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2019

ANNUAL REPORT

Making the possible practical

Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Program

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EXECUTIVE SUMMARY

Chairman & CEO's Review

The 2018-19 year marks the end of the Sheep CRC. First established in 2001, it was re-funded for a second term in 2007 and was successful in applying for a five year extension in 2014. An analysis of impact during the 18 years, covered by the three iterations of the Sheep CRC, has confirmed that the transformational change anticipated at the outset has been delivered.

Initiatives started in CRC1 and CRC2 have delivered important outcomes in their own right as well as providing essential building blocks for CRC3. Two examples illustrate this point. The eID precision sheep management initiative in CRC1 underpinned the successful genomics program in CRC2 and its impact continues to grow as an essential tool in ram breeding and commercial sheep production. The second example was the investment in education and training, commenced in CRC1 and continued in CRC2, which has had a significant impact as the next generation of industry innovators have taken on key roles in CRC3 and prepare to lead the sheep industry forward following the wind-up of the CRC.

The CRC has prepared a book *Concept to Impact* that provides more detail of the changes that have occurred in the industry as a result of the Sheep CRC and provides information on how the CRC, and its Participants, have worked together to achieve these changes.

In the final year of operations all Sheep CRC Research Programs have delivered what they set out to achieve. In just two areas the CRC has not met anticipated levels of uptake of research outputs. The meat program delivered the planned cuts-based grading system but, due to some technical challenges in the commercial installation of systems required for automated grading, the MSA Mark II system has not yet delivered the target number of lambs graded. In the sheep wellbeing program, the new web-based app, ASKBILL, was launched in August 2018 and the number of licences at 30 June 2019 was below target. MLA and Murdoch University have undertaken to implement the MSA grading system post-CRC and UNE has committed to continue the commercial delivery of ASKBILL and build the user base.

All Sheep CRC IP has been assigned under an overarching IP agreement executed by all Participants in CRC1, CRC2 and CRC3. The agreement provides a clear end point, with all Participants and the CRC Board in agreement over arrangements for ongoing exploitation of Centre IP. The commercialisation plans prepared by the assignees confirm commitment to legacy arrangements post-CRC. At 30 June 2019 all funds, apart from provision for the wind-up phase and contingencies, had been spent. Included in the final expenditure were grants approved by the Commonwealth CRC Program to UNE for ongoing delivery of ASKBILL and to Murdoch University for ongoing support of the postgraduate professional development program.

The Sheep CRC sold the sheep DNA business to Neogen Corporation. Neogen have established a genotyping laboratory in Australia and will continue to provide the DNA testing services initiated by the Australian Company Innovation (AIC). Continuity of the testing business is supported by arrangements to continue the employment of all staff involved in sheep DNA testing.

The achievements over the last 18 years were the result of a productive collaboration involving all sectors of the Australian sheep industry, the significant support from the Department of Industry's CRC Program, guidance and leadership from a skills-based board, the dedicated commitment of the research program teams and support of the Sheep CRC management group. The Commonwealth CRC Program model has served the sheep industry very well.

ACHIEVEMENTS

All Sheep CRC Research Programs have involved collaboration between organisations and across scientific disciplines. The fact that the postgraduate students were embedded in each research program added to the collaboration and ensured that student projects were well supported and aligned with industry objectives.

Research & collaboration

Enhanced sheep wellbeing & productivity

- The web-based app, ASKBILL, was launched in August 2018 at LambEx. ASKBILL integrates weather information with biophysical models that include information about the genetics of the animals and any management inputs. By predicting risks to sheep wellbeing, producers have an opportunity to respond in a timely way. The ASKBILL app is seen as holding significant potential to have a widespread impact on the management of sheep for better wellbeing and improved productivity.
- The supply chain app, MOBSELECT, partly funded by AMPC, was completed through to proof-of-concept stage in a major project conducted with the support of JBS Australia. The app works with the ASKBILL program to predict turn-off and carcase characteristics of lambs from a diverse range of genetic backgrounds reared under varying climatic conditions. Plans for full commercial development have been prepared as part of the legacy arrangements for the CRC.
- Validation trials comparing measured pasture and animal production with ASKBILL predictions have confirmed the accuracy of long term forecasts of both pasture production and animal performance.

Quality-based sheepmeat value chains

- A new eating quality genetic selection index has been released. The new index builds on CRC research and uses the genomic predictions of intramuscular fat and shear force that have an influence on meat eating quality. This has been a major collaboration between the CRC's meat program and the genomics program. It has also involved significant investment from MLA through Sheep Genetics. Introducing a new index for the lamb industry represents a major development and recognises the importance of eating quality in order to maintain consumer confidence and willingness to pay for high quality.
- Progress in the evaluation of the technical options for measuring intramuscular fat has continued to make good progress. During the last year two candidate methods have been evaluated and will progress to commercial proof-of-concept as a legacy task for completion post-CRC.
- The negative impact of modified atmosphere packaging of meat on eating quality has been the subject of a major study coordinated by the CRC. The research team found that by adjusting the gas composition in the packaging the meat eating quality could be maintained while still achieving the required shelf life. The impact of this research is expected to be considerable as it will enable the use of packaging technologies for increased shelf life of lamb products without unduly compromising eating quality.

Faster, affordable genetic gain

- The CRC Participants have worked with the Neogen Corporation to design a new 50k SNP test incorporating predictive SNPs identified from the CRC's full sequence analyses. The improved accuracy and broader scope of predictions from the new test are expected to increase the predictive accuracy from genomics by between 10% and 20%. The implications for faster genetic gain are significant.

- The scope of the genomic Flock Profile test has been expanded with additional information related to parasite resistance and reproductive efficiency. The Flock Profile test will have increased value for many producers where parasites are important, and for all production systems striving to select animals that contribute to improved reproductive efficiency.

Commercialisation and utilisation

The increased uptake and use of ASKBILL has been facilitated during the last 12 months through increasing engagement with sheep industry consultants and advisors. The model whereby advisors assist their clients to get the most information out of ASKBILL has started to gain momentum and has been identified as the appropriate focus for future commercialisation and expansion.

The Lamb Supply Chain Group has continued to expand. MLA has agreed to support the group post-CRC and include the beef cattle supply chains in the initiative. The regular meetings of processors, producers and researchers to discuss opportunities for improved supply chain functionality has been an important aspect of fast adoption of CRC technologies over the last nine years. Having this initiative continued post-CRC is an excellent outcome.

Expanded use of RamSelect includes increased number of user accounts and increased numbers of rams listed. The change in the commercialisation model to rely on income from user accounts, rather than ram listing charges, has proved to be popular with ram breeders and has not diminished the interest from commercial producers.

The use of DNA testing to provide information for ram breeders has continued to grow by around 20% during the year to June 2019. The increases resulted from existing clients using more tests and through new users starting to use genomic information as part of their genetic improvement strategy.

Education and training

In collaboration with UNE and the Australian Wool Education Trust a new education initiative was established to develop teaching resources that utilise the web-based apps, RamSelect and ASKBILL. Introducing these apps to the undergraduate curriculum is the main objective but it is also recognised that the teaching resources, and particularly the practical exercises, will be of significant interest to high schools, particularly where there is access to a teaching farm as this will allow comparisons of predictions with actual measurements. The long term value of training undergraduates and high school students is to embed these data-driven technologies in future farm management practices.

The postgraduate conference and professional development training activities were again a great success in FY19. During the last year the CRC undertook a graduate tracking survey to identify the careers undertaken by all past postgraduate students. The survey indicated a high level of retention of postgraduates (approximately 70%) in the sheep and cattle industries and also identified the importance that graduates placed on the value of the annual conference and professional development program.

Highlights and awards

The CRC nominated the genomic Flock Profile test for consideration under the CRC Association awards for Excellence in Innovation. While highly commended, the CRC did not receive an award on this occasion.

Key events

The CRC held the 'Final Conference' in Dubbo, NSW (20-21 March 2019). The conference provided an important opportunity to report back to Participants, and to the Australian sheep industry in general, on progress made during the 18 years of the CRC's activities. Attended by around 350 delegates, the conference was seen as a very positive finale.

Another achievement has been the preparation of a book on the Sheep CRC's activities and achievements due to be launched in October 2019.

Internal and external reviews

The Sheep CRC's Project Review & Research Committee continued quarterly meetings through to June 2019. The Committee has provided valuable feedback to the Executive and Board on progress being achieved in each task and has also monitored the delivery of outputs against those promised in the Operational Plan. This Committee has proven to be one of the most valuable independent advisory groups to assist the Sheep CRC manage the process of delivering the outputs and outcomes specified in the Commonwealth Agreement.

RISKS & IMPEDIMENTS

The major risk identified for the final year of the Sheep CRC was to achieve a smooth transfer of all Centre IP to appropriate organisations to continue the delivery of CRC outcomes and commercialisation activities. With 21 Essential Participants involved in the three CRCs from 2001 to 2019 it was essential to allocate sufficient time to reach a consensus position with all Participants.

While Sheep CRC Ltd was the single legal owner of all Centre IP the beneficial interests were held by Participants in relation to their participating equity.

The process to reach agreement on the assignment of Centre IP commenced around August 2018 and reached a successful conclusion in June 2019.

- The first step was to review options for the commercialisation of CRC outputs and products.
- The next step was to request from potential assignees details of proposed commercialisation/utilisation plans with indication of the commitment that the organisation would make to the post-CRC activities.
- Commercialisation/utilisation plans were considered by the Board and a Working Group, chaired by the CEO, was set up to work with all organisations interested in receiving CRC IP. Regular meetings of the Working Group enabled the development of a draft IP distribution plan by the end of October 2018.
- At the Participants Forum in November 2018 there was a full review of the IP register and proposed arrangements for assignment of each element of IP.
- MLA proposed an overarching agreement covering the assignment of both legal and beneficial interests to be executed by all Participants.
- MLA took the lead in this process by engaging specialised IP lawyers to help develop an agreement acceptable to Sheep CRC Ltd and to all Participants.
- Having a fully executed overarching agreement, prior to 30 June, achieved the required outcome of transferring all the Centre IP from the Sheep CRC to the agreed assignees on 30 June 2019.

Critical factors in securing a clean agreement on IP assignment were: the lead time allocated for this process; and the strong support from MLA, as the major stakeholder.

IMPACTS

The Impact Tool, developed by the CRC Program to ensure a consistent approach to cost:benefit analysis, has been used by the Sheep CRC to monitor and value the benefits associated with outputs for the three Research Programs conducted over the last five years. Details of inputs, usage, impacts and the probabilities associated with these assumptions were revised in March 2019 and subsequently reviewed by the Sheep CRC Executive, the Project Review and Research Committee and the Sheep CRC Board.

The impact from the meat and genetics programs estimated in March 2019 were partly due to outputs of R&D programs completed during CRC2 (2007-14). For this reason part of the input costs of CRC2 programs have been included with input costs for CRC3 to give a more accurate estimate of impact.

ASKBILL—delivers enhanced sheep wellbeing and productivity

ASKBILL reduces production losses through improved management of parasite risks and better management of flystrike prevention. Good feed budgeting to minimise problems associated with under-nutrition of ewes facilitates management of slightly higher stocking rates and increases lamb-marking percentages. These benefits are achieved with costs of software licence fees ($100/year) and some additional feed costs.

Cuts-based MSA grading system Mark II—delivering the basis for a quality-based meat value chain

The cuts-based grading system and associated measurement technologies help producers deliver products that are more closely aligned with the requirements of processors and the retail sector. Better targeted production reduces costs due to carcases that are either too big or too small. The measurement systems for lean meat yield and eating quality contribute to consumer satisfaction and willingness to pay. Consistency and improving eating quality contribute to demand for lamb and higher prices. Usage costs include abattoir measurement systems and feedback reporting.

Use of genomic technologies and RamSelect—delivering faster and more affordable genetic gain

Increased use of genomic technologies in sheep breeding provides more accurate estimation of true genetic merit for a wide number of traits and allows faster genetic gain to improve these traits. Faster genetic gain in the ram breeding sector delivers benefits for commercial producers and these improvements are realised through additional meat production, improved eating quality and higher prices that consumers are prepared to pay for a high-quality product. Usage costs relate to purchase of DNA tests.

There were no substantial changes to the expected outputs but there have been changes in usage and impact. The associated probabilities for delivering the anticipated outputs and levels of usage have increased as the products have been delivered and actual figures of usage have become available.

The usage and impact from the genetic/genomic products were ahead of our initial expectations. Through the improving value of the genomic technologies and reduced cost of DNA testing, the new technologies have been taken up by industry more rapidly than initially expected and this has had flow on effects for estimated impact. The impact of genomic technologies on the rate of genetic gain has also been greater than anticipated in 2013.

In the meat program some delays in the final development of measuring systems to underpin the new cuts-based grading system have resulted in usage levels being a bit behind schedule. A major impact of the meat program, not anticipated in the initial impact analysis, was the rapid response of the industry to select genetics for improving meat eating quality. Eating quality has been shown to underpin consumer willingness to pay and has contributed to increased demand and higher sheep prices.

The change in approach for Program 1 'Enhanced Sheep Wellbeing and Productivity' during 2016 meant a delayed start to the commercial delivery of the web-based product, ASKBILL, (launched in August 2018) and actual usage numbers for the new tool have been below target. The validation trials have confirmed the accuracy of risk prediction and confirmed the value of the tool in feed budgeting. The additional supply chain functionality, facilitated through the new MobSelect app, has the potential to increase usage. Relatively high usage costs for ASKBILL were included to account for the additional cost of feeding to deliver enhanced sheep wellbeing. The impacts resulting from increased feeding and improved management have been estimated from results of Lifetime Ewe management trials.

Non-monetary impacts

The current research programs in CRC3 and their impact do not account for all of the CRC's outcomes and products. The following is a summary of some of the more important outcomes not described as monetary impacts in the analysis.

1. ParaBoss – now delivered through UNE, has 15,000 subscribers and contributes to effective parasite management throughout the Australian sheep industry with Flyboss assisting producers to manage the risk of flystrike without mulesing.
2. The LifeTime Ewe Management Program, promoted and established during CRC2 and then strongly supported by AWI post-CRC2, and the Managing Scanned Ewe program (CRC2), with ongoing support from pregnancy scanners, have contributed to the increased lamb-marking percentage over the last 7 years.
3. eID technologies, through Precision Sheep Management, have continued to support ram-breeding and commercial sheep production (six companies and research providers have been granted licences to exploit the CRC's patent).
4. Education – developing undergraduate teaching resources in CRC1 (with ongoing support from AWET) and the postgraduate program (81 postgraduates over 18 years) has provided a long-term industry benefit through the creation of skills to develop and utilise innovation.
5. Increased membership of MERINOSELECT through RamSelect workshops and the app.
6. Increased use of poll rams (occupational safety and animal welfare benefit).
7. Confidence by major processors and exporters that pursuing larger leaner carcases will not be detrimental to overseas consumers if IMF is maintained
8. Development a technical basis for domestic markets for yearling merinos if restrictions are placed on live sheep export.
10. DNA tests for genetic defects allows breeders to remove recessive mutations and gives their clients more confidence in paying higher prices for genetic merit and using top rams more widely.
11. Use of DNA parentage testing to remove the need for single sire mating for breeding. Benefits include reduced labour costs and improved accuracy.
12. Livestock Library and digitization of the CSIRO agricultural journals to make existing knowledge more readily available for research and education.
13. Wool ComfortMeter and HandleMeter – increasing the demand and price for finer-micron wools.

Changes in expected monetary impacts ($, million)

Initial Impact Tool analysis 2013

Program	Input costs $	Utilisation $	Impact $	Benefit cost
Program 1—Enhanced sheep wellbeing and productivity	11.4	13.0	85.3	3.50
Program 2—Quality-based meat value chain	28.5	45.5	160.4	2.17
Program 3 —Faster, affordable genetic gain	12.7	5.8	72.9	3.93

FY19 Impact assessment (Analysis March 2019)

Program	Input costs $	Utilisation $	Impact $	Benefit cost
Program 1—Enhanced sheep wellbeing and productivity	18.4	188.2	562.6	2.72
Program 2—Quality-based meat value chain	54.8*	15.2	317.0	4.51
Program 3—Faster, affordable genetic gain + RamSelect	44.0**	3.4	121.1	2.55
Overall Total	117.2	207.1	1,001	3.09

* Includes estimated investment of $40 million in meat R&D during CRC1 and CRC2

** Includes estimated investment of $30 million in genetics and genomics R&D during CRC2

Notes on Program 1 Impact assessment

- A major non-monetary impact is the benefit for the sheep industry through being 'on the front foot' in responding to concerns by animal activists through reference to ASKBILL as a framework for responding to risks that may compromise the wellbeing of sheep.
- A further non-monetary benefit is the fact that forecasting components of ASKBILL can be relatively easily adapted to forecast cattle production and risks.
- The relatively high 'usage' costs relate mainly to additional nutrition inputs and the cost of labour for additional management inputs. The usage costs are more than compensated for by additional lambs and wool sold and through reduced ewe mortalities.

Notes on Program 2 Impact assessment

- The input costs include an estimated $40M invested in the meat Program during Sheep CRCs 1 and 2. The cost of abattoir measurement of LMY and IMF were increased from $0.25 to $0.55/carcase and might be higher

Notes on Program 3 Impact assessment

- As noted above input costs for analysis of impact include investment of $30M in genomics research during CRC2 (2007-2014). It should also be noted that benefits resulting from genomic technologies are long term and will extend beyond fifteen years (max period for Impact Tool). The estimate benefit: cost ratio of 2.55 is considered be very conservative.

PERFORMANCE AGAINST ACTIVITIES

All research milestones have been satisfactorily completed with publication of the results in peer-reviewed journals and national/international conferences. A list of peer-reviewed papers published during the 12 months to 30 June 2019 are included in Appendix 1 of this Report.

Postgraduate completions are slightly behind schedule and arrangements have been made with Murdoch University to continue to monitor progress and assist completions where necessary.

Program 1 Enhanced sheep wellbeing and productivity

The ASKBILL web-based app has been completed and was launched at LambEx (August 2018). The validation trials conducted in conjunction with commercial sheep producers in four different climatic regions provided data for assessing accuracy of ASKBILL predictions for a range of risks and production variables. A comparison of predictions against measured values has provided confidence amongst producers and their advisors as well as providing data for fine-tuning the biophysical models.

There is strong industry support for ASKBILL as it tackles problems widely recognised as being very difficult to manage such as feed budgeting and parasite control.

Program 2 Quality-based meat value chains

The research team has completed development of the new cuts-based MSA grading system that is designed to facilitate value based trading. The work program has also delivered documentation of lean meat yield and eating quality management for industry training based on research publications.

Details of the MSA cuts-based grading system have been reviewed and finalised with industry groups and documentation has been accepted by all relevant sectors of the lamb supply chain. The CRC, working with MLA, has also updated the Lean Meat production manual and written a manual documenting factors contributing to eating quality and options for managing eating quality through genetics, management and processing. A training program has been developed in conjunction with processors for use with lamb suppliers and processing staff.

Program 3 Faster affordable genetic gain

The research team has reviewed options for improvements in genomic technologies and has developed funding for a program of work that will extend beyond the end of the CRC. Through extension initiatives and development of new software tools the industry is well placed to capitalise on faster genetic gain in ram breeding.

In collaboration with Neogen Corporation the CRC has developed a new 50k SNP test that incorporates around 2,500 predictive SNPs identified through analysis of full-sequence DNA data. The new test is expected to be available in September 2019 and is anticipated to increase the accuracy of genomic prediction without increasing the cost of testing. An analysis of the benefits of using DNA technologies has been developed for a range of applications in different breeding program designs. The clear benefits of the technology when appropriately used has resulted in a 20% increase in DNA testing during the year to June 2019.

EDUCATION & TRAINING

Industry training

The CRC's focus on industry training was to engage with groups of consultants, livestock agents and producer groups to plan training programs on the use of new CRC products and apps. Wherever possible the CRC has used Zoom video to assist with individual farm support and training and held face to face training programs for groups. There is a degree of complexity to ensure that individual farms are set up accurately and it is only when this is achieved that major farm decisions such as investment in genomic technologies can be fully realised using the applications.

The CRC also continued to support a number of training programs related to the use of the new genomic Flock Profiling product. Working with a number of producer groups the CRC has co-funded the use of genomic testing as one of the key components of interpreting ewe production trial results. These training and development initiatives have been very popular amongst a wide range of producers.

Postgraduate students

The CRC has supported 12 students who have submitted and graduated or are well on the way to completion.

As anticipated a number of students will complete their studies after the termination of the CRC in June 2019. Provision for completion of these programs has been negotiated with Murdoch University and will see Associate Professor Graham Gardner continuing to support and monitor these students through to the completion of their programs.

The annual postgraduate conference and professional development program continued to be a major success. All students attending the conference and professional development program continue to provide very positive assessment of the event and good suggestions for its continued improvement. The event builds on a format that has been found to be very effective over a number of years and includes the preparation and delivery of research papers by students and comprehensive critique and feedback from a panel of senior researchers.

The program was initiated by the Beef CRC and run in conjunction with the Sheep CRC for a number of years. The program now includes MLA-funded students and students working in the pig industry. This collaboration with different organisations provides a critical mass of students. A grant of $150k has been provided to Murdoch to ensure its continued delivery following the wind-up of the CRC.

An analysis of postgraduate student careers following graduation was conducted in collaboration with the Beef CRC in 2013. A follow up postgraduate tracking study was conducted in FY19. The process involved contacting all students and organising a phone interview to collect key information about their careers and achievements since completion of their training programs with the CRC. The graduate tracking report indicates there has been a high retention of students within the agricultural industry and research provider organisations. The study also indicated the value placed in the annual postgraduate conference.

