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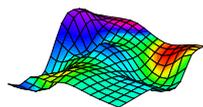
Australian Wool Innovation

Benefit Cost Analysis of AWI's Life Time Ewe Management Investment

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August 2012



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BACKGROUND

BDA Group was commissioned by AWI to complete a benefit cost analysis of their research & development investment in the Lifetime Ewe Management program (LTEM). This investment was made under AWI's 2010-13 Strategic Plan, On-Farm R&D Strategy 1 Sheep Health, Welfare and Productivity, Program 3 Productivity, Reproduction and labour Efficiency. The analysis was completed with the primary purpose of providing a robust assessment of the potential returns to Australian wool growers from that investment.

The analysis reported here also includes a Program Investment Logic which provides a brief summary of the value of the investment to Australian Wool Growers, investment targets and activities and identified funding gaps that will aid in directing future funding in this area (Attachment).

INVESTMENT

LTEM is a (up to) two year course run through Rural Industries Skill Training (RIST). The course was developed from the successful Lifetime Wool project which was run from 2001 to 2008. This program had a total investment of nearly \$10m, with AWI contributing \$6.7m with the remainder provided by state governments Department of Primary Industries and the CSIRO¹. The course has run from the spring of 2006 and by the end of 2010 221 wool growers had completed the course. The course is designed to assist wool growers to better understand the nutritional requirements of ewes and how feed budgeting (including the use of supplements) should be based ewe target condition scores².

The LTEM course delivered by RIST is based on small group (average 5 people) extension model which has successfully enabled participants to increase their lamb weaning rates. The total cost of the course is \$2,100 per participant, but with access to the federal government's Farm Ready program and state government funds the cost to participant can be as low as \$400 each.

In 2011 there were 80 LTEM groups, but because of the withdrawal of the Farm Ready training subsidy (training had to be completed by June 2012 to qualify) 46 of these groups faced higher participation costs. AWI agreed to cover the shortfall in funding for 30 groups with the Sheep CRC and DAWFA covering the remaining 16 groups. It was intended that AWI support would not be extended to other participants and movement to a grower self funding model was to be examined by the Sheep CRC³. AWI investment in 2010 /11 was \$200,000.

¹ RMCG 2008, AWI Project Evaluation – Lifetime Wool, December.

² Trompf, J.P., Gordon, D.J., Behrendt, R., Curnow, M., Kildey, L.C. & Thompson, A.N. 2011, Participation in Lifetime Ewe management Results in changes in stocking rates, ewe management and reproductive performance on commercial farms, *Animal Production Science*, 2011, 51, 866-872.

³ AWI R&D Project Approval memo, 12 January 2011.

On 6th January 2012 a decision was made by AWI to fund a further 30 groups (150 growers) at a total cost of \$215,250. Research by RIST had shown reluctance by growers to contribute more than \$400 each towards the program⁴ and hence potential to move to a grower self funding model was limited in the short to medium term.

Through LTEM training course participating growers gain knowledge and practical experience across several key nutrition management principles⁵.

1. Whole farm profit can be increased by managing ewes to achieve condition score targets.
2. Condition scoring involves the use of a simple and quick assessment tool for managing ewes to targets.
3. Ewes in higher condition score at joining conceive more lambs.
4. Ewes in higher condition score produce more wool that is broader and sometimes stronger.
5. Ewes in better condition at lambing have heavier lambs that are more likely to survive.
6. Ewes in better condition at lambing produce lambs that produce more wool that is finer throughout their lifetime.
7. Lambs grazing more pasture during lactation grow faster and are more likely to survive post weaning.

NATURE OF BENEFITS

The three main benefits that have been assessed to date include increases in stocking rate and lambs marked and a decrease in ewe mortality. The average changes across a survey of 182 past LTEM participants are summarised in Figure 1⁶. Survey participants ran an average of nearly 5,000 ewes each comprising 39% cross bred ewes with a maternal composite or terminal sire, 46% merino ewes with a merino sire and the remainder merino ewes with non-merino sire.

