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### AWI investment analysis fails genetics 101

An economic analysis of the wool industry's research investment fails to take account of one of the fundamental principles of breeding programs: genetic improvement is cumulative and the improvement is multiplied over many sheep.

A Cooperative Research Centre for Sheep Industry Innovation (Sheep CRC) review has shown that the report '*Benefit Cost Analysis of AWI's Genetics & Genomics Investment*', which was commissioned by Australian Wool Innovation (AWI) and conducted by consultants BDA Group, has failed to accurately account for the benefits of genetic improvement.

Sheep CRC Genomics Program Leader and internationally recognised animal genetics researcher, Professor Julius van der Werf, said the calculations used in the report, which addressed AWI's investment in genetic programs from 2010-13, "grossly underestimated" the total value of genetic gain by at least 10-fold.

"A simple calculation taking into account the cumulative effect of genetic gain and using the same assumptions as those in the report, shows that the value of a three-year investment in genetic gain delivers an additional benefit to the industry with a net present value of about \$6.4M rather than \$0.7M as estimated by BDA," Prof. van der Werf said.

"Our calculated benefit of \$6.4M is still a conservative estimate because the genetic gain will slowly spread over a larger proportion of the ewe flock – much larger than the 4 million ewes assumed to be directly linked to the 40,000 rams sold out of MERINOSELECT studs.

"Some of the assumptions made in the report are also questionable, especially with regard to the counterfactual in what can be achieved without MERINOSELECT."

Prof. van der Werf said investments in genetic improvement programs were always highly beneficial due to the cumulative and multiplicative effect of that improvement.

"The net present value of an ongoing breeding program with a modest rate of genetic improvement can easily add up to \$500 million over a 25 year period," he said.

"Even a small increase in the rate of genetic improvement is very valuable to the wider industry, even though the ram breeders capture only a small part of these benefits."

If the AWI report had taken into account the genetic benefits delivered by its investment in the Information Nucleus Program and the doubling in numbers of new sheep registered in the MERINOSELECT program, the returns on investment would have been further increased.



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Over the three year period from 2010-11 to 2013-14 the number of new animals entering MERINOSELECT grew from 75,000 to around 150,000 in 2013-14.

“Given those staggering figures it was therefore very strange to read the conclusion that there had been ‘low adoption of MERINOSELECT’,” Prof. van der Werf said.

Also ignored by the report are the new breeding tools brought to industry as a result of the INF, including:

- New ASBV for breech wrinkle available from 2009 to help breed sheep resistant to flystrike.
- New ASBVs and biological information for difficult to measure traits from Information Nucleus data and analyses (including meat eating quality, reproduction) from 2010.
- New DNA parentage test combined with poll gene test from 2012 – 50,000 commercial ram breeder parentage and poll tests have been sold since 2012. The tests provide increased pedigree accuracy which improves genetic gain. Poll rams are more valuable than horned rams, with additional benefits in automated sheep handling systems and occupational safety.
- DNA genomic tests commercially available from 2011 when the first 500 young industry rams were tested. Since 2011 a further 6000 commercial rams have been tested, allowing breeders to:
  - Increase the rate of genetic gain through improved accuracy of ASBVs
  - Select and breed from younger rams (decreased generation interval)
  - Select for important hard to measure traits such as worm egg count (WEC), reproduction and meat eating quality.

“Footnote #8 on Page 4 of the report indicates that potential benefits of genomic technologies were not included in the evaluation,” Prof. van der Werf said. “We have published research on the benefits of genomics since 2009, including economic analysis, but these seem to have been ignored in the AWI report.

“It is hardly surprising that if you do a cost/benefit analysis that only includes the costs and ignores the benefits then the answer will show a negative return on investment.”

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