A table summarising details of each of the postgraduate students is as follows:

Name	Institution	Course	Short thesis description	CRC Prog	Start Date	Principal Supervisor	Stipend Funding Source	Completion Estimate
Rachel O'Reilly	Murdoch	PhD	Chinese consumer perceptions of lamb eating quality	E2	01/04/15	Dr Liselotte Pannier (Murdoch)	CRC	Writing up
Jamie Barwick	UNE	PhD	Remote autonomous disease detection in sheep	E1	01/09/13	Professor David Lamb (UNE)	APA and CRC Top-up	Awarded
Emily Grant	Murdoch	PhD	Automated video capture to monitor sheep wellbeing	E1	01/06/15	Assoc. Prof. David Miller (Murdoch)	CRC	Awarded
Tellisa Kearton	UNE	Masters	Body temperature monitoring in sheep	E1	01/06/15	Dr Amanda Doughty (UNE)	CRC	Awarded
Maddison Corlett	Murdoch	PhD	Consumer perceptions towards lamb and yearling meat colour	E2	01/02/16	Assoc. Prof. Graham Gardner (Murdoch)	CRC	Writing up
Steve Connaughton	Murdoch	PhD	DEXA scanning for body composition in sheep	E2	01/04/16	Assoc. Prof.Graham Gardner (Murdoch)	CRC	Writing up
Mohammad Alkalaldeh	UNE	PhD	Identification of gene for parasite resistance in sheep	E3	01/03/12	Dr Cedric Gondro (UNE)	CRC	Awarded
Jessica Monk	CSIRO	PhD	Assessing resilience and its genetic basis in sheep	E3	01/02/16	Professor Geoff Hinch (UNE)	APA, CSIRO, CRC	Submitted
Penelope Schulz	UNE	PhD (Part time)	Computer apps can significantly contribute to the future of training and extension in the sheep industry	E1	01/08/16	Dr Julian Prior (UNE)	CRC	31/12/19
Madeleine Broomfield	UNE	Masters	Prediction of well-being in sheep at risk and guidelines for use of Barbervax in ewes and lambs for control of Barber's Pole Worm	E1	01/04/16	Professor Steve Walkden-Brown (UNE)	CRC	Awarded
Bruno Santos	AbacusBio	PhD	Economic impact of performance recording and genotyping in Australian commercial sheep breeding operations	E3	01/02/15	Professor Julius van der Werf (UNE)	CRC	Awarded

Name	Institution	Course	Short thesis description	CRC Prog	Start Date	Principal Supervisor	Stipend Funding Source	Completion Estimate
Peter Fitzgerald	UNE	Masters	Sheep wellbeing and productivity	E1	01/02/17	Professor Lewis Khan (UNE)	GEAFSE Exchange S'ship	Withdrawn
Claire Payne	Murdoch	PhD	Using DEXA to predict age and eating quality in lamb	E2	01/06/17	Dr Fiona Anderson (Murdoch)	CRC	Transferred to Murdoch

SME ENGAGEMENT

The nature of the Australian sheep industry means that engagement of the Sheep CRC with the industry essentially occurs via SMEs. Nearly half of the CRC's 41 Participants are SMEs in their own right and others, such as Sheepmeat Council of Australia and WoolProducers Australia, represent the many thousands of sheep producers and breeders that are all SMEs. The CRC's engagement with SMEs has therefore been very widespread.

In the CRC's industry training program, the strategy has been to support our SME Participants to deliver new information to their clients. This approach was designed to build capacity amongst consulting groups and service providers as well as utilising a very broad delivery network.

The CRC's Final Conference held in Dubbo 20-21 March 2019 was well attended by numerous SMEs. There were 15 trade displays involving CRC Participants – mainly SMEs.

A further way in which the CRC supported our SME Participants was by providing speakers at events and field days organised by producer groups and processors. These forums provided a good opportunity for CRC researchers and Participants to discuss CRC research priorities and identified opportunities for achieving further uptake and more widespread adoption of CRC outputs. MerinoLink and Australian Superfine Woolgrowers both held their annual conferences in Armidale during FY19 and each event was strongly supported by CRC speakers and with demonstration of the apps.

COMMERCIALISATION

Use of DNA testing and genomic technologies has surpassed expectations during the year to 30 June 2019 but progress with commercial delivery and adoption of ASKBILL and the cuts-based meat grading systems has been behind schedule.

Commercialisation of ASKBILL commenced with a high-profile launch of the web-based app at LambEx in August 2018 with a view to having at least 1,000 commercial sheep producers with licences before June 2019. The additional expectation was that at least 50 producers would be using ASKBILL in combination with within-flock selection to enhance productivity.

After a rapid initial uptake the number of licensed users has dropped back to 155 as it has become clear that producers often require support from expert users or advisors to set up and use the app effectively. The number of licences was below target at 30 June. Only 5 producers were using within-flock selection in conjunction with ASKBILL at the end of the CRC.

More focus on train-the-trainer activities to increase adoption has been an effective way to increase numbers of users and will be used during post-CRC commercialisation activities. Use of ASKBILL in conjunction with the new MobSelect app for supply chain management is anticipated to increase use and the number of licences. MobSelect is also expected to facilitate increased application of within-flock selection.

New cuts-based grading was expected to exceed a target of 4 million lambs and include web-based feedback to producers.

While the methodology for a new cuts-based grading system was successfully developed in collaboration with processors, retailers and producers, implementation of the new grading has been delayed through some technical problems. However, even in the absence of the physical grading system, the supply chain has already responded to the changes that will be important under the new grading system. There has been increased use of a new eating quality selection index in ram breeding and fine-tuning of production and processing methods to ensure improved eating quality.

MLA and Murdoch University have committed to developing and calibrating intramuscular fat measurement technology and web-based feedback through the ALMtech project post-CRC.

DNA testing and ongoing hosting/support for RamSelect The SheepDNA business, coordinated by the Australian Innovation Company, has been sold to Neogen and will continue post-CRC with the same staff, operating out of the same offices to ensure ‘business as usual’. RamSelect has been transferred to UNE supported by the same technical team. Again a smooth 'business as usual' transition at 30 June 2019. Use of DNA testing has continued to grow by around 20% per annum.

INTELLECTUAL PROPERTY MANAGEMENT

The Sheep CRC strategy has been to use registered IP to ensure freedom to operate for all CRC Participants, and supporting the branding for delivery of CRC products.

The CRC maintained a number of valuable databases that continued to be widely used by CRC Participants subject to conditions stipulated in the Participants Agreement. The integrity of the databases and their secure management was achieved through carefully controlled access.

Under the Participants Agreements the Company was the legal owner of Centre IP and the Participants were the beneficial owners of Centre IP. An overarching intellectual property agreement dealing with all Centre IP was entered into on 28 June 2019 whereby all Participants assigned their beneficial interest in IP to specified Assignees and the Company assigned the legal ownership to these Assignees. The assignment of IP was based on commercialisation plans developed by assignees involving commitment to maximise the use of the IP to deliver benefits to industry and Australia.

Patents held and assigned

The CRC actively managed and assigned two patents.

- Integrated Animal Management System and Method (Australia and New Zealand). This patent has been assigned to MLA; and
- Apparatus and method for providing a measurement of the prickle propensity of a fabric, yarn or garment surface having protruding fibre ends - Wool ComfortMeter® (Australia and New Zealand). This patent has been assigned to AWTA.

COMMUNICATIONS

All communication activities have been designed to be consistent with CRC Program branding requirements.

Internal communication

Over the year there has been regular internal reporting.

- The CEO prepared monthly reports for the Board and Executive Committee.
- Program Leaders provided monthly reports prior to each Executive Committee meeting and these reports were also used in preparing the Sheep CRC's monthly newsletter.
- The CRC distributed a monthly newsletter to all industry stakeholders that was designed to provide an update on CRC activities.
- Formal quarterly reports were provided to Essential Sheep CRC Participants.

As our major CRC Participant, MLA had a position on both the CRC Executive Committee and the Project Review & Research Committee (PRRC). WoolProducers Australia also had a position on the PRRC in order to review quarterly progress against their funding contributions towards Program 1 activities.

Monthly meetings of the Executive Committee ensured good communication across all research and adoption activities. Seven Board meetings held during the year focused on transition strategy and policy matters with feedback to the Executive Committee where appropriate.

The Annual General Meeting and Participants' Forum held in November 2018 provided an update on progress and an opportunity to discuss and agree on wind-up plans. A final conference was held in March 2019 to update stakeholders and industry on the achievements of the CRC and to communicate details of the planned transition of outputs to industry at the end of the funding period.

The CRC maintained an up-to-date website to provide information for CRC staff, Participants and a broad range of industry stakeholders.

External communication

During the 2019 financial year, the CRC circulated 29 media releases raising awareness on a broad range of activities including genomic testing and flock profiling, CRC research outputs adding value to the industry and aspects of animal wellbeing. All media releases were branded with both the Sheep CRC and CRC Program logos. These media releases have been widely used and generated good exposure of CRC activities with 536 media clips during the year.

As part of the social media strategy, the CRC used Facebook, Twitter, YouTube and LinkedIn. The Sheep CRC published 35 videos via Facebook and YouTube. Facebook 'likes' increased during the year to more than 11,200, while Sheep CRC videos received in excess of 25,000 views on YouTube, up from 17,000 last year.

e-Bulletins were circulated via the website to publicise workshops and particular topics of interest to subscribers. The CRC's website was kept up to date throughout the year and received over 30,000 unique visitors for the year.

CRC communication strategy

The CRC developed a communication plan at the start of the year documenting strategies to support the various CRC products and activities. Details of the plan were reviewed and updated each quarter. The CRC's communication team held weekly meetings via phone conference to develop operational details and tactical initiatives to respond to industry issues and progress across the CRC's portfolio.

GOVERNANCE

Sheep CRC Ltd is a public company limited by guarantee administered through a skills-based Board of Directors appointed by Members (Essential Participants) with the Participants Agreement and the Constitution as key reference documents for the Board.

The Board established the following two sub-committees, each with their own Charter and Terms of Reference:

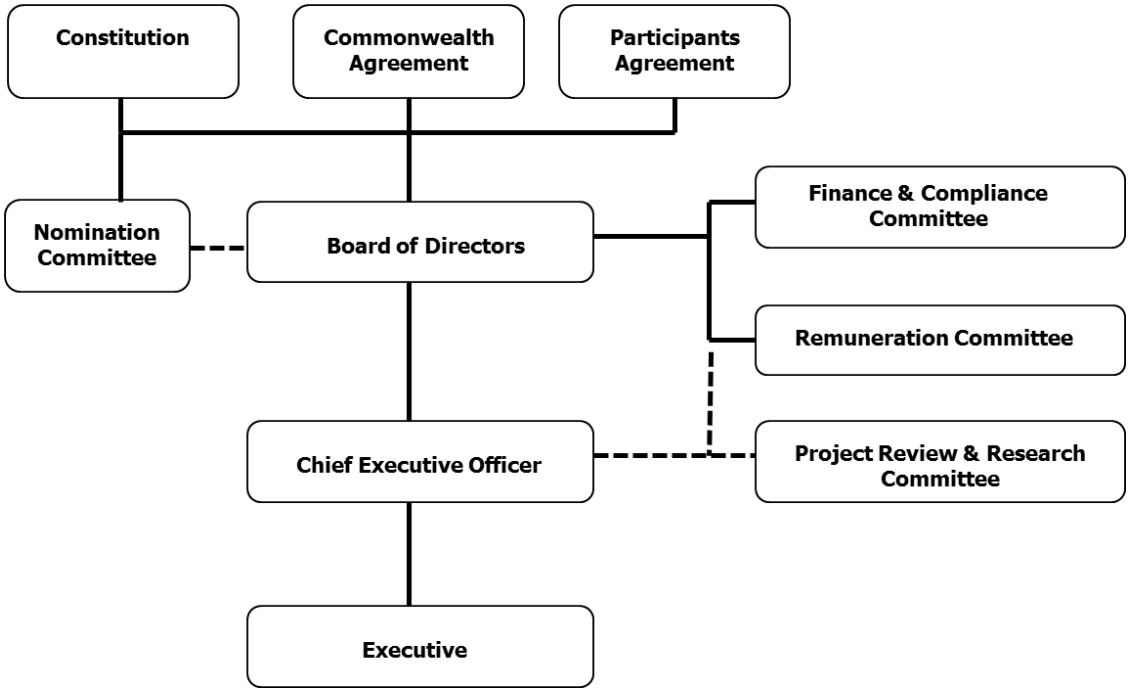
- Finance and Compliance; and
- Remuneration.

The Board also established the Project Review and Research Committee as an advisory committee comprised of an independent Chair and specialists in areas of research and adoption.

The Sheep CRC's Constitution provided for a Chair Selection Committee and a Director Nomination and Selection Committee to undertake the process of identifying suitable candidates for nomination and appointment of Chair and Directors as required.

The Sheep CRC's governance framework has been set up to ensure transparent accountability to all stakeholders and is represented diagrammatically below.

To facilitate the effective application of the governance structure, a Corporate Governance Manual was compiled as the key corporate governance reference of the Company and defines the respective roles, responsibilities, delegations and authorities of the Board, the respective committees of the Board and of management.



Board committees

As reported above, the Board established a Finance and Compliance Committee, a Remuneration Committee and a Project Review and Research Committee. All matters considered and determined by the committees were submitted to the Board for information and, where appropriate, ratification or resolution.

Finance & Compliance Committee

The Finance and Compliance Committee met quarterly, and as required. The Finance and Compliance Committee's purpose, as detailed in the Committee's Charter, was to assist the Board in key governance areas of financial risk management, internal control and compliance by monitoring and reporting on the following:

- financial performance and the financial reporting process, including the annual financial statements;
- the effectiveness of systems of internal control, including delegations, management information systems and safety;
- the scope of work, independence and performance of the external auditor; and
- the process for monitoring compliance with; laws and regulations, Government policy and its own Code of Conduct.

The Finance and Compliance Committee met with the external auditor prior to recommending financial statements be signed by the Board.

Committee Members: Catherine Hayne (Chair), John Gibson and Stuart Mitchell.

Remuneration Committee

The Remuneration Committee met at least once a year. The purpose of the Committee was to:

- establish appropriate remuneration levels and policies including incentive policies for Directors and senior executives;
- assess the market to ensure that senior executives are being rewarded commensurate with their responsibilities;
- review recommendations from the CEO relating to proposed merit increases for direct reports;
- propose, for full Board approval, the terms and conditions of employment for the CEO;
- undertake a review, which will be reported to and confirmed by the full Board, of the CEO's performance, at least annually, including setting the CEO's KPIs for the coming year and reviewing progress in achieving those goals;
- review the Company's recruitment, retention and termination policies and procedures for senior management;
- review and make recommendations to the Board on the salary levels of senior executives and the Company's incentive schemes;
- review and make recommendations to the Board on the Company's superannuation arrangements; and
- review the remuneration of both executive and non-executive Directors and make recommendations to the Board on any proposed changes.

Committee Members: Ian Wilton (Chair), Ian Johnsson & Mike van Blommestein.

Board of Directors

The Sheep CRC Directors are accountable to the Members and Participants and are responsible for the overall strategy, governance and performance of the CRC. The Board included a non-executive Chairman and six non-executive Directors. Ian Wilton held the role of Chair of the Board from 1 October 2017. Mike van Blommestein, as the longest standing Director resigned at the 2018 AGM and was reappointed by the Members. Catherine Hayne was appointed as a Director by the Members at the 2018 AGM, confirming an interim appointment by the Board to fill a vacancy due to the retirement of Mr Philip Rose.

Directors acted independently. Other management and directorships were noted for information and it was understood that Directors were not acting as representatives of those organisations.

The Directors in office through the financial year and at the date of this report, are listed on the following pages along with their roles and responsibilities.

Board meetings were held on the following dates: 16 August 2018, 3 October 2018, 13 November 2018, 13 February 2019, 20 March 2019, 15 April 2019 and 7 May 2019. Director meeting attendance can be found in the Directors' report included in the financial statements.

Ian Wilton

Chair – Independent: Appointed: 15/11/2017
Director—Independent: Appointed: 18/11/2015

Ian Wilton is an experienced non-executive director and senior agribusiness executive. He currently serves on the Board of Elders Ltd and is Chair of its Audit Committee. He is also a non-executive director of One Harvest Holdings Pty Ltd and sits on the advisory Board of Mackay's Banana Marketing. He has undertaken senior management roles in a number of companies including President and CEO of GrainCorp Malt and CFO and interim CEO of Ridley Corporation Ltd. Ian is a Chartered Accountant and CPA and has considerable corporate, finance oversight and governance experience.

Committee Roles: Chair, Remuneration Committee

Other Management/Directorships: Director, Elders Limited; Director, One Harvest Group; Chairman, Advisory Board of Mackay's Banana Marketing; Chairman, Australian Innovation Company Ltd.

John Gibson

Director—Independent: Appointed: 01/06/2007

John Gibson brings over 35 years' experience in genetics, genomics, farming systems, livestock nutrition and economics of livestock production. He is currently Professor and Director at the Centre for Genetic Analysis and Applications at The University of New England (Armidale, NSW) and has experience in leading research, development and the successful delivery of innovation to industry in Australia, Europe, North America and Africa.

Committee Roles: Member, Finance and Compliance Committee

Other Management/Directorships: Director, Centre for Genetic Analysis and Application, UNE; Director, Australian Innovation Company Ltd.

Catherine Hayne

Director—Independent: Appointed: 02/01/2018

Catherine Hayne is a commercial sheep and wool producer whose family has over 100 years in the production of superfine wool. She currently operates her own public accounting practice and her extensive experience as a chartered accountant at general management level in the top 50 listed companies brings a depth of expertise to the skills-based Board.

Committee Roles: Chair, Finance and Compliance Committee

Other Management/Directorships: Director, Hayne & Co Pty Limited; Councillor, Governing Council – Australian Superfine Woolgrowers Assoc. Inc.; Honorary Treasurer, Australian Superfine Woolgrowers Assoc. Inc.; Director, Australian Innovation Company Ltd (ceased 31/07/2019).

Stuart Mitchell

Director—Independent: Appointed: 01/06/2007

Stuart Mitchell is a commercial wool and sheep producer from Bollon in Queensland. He has extensive experience in commercial sheep production systems and a good understanding of the value and practical application of the research outcomes expected from the CRC for Sheep Industry Innovation. Previously Stuart has been a member of the Australian Wool Innovation Sustainable Production Systems Advisory Panel, the Falkiner Memorial Field Station Advisory Panel, the Bestprac National Steering Committee and the Woolmark Company's Pastoral Zone Advisory Committee.

Committee Roles: Member, Finance and Compliance Committee

Other Management/Directorships: Director, Cashel Vale Pastoral Company Pty Ltd; Director, Australian Innovation Company Ltd (ceased 31/07/2019).

Ian Johnsson

Director—Independent: Appointed: 23/11/2011

Ian Johnsson is a rural RD&E management consultant, having held positions such as General Manager for on-farm RD&E investment in both Meat & Livestock Australia and Australian Pork Ltd and has over 30 years' experience in managing national RD&E programs. Ian was a Board Member of the Animal Biosecurity CRC for Emerging Infectious Disease (2004–6). He is a graduate of Rural Science, UNE, holds a PhD from University Reading (UK) and is a Graduate of the Australian Institute of Company Directors.

Committee Roles: Member, Remuneration Committee

Other Management/Directorships: ACT Natural Resource Management Council; Chair, Livestock Productivity Partnerships (MLA,NSWDPI,CSIRO,UNE); Director, Australian Innovation Company Ltd.

Mike van Blommestein

Director—Independent: Appointed: 18/11/2015

Mike van Blommestein has held senior Director roles with Pfizer Animal Health and SmithKline Beecham and positions of Vice President and Country Manager in animal health. He has also had time as President of Animal Medicines Australia. Mike has expertise in pharmaceuticals and vaccine biologicals, genetic and diagnostic plus strategic marketing of products, acquisitions and corporate governance and much international experience especially in the Asia Pacific markets.

Committee Roles: Member; Remuneration Committee

Other Management/Directorships: Director, Apiam Animal Health Limited; Director, VitaVet Pty Ltd; Director, IRiccorgPharm Pty Ltd (ceased April 2019) Director, Australian Innovation Company Ltd (ceased 31/07/2019).

Peter Trefort

Director—Independent: Appointed: 15/06/2009

Peter Trefort manages his family's property at Narrogin, Western Australia. He has over 50 years' experience in sheep and cattle production as well as management across the meat supply chain. He has worked extensively developing on-farm and processing R&D strategy with the Department of Agriculture and Food (WA), University of Western Australia and Murdoch University. Peter has been successful in developing and commercialising an innovative new range of lamb cuts to extend markets both domestically and internationally. In 2017 Peter was inducted into the WA Agriculture Hall of Fame for contributions to agricultural education.

Other Management/Directorships: Director, Australian Innovation Company Ltd (ceased 31/07/2019).

Executive Committee

The role of the Executive Committee was to oversee the management of the CRC to ensure that programs complied with the objectives of the CRC and that there was effective co-operation and communication between programs.

James Rowe
Chief Executive Officer
Sheep CRC (1 FTE)
Professor James Rowe holds a PhD in animal nutrition.
His research on sheep and cattle production has resulted in a number of new products and innovative feeding systems. He has worked in the public sector with international organisations, large private sector companies and at the University of New England.