The average impact from participation in the LTEM course was estimated:

14% increase in stocking rate

12% increase in lamb marking (highest in cross bred ewes).

43% reduction in ewe mortality (from an average of 4.9% to 2.8%).

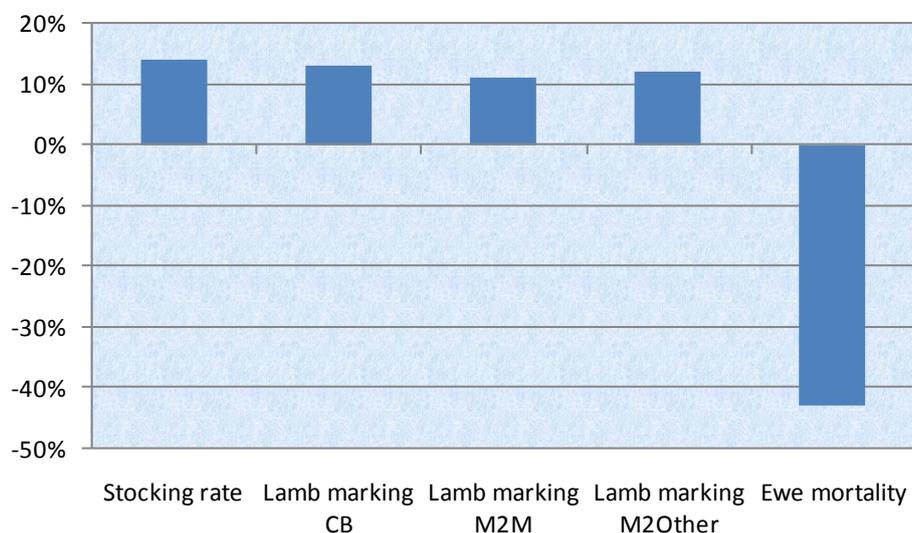
⁴ Discussions with Darren Gordon, RIST, June 2012.

⁵ RIST LTEM training Manual

⁶ Trompf, J.P., Gordon, D.J., Behrendt, R., Curnow, M., Kildey, L.C. & Thompson, A.N. 2011, Participation in Lifetime Ewe management Results in changes in stocking rates, ewe management and reproductive performance on commercial farms, *Animal Production Science*, 2011, 51, 866-872.

To achieve these benefits additional costs per ewe were incurred, typically for increased feed supplementation, pregnancy scans and paddock allocation based on energy requirements and energy availability.

FIGURE 1: PRODUCTIVITY GAINS ACHIEVED THROUGH PARTICIPATION IN LTEM COURSE.



Other benefits that are likely to be realised but were not been reported as part of the survey (as they are more long term in nature) include potential increases in rates of genetic progress associated with a larger number of ewes from which to select replacements and an increase in lamb lifetime wool revenue (from a reduction in micron and an increase in fleece weight).

QUANTIFYING BENEFITS

A number of analysis have been undertaken on the pay off from AWI's investment in Lifetime Wool and Lifetime Ewe Management⁷. However, these analyses did not consider the investment evaluation purpose specific to this evaluation and hence a separate analysis was required. Only the changes in ewe mortality, lamb marking percentage and stocking rate was considered as no data was available on other benefits noted in the previous section.

Survey results showed that the average number of ewes carried by participants from 2008 to 2011 was 5,000, considerably higher than the industry average of 1,500. As details of the business structure of participants supported with AWI funds were not available at the time this evaluation was undertaken, it was assumed that participant's flocks would mirror the industry average. If the average number of ewes

⁷ Most of these analysis were undertaken by John Young, Farming Systems Analysis Service, Kojonup WA using the DAFWA MIDAS Model.

run is actually higher than the industry average then the estimated return on the AWI investment reported in this evaluation will be understated. Sensitivity analysis is carried out later on larger flock sizes.

