikely to change from assumptions made in the year 1 worksheet.

[6]**Farm dairy:** This is unlikely to change from assumptions made in the year 1 worksheet.

[7]**Time:** When the system is well settled and has gone through a full 12-month cycle, time available to spend on other farm practices is likely to be significantly increased due to minimal labour requirements and time constraints in the farm dairy.

[8]**Stress:** After year 1 farmers generally report reduced stress, more flexibility and greater enjoyment from their work.

[9]**System creep:** Warning! After year 1 you should continue to be vigilant with considerations regarding any significant changes to your farming system. Changes in level of supplementary feeding and calving spread should involve careful consideration of the associated impacts on cost of production. Don't allow AMS to drive the decisions, the way you milk your cows should not necessarily impact on the type of farm system you operate.

[10]**Depreciation:** The expected life of an AMS is 10-15 years. Therefore most models would depreciate at 6.7-10% annually.

[11]**Cow losses:** Experience on both research and commercial farms have indicated that between 2-5% of cows will need to be culled/sold. After year 1 the key factors for losses specific to AMS are likely to be udder conformation. Adopt a robust heifer training schedule to ensure that they adapt to the system well when they calve.

[12]**Consultancy:** After year 1 you will have experienced every season and stage of lactation and will likely be well positioned to refine the system operations. You may find that the need for external consultancy is reduced. However, it is possible that you realise that the skills required in this area are best provided by a consultant if the necessary skill level does not exist within the team.

Other: It is important to note that these values have potential to vary significantly between farms as would occur on a conventional farm. This partial budget is designed to be used to help you analyse the potential financial and non financial changes that are likely to occur when converting your current system to AMS. The data generated for this worksheet should be used in developing a full economic analysis with your financial advisor.