Kate Woodland-Smith
Chief Financial Officer/Company Secretary
Sheep CRC (1 FTE)
Kate Woodland-Smith is a FCA with experience across multiple business sectors in public practice and with not-for-profit organisations. She holds a Bachelor of Financial Administration and her involvement includes Board and Committee appointments with local Government and community organisations.

Lewis Kahn
Program Leader—Enhanced sheep wellbeing and productivity
University of New England (0.5 FTE)—Commenced: 01/01/2017
Lewis Kahn holds a Bachelor Rural Science, and PhD, Animal Sciences. His research interests include; Nutritional and genetic regulation of host resistance to internal parasites of sheep, Ecology of internal parasites of sheep, Grazing management and effects on animal production and natural resource management, Strategies to reduce neonatal lamb mortality. He is Executive Officer with ParaBoss, which is the national authority for ruminant livestock parasite management. Lewis also works directly with producers to improve on-farm management and has a commitment to ensuring that research has industry impact.

David Pethick
Program Leader—Quality-based sheepmeat value chains
Murdoch University (0.7 FTE)
Professor Dave Pethick holds a PhD qualification from Cambridge University (UK) and an undergraduate Degree in Agricultural Science from the University of Adelaide. His research in fundamental and applied meat science in beef, lamb and sheep meats has made a major contribution to the understanding of meat quality and its management. He is head of Production Animal Research at Murdoch University and was previously Program Manager for Meat Science in the Beef CRC.

Julius van der Werf
Program Leader—Faster, affordable genetic gain
University of New England (0.6 FTE)
Professor Julius van der Werf holds a PhD (1990) in Animal Breeding from Wageningen University in the Netherlands. After appointments as Assistant Professor in Wageningen, and Senior Researcher in dairy cattle breeding at the National Institute for Animal Science and Health, he moved to the University of New England in 1997, first as Senior Lecturer and now as Professor in Animal Breeding and Genetics. His expertise ranges from genetic evaluation and breeding program design to analysis and use of genomic information.

Lu Hogan

Industry Engagement and Training Coordinator
Sheep CRC & AIC (0.8 FTE)

Lu Hogan holds a Bachelor of Agricultural Science from the University of Melbourne. She comes from a farming background and until 2002 was a wool, sheep and grain producer in the Riverina region of southern NSW. Lu has previously worked with CSIRO and the Victorian Department of Agriculture and was General Manager, Wool Production at AWI, responsible for on-farm research, development and innovation relating to animal health, welfare, genetics, genomics, wool harvesting, pastures, natural resource management, education and adoption of innovation within industry.

Michael Crowley

General Manager, Producer Consultation and Adoption
Meat & Livestock Australia (0.09 FTE)

Michael holds a Bachelor's Degree, Rural Science from the University of New England and a Graduate Certificate in Business Administration from QUT. His team are responsible for MLA's investments in Adoption, R&D consultation, Livestock Genetics and MSA working closely with producers and the red meat value chain to drive adoption of R&D. Michael joined MLA in 2009 where he has held position of MSA Manager, International Business Manager (EU & Russia) and now GM Producer Consultation & Adoption. Prior to joining MLA, Michael held a number of commercial positions in the red meat supply chain including running his own business.

Project Review & Research Committee

The Board of Directors established a Project Review and Research Committee (PRRC). The PRRC was tasked with reviewing the achievement of quarterly project targets and providing advice to the Board of Directors with regard to CRC projects; potential new and stoppage of existing projects. The PRRC was governed by Board-approved Terms of Reference.

David Masters

Chair—Independent

Dr David Masters worked as a scientist and research leader with CSIRO and the University of Western Australia for 25 years. He has an international research reputation in livestock production in saline areas, mineral, amino acid and protein nutrition, wool production and livestock systems. David has experience in research management, economics, financial evaluation, risk analysis and conflict resolution, in addition to agriculture. He currently operates as a Livestock Systems Scientist, on a contract basis.

Neal Fogarty

Research Specialist—Independent

Dr Neal Fogarty was instrumental in design and development of the Information Nucleus Program and Leader of that Program up until December 2007. He was also Research Leader for the Sheep Genetics and Improvement Unit with responsibility for 27 staff and the overall supervision of sheep production research in NSWDPI. He has a B.Sc. (Wool and Pastoral Sc., 1969) University of New South Wales, M.Sc. (1977) University of New South Wales and Ph.D. (1981) University of Nebraska, USA.

Jenny O'Sullivan

Adoption and Project Management Specialist—Independent

Jenny O'Sullivan has extensive project management and facilitation experience. She has been involved with various agricultural sectors, in particular the promotion of red meat. Jenny's family have a grazing operation running beef and prime lambs in Gippsland, Victoria. She has a B.Ag.Sc. (1986) University of Melbourne and a Grad Dip Educ. (1992) Monash University.

Richard Apps

Program Manager, Sheep R&D and Objective Measurement—MLA

Richard Apps has been employed by Meat & Livestock Australia since 2002. During this time he has managed a number of portfolios covering the Sheep Genetics business unit delivering LAMBPLAN and MERINOSELECT, sheep and southern beef extension, the Producer Demonstration Site program and is currently the Program Manager for sheep production R&D and objective measurement. Prior to joining MLA Richard worked in beef genetics roles across both southern and northern Australia. Richard holds a Rural Science degree from the University of New England and is a partner in his family's grazing business in the New England region.

Andrew Johnston

Director—WPA

Andrew manages a mixed farming operation at Exton and Sheffield in North Tasmania. He is a member of the TFGA Wool Council and a member and past President of the Deloraine Rotary Club. Andrew worked for 37 years in various roles for the Tasmanian DPIPWE in livestock industries, the last 15 years as a sheep and wool development officer. His areas of work included livestock skills training, shearer and wool handler training and owner courses.

Key Support Staff

The smooth running of many aspects of the Sheep CRC's operations during the year depended highly on our support staff Rhonda Brooks, Polly Ward and Michael Thomson. The effective teamwork in coordinating major CRC events and attention to detail in taking individual responsibility for specific areas of the CRC's activities made a major contribution to the success of the CRC.

Rhonda Brooks
Office Manager
Sheep CRC (1 FTE)
Prior to joining the CRC, Rhonda ran her own businesses for 18 years primarily in Graphic Art and Interior Design. She has extensive experience in business management and has received two Rotary Business Awards. Rhonda oversees the general office duties, archival files and the day to day activities in relation to payments, invoicing and human resources. She is Executive Officer for the Project Review and Research Committee coordinating the Centric Project Management System and flow on activities leading to the Operational Plan and Project monitoring. Rhonda also designs and coordinates all the promotional material, publications and websites for the CRC.

Polly Ward
Executive Assistant
Sheep CRC (1 FTE)
Polly has extensive experience as an Executive Assistant across the public and private sectors. As Executive Assistant for the Board and Executive Committees, her role includes preparation of meeting papers as well as coordinating meeting arrangements and travel. She coordinates industry stakeholder activities and forums including the AGM, Participants Forum and Planning Meetings. She manages the CRC research publications process and maintains the CRC database and events calendar.

Michael Thomson
Media Specialist
CQ University (0.4 FTE)
Michael oversees the communications & media activities of the Sheep CRC. He was a Senior Consultant for Cox Inall Communications, leading projects for clients including the Beef Australia expo, Meat & Livestock Australia, Woolworths, the Sheep CRC, Grains Research & Development Corporation, the Livestock Biosecurity Network, the Australian Animal Welfare Strategy, and RIRDC's National Weeds Research Program. He has also worked for NSW's The Land newspaper, Northern Star in Lismore, and Queensland Country Life. He then progressed to roles including Fairfax Agricultural Media's national political reporter based at Parliament House, Canberra, and national online editor for Fairfax's FarmOnline group of news sites.

PARTICIPANTS

The Sheep CRC received strong support from many of the major providers, managers and users of research throughout the Australian sheep industry. A number of these supporters formally committed their organisations to the CRC by becoming Members and/or Participants and collectively they contribute substantial in-kind and cash (as detailed in the Commonwealth Financial Tables) to facilitate the achievement of the CRC outcomes. As at the 30 June 2019 there were 10 Essential Participants and 31 Other Participants. The Members/Participants share of equity in the CRC is governed by the Participants Agreement.

Changes to Members/Participants

Participant details can be found in the Table below and also on the Sheep CRC website (www.sheepcrc.org.au). The Sheep CRC Members/Participants as at 30 June 2019 were as follows:

NAME	PARTICIPANT TYPE	ABN	ORGANISATION TYPE
Achieve Ag Solutions	Other	35 601 734 721	Private Sector
Allflex Australia Pty Ltd	Other	61 005 237 472	Private Sector
Australian Meat Processor Corporation Ltd	Essential	67 082 373 448	Industry
Australian Superfine Wool Growers' Association Inc	Other	41 338 467 905	Industry
Australian White Suffolk Association Inc.	Other	89 020 103 431	Industry
Australian Wool Exchange Ltd	Other	35 061 495 565	Industry
Australian Wool Testing Authority Limited	Other	43 006 014 106	Private Sector
Bureau of Meteorology	Other	92 637 533 532	Federal Government
Frontmatec A/S (previously Carometec A/S)	Other	Denmark domicile	Private Sector
Cousins Merino Services	Other	54 019 509 781	Private Sector
Coles Supermarkets Australia Pty Ltd	Other	45 004 189 708	Other
Cox Inall Communications Pty Ltd	Other	92 103 190 085	Private Sector
Department of Economic Development, Jobs, Transport & Resources (Vic)	Essential	42 579 412 233	State Government
Department of Primary Industries NSW	Essential	72 189 919 072	State Government
Food Processing Equipment Pty Ltd	Other	75 008 131 217	Private Sector
Gallagher Australia Pty Ltd	Other	37 005 550 845	Private Sector
Icon Agriculture	Other	33 470 165 035	Private Sector
JBS Australia	Other	14 011 062 338	Private Sector
Meat & Livestock Australia Limited	Essential	30 081 678 364	Industry
Meat Elite Australia	Other	65 206 172 969	Other
MerinoLink Limited	Other	67 162 393 348	Industry

NAME	PARTICIPANT TYPE	ABN	ORGANISATION TYPE
Merinotech (WA) Ltd	Other	21 009 349 759	Industry
Meridian Agriculture Pty Ltd	Other	69 093 095 875	Private Sector
Murdoch University	Essential	61 616 369 313	University
Practical Systems Limited	Other	40 001 656 373	Private Sector
Sapien Technology Pty Ltd	Other	34 606 708 570	Private Sector
Sheepmatters	Other	40 321 678 820	Private Sector
Sheep Producers Australia (SPA) previously SCA	Essential	21 256 252 885	Industry
South Australian Research and Development Institute	Essential	53 763 159 658	State Government
SuperBorders Inc.	Other	80 657 060 440	Industry
The SRS Company Pty Ltd	Other	83 082 229 329	Private Sector
Thomas Foods International	Other	52 008 178 121	Private Sector
University of Adelaide	Other	61 249 878 937	University
University of Melbourne	Other	84 002 705 224	University
University of New England	Essential	75 792 454 315	University
University of Tasmania	Other	30 764 374 782	University
Vanguard Business Services Pty Ltd	Other	81 081 931 688	Private Sector
Western Australian Agriculture Authority	Essential	86 611 226 341	State Government
Western Australian Meat Marketing Cooperative Ltd	Other	54 048 449 698	Private Sector
WoolProducers Australia Limited	Essential	83 124 570 832	Industry
Woolworths Ltd	Other	88 000 014 675	Other

COLLABORATION

Effective collaboration has been regarded as a defining feature of the Sheep CRC. The Sheep CRC has 41 Participants operating in all sectors of the Australian sheep industry. The CRC has also developed strong international collaboration with organisations in the US, China, Denmark and New Zealand.

Every Sheep CRC research project involved multiple industry and research participants as well as third-party organisations. Examples of effective collaboration in each of the CRC's research programs and the postgraduate training activities are described below.

Enhanced sheep wellbeing & productivity

A significant example of effective collaboration in the Sheep CRC was the team working on ASKBILL. This grew to over 25 individuals from 11 organisations involved in the day-to-day development and validation of ASKBILL, from on farm to the technology laboratory. In addition there were over 100 active users trialling the app. Approximately 20 commercial sheep producers and two processing plants have collaborated with the CRC and AMPC to evaluate the use of ASKBILL in lamb supply chains. Comparison of predicted growth and carcase characteristics were compared with measured values.

Quality-based sheepmeat value chains

The level of collaboration in the meat program was significant. The Lamb Supply Chain Group met each quarter with some 25 members representing sectors throughout the lamb supply chain. The Group reviewed progress to distil out implications of recent research findings for utilisation of new information as well as fine-tuning the R&D activities. The recent expansion of the supply chain to include cattle is indicative of the success of the initiative.

The successful international collaboration by the meat program has been essential to understand the perceptions of international consumers as well as drawing on expertise in the meat measurement field. The links with Texas Tech in the US, Beijing Agricultural University in China and the Frontmatec Company in Denmark have extended the scope of the meat program and introduced valuable innovation from other countries and other livestock industries.

Faster affordable genetic gain

The genetics program draws on a productive collaboration of researchers at UNE, Vic DEDJTR, AGBU, Sheep Genetics and Neogen. The close collaboration with numerous ram breeding organisations and a wide range of commercial sheep producers has provided valuable feedback to shape the R&D program, as well as providing an effective conduit for rapid uptake of new information and technologies.

Postgraduate training program

The annual postgraduate conference and professional development workshops have been organised by the CRC in collaboration with MLA, the Pork CRC and Australian Pork Ltd. The members of the expert panel providing feedback for the postgraduate students draws on expertise from many CRC Participants as well as specialists from third-party collaborating organisations. Provision has been made for continuation of this valuable activity post-CRC.

FINANCIAL MANAGEMENT

For the five year CRC extension to June 2019 the Commonwealth committed $15.5M, matched by $10.2M from industry. At 30 June 2019 the cash balance was $1.38M with commitments for wind-up activities and grants to support ongoing expansion of the commercial delivery of the apps and the professional development programs for postgraduate students.

Consistent with previous years, the income and expenditure accounts of the CRC have been balanced to zero for Commonwealth activities, as income was applied from unearned revenue in accordance with the revenue recognition policy. During the year genomic testing services were coordinated by the Australian Innovation Company Ltd, which is a controlled entity of Sheep CRC Ltd. The consolidated company results incorporate the activities of the AIC.

The CRC has been well supported by its Participants with in-kind contributions in excess of the Operational Plan over the last 5 years. As indicated in the Commonwealth Financial Tables of this Annual Report, the CRC Participants and third parties have contributed 24.43 in-kind FTEs which is just below the Commonwealth Agreement target of 25 FTEs for the year and is a result of projects being completed ahead of the end of June. Actual contributions from some Participants were below their commitment levels for the year, however there was no negative impact on the CRC Milestones and Outcomes. Total in-kind FTE contributions for five-year extension period exceeded commitments by 20FTE or 16.3%.

The annual audit of the CRC has concluded with no control deficiencies or material issues being identified.

CRC TRANSITION ARRANGEMENTS

In discussion with Participants it was agreed that Sheep CRC Ltd, and its controlled entity, Australian Innovation Company (AIC), should be deregistered at the end of the agreement period.

Plans for ceasing operation and deregistration were prepared with reference to provisions in the CRC Participants Agreement and the Company Constitution.

The transition arrangements were designed to implement the CRC's strategy for maximising the utilisation of outputs resulting from the collaboration and ensuring the CRC's legacy. The following process was followed.

- The CRC requested expressions of interest from CRC Participants and other organisations for ongoing delivery and commercialisation of CRC outputs.
- CRC reviewed expressions of interest and asked organisations with appropriate expressions of interest to complete commercialisation/business plans with details of how outputs would be delivered, adoption increased and commercialisation undertaken where appropriate.
- Commercialisation/business plans were reviewed by the CRC Board and circulated to all CRC Participants for comment. Once agreement was reached on the assignment of each item of Centre IP required to support the respective commercialisation/business plans, arrangements were made for an appropriate IP agreement.
- Working with MLA and other CRC Participants a final overarching IP agreement was prepared and executed prior to 30 June 2019.

Arrangements for key Sheep CRC outputs

1. At the start of the CRC it was agreed that MLA would have first right for commercialisation and utilisation of outputs in the fields of genetics and meat science. Consequently, outputs in these areas were assigned to MLA. MLA indicated that coordination of DNA testing was outside their area of interest for genetic delivery and other arrangements were made for transition of this aspect of the AIC's business.
2. Web-based apps were assigned to UNE. UNE made a commitment to continue to develop and promote these apps. Another important consideration was UNE's commitment to employ the members of the app development team responsible for building ASKBILL, RamSelect and the DNA ordering system.
3. The DNA testing business, coordinated by AIC, was sold to Neogen Corporation on the basis that they would continue to provide a similar level of service to the Australian sheep industry through their laboratory based in Queensland, while maintaining an office in Armidale to ensure continuity of the service.
4. Knowledge products including the Livestock Library were assigned to MLA on the understanding that ongoing maintenance of the online information repository will be maintained through a funding agreement between MLA and AGBU.
5. The wool measurement systems (Wool ComfortMeter and Wool HandleMeter) were assigned to AWTA. This assignment was a logical extension of the licensing arrangements that had been negotiated between the CRC and AWTA in 2013.
6. The CRC's web page will be archived through the Trove facility managed by the National Library.

SHEEP CRC WIND-UP PLAN

The following Wind-up Plan describes how the CRC will meet its obligations to the Commonwealth and its Participants as it ceases operations. In May 2019 the CRC provided an updated plan to the Commonwealth seeking permission for the use of unspent funds at the end of the CRC. This plan incorporates the approval from Commonwealth to transfer funds.

Ceasing operations

The CRC's plans for ceasing operation are summarised below:

- *Governance and management arrangements after the end of the agreement period*
  With the agreement of Participants the CRC assigned all IP under an "overarching agreement" prior to 30 June 2019. Administrative operations of the company will continue to the end of October 2019 to ensure that all obligations for the final reporting, transition and wind-up activities can be completed. The company will then be deregistered. Detailed planning of this process is regularly reviewed and updated.
- *Research and commercialisation activities*
  The CRC's research and commercialisation activities for FY19 were defined in the FY19 Operational Plan. All Tasks and associated Milestones were completed by June 2019 and all related R&D activities ceased by that date.
- *Education and training activities*
  A number of postgraduate student projects will extend beyond 30 June 2019. Arrangements have been made for supervision of the postgraduate completions to be provided by Murdoch University.
- *Financial management and budget provisions*
  The final Operational Plan for FY19 included allocation of resources for the wind-up activities and reporting obligations to 31 October 2019. Approval was received to transfer funds to support key transition activities and agreements covering these transfers were executed in mid-June.
- *IP, assets, capital items and tax arrangements*
  Details of IP and tax arrangements are covered in detail under sections 1.7 and 1.9 in this report.

Governance and management

The Board of the CRC has taken a structured approach to overseeing the wind-up arrangements that included the following.

- *Ensure all the participants were aware of their roles and responsibilities*

  The Board has allocated time at a number of Participants' forums to formally discuss arrangements for the transition and wind-up of the CRC. Further detail was provided in quarterly reports.

  The IP assignment process coordinated by MLA provided significant communication opportunities to further inform Participants of the wind up process and their roles and responsibilities.

- *Ensure appropriate management resources were in place to complete all obligations under the these guidelines and Funding Agreement*

  The Board has made provision in the final year budgets for key management positions to be funded through to 31 October 2019 in order to ensure all Commonwealth obligations are met prior to CRC wind-up.

- *Ensure appropriate arrangements for the transition of human resources funded by the CRC are in place*

  Within each of the Program teams provision was made to provide adequate notice for research and support staff to find alternative employment. A number of the CRC-funded positions will be funded post-CRC by Participant organisations. Provision has been made, where appropriate, for end of contract severance payments. The Board has also provided incentives for key CRC management to remain in the CRC through to the completion date.

- *Ensure the appropriate storage and archival of CRC documentation*

  Arrangements have been made with relevant parties for the archiving of CRC documents, particularly contract material, so that it will be accessible by the Commonwealth for a period of at least seven years. The CRC has appropriate arrangements in place with the National Library for the storage and archival of the CRC websites and those key documents required as State Archives. The CRC's legal representative will store and maintain all other hard copy archives as required. Provision has also been made for electronic storage of information with the UNE Archive, including all information stored within the CRC's project management portal, Centric. Relevant CRC practical wisdom notes, research publications, case studies, books and conference proceedings have also been loaded onto the Livestock Library for ongoing access by the public.

- *Incorporated entities and control of the CRC*

  The Australian Innovation Company (AIC) is an incorporated entity under the control of the Sheep CRC, established to coordinate a DNA testing operation for the Australian sheep industry. The DNA operation was sold in June 2019. The company ceased operations in June 2019 and will be deregistered.

Contact details

The Sheep CRC's Chief Executive Officer, James Rowe, has been appointed to act as the post-CRC point of contact for assisting the Department with any outstanding reporting requirements.

Activities status

At the end of each quarter the CRC reviews progress and satisfactory completion of all Tasks and Milestones.

- *Activities to be completed or terminated at the end of the agreement period*

  By the end of the agreement period the CRC documented the completion of practically all Task and Milestone obligations and a full delivery of agreed outputs (see Table below for summary).