The benefits from LTEM outcomes was modelled using a self replacing flock of 1,500 ewes. The structure of such a flock is detailed in Table 1⁸. Annual trading income was \$156,202 for the baseline representative flock.

TABLE 1: REPRESENTATIVE FLOCK STRUCTURE: BASELINE

Class	Number	Bought	Sold	Deaths	Sales \$ / hd	Wool kg grsy / hd
Ewes	1,500		339	60	\$45	5
Wethers	900		203	36	\$45	6
Lambs	1,125		255	45	\$100	2
Hoggets	825		155	33	\$120	3.5
Rams	30	6	5	1	\$70	6
Total	4,380	6	956	175	\$68,758	\$87,444

Wool price (net levies and commission 500 cents greasy. Livestock sale prices derived from recent MLA sheep trading data.

In Table 2 the trading account for a 1,500 self replacing ewe flock is detailed with improvements in lambs marked (12%) and ewe mortality (down 43%) attributed to LTEM outcomes. The change in annual trading income was estimated at \$17,997. This benefit would be offset by the increased farm cost of extra supplementary feeding and pregnancy scanning of ewes, estimated at \$10 per ewe⁹. The net farm benefit was estimated at \$2,997. The main source of gain is through increased lamb and hogget sales.

TABLE 2: BENEFITS FROM DECREASED EWE MORTALITY (43%) AND INCREASED LAMBS MARKED (12%)

Class	Number	Bought	Sold	Deaths	Sales \$ / hd	Wool kg grsy / hd
Ewes	1,500		339	34	\$45	5
Wethers	900		203	36	\$45	6
Lambs	1,260	0	385	50	\$100	2
Hoggets	825		180	33	\$120	3.5
Rams	30	6	5	1	\$70	6
Total	4,515	6	1,111	155	\$84,814	\$89,385

⁸ Flock structures were based on the RMCG farm model (medium wool flock) used by AWI to evaluate on-farm investments.

⁹ Estimates provide by Dr Andre Thompson (Rapid Evaluation BCA)

In Table 3 the trading account for the 1,500 self replacing ewe flock as presented in Table 2 is adjusted to include an increase in stocking rate of 14% as a result of LTEM outcomes and the increased utilisation of available pasture in consumption with additional supplementation. The change in annual trading income against the baseline flock (pre LTEM) was estimated at \$42,351. Offsetting this gain would be the increased cost per ewe of \$17,100 and the capital cost of the additional ewes run (210) wethers (126), hoggets (116) and rams required (4). Assuming the capital cost of additional stock can be given by their opportunity income forgone if sold as lambs and rams are bought for \$500 each, this cost would be \$47,200 in total. The annualised value of this capital cost was estimated at \$6,736¹⁰. Therefore, the net annual gain to growers would be \$18,515.

TABLE 3: BENEFITS FROM DECREASED EWE MORTALITY (43%) AND INCREASED LAMBS MARKED (12%) AND INCREASED STOCKING RATE (14%)

Class	Number	Bought	Sold	Deaths	Sales \$ / hd	Wool kg grsy / hd
Ewes	1,710		386	39	\$45	5
Wethers	1,026		231	41	\$45	6
Lambs	1,436	0	438	57	\$100	2
Hoggets	941		206	38	\$120	3.5
Rams	34	6	5	1	\$70	6
Total	5,148	6	1266	176	\$96,646	\$101,907

Adoption of LTEM outcomes will be driven by participation in the RIST courses. For the evaluation period considered here there are will be 150 growers funded in 2011 and another funded in 2012. In future years it is likely that growers will increasingly opt for a one year course and hence the size of benefits generated might be less. However, evaluation of courses starting in 2013 and beyond is not considered in this evaluation.