- *Activities to be continued by participants on a cooperative basis for further development and future uptake by industry (including commercialisation)*

  Under the Participants Agreement MLA will be responsible for commercialisation of key outputs in the areas of genetics and meat science. MLA has prepared a commercialisation plan with details of how meat and genetics products, developed by the CRC, will be delivered to industry post-CRC. MLA will work with a range of Participants to further develop and deliver the meat and genetic products.

- *Activities transferred to a participant or other organisation for further development and future uptake by industry (including commercialisation)*

  A major output from the CRC was the web-based app, ASKBILL, that provides the infrastructure for enhanced sheep wellbeing and productivity. UNE has undertaken to continue the technical development of the app to extend its application to other grazing livestock. The commercialisation plans for ASKBILL and RamSelect have been accepted by the CRC Participants and Board.

It is recognised that the ASKBILL app has the potential to impact practically all aspects of the sheep industry. By 30 June 2019, the ASKBILL product will be complete for the main targets specified in the CRC's Commonwealth Agreement. At the end of the CRC the full potential for the ASKBILL app will not have been reached. The Commonwealth has approved the transfer of unspent funds to UNE for future development and ongoing promotion of ASKBILL.

- *Arrangements for ongoing support of CRC students*

  A number of postgraduate students had not completed their programs before June 2019. The table shows the anticipated timing and plans for these student completions. Murdoch University has lead the coordination of the postgraduate program and will provide ongoing support to CRC students who are yet to complete their programs.

  One of the most successful aspects of the CRC's postgraduate program has been the annual postgraduate conference and professional development program. The Commonwealth has approved the transfer of unspent funds to Murdoch to support the continued delivery of the conference following the wind-up of the CRC for the benefit of the sheep industries as well as related livestock industries.

The status of all milestones and outputs is provided in the following table:

Outputs/Milestones yet to be completed	Expected status at end of agreement	If Transferred, organisation responsible
Output R1.1 (June 2019) New ways of predicting risks to sheep wellbeing will be developed based on big data applications that draw on weather data, analysis of the Information Nucleus database and regular monitoring to identify management factors that influence risk to wellbeing and productivity. This analysis will be used to build a web-based app(s) that uses past and current data to inform management decisions involving culling, nutrition and animal health treatment.	ASKBILL has been completed and outputs tested in a series of validation trials.	
Milestone R1.1.5 (June 2019) Upgrade software and app(s) for improved wellbeing and productivity based on validation data and feedback from producers and service providers operating in at least 3 climatic regions. Completion of PhD students.	Software updates have been completed based on results of the validation trials.	
Output U1.1 Web-based apps used by sheep producers and their advisors will draw on weather data to predict pasture production, feed budgets and risks from parasites, cold and heat stress to make better decisions at joining, pregnancy scanning, weaning and shearing to improve wellbeing and productivity of the flock. Sheep assessment, monitoring systems and on-farm data collection will be used in conjunction with new web-based apps.	Increased use of the new app is being expanded in a strategic manner with input from a number of livestock consultants and supply chains. Progress with adoption is expanding as planned.	

Outputs/Milestones yet to be completed	Expected status at end of agreement	If Transferred, organisation responsible
Milestone U1.1.5 (June 2019) At least 1000 commercial sheep producers using the web-app for managing over 2.5M sheep. At least 50 of these producers also using within flock selection to enhance productivity.	The target of 1,000 commercial sheep producers actively using ASKBILL will not be met. Current number of licences is around 400.	It is recommended that this Task be transferred to UNE on completion of the CRC using unspent funds to support continued adoption and impact from ASKBILL.
Output R2.1 (June 2019) A new carcase measurement system will be calibrated against biochemical and physical measurements that are predictive of yield and eating quality in order to develop a cuts-based grading system. The research program will integrate information on genetics, production and processing systems to produce algorithms for a new cuts-based grading system to operate via MSA. Further outputs will be a system of feedback and communication along the supply chain, documentation of the MSA protocol and a training program.	This output has been completed with development of the cuts-based grading system.	
Milestone R2.1.5 (June 2019) Complete MSA and value based pricing documentation, research publications and training programs.	Documentation of the new MSA systems for lean meat yield and eating quality have been completed and training programs developed.	
Output U2.1 (June 2019) New measurement and cuts-based grading used by Participant meat processors and their supply chains.	The new DEXA system to underpin cuts-based grading is being installed in a number of abattoirs and industry reps have endorsed introduction of cuts-based grading.	
Milestone U2.1.5 (June 2019) New cuts-based grading of 4 million lambs with feedback to producers (Prototype MSA). Use of web-based app used in two supply chains to help manage turn-off time and carcase specifications.	Completion of this Task and achievement of the target for cuts-based grading will not be met.	MLA and the ALMTech program will oversee the introduction of the cuts-based grading system as part of the plans for commercialisation.
Output R3.1 (June 2019) Research based on full DNA sequencing of key rams will produce more accurate estimates of breeding values that will facilitate faster genetic gain. The project will also identify and validate lower cost options for DNA testing. The combination of cheaper DNS testing and increased accuracy in predicting breeding	A new DNA test has been developed based on full DNA sequence data and will be available at the target price of $25/test and delivered commercially July-August 2019.	

Outputs/Milestones yet to be completed	Expected status at end of agreement	If Transferred, organisation responsible
values creates an affordable product that will be widely used to achieve faster genetic gain.		
Milestone R3.1.5 (June 2019) Review future options for further improvements in genomic technologies and, if appropriate, secure industry funding for post-CRC R&D. Report benefit:cost of using genomic technologies and new software tools to achieve faster genetic in ram breeding.	Projects for new software products and predications are well-advanced with new Flock Profile predictions for cross-bred lambs, worm egg counts and reproduction in preparation.	
Output U3.1 (June 2019) The use of DNA tests and the impact of faster genetic gains will increase based on: improved genomic technologies (for ram breeding and for benchmarking flock average breeding values), affordable DNA tests; and computer apps to assist commercial producers select rams with improved genetic merit for their production systems.	The use of DNA testing has been expanded via a number of pilot projects with large sheep production consortia such as MerinoLink.	
Milestone U3.1.5 (June 2019) DNA testing and ongoing hosting/support for RamSelect coordinated by the Innovation Company, or other provider, as commercial products.	The DNA testing business is transferred to Neogen and the web-based ordering supported by UNE. The Australian Innovation Company will be closed and deregistered.	

The status of all CRC students is provided in the following table:

Student name	Degree type	Status	Enrolling organisation
Rachel O'Reilly	PhD	Writing up	Murdoch
Jamie Barwick	PhD	Awarded	UNE
Emily Grant	PhD	Awarded	Murdoch
Tellisa Kearton	Masters	Awarded	UNE
Maddison Corlett	PhD	Writing up	Murdoch
Steve Connaughton	PhD	Writing up	Murdoch
Mohammad Alkalaldeh	PhD	Awarded	UNE
Jessica Monk	PhD	Submitted	CSIRO
Penelope Schulz	PhD	December 2019	UNE
Madeleine Broomfield	Masters	Awarded	UNE

Student name	Degree type	Status	Enrolling organisation
Bruno Santos	PhD	Awarded	Abacus Bio
Claire Payne	PhD	Transfer to Murdoch	Murdoch
Peter Fitzgerald	Masters	Withdrawn	UNE

Financial management and budget provisions

The following arrangements have been made for addressing financial management and budget activities during the wind-up:

- Finalising the accounts:
  - Every effort was made to finalise supplier accounts relating to services provided for CRC activities prior to 30 June 2019. The provision for outstanding budgeted commitments was adjusted accordingly at the end of the year. A thorough review of the remaining forecast has been undertaken by the Board's Finance & Compliance Committee.
  - Provision has been made for salaries, employee entitlements, retention and administrative overheads for staff required through to wind-up.
  - Arrangements have been made for necessary legal and accounting services to manage the final phase of the wind-up process to deregistration.
  - Ongoing assessment of State and Federal taxes due at the end of the funding period has been supported by the company's tax agent and auditor.
  - All committed scholarship payments have been made to Murdoch who will manage the final CRC students through to completion.
- Final acquittal of Commonwealth funds will be completed with the FY19 reporting process.

Final (part) year budget

This final part year cash budget is presented in the following tables.

Cash Budget for Final Year of Operation	$'000
Opening balance (July 2019)	1,379
Income - Interest	3
Total resources (opening balance + income)	**1,382**
Expenses	
Employee expenses and Board	505
Supplier expenses	210
Other expenses - including wind-up	105
Total expenses	**820**
Net balance	**562**
Accrued expenses (wind up, and tax)	97
Transfer to UNE (ASKBILL)	**340**
Remaining funds	**125**
Remaining funds that are Commonwealth CRC Program funding	**125**

Management of intellectual property (IP)

The attached IP schedule is taken from the final Sheep CRC IP Agreement executed by the Sheep CRC and all CRC1, CRC2 and CRC3 Essential Participants prior to 30 June 2019. The agreement assigned all Sheep CRC Centre IP.

Name of Assigned IP	Description of Assigned IP	Assignee
Patents		
Integrated animal management system and method AU2005233651	**Australian Patent**. A system for the intensive management of animals, the system comprising: animal identification means for identifying individual animals; at least one device for measuring one or more parameters of individual animals; a processor for processing measurements obtained for the one or more parameters, wherein the processed parameter data is used to determine management strategies for individual animals in real-time; and means for implementing management strategies for the animals.	Meat & Livestock Australia Limited
Integrated animal management system and method NZ551182	**New Zealand Patent**. A system for the intensive management of animals, the system comprising: animal identification means for identifying individual animals; at least one device for measuring one or more parameters of individual animals; a processor for processing measurements obtained for the one or more parameters, wherein the processed parameter data is used to determine management strategies for individual animals in real-time;	Meat & Livestock Australia Limited

Name of Assigned IP	Description of Assigned IP	Assignee
	and means for implementing management strategies for the animals.	
Wool Comfort Meter AU2010204426	**Australian Patent**: An apparatus (10) for providing a measurement of the prickle propensity of a fabric (80), garment or yarn (110) surface having protruding fibre ends	Australian Wool Testing Authority Limited
Wool Comfort Meter NZ593817A	New Zealand Patent: An apparatus (10) for providing a measurement of the prickle propensity of a fabric (80), garment or yarn (110) surface having protruding fibre ends	Australian Wool Testing Authority Limited
Trademarks		
e-sheep 929722	Australian Trademark class 9&42	University of New England
e-sheep 752591	New Zealand Trademark Class 9&42	University of New England
e-cattle 1196906	Australian Trademark class 44	University of New England
e-merino 1236957	Australian Trademark class 44	University of New England
Information Nucleus 1271844	Australian Trademark class 42 & 44	Meat & Livestock Australia Limited
Information Nucleus 798384	New Zealand Trademark Class 42 & 44	Meat & Livestock Australia Limited
Ramboss 1413800	Australian Trademark class 44	Meat & Livestock Australia Limited
Everwhite wool 1411597	Australian Trademark class 24	Australian Wool Testing Authority Limited
Everwhite wool 1411595	Australian Trademark class 25	Australian Wool Testing Authority Limited
Livestock Library 1123386	Australian Trademark class 44	University of New England
Smartflock 1196905	Australian Trademark class 44	University of New England
Smartherd 1196907	Australian Trademark class 44	University of New England
pedigree matchmaker 1196910	Australian Trademark class 44	Meat & Livestock Australia Limited
Wool HandleMeter 1422485	Australian Trademark class 9 W@@L HandleMeter	Australian Wool Testing Authority Limited
Wool ComfortMeter 1423676	Australian Trademark class 9 W@@L ComfortMeter	Australian Wool Testing Authority Limited
RamSelect 1824486	Australian Trademark class 42	University of New England
RamSelect 1021553	New Zealand Trademark class 44	University of New England
FlockSelect 1836165	Australian Trademark class 42	University of New England
FlockSelect 1022073	New Zealand Trademark class 44	University of New England
EweSelect 1836171	Australian Trademark class 42	University of New England
EweSelect 1037007	New Zealand Trademark class 44	University of New England
WeanerSelect 1836185	Australian Trademark class 42	University of New England
WeanerSelect 1037013	New Zealand Trademark class 44	University of New England
MyRamTeam 1886269	Australian Trademark class 42	University of New England

Name of Assigned IP	Description of Assigned IP	Assignee
BullSelect 1886261	Australian Trademark class 42	University of New England
Bull$elect 1796480	Australian Trademark class 44	University of New England
Ram$elect 1796479	Australian Trademark class 44	University of New England
CRC Logo (with text)	Unregistered trademark 	Meat & Livestock Australia Limited
CRC Logo (without text)	Unregistered trademark 	Meat & Livestock Australia Limited
AskBill 1854239	Australian Trademark class 42 & 44	University of New England
AskBill 1060915	New Zealand Trademark class 42	University of New England
SemenSireSelect 1856235	Australian Trademark class 42	University of New England
LambSelect 1884742	Australian Trademark class 42	University of New England
LambSelect 1079977	New Zealand Trademark class 42	University of New England
SteerSelect 1884784	Australian Trademark class 42	University of New England
SteerSelect 1079981	New Zealand Trademark class 42	University of New England
HerdSelect 1079978	New Zealand Trademark class 42	University of New England
HerdSelect 1884782	Australian Trademark class 42	University of New England
CowSelect 1079979	New Zealand Trademark class 42	University of New England
CowSelect 1884783	Australian Trademark class 42	University of New England
WoolSelect 1081192	New Zealand Trademark class 42	University of New England
WoolSelect 1888573	Australian Trademark class 42	University of New England
MobSelect 1081195	New Zealand Trademark class 42	University of New England
MobSelect 1888577	Australian Trademark class 42	University of New England
StockSelect 1081198	New Zealand Trademark class 42	University of New England
StockSelect 1888579	Australian Trademark class 42	University of New England
Ask Doctor Mac TM1809130	Australian Trademark class 42	University of New England
Ask Dr Mac TM1810455	Australian Trademark class 42	University of New England
Domain Names		
woolcomfortmeter.com	Domain Name	Australian Wool Testing Authority Limited
woolcomfortmeter.com.au	Domain Name	Australian Wool Testing Authority Limited
woolhandlemeter.com	Domain Name	Australian Wool Testing Authority Limited
woolhandlemeter.com.au	Domain Name	Australian Wool Testing Authority Limited
bullselect.com.au	Domain Name	University of New England
bullselect.com	Domain Name	University of New England
ramselect.com	Domain Name	University of New England
ramselect.com.au	Domain Name	University of New England
flockselect.com	Domain Name	University of New England
flockselect.com.au	Domain Name	University of New England
australianinnovationcompany.com.au	Domain Name	University of New England
sheepdnatesting.com	Domain Name	University of New England
sheepdnatesting.com.au	Domain Name	University of New England
sheepdna.com.au	Domain Name	University of New England
sheepdnatest.com.au	Domain Name	University of New England

Name of Assigned IP	Description of Assigned IP	Assignee
sheepdnatest.com	Domain Name	University of New England
eweselect.com.au	Domain Name	University of New England
eweselect.com	Domain Name	University of New England
weanerselect.com.au	Domain Name	University of New England
weanerselect.com	Domain Name	University of New England
flockprofile.com.au	Domain Name	Meat & Livestock Australia Limited
askbill.com.au	Domain Name	University of New England
askbill.com.nz	Domain Name	University of New England
sheepdna.co.nz	Domain Name	University of New England
semensireselect.com.au	Domain Name	University of New England
semensireselect.com	Domain Name	University of New England
cowselect.co.nz	Domain Name	University of New England
cowselect.com	Domain Name	University of New England
cowselect.com.au	Domain Name	University of New England
eweselect.co.nz	Domain Name	University of New England
flockselect.co.nz	Domain Name	University of New England
herdselect.co.nz	Domain Name	University of New England
herdselect.com	Domain Name	University of New England
herdselect.com.au	Domain Name	University of New England
lambselect.co.nz	Domain Name	University of New England
lambselect.com	Domain Name	University of New England
lambselect.com.au	Domain Name	University of New England
ramselect.co.nz	Domain Name	University of New England
steerselect.co.nz	Domain Name	University of New England
steerselect.com.au	Domain Name	University of New England
mobselect.com.au	Domain Name	University of New England
mobselect.com	Domain Name	University of New England
mobselect.co.nz	Domain Name	University of New England
woolselect.com.au	Domain Name	University of New England
woolselect.com	Domain Name	University of New England
woolselect.co.nz	Domain Name	University of New England
stockselect.com.au	Domain Name	University of New England
stockselect.co.nz	Domain Name	University of New England
Database and related IP		
Information Nucleus Database	Purpose-built database hosted by AGBU to store information collected as part of the Information Nucleus Program	Meat & Livestock Australia Limited
Information Nucleus Data	Information collected as part of the Information Nucleus Program	Meat & Livestock Australia Limited
Wool Samples from INF	Fabric from wearer trials and Data wearer trial database	Australian Wool Testing Authority Limited
Sheep Genomics database	Algorithms and methodologies developed with CRC for delivery of ASBV information via Sheep Genetics.	Meat & Livestock Australia Limited
Sheep Genomics data	Genotypes collected as part of the Information Nucleus Program and other CRC projects	Meat & Livestock Australia Limited
DEXA calibration data and algorithms	Meat Science - DEXA calibration - LMY - IMF and Eating Quality	Meat & Livestock Australia Limited

Name of Assigned IP	Description of Assigned IP	Assignee
ASKBILL Validation site database	Data on validation sites including pasture, animal weights, fleece weights, faecal egg counts	University of New England
Full sequence analysis of 400 animals	Copies of the full sequence data are held by Vic DJPR and by UNE and in the NCBI (National Center for Biotechnology Information) international database (Bioproject: PRJNA325682)	Meat & Livestock Australia Limited
APPs and Software		
RamSelect	Web-based app for ram buyers and breeders	University of New England
ASKBILL	Forecasting platform and related models including integrated ASKBILL program	University of New England
DNA online ordering portal	Online DNA ordering system	University of New England
Cuts-based calculator	Lamb Cuts-based calculator – CRC and MLA copies with lamb supply participants	Meat & Livestock Australia Limited
Processor data aggregation portal	Software for aggregating forecasting and compliance data from multiple lamb producers	University of New England
ASKBILL song	Music and lyrics	University of New England
Residual Assigned IP	The legal interest in all remaining Phase 1 Centre IP, Phase 2 Centre IP and Phase 3 Centre IP owned by the Company and which is not specifically assigned in this table. The beneficial interest in all remaining Phase 1 Centre IP, Phase 2 Centre IP and Phase 3 Centre IP owned by the Participants and which is not specifically assigned in this table	Meat & Livestock Australia Limited

Assets

Sheep CRC has cash on deposit which will be utilised to pay June creditors and applied to the final part year budget. CRC's main piece of office equipment, a multifunction printer device is used under a month to month rental lease arrangement which will cease at wind up. Items of furniture and equipment that have been purchased through UNE as the host organisation, will remain the property of UNE after the wind up is completed.

Taxation

The CRC has carried on its operations within Sheep CRC Limited (a tax paying public company limited by guarantee). The Company had carry forward tax losses after lodging its income tax return for 2018. Current year tax estimates indicate that, since the Commonwealth has granted approval for the transfer of funds by way of grant that no tax liability should arise as the company completes operations and proceeds to deregistration.

On completion of the FY19 annual financial reports, the company income tax return will be prepared reflecting the tax position as at 30 June 2019.

Part year returns for fringe benefits tax, payroll tax, income tax, and business activity statements will be required to be completed for the period of operations from 1 July to 31 October 2019 and arrangements have been made for the preparation of these returns. Taxation clearance can then be obtained so that company deregistration can commence.

EXIT REPORT

Executive Summary

The Sheep CRC was established in 2001 to integrate wool and meat R&D with the focus on understanding what the consumer wanted from the sheep industry in order to develop the technologies and know-how required to meet and exceed these expectations.

The Sheep CRC was a collaboration involving commercial breeders, sheep producers, processors and retailers working with research organisations, universities, R&D corporations and private sector consultants and advisors (see Figure 1).

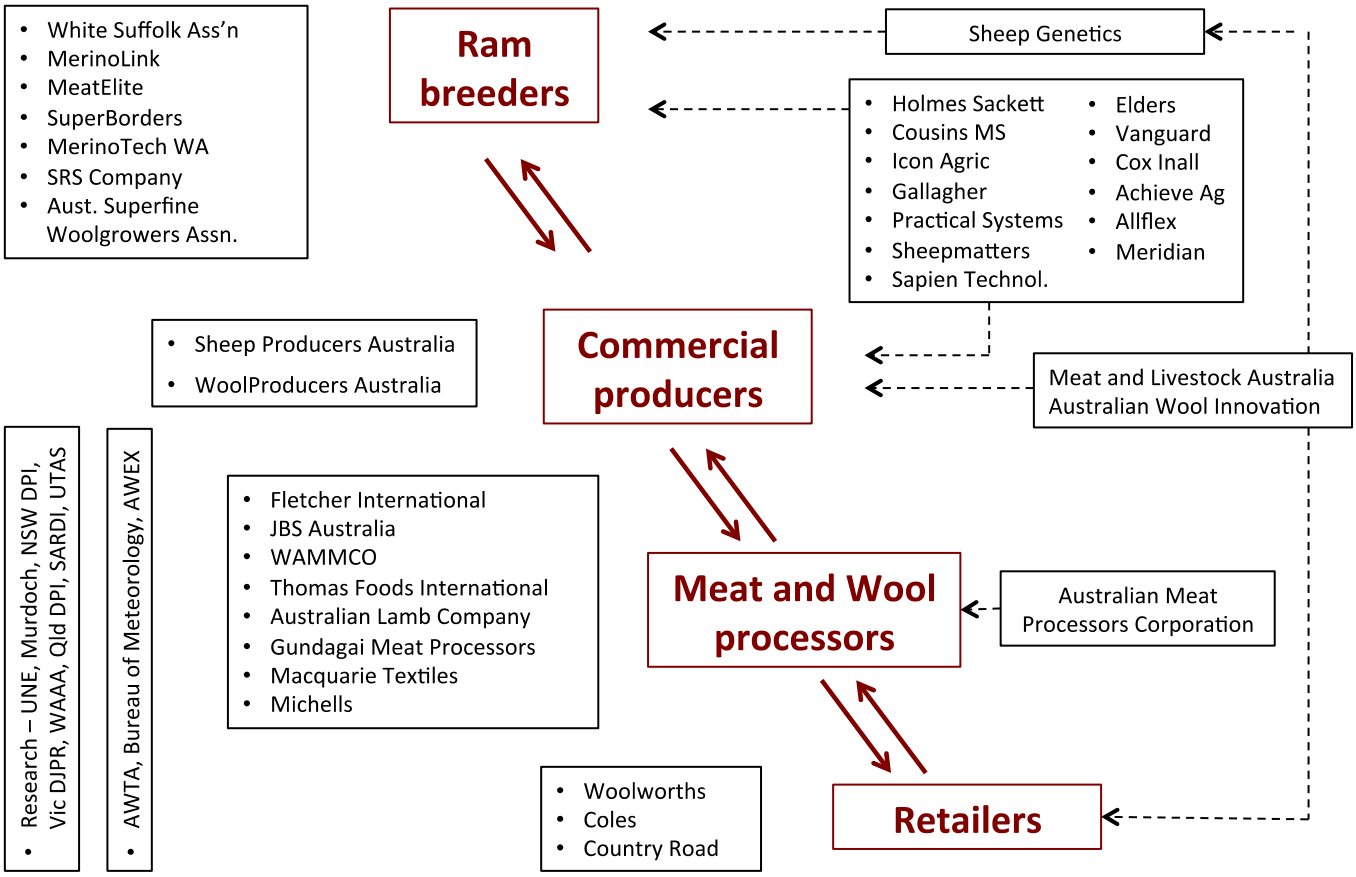


Figure 1 Schematic summary of the CRC Participants and supporters represented in each sector of the sheep industry.

The final five year extension from 2014 to 2019 of the Sheep CRC provided an opportunity to consolidate the achievements of the CRC in transforming wool, meat and the sheep that produced them. Key achievements delivered over the last 18 years are summarised below.

Direct economic benefits delivered by the Sheep CRC

The Impact Tool, developed by the CRC Program to ensure a consistent approach to cost:benefit analysis, has been used to monitor and value the expected future benefits associated with our significant outputs for the three

Research Programs conducted over the last 5 years. Details of inputs, usage, impacts and the probabilities associated with these assumptions were revised in March 2019 and subsequently reviewed by the Sheep CRC Executive, the Project Review and Research Committee and the Sheep CRC Board.

The future impact from the meat and genetics programs estimated in March 2019 were partly due to outputs of R&D programs completed during CRC2 (2007-14). For this reason part of the input costs of CRC2 programs have been included in the 2019 impact analysis.

ASKBILL—delivers enhanced sheep wellbeing and productivity

ASKBILL reduces production losses through improved management of parasite risks and better management of flystrike prevention. Good feed budgeting to minimise problems associated with under-nutrition of ewes facilitates management of slightly higher stocking rates and increases lamb-marking percentages. These benefits are achieved with utilisation costs of software licence fees ($100/year) and some additional feed costs.

Cuts-based MSA grading system Mark II—delivering the basis for a quality-based meat value chain

The cuts-based grading system and associated measurement technologies help producers deliver products that are more closely aligned with the requirements of processors and the retail sector. Better targeted production reduces costs due to carcases that are either too big or too small. The measurement systems for lean meat yield and eating quality contribute to consumer satisfaction and willingness to pay. Consistency and improving eating quality contribute to demand for lamb and higher prices. Utilisation costs include abattoir measurement systems and feedback reporting.

Use of genomic technologies and RamSelect—delivering faster and more affordable genetic gain

Increased use of genomic technologies in sheep breeding provides more accurate estimation of true genetic merit for a wide number of traits and allows faster genetic gain to improve these traits. Faster genetic gain in the ram breeding sector delivers benefits for commercial producers and these improvements are realised through additional meat production, improved eating and wool qualities and higher prices that consumers are prepared to pay for high-quality products. Utilisation costs relate to purchase of DNA tests

There were no substantial changes to the expected outputs but there have been changes in usage and impact. The associated probabilities for delivering the anticipated outputs and levels of usage have increased as the products have been delivered and actual figures of usage have become available.

FY19 Impact assessment (Analysis March 2019)

Program	Input costs $	Utilisation $	Impact $	Benefit cost
Program 1—Enhanced sheep wellbeing and productivity	18.4	188.2	562.6	2.72
Program 2—Quality-based meat value chain	54.8*	15.2	317.0	4.51
Program 3—Faster, affordable genetic gain + RamSelect	44.0**	3.4	121.1	2.55
Overall Total	117.2	207.1	1,001	3.09

* Includes estimated investment of $40 million in meat R&D during CRC1 and CRC2

** Includes estimated investment of $30 million in genetics and genomics R&D during CRC2

Notes on Program 1 Impact assessment

- A major non-monetary impact is the benefit for the sheep industry through being 'on the front foot' in responding to concerns by animal activists through reference to ASKBILL as a framework for responding to risks that may compromise the wellbeing of sheep.
- A further non-monetary benefit is the fact that forecasting components of ASKBILL can be relatively easily adapted to forecast cattle production and risks.
- The relatively high 'usage' costs relate mainly to additional nutrition inputs and the cost of labour for additional management inputs. The usage costs are more than compensated for by additional lambs and wool sold and through reduced ewe mortalities.

Notes on Program 2 Impact assessment

- The input costs include an estimated $40 M invested in the meat Program during Sheep CRCs 1 and 2.
- The cost of abattoir measurement of LMY and IMF has been increased from $0.25 to $0.55/carcase.

Notes on Program 3 Impact assessment

- As noted above input costs for analysis of impact include investment of $30M in genomics research during CRC2 (2007-2014). It should also be noted that benefits resulting from genomic technologies are long term and will extend beyond fifteen years (max period for Impact Tool). The estimate benefit: cost ratio of 2.55 is considered be very conservative.

Importance of collaboration

As summarised in Figure 1 collaboration was the essential ingredient for success in the Sheep CRC. The diagram illustrates the fact that there was collaboration throughout the meat and wool value chains from the genetic development by the ram breeders through to the retail sector.

The Sheep CRC had developed a strong collaboration amongst a range of organisations prior to establishment of the Growth Centres. Therefore, while the Sheep CRC held a number of discussions with the Food and Agribusiness Growth Centre, there was not extensive need for Growth Centre input in developing the effective collaboration within the sheep industry.

The most important collaboration during the life of the CRC was the Information Nucleus program that involved practically all CRC Participants working together in all major sheep producing areas throughout Australia to study all aspects of sheep production and the quality of wool and meat products. A significant achievement from the Information Nucleus program was establishment of genomic technologies for sheep improvement and a deep understanding of the biological interactions involved in wool and meat production as well as in reproduction and wellbeing.

Impact of the education program

During the last five years the CRC supported 12 new postgraduate students and this adds to 70 students enrolled in the previous two CRCs.

A tracking survey conducted in 2019 indicated that around 70% of postgraduate students working with the Sheep CRC had taken up positions in research, academic and production sectors of the industry. One of the reasons for the high retention rate was the policy of, wherever possible, having a university and an industry-based supervisor for each student. Another important aspect was students' research projects being embedded in CRC programs.

A number of postgraduates have entered the consulting and advisory sector, following completion of their degrees, and have had a significant impact on the uptake of new technologies and knowledge. There has also been a significant impact of the CRC's undergraduate teaching material that forms the basis of a national 'hub and spoke' teaching model supporting the development of specialist skills in undergraduate training programs throughout Australia. This has been made possible through continued support for the coordination and delivery of these modules by the Australian Wool Education Trust.

Sheep industry outcomes to which the Sheep CRC has contributed

Increasing gross value of lamb (Real $1.2 billion in 2001 to $3.7 billion in 2019)

All factors influencing the gross value of lamb increased: the average carcase weight; the number of lambs slaughtered; and the price per kilogram carcase weight. These trends were in place prior to the start of the CRC and continued to be supported by MLA strategies and investment. The CRC's R&D activities have contributed to this upward trajectory in a number of ways including an improved understanding of meat eating quality.

Increasing carcase weight (19 kg in 2001 to 23 kg in 2019)

The continued increase in lamb carcase weight (equivalent to approximately 350g/carcase/year) can be largely attributed to MLA's LAMBPLAN initiative and the effective selection for increased growth, increased muscling and decreased fat. The CRC's development of genomic technologies and improved genetic parameters has contributed to faster genetic gain particularly for the expanding Merino-based lamb production sector.

More lambs (18 million in 2001 to 22.5 million in 2019)

The CRC's Information Nucleus program clearly demonstrated that carcase characteristics and meat quality from Merinos and Merino-cross lambs were very similar to lambs from specialist prime lamb production dams and sires. The data collected under eight different production environments over five years provided unambiguous evidence that Merino-based lambs could, with the right genetics and nutrition, consistently meet stringent lamb quality specifications.

The CRC's initiatives to improve lamb survival and improve reproductive efficiency through the LTEM and Managing Scanned Ewes initiatives made a significant contribution to the increase of between 15 and 20% in the number of lambs marked per ewe joined.

Increased price of lamb (Real $3.07 in 2001 to $7.25/kg carcase weight in 2019?)

The CRC's work on electrical stimulation contributed to product consistency. The CRC assisted with the first installation of mid-voltage electrical stimulation systems and in the assessment of improved product quality.

The Information Nucleus program confirmed the genetic antagonism between selecting for faster growth and muscling and the corresponding decrease in eating quality, principally due to decreasing levels of intramuscular fat. As a result of this work Sheep Genetics released new 'research' breeding values for eating quality traits that created awareness of the variation that existed in the industry.

Change in gross value of wool (Real $2.3 billion in 2010 to $4.0 billion in 2019)

There were three major changes in wool production during the period 2001 to 2019. Firstly, there was a significant reduction in the amount of wool produced due to the decline in sheep numbers between 2001 and 2010. Secondly, there was a change in the type of wool produced with decreasing focus on medium wools and increasing production of finer micron wool. The third point was the average wool cut per head remained constant at around 4.4 kilograms during the change to production of finer wool.

The change in production towards finer diameter wools

During the period from 2001 and 2019 the production of wool in the micron categories 21-24 declined from around 400 to 46mkg/year and production of finer wools in the 16.5-18 micron categories increased from 40 to 104mkg/year. When the changes in volume of wool produced is considered in combination with the increasing premium paid for finer micron wools during the five years to 2019, it is clear that the increased value of finer micron wools has had a major impact on the gross value of wool production. Between 2010 and 2019 the production of wools between 16.5 and 18 micron increased in gross value from $1 billion to $2.6 billion (see Figure 6.2.2).

The Sheep CRC's activities had some impact on this change through its research showing the importance of finer micron wools to deliver next-to-skin comfort, and through providing tools for genetic and within flock selection to facilitate increased production of wools of finer fibre diameter. Demand and premiums for finer wool are expected to continue to increase as knowledge of the CRC's research on next-to-skin comfort and the use of the Wool ComfortMeter become more widespread.

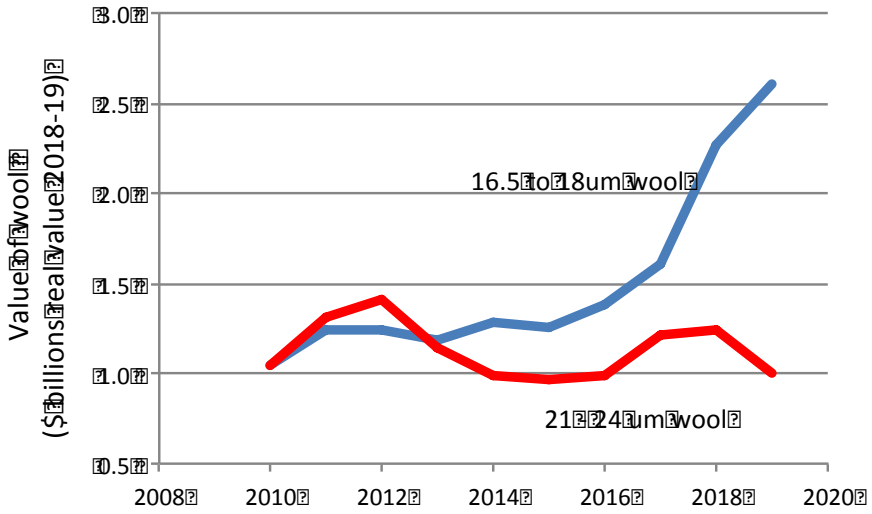


Figure 6.2.2 Value of wool of different micron categories based on wool production data reported by the AWI Wool Forecasting Committee and prices by micron provided by AWEX and adjusted to real 2018-19 dollars using ABARES data.

Case study reports from the sheep industry

"The CRC coordinated widespread industry innovation that has, without doubt, improved the supply and quality of lambs. The CRC also contributed to improved processing systems to ensure consistent quality through electrical stimulation. New carcase measurement systems like DEXA and the MSA cuts-based grading program will contribute to future value-based trading."

- Mark Inglis, Farm Assurance and Supply Chain Manager, JBS Australia

"Our 'Henry and Grace' brand for mothers' and babies' knitwear relies on the Wool ComfortMeter for quality control to ensure total next-to-skin comfort. From our experience all results point to the need for finer micron wools to meet the stringent comfort specifications for these products and there is increasing demand in the market for wool in this category."

- Philip Attard, Director of Gostwyck Merino and Henry and Grace

Snapshot Sheep CRC's top 10 innovations

- Information Nucleus Flock (INF) – The INF involved mating approximately 100 sires by artificial insemination to 5,000 ewes each year for five years, across eight sites representative of major sheep production environments. The INF was central to the CRC's work in delivering new and far-reaching genetic information and data for genomic predictions of sheep breeding values. While traditional production traits were also measured, new consumer-oriented eating quality traits, such as tenderness and intramuscular fat, were a prime focus. In 2011, the INF transitioned to an industry-funded model and in 2012 became the MLA Resource Flock.
- Genomic testing – DNA tests are now commercially available to assess a range of genetic traits, as well as identify parentage and specific genetic conditions (e.g. horn or poll status). These tests have been widely adopted by sheep breeders, with more than 50,000 tests used in 2018. This has resulted in accelerated rates of genetic gain through more precise selection of the genetics required to improve flock performance for productive traits and environmental conditions. One of the breakthroughs to making genomic technologies available to commercial producers was the development of the DNA Flock Profile test specifically for commercial Merino breeders, and combining it with the web-based RamSelect tool.
- Objective measurement of meat eating quality – New genetic traits were identified for carcase characteristics, lean meat yield (LMY) and eating quality. The dual-energy X-ray absorptiometry (DEXA) meat-grading system for estimating LMY is allowing abattoirs to accurately measure carcase LMY at line speed and has the potential to change the structure of the Australian sheepmeat industry through a shift to value-based pricing of carcases.
- Wool ComfortMeter and Wool HandleMeter – These objective measurement systems add value to traditional measurements of fabric quality, which cannot account for the effects of processing and finishing, or accurately predict comfort and softness. Used together, the instruments allow manufacturers and retailers to produce greatly improved next-to-skin garments and market these products with objective customer assurance measures.
- RamSelect – This project started as a training program providing a practical approach to using Australian Sheep Breeding Values (ASBVs). The program delivered 73 workshops to 1,389 participants, with more than 95% indicating they had a better understanding of how to make better use of ASBVs. In 2016, the popular RamSelect app was launched, which made it even easier to select superior genetics specifically matched to flock needs.
- ASKBILL – This program was designed to forewarn sheep producers about risks of cold snaps and parasite outbreaks, as well as better manage their pasture base in order to meet production targets. ASKBILL provides timely and accurate predictions of sheep wellbeing and productivity using a combination of historical weather records, short and long-range weather forecasts, biophysical models for stock and pasture production, and on-farm measurements and flock information.
- Precision technologies – Historically, shepherds looked after the whole flock. With affordable and robust technology such as fast, electronic weighing systems, electronic identification and automated drafting, producers can easily monitor and manage each animal in the mob according to its needs and merits. The precision production tools are particularly useful when used with ASKBILL forecast information.
- ParaBoss – The ParaBoss suite of products, including WormBoss, FlyBoss and LiceBoss, was developed as part of the CRC's parasite control program and continues to be hosted by the University of New England. Innovations included the targeted treatment approach in which only animals most susceptible to worms are drenched in order to slow the development of drench resistance.

- Lifetime Ewe Management – This program sees groups of five or six producers meet in six 'hands-on' sessions over 12 months with a trained Lifetime Ewe Management facilitator. The group visits each participating farm and learns skills in condition scoring, pasture assessment and best practice management to increase lambing performance and wool production. Results have included increased whole-farm stocking rates by up to13%, increased lamb marking percentages by up to 14%, decreased annual ewe mortality rates by up to 43%, and increased numbers of lambs weaned per hectare by up to 30%.
- Managing scanned ewes – A total of 88 pregnancy scanning workshops were delivered around Australia and attended by 1,800 sheep producers. The workshops resulted in about 80% of attendees changing their management practices. It was estimated that improved use of pregnancy scanning data and increased uptake of testing has led to significantly improved reproductive efficiency under many production systems.

Commercialisation and utilisation

- Use of eID tags for data collection and automated drafting in commercial ram breeding has become widespread throughout the sheep industry. Six licences have been granted for the CRC's Integrated Animal Management Patent.
- DNA testing for sheep breeding, introduced by the CRC, has increased from zero to 25,000 genomic tests and around 60,000 parentage tests per annum. The CRC's Australian Innovation Company coordinated the commercial testing service before selling the business to Neogen Corporation.
- The RamSelect and ASKBILL apps operate on a cost-recovery commercial basis with increasing use by sheep producers and the lamb supply chain.
- The Wool ComfortMeter developed by the CRC is used in a number of wool testing laboratories for quality assurance in production of lightweight knitwear.

SME Engagement

- Most sheep production businesses operate as small-to-medium-size enterprises and have been the focus of practically all CRC engagement strategies.
- Consulting and advisory companies have also been important collaborators in CRC train-the-trainer initiatives.
- Engagement has been through communication channels including social media and formal workshops and demonstrations.

International engagement

- Close international links were maintained through regular publication in international journals and through active participation in international conferences on topics relevant to the CRC's portfolio.
- Collaborative research was undertaken with meat scientists in Europe, USA, China and New Zealand.
- The International Sheep Genomics Consortium provided a mechanism for Sheep CRC researchers to share DNA sequence data with the international research community.

Further details of the CRC's activities, impacts and achievements are provided in the book 'Concept to Impact' covering the story of the Sheep CRC from 2001-2019.