The counterfactual for the investment (or extent to which benefits would be captured without AWI investment) can be considered in terms of the time it would otherwise take for participating growers to increase their skills in ewe nutrition management and make the necessary farm level changes. It is evident that a move to a grower self funding model could not be achieved in the short to medium term given the reluctance of growers to fund the full cost of the course in the current environment. For the purpose of this evaluation it was assumed that there would be a five year lag. Further, it was also assumed that there would be a three year lag from the time a grower first enrolls in the LTEM course to

¹⁰ Based on a 10 year period and grower discount rate of 8% in real terms.

when changes are implemented. Finally, it was assumed that moving to a higher stocking rate would unlikely to occur immediately and would typically be increased over a five year¹¹ period as more lambs are held back.

PAYOFF

In this section the estimated pay off on the AWI investment is reported. Measures are reported in Table 4. It was estimated that the AWI investment will generate benefits to Australian wool growers of between \$6m and \$21m in present value terms¹². This represents a return of \$13 to \$44 on every dollar invested by AWI and growers in the LTEM courses over the years 2011/12 to 2012/13.

TABLE 4: INVESTMENT PERFORMANCE MEASURES

Performance Measure	Without Increased Stocking rate	With Increased Stocking Rate
Present value of Benefits (\$m)	\$6.4m	\$21.8m
Present value of Costs AWI (\$m)	\$0.4m	\$0.4m
Present value of Costs Grower (\$m)	\$0.1m	\$0.1m
Net Present Value (\$m)	\$5.9m	\$21.3m
Benefit Cost Ratio	13	44

CONCLUSION

It was estimated that the AWI investment in the LTEM will deliver a positive return to Australia wool growers. The value of the AWI investment was estimated to be significant even when possible benefits from increased stocking rates are excluded. Under current market conditions, where meat prices are firm, the economic gains from LTEM outcomes can be substantial.

If the average number of ewes run per grower is higher than 1,500 then the return to AWI and participating grower funds will be higher. At an average of 5,000 ewes per grower the pay off without an increased stocking rate would be \$19.00 for every dollar invested and with an increase in stocking rates \$106.00 for every dollar invested.

¹¹ Ewes are replaced as 5 year olds.

¹² Benefits were adjusted to reflect the level of capture of profit gains by Australian wool growers – estimated at 75%. A discount rate of 5% was used.

ATTACHMENT AWI PROGRAM INVESTMENT LOGIC

On-Farm Strategy	Strategy 1 – Sheep Health, Welfare and productivity		
Program	Program 3– Productivity, Reproduction and Labour Efficiency		
Value to AWI <i>Why is AWI investing in this area? In what way will value be captured by Australian woolgrowers (metric)?</i>	Increased profitability of wool growing businesses through improved ewe nutrition management. Productivity gains result from growers making changes following LTEM training. AWI contribution to course in short to medium term does not crowd out private investment as demonstrated reluctance of growers to fully fund course.		
Target market(s)	All wool growers. However, only 150 grower places are supported each year.		
Measure <i>What could be measured to demonstrate that the value has been achieved?</i>	For participating wool growers changes in average productivity as measured by: <ul style="list-style-type: none"> • Increase in lamb marking percentage • Decrease in ewe mortality • Increase in stocking rates • Additional ewe feed costs and pregnancy scanning less than generated increase in revenue 		
Target(s) <i>For the measure selected what is the target change sought under the strategic plan?</i>	Performance of AWI funded groups expected to achieve: <ul style="list-style-type: none"> • Increase in lamb marking percentage of 15% • Decrease in ewe mortality of 50% • Increase in stocking rates of 15% 		
Investment Activities <i>What activities have been undertaken with AWI funds to achieve the target?</i>	The course is run by RIST with AWI funding support.		
Investments	2011-12	2012-13	Total
AWI cash			
AWI overheads if any			
AWI total investment	\$0.2m	\$0.22m	\$0.42m
Co-funding by growers (a)	\$60k	\$60k	\$120k
Co-funding by others	\$30k	\$30k	\$60k
Gaps <i>What gaps currently exist in which AWI investment might be required in the future to ensure target is met?</i>	Redesign of course to suit smaller wool growers in mixed sheep / cropping enterprises. Need to assess viability of longer term grower self funding models.		