Appendix 1 – Publications

Journal Article – Refereed

1. Bolormaa, S., Chamberlain, A.J., Khansefid, M., Stothard, P., Swan, A.A., Mason, B., Prowse-Wilkins, C.P., Duijvesteijn, N., Moghaddar, N., van der Werf, J.H., Daetwyler, H.D., and MacLeod, I.M. (2019). Accuracy of imputation to whole-genome sequence in sheep. *Genetics Selection Evolution*, 51(1). Available online at: https://gsejournal.biomedcentral.com/track/pdf/10.1186/s12711-018-0443-5

2. Dakhlan, A., Moghaddar, N., and van der Werf, J.H. (2018). Genotype x birth type or rearing-type interactions for growth and ultrasound scanning traits in Merino sheep. Animal Production Science, 59: 1016-1021. Available online at: https://www.publish.csiro.au/an/pdf/AN17464

3. Doughty, A.K., Horton, B., Corkrey, R., and Hinch, G.N. (2018). Key factors affecting mortality of adult ewes in extensive Australian conditions: Applications for welfare assessment. *Small Ruminant Research*, 170: 1-7. Available online at: https://www.sciencedirect.com/science/article/pii/S0921448818309118

4. Duijvesteijn, N., Bolormaa, S., Daetwyler, H.D., and van der Werf, J.H. (2018). Genomic prediction of the polled and horned phenotypes in Merino sheep. *Genetics Selection Evolution*, 50(28). Available online at: https://gsejournal.biomedcentral.com/articles/10.1186/s12711-018-0398-6

5. Fowler, S.M., Morris, S., and Hopkins, D.L. (2019). Nutritional composition of lamb retail cuts from the carcases of extensively finished lambs. *Meat Science*, 154: 126-132. Available online at: https://www.sciencedirect.com/science/article/pii/S0309174019300142?via%3Dihub

6. Granleese, T., Clark, S.A., and Kinghorn, B.P. (2018). Optimizing female allocation to reproductive technologies considering merit, inbreeding and cost in nucleus breeding programmes with genomic selection. *Journal of Animal Breeding and Genetics*, 136: 79-90. Available online at: https://onlinelibrary.wiley.com/doi/epdf/10.1111/jbg.12374

7. Granleese, T., Clark, S.A., Duijvesteijn, N., Bradley, P.E., and van der Werf, J.H. (2018). Strategies and cost–benefit of selecting for a polled sheep nucleus by using DNA testing. *Animal Production Science*, 59: 1428-1437. Available online at: https://www.publish.csiro.au/an/AN17720

8. Grant, E.P., Brown, A., Wickham, S.L., Anderson, F., Barnes, A.L., Fleming, P.A., and Miller, D.W. (2018). What can the quantitative and qualitative behavioural assessment of videos of sheep moving through an autonomous data capture system tell us about welfare? *Applied Animal Behaviour Science*, 208: 31-39. Available online at: https://www.sciencedirect.com/science/article/pii/S016815911830457X

9. Grant, E.P., Wickham, S.L., Anderson, F., Barnes, A.L., Fleming, P.A., and Miller, D.W. (2019). Remote Identification of Sheep with Flystrike Using Behavioural Observations. *Animals*, 9(6): 368. Available online at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6616955/

10. Horton, B.J., Corkrey, R., Doughty, A.K., and Hinch, G.N. (2018). Estimation of lamb deaths within 5 days of birth associated with cold weather. *Animal Production Science*, 59: 1720-1726. Available online at: http://www.publish.csiro.au/an/pdf/AN18494

11. Kalaldeh, M.A., Gibson, J., Duijvesteijn, N., Daetwyler, H.D., MacLeod, I., Moghaddar, N., Lee, S.H., and van, van der Werf, J.H. (2019). Using imputed whole-genome sequence data to improve the accuracy of genomic prediction for parasite resistance in Australian sheep. *Genetics Selection Evolution*, 51(32). Available online at: https://gsejournal.biomedcentral.com/track/pdf/10.1186/s12711-019-0476-4

12. Li, L., Brown, D.J., Swan, A.A., and van der Werf, J.H. (2018). Genetic parameters for faecal worm egg count at different ages in Australian sheep under natural challenge. *Animal Production Science*, 59, 1201-1208. Available online at: https://www.publish.csiro.au/AN/pdf/AN17833

13. Monk, J.E., Belson, S., Colditz, I.G., and Lee, C. (2018). Attention Bias Test Differentiates Anxiety and Depression in Sheep. *Frontiers in Behavioral Neuroscience*, 12(246). Available online at: https://www.frontiersin.org/articles/10.3389/fnbeh.2018.00246/full

14. Pannier, L., Gardner, G.E., and Pethick, D.W. (2018). Effect of Merino sheep age on consumer sensory scores, carcass and instrumental meat quality measurements. *Animal Production Science*, 59(7): 1349-1359. Available online at: https://www.publish.csiro.au/an/AN17337

15. Shahinfar, S., Kelman, K., and Kahn, L. (2018). Prediction of sheep carcass traits from early-life records using machine learning. Computers and Electronics in Agriculture, 156: 159-177. Available online at: https://www.sciencedirect.com/science/article/pii/S0168169918309736

Conference Proceedings – Refereed

1. Fitzgerald, P.T., Kahn, L.P., Shahinfar, S., Paul, D., Goodacre, M., and Kemmis, L.S. (2018). On Farm Validation of ASKBILL - A Sheep Wellbeing and Productivity Application for Australian Industry, Australian Society of Animal Production, 2-4 July 2018, Wagga Wagga, Australia.

2. Fowler, S.M., and Hopkins, D.L. (2018). Prediction of Intramuscular Fat of lamb topside in-situ using Near Infrared Spectroscopy, International Congress of Meat Science and Technology, 12-17 August 2018, Melbourne, Australia. Available online at: http://icomst-proceedings.helsinki.fi/papers/2018_03_20.pdf

3. Fowler, S.M., and Hopkins, D.L. (2018). Prediction of Intramuscular Fat of lamb loin using a hand-held Near-infrared device, Australian Society of Animal Production, 2-4 July 2018, Wagga Wagga, Australia.

4. Fowler, S.M., Morris, S., and Hopkins, D.L. (2018). Nutritional composition of leg cuts from carcasses of grain fed lambs. International Congress of Meat Science and Technology, 12-17 August 2018, Melbourne, Australia. Available online at: http://icomst-proceedings.helsinki.fi/papers/2018_06_11.pdf

5. Fowler, S.M., Morris, S.L., and Hopkins, D.L. (2018). Fatty acid composition of retail cuts from carcases from grass fed lambs. International Congress of Meat Science and Technology, 12-17 August 2018, Melbourne, Australia. Available online at: http://icomst-proceedings.helsinki.fi/papers/2018_06_09.pdf

6. Hopkins, D., Hoban, J., Melville, G., 2018. Impact of selected demographics on consumer's weight preference for lamb roasts, Australian Society of Animal Production, 2-4 July 2018, Wagga Wagga, Australia.

7. Kearton, T.R., Doughty, A.K., Hinch, G.N., Webster, J.R., Schneider, D.A., Cowley, F.C., 2018. Investigating the use of infrared thermography for the detection of skin inflammation in sheep with varying fleece lengths, Australian Society of Animal Production, 2-4 July 2018, Wagga Wagga, Australia.

8. Khansefid, M., Bolormaa, S., Swan, A.A., van der Werf, J.H., Moghaddar, N., Duijvesteijn, N., Deatwyler, H.D., and MacLeod, I.M. (2018). Genomic selection in sheep and how it applies to the sheep industry, 8th Iranian Animal Science Congress, 28-29 August 2018, University of Kurdistan, Iran.

9. Wickramasinghe, A., Winslow, E., Skinner, A., Hocking-Edwards, J.E., 2018. Development of automated sheep condition scoring, Australian Society of Animal Production, 2-4 July 2018, Wagga Wagga, Australia.

Appendix 2—Acronyms

AASB ..... Australian Accounting Standards Board
AGBU..... Animal Genetics Breeding Unit
AGM..... Annual General Meeting
AIC..... Australian Innovation Company Ltd
AMPC ..... Australian Meat Processor Corporation Ltd
ASBV ..... Australian Sheep Breeding Value
ATO ..... Australian Taxation Office
ASWGA..... Australian Superfine Wool Growers' Association
AWEX ..... Australian Wool Exchange
AWI ..... Australian Wool Innovation
AWSA ..... Australian White Suffolk Association Inc.
AWTA ..... Australian Wool Testing Authority Limited
CRC..... Cooperative Research Centre (Sheep CRC Ltd)
CRCA ..... Cooperative Research Centres Association
CT ..... Computed tomography
D2D ..... Data to Decisions Cooperative Research Centre
DAFWA..... Department of Agriculture and Food, Western Australia
DEXA ..... Duel-energy X-ray absorptiometry
DJPR (DEDJTR)... Department of Jobs, Precincts and Regions, Victoria (formally Department of Economic ..... Development, Jobs, Transport & Resources)
DPI..... Department of Primary Industries
eID..... Electronic identification
FTE ..... Full time equivalent (staff)
FY ..... Financial year
GST..... Goods and Services Tax
ICoMST..... International Congress of Meat Science and Technology
IP ..... Intellectual Property
KPI ..... Key performance indicator
LMY ..... Lean meat yield
MLA..... Meat & Livestock Australia Limited
MOU ..... Memorandum of Understanding
MSA..... Meat Standards Australia
NPV ..... Nett Present Value
NSWDPI..... NSW Department of Primary Industries
PIRSA..... Department for Primary Industries and Resources, South Australia
PRRC..... Project Review & Research Committee
PSL..... Practical Systems Limited
R&D..... Research & Development
SARDI ..... South Australian Research & Development Institute
SG..... Sheep Genetics

SME ..... Small & Medium Enterprises
SNP..... Single nucleotide polymorphism
SPA..... Sheep Producers Australia
TFI ..... Thomas Foods International
UMel ..... University of Melbourne
UNE ..... University of New England
UTAS ..... University of Tasmania
WAAA..... Western Australian Agriculture Authority
WAMMCO..... Western Australian Meat Marketing Cooperative Ltd.
WPA ..... WoolProducers Australia Limited

Appendix 3 – Glossary

Australian Sheep Breeding Value (ASBV)	An ASBV is an estimate of the genetic potential a sheep will pass on to its progeny. ASBVs are calculated by Sheep Genetics and allow across-flock comparison of genetic merit.
Genomic	Pertaining to the genome, all of the genetic information possessed by any organism.
Genotype	The genotype of an individual is the genetic information carried by the sheep's genes, whether or not the genes are actively expressed as proteins.
In-kind contribution	Contributions to the CRC based on providing staff or physical resources without charge to the CRC.
SNP chip	A micro-array of tiny squares containing DNA strands designed to test for the presence of single nucleotide polymorphism markers.

ACN: 125 726 847

& Controlled Entities

FINANCIAL STATEMENTS

STATUTORY FINANCIAL REQUIREMENTS

for the year ended 30 June 2019

STATUTORY FINANCIAL REQUIREMENTS

Directors' report

The Sheep CRC Ltd Directors present their report together with the consolidated financial statements for Sheep CRC Ltd and Australian Innovation Company Ltd for the financial year ended 30 June 2019.

Directors

The Directors in office at any time during or since the end of the year are:

Name	Date of Original Appointment	Date of Cessation
Ian Wilton	18 November 2015	-
John Gibson	1 June 2007	-
Catherine Hayne	2 January 2018	Resigned effective 31 August 2019
Ian Johnsson	23 November 2011	-
Stuart Mitchell	1 June 2007	Resigned effective 31 August 2019
Peter Trefort	15 June 2009	Resigned effective 31 August 2019
Mike van Blommestein	18 November 2015	Resigned effective 31 July 2019

Details of Directors' qualifications, experience and Board responsibilities can be found in the Governance (Board of Directors) section of the Annual Report.

Company Secretary

Kate Woodland-Smith is a Chartered Accountant and the Chief Financial Officer. Her qualifications and experience are provided in the Governance (Executive Committee) section of the Annual Report. Ms Woodland-Smith has been Company Secretary since October 2015.

Principal activities

The Cooperative Research Centre for Sheep Industry Innovation (Sheep CRC) was announced by the Minister for Science in December 2006 and commenced operation as a company limited by guarantee in July 2007. In December 2013 the CRC was granted a five year extension and from 1 July 2014 the CRC has operated under a Commonwealth Agreement executed in June 2014. In March 2017, the CRC negotiated a Contract Variation dealing with an altered methodology without changing target outcomes.

Following a successful final five-year term, the CRC ceased its activities as a Cooperative Research Centre effective 30 June 2019.

The Sheep CRC operated under the governance of a skills-based Board and involved collaboration between 41 Participant organisations involved in various aspects of the Australian sheep industry. The portfolio of activities delivering world-class research and accelerated adoption of technologies was organised into three research programs:

Program 1—Enhanced sheep wellbeing and productivity;

Program 2—Quality-based sheepmeat value chains; and

Program 3—Faster affordable genetic gain.

The Sheep CRC also coordinated the following activities across all three research programs:

Education and training for postgraduate students;

Communication and training activities to promote CRC outputs, reducing the time from research to utilisation by industry;

Development and hosting of computer apps to assist producers and breeders with their management decisions;

Commercialisation and coordination of genomic testing for the sheep industry; and

Liaison with Participants and administration of the Company.

As the CRC was required to cease its activities by 30 June 2019, during the latter part of the financial year the CRC has focussed on strategies for transition of the IP and related products to maximise the benefits from the CRC's programs for the Australian sheep industry. These strategies included working collaboratively with Participants for continuation of the CRC's work post CRC, and assignment of all CRC IP prior to 30 June 2019.

Short & long term objectives and strategy

The goals of the Sheep CRC during the five year extension were to continue the technological transformation of the Australian sheep industry through the use of cutting edge research to enhance sheep wellbeing, introduce value-based pricing of sheepmeat and deliver affordable technologies for DNA based genetic improvement.

In order to enhance sheep wellbeing and productivity, the Sheep CRC developed a number of predictive biophysical models to help anticipate situations where animals may approach conditions of compromised wellbeing or sub-optimal production.

Delivering the tools for quality-based sheepmeat value chains involved development of new knowledge and technologies to provide accurate prediction of sheepmeat eating quality and the saleable yield of retail cuts. The research and technology solutions have application for the lamb supply chain and potential application for older sheep.

Faster and affordable genetic gain involved developing cheaper DNA tests for predicting genetic merit and improved accuracy of the genomic technology in predicting hard to measure traits. During the final year the CRC, working in collaboration with Neogen, developed a new 50k SNP test that incorporated a number of predictive SNPs identified as a result of full sequence analysis of key sires. The new test is expected to be ready for commercial use by September 2019. The retail price of genotyping has continued to drop from $50/test at the start of the CRC Extension in 2014 to $27/test at 30 June 2019 – a level very close to the target of $25/test set in 2014.

The longer term goal, beyond the term of the CRC, is for the continued use and further development of IP in the Sheep industry. This will be achieved through the assignment of IP to Participants.

- IP relating to genetics, genomics and meat science will have continued delivery via MLA, of the DNA informed breeding values using algorithms developed during the CRC.
- IP related to the web-based apps, RamSelect, ASKBILL and online DNA ordering will continue with UNE to promote and support the use of these apps.
- IP related to the Wool ComfortMeter and HandleMeter, has been assigned to AWTA for the continued Commercialisation of the wool measurement systems.

The Sheep CRC and all CRC Essential Participants agreed to the arrangements for IP assignment and post-CRC commercialisation of Centre IP and related products, to enable utilisation of IP in the industry beyond the term of the CRC.

Activities / Achievements of the Company during the financial year

The key activities and achievements during the CRC's fifth year of operation are summarised below.

All research milestones have been satisfactorily completed with publication of the results in peer-reviewed journals and national/international conferences. A list of peer-reviewed papers published during the 12 months to 30 June 2019 is included as an attachment to the Annual Report.

Postgraduate completions are slightly behind schedule and arrangements have been made with Murdoch University to monitor progress and assist completions where necessary.

Program 1 Enhanced sheep wellbeing and productivity

The ASKBILL web-based app has been completed and was launched at LambEx (August 2018). The validation trials conducted in conjunction with commercial sheep producers in four different climatic regions provided data for assessing accuracy of ASKBILL predictions for a range of risks and production variables. A comparison of predictions against measured values has provided confidence amongst producers and their advisors as well as providing data for fine-tuning the biophysical models.

After a rapid initial uptake the number of licensed users has dropped back to 155. Post launch it has become clear that producers often require support from expert users or advisors to set up and use the app effectively. The number of licences is below target. Only 5 producers were using within-flock selection in conjunction with ASKBILL at the end of the CRC. More focus on train-the-trainer activities to increase adoption has been an effective way to increase numbers of users and will be used during post-CRC commercialisation activities. Use of ASKBILL in conjunction with the new MobSelect app for supply chain management is also anticipated to increase use and the number of licenses. MobSelect is also expected to facilitate within-flock selection. UNE has undertaken to continue commercial delivery and technical support for ASKBILL and MobSelect post-CRC.

Program 2 Quality based meat value chain

The research team has completed development of the new cuts-based MSA grading system that is designed to facilitate value based trading. The work program has also delivered documentation of lean meat yield and eating quality management, for industry training, based on research publications.

While the methodology for a new cuts-based grading system was successfully developed in collaboration with processors, retailers and producers, implementation of the new grading system has been delayed through some technical problems. Even in the absence of the physical grading system, the supply chain has already responded to the changes that will be important under the new grading system. MLA and Murdoch University have committed to developing and calibrating intramuscular fat measurement technology and web-based feedback through the ALMTech project post-CRC.

Program 3 Faster affordable genetic gain

In collaboration with Neogen Corporation the CRC has developed a new 50k SNP test that incorporates around 2,500 predictive SNPs identified through analysis of full-sequence DNA data. The new test is expected to be available in September 2019 and is anticipated to further increase the accuracy of genomic prediction without increasing the cost of testing. Benefit: cost analysis of using DNA technologies has been developed for a range of applications in different breeding program designs. The clear benefits of the current test has resulted in a 20% increase in DNA testing during the year to June 2019.

During the last financial year, the CRC, working in collaboration with Participants has prepared and executed a final overarching IP agreement that covered assignment of all Sheep CRC Centre IP. The effective date of the agreement was 30 June 2019.

- IP relating to genetics, genomics and meat science was assigned to MLA under arrangements agreed to by all Participants at the start of the CRC. MLA have committed to continue delivery of the DNA informed breeding values using algorithms developed during the CRC.

- IP related to the web-based apps, RamSelect, ASKBILL and online DNA ordering, was assigned to UNE. Commercialisation plans developed by UNE provide details of their commitment to continue to promote and support the use of these apps for the advancement of the Australian sheep industry. Staff required for app maintenance and development, previously employed on CRC funds, have been employed by UNE to fulfil UNE's commitment under the assignment arrangements.
- The Wool ComfortMeter and HandleMeter, previously licensed to AWTA, have been assigned to AWTA. Commercialisation of these wool measurement systems by AWTA will continue post-CRC.
- The sheep DNA testing business, developed and coordinated through the Australian Innovation Company, was sold to Neogen Australasia. Neogen operate a livestock genotyping laboratory in Gatton, Queensland, and will continue to provide the same services with the same staff to provide genomic services to the Australian sheep industry.

Directors' meetings

Attendance at Board and Board committee meetings held during the financial year are as follows:

DIRECTOR		BOARD OF DIRECTORS	FINANCE & COMPLIANCE COMMITTEE	REMUNERATION COMMITTEE
Total meetings held:		**7**	**5**	**2**
John Gibson	Attended	5	5	-
Ian Johnsson	Attended	7	-	2
Catherine Hayne	Attended	7	5	-
Stuart Mitchell	Attended	6	5	-
Peter Trefort	Attended	7	-	-
Mike van Blommestein	Attended	6	-	2
Ian Wilton	Attended	7	1 *	2

** Attendance by Board Chair as observer*

Operating results

The consolidated operating result for the year was a deficit of $54,902 (FY18 $274,803 surplus) after tax and other comprehensive income. The deficit is made up of a net deficit in the controlled entity AIC of $68,050 and the reversal of the deferred tax provision of $13,147 in the CRC. The Commonwealth Agreement activity resulted in no net revenue before tax due to income recognition as per the policy stated in Note 2 of the Notes to the Financial Statements. At 30 June 2019 the consolidated cash at bank totalled $1,492,604 (FY18 $5,181,407) a reduction of $3,688,803 from the previous year.

Members' guarantee

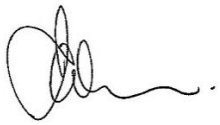
In accordance with the Company's Constitution, in the event the Company is wound up, each Member is required to contribute a maximum of $10 towards meeting any outstanding obligations of the Company. At 30 June 2019 the CRC consists of 10 Essential Participants/Members and 31 Other Participants. The Total amount Members would be required to contribute is $100.

Auditor's independence declaration

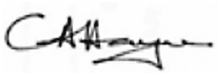
The following Auditor's independence declaration is required under section 307C of the Corporation Act 2001 and forms part of the Directors' report for the year ended 30 June 2019.

Rounding

Unless otherwise stated, amounts in this report and the financial reports have been rounded to the nearest dollar. Signed in accordance with a resolution of the Board of Directors made pursuant to section 298 (2) of the Corporations Act 2001.



Ian Wilton
Chair



Catherine Hayne
Chair, Finance & Compliance Committee

Dated this 30 August 2019

Auditor's declaration of independence

ROBERTS & MORROW
CHARTERED ACCOUNTANTS

To the Directors of Sheep CRC Limited and Controlled Entities

I declare that, to the best of my knowledge and belief during the year ended 30 June 2019, there have been no contraventions of:

i. the auditor independence requirements of the *Corporations Act 2001* in relation to the audit; and
ii. any applicable code of professional conduct in relation to the audit.

Roberts & Morrow
Chartered Accountants

Michelle Paull
Partner
Auditor Registration Number: 164853

Dated: 30 August 2019

Consolidated statement of profit or loss

and other comprehensive income for the year ended 30 June 2019

	Note	2019 $	2018 $
Revenue	3	7,553,252	8,171,687
EXPENDITURE			
Research Project Expenses		1,968,201	2,026,825
Research Project Personnel		1,203,774	1,813,254
Centre Salaries		1,191,569	1,407,445
Direct Costs of Fee for Service	3a	2,456,798	1,956,742
Scholarships & Education		216,609	414,218
Communication, Marketing & Events		168,223	141,308
Travel & Accommodation		65,158	33,988
Administration & Financial Expenses	3b	478,215	45,553
Professional Fees		6,989	57,412
IT & Telecommunications		27,234	18,250
Grant Expenses		175,000	-
Total Expenditure		**7,957,770**	**7,914,995**
Surplus / (Deficit) Before Income Tax		**(404,518)**	**256,692**
Income Tax (Expense)/ Credit	4	**13,148**	**18,111**
Surplus / (Deficit) After Income Tax		**(391,370)**	274,803
Other Comprehensive Income			
Surplus on sale of Sheep DNA testing business	5	336,468	-
Total Other Comprehensive Income		**336,468**	-
Surplus / (Deficit) After Income Tax		**(54,902)**	**274,803**

Consolidated statement of financial position

as at 30 June 2019

	Note	2019 $	2018 $
CURRENT ASSETS			
Cash and Cash Equivalents	6	1,492,604	5,181,407
Trade and Other Receivables	7	217,020	1,360,405
Other Assets	8	16,290	114,641
Total Current Assets		**1,725,914**	**6,656,453**
NON-CURRENT ASSETS			
Deferred Tax Asset	9	-	48,275
Total Non-Current Assets		**-**	**48,275**
Total Assets		**1,725,914**	**6,704,728**
CURRENT LIABILITIES			
Trade and Other Payables	10	1,392,090	6,298,455
Provisions	11	95,347	112,894
Current Tax Liability		-	-
Total Current Liabilities		**1,487,437**	**6,411,349**
NON-CURRENT LIABILITIES			
Total Non-Current Liabilities		**-**	**-**
Total Liabilities		**1,487,437**	**6,411,349**
Net Assets		**238,477**	**293,379**
EQUITY			
Accumulated Surplus/(Deficit)		238,477	293,379
Total Equity		**238,477**	**293,379**

Consolidated statement of changes in equity

for the year ended 30 June 2019

	Note	2019 $	2018 $
Balance at 1 July		**293,379**	**18,576**
Surplus / (Deficit) After Tax		(54,902)	274,803
Balance at 30 June		**238,477**	**293,379**

Consolidated statement of cash flows

for the year ended 30 June 2019

		2019 $	2018 $
CASH FLOWS FROM OPERATING ACTIVITIES			
Commonwealth Grant Funds *		792,000	1,718,000
Participant and Supporting Contributions *		1,778,500	2,712,950
GST on Grant Funds and Contributions		207,050	443,095
Interest Received		101,305	105,236
Other Income		1,167,527	1,725,183
Payments to Suppliers, Researchers and Employees		(7,427,930)	(8,075,026)
Net Cash Provided by Operating Activities	12	**(3,381,548)**	**(1,370,562)**
CASH FLOWS FROM FINANCING ACTIVITIES			
Approved disbursement of Commonwealth funds		(500,000)	-
Cash used in Operating Activities		**(500,000)**	**-**
CASHFLOW FROM INVESTING ACTIVITIES			
Proceeds from Sale of Sheep DNA testing Business	5	192,745	-
Cash provided by investing activities		**192,745**	**-**
Net Increase/(Decrease) in Cash Held		(3,688,803)	(1,370,562)
Cash at Beginning of Financial Year		5,181,407	6,551,969
Cash at End of Financial Year	6	**1,492,604**	**5,181,407**

** To ensure the statement of cash flows is consistent with the Commonwealth reporting requirements GST on Grant funds and Participant Contributions has been separately reported.*

Notes to the consolidated financial statements

for the year ended 30 June 2019

Note 1: General information and statement of compliance

The consolidated financial statements for the year ended 30 June 2019 were authorised for issue in accordance with a resolution of the Directors on 30 August 2019.

Sheep CRC Ltd is a company limited by guarantee, incorporated and domiciled in Australia. The nature of the operations and principal activities of the Company are described in the Directors' report.

Note 2: Summary of accounting policies

A) Basis of preparation

Sheep CRC Ltd applies Australian Accounting Standards—Reduced Disclosure requirements as set out in AASB 1053: Application of Tiers of Australian Accounting Standards.

The financial statements are general purpose financial statements that have been prepared in accordance with Australian Accounting Standards—Reduced Disclosure Requirements of the Australian Accounting Standards Board (AASB) and the Corporations Act 2001. The Company is a not-for-profit entity for financial reporting purposes under Australian Accounting Standards.

Australian Accounting Standards set out accounting policies that the AASB has concluded would result in financial statements containing relevant and reliable information about transactions, events and conditions. Material accounting policies adopted in the preparation of these financial statements are presented below and have been consistently applied unless stated otherwise.

The financial statements, except for cash flow information, have been prepared on an accruals basis and are based on historical costs.

The financial statements are presented in Australian dollars, which is the Group's functional and presentation currency.

Principles of consolidation

The Group financial statements comprise all of the assets, liabilities and results of the Sheep CRC Ltd (parent company), the Australian Innovation Company Ltd (subsidiary) and trusts for both CRC 2007-14 and CRC Extension 2014-19 which came into existence in accordance with each Participants Agreement. At balance date neither trust had traded. By the end of the financial year the Participants had assigned their beneficial interests in Sheep CRC IP, and Sheep CRC Ltd had assigned its legal interest in the IP, and the trusts ceased to exist. The Australian Innovation Company Ltd has traded since 1 July 2016 and entered into a contract to sell its operations in June 2019. Subsidiaries are entities the parent controls. The parent controls a subsidiary if it is exposed and has rights to variable returns from the involvement with the controlled entity and has the ability to affect those returns through its power over the controlled entity. The Australian Innovation Company has a reporting date of 30 June.

All transactions and balances between the Group companies are eliminated on consolidation, including unrealised gains and losses on transactions between Group companies. Amounts reported in the financial statements of subsidiaries have been adjusted where necessary to ensure consistency with the accounting policies adopted by the Group.

Going concern

Sheep CRC Ltd operated under an agreement with the Commonwealth Government and Participants Agreement for funding to 30 June 2019. The Participants approved to extend their agreement until such time as the Company delivers to the Commonwealth the final report of the operations.

As a result of the Commonwealth Agreement and subsequent confirmation from the Commonwealth for the use of funds post 30 June 2019, the Company will have sufficient funds to meet its obligations arising in relation to the wind-up of its affairs and deregistration.

On 27 August 2019, the Members passed a resolution to deregister the Company as soon as practicable after the Company has discharged its obligations to the Commonwealth.

The Directors acknowledge economic dependence referred to in their statement at Note 15.

B) Significant accounting judgements, estimates and assumptions

The preparation of financial statements requires management to make judgements, estimates and assumptions that affect the application of policies and reported amounts of assets, liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and other factors that are believed to be reasonable under the circumstances, the results of which form the basis of making the judgements. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period or in the period of the revision and future periods if the revision affects both current and future periods.

C) Revenue recognition

Revenue is recognised when the Group is legally entitled to the income and the amount can be quantified with reasonable accuracy. Revenues are recognised net of the amounts of goods and services tax (GST) payable to the Australian Taxation Office. Revenue recognition relating to the provision of service is determined with reference to the stage of completion of the transaction at the end of the reporting period, where outcome of the service can be estimated reliably. Where outcome cannot be estimated reliably, revenue is recognised only to the extent that related expenditure is recoverable.

Revenue is only recognised when the Company is legally entitled to the income, being when the conditions attached to the contributions are met or services provided. Untied grants and contributions are recognised as revenue on a proportional basis to match the income to expenditure. To the extent that revenue is unearned it is carried as a liability in Trade and Other payables at balance date.

Cash contributions

On invoice, Government, Participant and supporting cash contributions are credited to unearned revenue in the statement of financial position, net of goods and services tax (GST) payable to the Australian Taxation Office.

Interest income

Interest income is derived from term deposits and other interest bearing accounts. Interest income is recognised as it accrues, using the effective interest method.

In-kind contributions

Participant and other supporting in-kind contributions of research staff and/or specialised facilities and infrastructure under the Commonwealth funding agreement are not recognised as revenue. Details of the Participants' and other supporting in-kind contributions are set out in the CRC Supplementary Financial Tables.

D) Expenditure

All expenditure is accounted for on an accruals basis and has been classified under headings that aggregate all costs related to the category. Where costs cannot be directly attributed to a particular category they have been allocated to activities on a basis consistent with use of the resources.

E) Cash & cash equivalents

Cash and cash equivalents comprise cash at bank and short term deposits with an original maturity of six months or less.

F) Trade & other receivables

Receivables are recognised and carried at original invoice amount less any allowance for any uncollectible amounts. Normal terms of settlement are 30 days. The carrying amount of the receivable is deemed to reflect fair value.

An allowance for doubtful debts is made when there is objective evidence that the Company will not be able to collect a debt. Bad debts are written off when identified.

G) Plant & equipment

Items of plant and equipment utilised by the Group are by way of a rental arrangement or provided by in-kind arrangements in accordance with funding agreement conditions. Other plant and equipment up to the value of $10,000 purchased with fee for service funds is written off in the year of acquisition.

H) Trade & other payables

Trade and other payables represent liabilities for goods and services provided to the Company prior to the end of the financial year that are unpaid. These amounts are usually settled in 30 days. The carrying amount of the creditors and payables is deemed to reflect fair value.

I) Unearned revenue

The liability for unearned revenue, as discussed in (c) above is included in Trade and Other Payables in these statements.

At 30 June 2019 unearned revenue from the Commonwealth represents funds to be either utilised in the wind-up period, dispersed in accordance with the Wind-Up Plan or returned to the Commonwealth.

J) Employee benefits

Employee benefits comprise wages and salaries, annual and long service leave, and contributions to superannuation plans.

Liabilities for wages and salaries expected to be settled within 12 months of the reporting date are recognised in other payables in respect of employees' services up to the reporting date. Liabilities for annual leave in respect of employees' services up to the reporting date that are expected to be settled wholly within 12 months after the end of the period in which the employees render the related services are recognised in the provision for annual leave. Both liabilities are measured at the amounts expected to be paid when the liabilities are settled and amounts expected to be settled after 12 months from the end of the reporting period are discounted.

The liability for long service leave is recognised in the provision for employee benefits and measured as the present value of expected future payments to be made in respect of services provided by employees up to the reporting date. Consideration is given to anticipated future wage and salary levels, experience of employee departures and periods of service.

K) Income tax

The income tax expense/ (income) for the year comprises current income tax expense/ (income) and deferred tax expense/ (income). Current income tax expense charged to the profit or loss is the tax payable on taxable income. Current tax liabilities/ (assets) are measured at amounts expected to be paid to/ (recovered) from the Australian Taxation Office.

Deferred income tax expense reflects movements in deferred tax asset and deferred tax liability balances during the year as well as unused tax losses.

Current and deferred tax expense/(income) is charged or credited outside profit or loss when the tax relates to items that are recognised outside profit or loss.

No deferred income tax is recognised from the initial recognition of an asset or liability where there is no effect on accounting or taxable profit or loss.

Deferred tax assets and liabilities are calculated at tax rates that are expected to apply to the period when the asset is realised or the liability is settled, and their measurement also reflects the manner in which management expects to recover or settle the carrying amount of the related asset or liability. Deferred tax assets relating to temporary differences and unused tax losses are recognised only to the extent that it is probable that future taxable profit will be available against which the benefits of the deferred tax asset can be utilised.

The Australian Innovation Company Ltd has self-assessed as a tax exempt entity for FY17 to FY19.

L) Goods and services tax

Revenues, expenses and assets are recognised net of the amount of GST, except where the amount of GST incurred is not recoverable from the Australian Tax Office.

Receivables and payables are shown inclusive of the amount of GST receivable or payable. The net amount of GST recoverable or payable to the ATO is included in other receivable or payables in the statement of financial position.

Cash flows are presented on a gross basis. The GST component of cash flows arising from investing or financing activities which are recoverable from, or payable to, the ATO are presented as operating cash flows included in receipts from customers or payments to suppliers.

M) Comparative financial information

Where required, comparative figures have been adjusted to conform to changes in presentation for the current financial year.

Note 3: Revenue

	Note	2019 $	2018 $
Operating Activities			
Commonwealth Government Grant		3,344,362	3,661,116
Participant Contributions		932,910	2,169,090
Contractor Research Income		691,782	266,896
Interest Income		76,917	120,579
Fees for service	3a	2,507,281	1,943,492
Foreign Exchange Gain		-	2,177
Other		-	8,337
Total Revenue		**7,553,252**	**8,171,687**

Note 3a: Direct costs of fee for service

Fees for service have been received for the delivery of DNA testing and other contract income. The direct costs of the fee for service include only the identifiable direct costs.

Note 3b: Administration and financial expenses

		2019 $
Consultants Fees (AIC)		151,255
IT costs (AIC)		165,065
Audit, legal and administration expenses (AIC)		49,642
Administration and financial expenses (CRC)		112,253
Total administration and financial expenses		**478,215**

Note 4: Income tax expense

		2019 $	2018 $
(a) The components of tax expense comprise:			
Current tax credit		13,148	18,111
Deferred tax expense		-	-
		13,148	**18,111**
(b) The prima facie tax on profit from ordinary activities before income tax is reconciled to the income tax as follows:			
Prima facie tax payable on profit from ordinary activities before income tax at 27.5%		-	-
Prior period tax reversed		-	(13,705)
Tax adjustment on wind-up		13,148	-
Adjustments for tax differences		-	(4,406)
Tax expense / (credit)		13,148	(18,111)
The applicable weighted average effective tax rate:		0.0%	0.0%
The applicable company tax rates:		**27.5%**	**27.5%**

Note 5: Sale of Sheep DNA testing Business

		2019 $	2018 $
Surplus from sale of Sheep DNA testing business		343,723	-
Legal expenses		(7,255)	-
Surplus on sale of Sheep DNA testing business		**336,468**	**-**
Income Tax Expense		-	-
Net surplus on sale of Sheep DNA business		**336,468**	**-**
The net cash flows of the sold division which have been incorporated into the statement of cash flow comprise;			
Proceeds received to 30 June 2019		200,000	-
Less Legal fees		(7,255)	-
Net cash flow from investing activity		**192,745**	**-**

Note 6: Cash and cash equivalents

		2019 $	2018 $
Cheque Account		163,172	460,710
Business Account		1,329,432	970,697
Short Term Deposits		-	3,750,000
Total		**1,492,604**	**5,181,407**

Note 7: Trade and other receivables

		2019 $	2018 $
Trade Receivables		115,000	1,305,753
Interest Receivable		-	24,388
GST Refundable		102,020	30,264
Total		**217,020**	**1,360,405**

Note 8: Other assets

		2019 $	2018 $
Inventories		-	78,843
Prepayments		16,290	35,798
Total		**16,290**	**114,641**

Note 9: Tax

		2019 $	2018 $
DEFERRED TAX ASSET			
Deferred tax assets comprise:			
Annual Leave		-	25,911
Long Service Leave		-	5,135
Legal Fees - IP		-	1,324
Carried Forward Tax Losses		-	15,905
Total		**-**	**48,275**

Note 10: Trade & other payables

		2019 $	2018 $
Trade Creditors		74,963	1,694,396
Accrued Expenses		15,765	36,939
PAYG Payable		22,451	32,513
Unearned – Commonwealth Grant		1,278,911	4,392,698
Unearned Receipts – MLA		-	116,909
Unearned Receipts – Other		-	25,000
Total		**1,392,090**	**6,298,455**

Note 11: Provisions

		2019 $	2018 $
CURRENT PROVISIONS			
Annual Leave		16,537	49,222
Employee Entitlements		60,000	45,000
Long-Service Leave		18,810	18,672
Total Current Provisions		**95,347**	**112,894**

Note 12: Cash flow information

		2019 $	2018 $
(a) Reconciliation of Cash Flow from Operations with Profit from Ordinary Activities after Income Tax			
Surplus / (Deficit) after Income Tax		(54,902)	274,803
Non-cash flows in Surplus / (Deficit) from Ordinary Activities			
Foreign Exchange gain / (loss)		-	(1,229)
Changes in assets and liabilities			
(Increase) / decrease in receivables		1,143,385	300,655
(Increase) / decrease in deferred taxes		-	(5,031)
(Increase) / decrease in other assets		98,351	53,614
Increase / (decrease) in tax payables		-	(13,080)
Increase / (decrease) in trade payables and accruals		(1,937,048)	(162,442)
Increase / (decrease) in unearned receipts		(2,613,787)	(1,838,984)
Increase / (decrease) in employee provisions		(17,547)	21,132
Net Cashflows from Operations		**(3,381,548)**	**(1,370,562)**

Note 13: Related parties & related party transactions

The Group's related parties include management personnel and related entities as described below.

Key management personnel compensation

Key management of the Group are the Chief Executive Officer, the Chief Financial Officer and the Company Secretary.
Total key personnel remuneration paid was $556,396 (2018 $460,160) for the year ended 30 June 2019.

Other management roles by key management

Lu Hogan held the position of Chief Executive Officer of the controlled entity. Lu is the Regional Chair of the Southern Australian Livestock Research Council (SALRC) for Northern NSW.

Directors' compensation

The Directors are compensated for their services as approved by members in general meeting. During the year, Directors were compensated a total of $245,573 (2018 $241,241). Associated travel expenses incurred for Directors in fulfilling their roles totalled $61,610 for the year (2018 $69,449), including the reimbursement of any related out of pocket expenses. Note: due to the Company making bulk payments for functions and events a portion of meals and entertainments costs will not be captured in the above.

Participant associations

The Company Board of Directors has included a member who was associated with an Essential Participant during the year ended 30 June 2019, being: John Gibson, University of New England (staff member).

Directors act independently. Other management and directorships are noted for information and the Directors are not acting as representatives of those organisations.

Participant contributions & payments

The following table outlines contributions from and payments to all Participants for the holding company. All transactions are undertaken in accordance with normal commercial terms and conditions and in accordance with the governance protocols of the Company.

	2019 $
CONTRIBUTIONS RECEIVED FROM RELATED PARTIES	
Australian Innovation Company (AIC)	441,540
Australian Meat Processor Corporation Inc. (AMPC)	1,623,954
Meat & Livestock Australia (MLA)	2,261,800
University of New England (UNE)	238,099
WoolProducers Australia (WPA)	356,250
Total Related Party Contributions	**4,921,643**
PAYMENTS TO RELATED PARTIES	
Australian Innovation Company (AIC)	206,877
Australian Wool Testing Authority Ltd (AWTA)	4,509
Bureau of Meteorology	64,348
Cox Inall Communications	6,640
Department of Economic Development, Jobs, Transport & Resources (DEDJTR/DEPIVIC)	272,249
Meat & Livestock Australia (MLA)	11,000
Meridian Agriculture Pty Ltd (previously Mike Stephens & Associates)	32,156
Murdoch University	1,179,000
NSW Department of Primary Industries (NSWDPI)	84,304
Sapien Technology Pty Ltd	1,124
South Australian Research & Development Institute (SARDI)	116,352
SheepMatters	1,100
University of New England (UNE)	2,772,967
University of Tasmania (UTAS)	111,598
Total Payments to Related Parties	**4,864,224**

Note 14: Members' guarantee

The Company is limited by guarantee. In the event of the Company being wound up, the Constitution states that each Member is required to contribute a maximum of $10 towards meeting any outstanding obligations of the Company. At 30 June 2019 there were 10 Members.

Note 15: Commitments & contingencies

At 30 June 2019 unearned revenue grants from the Commonwealth represents funds to be either utilised in the wind-up period or dispersed in accordance with the Wind-Up Plan or returned to the Commonwealth.

To the best of the Directors knowledge and belief there are no other commitments or contingencies at balance date.

Note 16: Economic dependence

The Company has been economically dependent on the Commonwealth Government of Australia and Participants' cash and in-kind contributions as committed in the Commonwealth Agreement for the period from 1 July 2014 to 30 June 2019.

Under the Commonwealth Agreement the Company ceased project activities on the 30 June 2019.

The Company's activities as a co-operative research centre were wound up by 30 June 2019, and after the Company's final reports are submitted to the Commonwealth (by 31 October 2019), the company will be deregistered.

On 27 August 2019, the Members passed a resolution to deregister the Company as soon as practicable after the Company has discharged its obligations to the Commonwealth.

Directors' declaration

The Directors of the Company declare that:

The financial statements and notes, as set out herein are in accordance with the Corporations Act 2001 and:

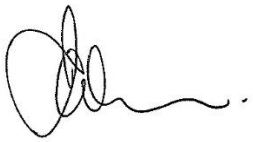
comply with Accounting Standards—Reduced Disclosure Requirements and the Corporations Regulations 2001; and

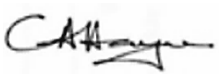
give a true and fair view of the financial position as at 30 June 2019 and of the performance for the year ended on that date of the Company.

In the Directors opinion the Company has sufficient funds to meet its obligations arising in relation to the wind-up of its affairs.

In arriving at their opinion in point 2 above, the Directors have taken into account the economic dependence of the Company detailed in Note 15 to the Financial Statements and the Going Concern Basis of Preparation outlined in Note 2 (A).

This declaration is made in accordance with a resolution of the Board of Directors.





Ian Wilton
Chair

Catherine Hayne
Chair, Finance & Compliance Committee

Dated this 30 August 2019

Independent auditor's report

ROBERTS & MORROW
CHARTERED ACCOUNTANTS

To the members of Sheep CRC Limited and Controlled Entities

Opinion

We have audited the accompanying financial report, of Sheep CRC Limited and Controlled Entities (the company), which comprises the statement of financial position as at 30 June 2019, the statement of profit or loss and other comprehensive income, the statement of changes in equity and statement of cash flows for the year then ended, and notes comprising a summary of significant accounting policies, and the declaration by those charged with governance.

In our opinion, the accompanying financial report presents fairly, in all material respects, the financial position of the company as at 30 June 2019 and of its financial performance and its cash flows for the year then ended in accordance with Australian Accounting Standards – Reduced Disclosure Requirements. Further, the financial report has been prepared in accordance with the Corporations Act 2001.

Basis for Opinion

We conducted our audit in accordance with Australian Auditing Standards. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Report section of our report. We are independent of the company in accordance with the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 Code of Ethics for Professional Accountants (the Code) and the auditor independence requirements of the Corporations Act 2001 that are relevant to our audit of the financial report in Australia. We have also fulfilled our other ethical responsibilities in accordance with the Code. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Report

Management is responsible for the preparation and fair presentation of the financial report in accordance with Australian Accounting Standards – Reduced Disclosure Requirements, in accordance with the Corporations Act 2001, and for such internal control as management determines is necessary to enable the preparation of the financial report that is free from material misstatement, whether due to fraud or error.

In preparing the financial report, management is responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the company's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Report

Our objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial report.

Our responsibilities

- Identifies and assesses the risks of material misstatement of the financial report, whether due to fraud or error, designs and performs audit procedures responsive to those risks, and obtains audit evidence that is sufficient and appropriate to provide a basis for the auditor's opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtains an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control.
- Evaluates the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by those charged with governance.
- Concludes on the appropriateness of those charged with governance's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If the auditor concludes that a material uncertainty exists, the auditor is required to draw attention in the auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify the auditor's opinion. The auditor's conclusions are based on the audit evidence obtained up to the date of the auditor's report. However, future events or conditions may cause the entity to cease to continue as a going concern.
- Evaluates the overall presentation, structure and content of the financial report, including the disclosures made by those charged with governance.

The auditor communicates with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that the auditor identifies during the audit.

Roberts & Morrow

Chartered Accountants

Michelle A Paull
137 Beardy Street
Armidale
Auditor Registration Number: 164853

Dated: 30 August 2019

ACN: 125 726 847

& Controlled Entities

FINANCIAL STATEMENTS

COMMONWEALTH FINANCIAL TABLES

for the year ended 30 June 2019

COMMONWEALTH FINANCIAL TABLES

Statement by Directors

The Directors of the Company declare that:

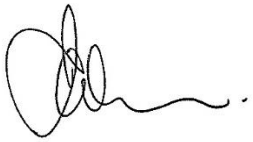
The Cooperative Research Centre Programme grant monies received by the Company have been expended solely upon the activities of the CRC and in accordance with the Commonwealth Agreement.

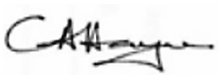
The information contained in the attached financial tables:

give a true and fair view of the sources and applications of funding of the CRC for the year ended 30 June 2019; and

has been prepared in accordance with the requirements of the Commonwealth Agreement.

This declaration is made in accordance with a resolution of the Board of Directors and is signed for and on behalf of the Board by:





Ian Wilton

Chair

Catherine Hayne

Chair, Finance & Compliance Committee

Dated this 30 August 2019

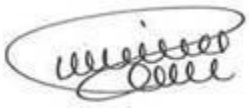
ROBERTS & MORROW
CHARTERED ACCOUNTANTS

Qualified Accountant Checklist

1.	The financial statements present fairly that contributions, both cash and in-kind, have been made and recorded in accordance with the budget as specified in schedule 4 and in accordance with the terms of the Commonwealth Funding Agreement;	No Refer attached table at Appendix A
2.	In accounting for Commonwealth funding and contributions, the CRC has exercised proper accounting standards and controls (clause 10.5 (a));	Yes
3.	The CRC has met its obligations to the Commonwealth in relation to capital items (clause 10.2(a));	Yes
4.	The cash contributions and Commonwealth funding have been paid into and expended from the CRC's Account, in accordance with the Commonwealth Funding Agreement, and all interest on the balance of the Account has been credited to the Account (clause 10.5).	Yes

In my opinion the reports specified under clause 12.7 (b) and (c) present fairly that the:

- Commonwealth funding and the contributions have been expended solely for the activities and in accordance with Schedule 4 of this contract and Australian accounting concepts and applicable Australian standards; and
- that all transactions for the activities as specified in schedule 2 have been conducted through the Account.



Signature:
Name: Michelle Paull - Partner
Firm: Roberts & Morrow
Registered Auditor Number: 164853

Date: 30 August 2019

Armidale p: 02 6774 8400 Glen Innes p: 02 6739 7600 Narrabri p: 02 6792 9700 Tamworth p: 02 6768 1111

Qualified Accountant Certification and Checklist
To the Co-operative Research Centres Program
Department of Industry, Innovation and Science
Cumulative to 30 June 2019

Appendix A

Cumulative Basis 2015 to 2019 Financial Years							
Participant	**Amount Contributed Cash and Non-Staff In-Kind**	**Amount Committed Cash and Non-Staff In-Kind**	**Variance to Amount Committed**	**Amount Contributed Staff In-Kind**	**Amount Committed Staff In-Kind**	**Variance to Amount Committed**	**Explanation for Variance**
	$'000	**$'000**	**$'000**	**FTE**	**FTE**	**FTE**	
WA Agriculture Authority	0	0	0	4.82	5.50	-0.68	Reduction in Participant personnel. Work covered by other participants.
Meat & Livestock Australia	9,606	9,550	56	4.94	6.00	-1.06	Reduction in Participant personnel. Work covered by other participants.
NSW Department of Primary Industries	0	0	0	6.28	8.30	-2.02	Reduction in Participant personnel. Work covered by other participants.

It should be noted that the above table shows the exceptions only against the Commonwealth Agreement that are greater than 10%.

Note that overall the CRC is 20.86 FTEs ahead of the Commonwealth Agreement.

Notes to the financial tables

Basis of preparation

The financial tables are prepared from the results of "the Account" in accordance with the Commonwealth Agreement with the Department of Industry and Science conducted in Sheep CRC Ltd. Transactions relating to activities of the group that do not relate to funding under the Agreement are not required to be reported and are not reported in the tables.

Note 1 – In-kind Contributions (Table 1a and Table 1b)

1.1 Basis of preparation

In-kind contributions include staff, facilities and services provided by CRC Participants from their own resources. Time spent by Participant staff on Sheep CRC projects are disclosed in Table 1a.

The non-staff in-kind contributions reported in Table 1b represent contributions of non-staff in-kind as agreed in Schedule 4 of the Commonwealth Agreement. Due to the fact that no additional calculation for overheads and expenditure for staff is included in the Agreement no allowance for these additional non-staff contributions has been included in the table.

The Department of Economic Development, Jobs, Transport & Resources Victoria was previously known as Victorian Department of Primary Industries.

Sheep Producers Australia was previously known as Sheepmeat Council of Australia.

1.2 Significant variations between the Commonwealth Agreement and actual as at 30 June 2019

There are no significant variations for FY19. Staff FTE (full time equivalent) in-kind aggregate contributions for FY19 was 24.43 FTE which was close to meeting the Commonwealth Agreement total of 25.0 FTE. Contributions from Other Participants totalled 13.19 FTE which was under the Commonwealth Agreement of 14.40 FTE. Contributions have also been made by other than Participants of 2.15 FTE.

Non Staff In-kind for FY19 was valued at $547k, just below the Commonwealth Agreement of $558k.

1.3 Projection 5 Years

The CRC has exceeded the cumulative five year Staff In-kind FTE Commonwealth Agreement commitment (Actual 148.46 FTE, Agreement 127.60 FTE).

The CRC has also exceeded the five year Non-staff In-kind Commonwealth Agreement commitment (Actual $2,829k, Agreement $2,790k).

Note 2 – Cash Contributions (Table 2)

2.1 Basis of Preparation

In accordance with the requirements of the Commonwealth Agreement Table 2 has been prepared on a cash basis. The CRC Commonwealth Grant is received in advance every quarter while Participants' Tied funding is invoiced and received on completion of project milestones/tasks in arrears every quarter. Not all tied funding is received in the year in which it is invoiced.

2.2 Significant variations between the Commonwealth Agreement and actual figures as at 30 June 2019

FY19 total cash contributions exceeded the Commonwealth Agreement by $1,116k (Actual $3,914k, Agreement $2,798k). Other Cash Resources not anticipated under the Commonwealth Agreement include interest on deposits.

2.3 Projection 5 Years

Total Participant and other contributions for the five years of $30,401k are above the Commonwealth Agreement of $27,256k. The additional funds include increased Participant contributions in addition to interest receipts, pre-commercial industry genomic test income, and computer application subscriptions.

Note 3 – Operating Expenses (Table 3)

3.1 Basis of Preparation

In accordance with the requirements of the Commonwealth Agreement Table 3 has been prepared on an accruals basis and excludes non-Commonwealth Agreement activity transactions.

3.2 Significant variations between the Commonwealth Agreement and actual figures as at 30 June 2019

Expenditure for FY19 ($4,382k) was above the Commonwealth Agreement ($4,012k). The difference was in respect of activity deferred from prior years.

Note 4 – Allocation of Resources (Table 4)

4.1 Basis of Preparation

The Allocation of resources table has been prepared on an accruals basis. The projections are in line with the projections in Tables 1a, 1b and 3.

Table 1a: Staff in-kind contributions

Number of Staff (FTE; 0.00)

	2014-15				Actual 2015-16				2016-17			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
ESSENTIAL PARTICIPANTS												
Australian Meat Processor Corporation Ltd												
Programme Leader/Senior Manager	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Key Researcher/Manager	0.00	0.10	-0.10	-100.00	0.00	0.10	-0.10	-100.00	0.00	0.10	-0.10	-100.00
Researcher/Professional	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.10	0.10	0.00	0.00	0.20	0.10	0.10	100.00	0.10	0.10	0.00	0.00
Meat & Livestock Australia Limited												
Programme Leader/Senior Manager	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.68	0.00	0.68	0.00
Key Researcher/Manager	0.40	0.40	0.00	0.00	0.20	0.40	-0.20	-50.00	0.20	0.40	-0.20	-50.00
Researcher/Professional	0.20	0.70	-0.50	-71.40	0.00	0.70	-0.70	-100.00	0.24	0.70	-0.46	-65.70
Support Staff	0.00	0.10	-0.10	-100.00	0.00	0.10	-0.10	-100.00	0.21	0.10	0.11	110.00
TOTAL	1.20	1.20	0.00	0.00	0.80	1.20	-0.40	-33.30	1.33	1.20	0.13	10.80
Murdoch University												
Programme Leader/Senior Manager	0.70	0.60	0.10	16.70	0.70	0.60	0.10	16.70	0.60	0.60	0.00	0.00
Key Researcher/Manager	1.00	0.60	0.40	66.70	1.00	0.60	0.40	66.70	0.70	0.60	0.10	16.70
Researcher/Professional	0.30	0.50	-0.20	-40.00	0.50	0.50	0.00	0.00	1.50	0.50	1.00	200.00
Support Staff	0.90	0.50	0.40	80.00	0.70	0.50	0.20	40.00	0.00	0.60	-0.60	-100.00
TOTAL	2.90	2.20	0.70	31.80	2.90	2.20	0.70	31.80	2.80	2.30	0.50	21.70
NSW Department of Primary Industries (formerly NSW Department of Agriculture)												
Programme Leader/Senior Manager	0.30	0.40	-0.10	-25.00	0.30	0.50	-0.20	-40.00	0.21	0.50	-0.29	-58.00
Key Researcher/Manager	0.60	0.00	0.60	0.00	0.80	0.00	0.80	0.00	0.46	0.00	0.46	0.00
Researcher/Professional	0.10	1.00	-0.90	-90.00	0.10	0.80	-0.70	-87.50	0.00	0.40	-0.40	-100.00
Support Staff	0.70	0.60	0.10	16.70	0.80	0.70	0.10	14.30	0.78	0.60	0.18	30.00
TOTAL	1.70	2.00	-0.30	-15.00	2.00	2.00	0.00	0.00	1.45	1.50	-0.05	-3.30
SA Dept of Primary Industries and Regions (incl. SA Research and Development Institute SARDI)												
Programme Leader/Senior Manager	0.30	0.20	0.10	50.00	0.20	0.20	0.00	0.00	0.18	0.20	-0.02	-10.00
Key Researcher/Manager	0.50	0.00	0.50	0.00	0.60	0.00	0.60	0.00	0.68	0.00	0.68	0.00
Researcher/Professional	0.00	0.10	-0.10	-100.00	0.10	0.10	0.00	0.00	0.00	0.10	-0.10	-100.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.80	0.30	0.50	166.70	0.90	0.30	0.60	200.00	0.86	0.30	0.56	186.70
Sheepmeat Council of Australia												
Programme Leader/Senior Manager	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	0.23	0.10	0.13	130.00
Key Researcher/Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Researcher/Professional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	0.23	0.10	0.13	130.00
The University of New England												
Programme Leader/Senior Manager	1.10	1.20	-0.10	-8.30	1.20	1.10	0.10	9.10	1.27	1.10	0.17	15.50
Key Researcher/Manager	0.30	0.40	-0.10	-25.00	0.30	0.40	-0.10	-25.00	0.94	0.40	0.54	135.00
Researcher/Professional	1.70	1.00	0.70	70.00	1.80	1.00	0.80	80.00	1.37	1.00	0.37	37.00
Support Staff	0.50	0.50	0.00	0.00	0.50	0.50	0.00	0.00	0.50	0.50	0.00	0.00
TOTAL	3.60	3.10	0.50	16.10	3.80	3.00	0.80	26.70	4.08	3.00	1.08	36.00
VIC Dept of Primary Industries												
Programme Leader/Senior Manager	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.02	0.00	0.02	0.00
Key Researcher/Manager	0.30	0.20	0.10	50.00	0.30	0.20	0.10	50.00	0.30	0.20	0.10	50.00
Researcher/Professional	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	0.60	0.40	0.20	50.00
Support Staff	0.00	0.10	-0.10	-100.00	0.00	0.10	-0.10	-100.00	0.20	0.40	-0.20	-50.00
TOTAL	0.40	0.40	0.00	0.00	0.50	0.40	0.10	25.00	1.12	1.00	0.12	12.00
WA Agriculture Authority (Department of Agriculture and Food WA)												
Programme Leader/Senior Manager	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.00	0.02	0.00	0.02	0.00
Key Researcher/Manager	0.40	0.40	0.00	0.00	0.40	0.40	0.00	0.00	0.26	0.00	0.26	0.00
Researcher/Professional	0.10	0.30	-0.20	-66.70	0.40	0.30	0.10	33.30	0.33	0.30	0.03	10.00
Support Staff	0.80	1.00	-0.20	-20.00	0.50	1.00	-0.50	-50.00	0.00	0.20	-0.20	-100.00
TOTAL	1.30	1.70	-0.40	-23.50	1.40	1.70	-0.30	-17.60	0.61	0.50	0.11	22.00
Wool Producers												
Programme Leader/Senior Manager	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00
Key Researcher/Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Researcher/Professional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00
TOTAL ESSENTIAL PARTICIPANTS												
Programme Leader/Senior Manager	3.30	2.60	0.70	26.90	3.50	2.60	0.90	34.60	3.31	2.60	0.71	27.30
Key Researcher/Manager	3.50	2.10	1.40	66.70	3.60	2.10	1.50	71.40	3.54	1.70	1.84	108.20
Researcher/Professional	2.50	3.70	-1.20	-32.40	3.10	3.50	-0.40	-11.40	4.14	3.40	0.74	21.80
Support Staff	2.90	2.80	0.10	3.60	2.50	2.90	-0.40	-13.80	1.69	2.40	-0.71	-29.60
TOTAL	12.20	11.20	1.00	8.90	12.70	11.10	1.60	14.40	12.68	10.10	2.58	25.50

Table 1a: Staff in-kind contributions - continued

Number of Staff (FTE; 0.00)

	Actual								Totals for 5 years			
	2017-18				2018-19							
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual/Proj	Agr'mt	Diff	%Diff
ESSENTIAL PARTICIPANTS												
Australian Meat Processor Corporation Ltd												
Programme Leader/Senior Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.00
Key Researcher/Manager	0.00	0.10	-0.10	-100.00	0.00	0.10	-0.10	-100.00	0.00	0.50	-0.50	-100.00
Researcher/Professional	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.40	0.00	0.40	0.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.10	0.10	0.00	0.00	0.10	0.10	0.00	0.00	0.60	0.50	0.10	20.00
Meat & Livestock Australia Limited												
Programme Leader/Senior Manager	0.45	0.00	0.45	0.00	0.71	0.00	0.71	0.00	3.04	0.00	3.04	0.00
Key Researcher/Manager	0.00	0.40	-0.40	-100.00	0.00	0.40	-0.40	-100.00	0.80	2.00	-1.20	-60.00
Researcher/Professional	0.04	0.70	-0.66	-94.30	0.01	0.70	-0.69	-98.60	0.49	3.50	-3.01	-86.00
Support Staff	0.21	0.10	0.11	110.00	0.19	0.10	0.09	90.00	0.61	0.50	0.11	22.00
TOTAL	0.70	1.20	-0.50	-41.70	0.91	1.20	-0.29	-24.20	4.94	6.00	-1.06	-17.70
Murdoch University												
Programme Leader/Senior Manager	0.60	0.60	0.00	0.00	0.70	0.60	0.10	16.70	3.30	3.00	0.30	10.00
Key Researcher/Manager	0.95	0.60	0.35	58.30	1.18	0.60	0.58	96.70	4.83	3.00	1.83	61.00
Researcher/Professional	1.28	0.50	0.78	156.00	0.80	0.50	0.30	60.00	4.38	2.50	1.88	75.20
Support Staff	0.00	0.50	-0.50	-100.00	0.00	0.50	-0.50	-100.00	1.60	2.60	-1.00	-38.50
TOTAL	2.83	2.20	0.63	28.60	2.68	2.20	0.48	21.80	14.11	11.10	3.01	27.10
NSW Department of Primary Industries (formerly NSW Department of Agriculture)												
Programme Leader/Senior Manager	0.12	0.50	-0.38	-76.00	0.07	0.50	-0.43	-86.00	1.00	2.40	-1.40	-58.30
Key Researcher/Manager	0.38	0.00	0.38	0.00	0.25	0.00	0.25	0.00	2.49	0.00	2.49	0.00
Researcher/Professional	0.00	0.40	-0.40	-100.00	0.00	0.40	-0.40	-100.00	0.20	3.00	-2.80	-93.30
Support Staff	0.27	0.50	-0.23	-46.00	0.04	0.50	-0.46	-92.00	2.59	2.90	-0.31	-10.70
TOTAL	0.77	1.40	-0.63	-45.00	0.36	1.40	-1.04	-74.30	6.28	8.30	-2.02	-24.30
SA Dept of Primary Industries and Regions (incl. SA Research and Development Institute SARDI)												
Programme Leader/Senior Manager	0.00	0.20	-0.20	-100.00	0.00	0.20	-0.20	-100.00	0.68	1.00	-0.32	-32.00
Key Researcher/Manager	0.59	0.00	0.59	0.00	0.12	0.00	0.12	0.00	2.49	0.00	2.49	0.00
Researcher/Professional	0.00	0.10	-0.10	-100.00	0.00	0.10	-0.10	-100.00	0.10	0.50	-0.40	-80.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.59	0.30	0.29	96.70	0.12	0.30	-0.18	-60.00	3.27	1.50	1.77	118.00
Sheepmeat Council of Australia												
Programme Leader/Senior Manager	0.20	0.10	0.10	100.00	0.18	0.10	0.08	80.00	0.81	0.50	0.31	62.00
Key Researcher/Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Researcher/Professional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.20	0.10	0.10	100.00	0.18	0.10	0.08	80.00	0.81	0.50	0.31	62.00
The University of New England												
Programme Leader/Senior Manager	1.21	1.10	0.11	10.00	1.17	1.10	0.07	6.40	5.95	5.60	0.35	6.20
Key Researcher/Manager	0.65	0.40	0.25	62.50	0.59	0.40	0.19	47.50	2.78	2.00	0.78	39.00
Researcher/Professional	0.45	1.00	-0.55	-55.00	0.38	1.00	-0.62	-62.00	5.70	5.00	0.70	14.00
Support Staff	0.50	0.50	0.00	0.00	0.50	0.50	0.00	0.00	2.50	2.50	0.00	0.00
TOTAL	2.81	3.00	-0.19	-6.30	2.64	3.00	-0.36	-12.00	16.93	15.10	1.83	12.10
VIC Dept of Primary Industries												
Programme Leader/Senior Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.12	0.00
Key Researcher/Manager	0.30	0.20	0.10	50.00	0.40	0.20	0.20	100.00	1.60	1.00	0.60	60.00
Researcher/Professional	0.60	0.60	0.00	0.00	0.50	0.60	-0.10	-16.70	1.90	1.80	0.10	5.60
Support Staff	0.20	0.60	-0.40	-66.70	0.20	0.60	-0.40	-66.70	0.60	1.80	-1.20	-66.70
TOTAL	1.10	1.40	-0.30	-21.40	1.10	1.40	-0.30	-21.40	4.22	4.60	-0.38	-8.30
WA Agriculture Authority (Department of Agriculture and Food WA)												
Programme Leader/Senior Manager	0.03	0.00	0.03	0.00	0.02	0.00	0.02	0.00	0.17	0.00	0.17	0.00
Key Researcher/Manager	0.40	0.00	0.40	0.00	0.43	0.00	0.43	0.00	1.89	0.80	1.09	136.30
Researcher/Professional	0.00	0.30	-0.30	-100.00	0.00	0.30	-0.30	-100.00	0.83	1.50	-0.67	-44.70
Support Staff	0.30	0.50	-0.20	-40.00	0.33	0.50	-0.17	-34.00	1.93	3.20	-1.27	-39.70
TOTAL	0.73	0.80	-0.07	-8.80	0.78	0.80	-0.02	-2.50	4.82	5.50	-0.68	-12.40
Wool Producers												
Programme Leader/Senior Manager	0.20	0.10	0.10	100.00	0.22	0.10	0.12	120.00	0.72	0.50	0.22	44.00
Key Researcher/Manager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Researcher/Professional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.20	0.10	0.10	100.00	0.22	0.10	0.12	120.00	0.72	0.50	0.22	44.00
TOTAL ESSENTIAL PARTICIPANTS												
Programme Leader/Senior Manager	2.81	2.60	0.21	8.10	3.07	2.60	0.47	18.10	15.99	13.00	2.99	23.00
Key Researcher/Manager	3.27	1.70	1.57	92.40	2.97	1.70	1.27	74.70	16.88	9.30	7.58	81.50
Researcher/Professional	2.47	3.60	-1.13	-31.40	1.79	3.60	-1.81	-50.30	14.00	17.80	-3.80	-21.30
Support Staff	1.48	2.70	-1.22	-45.20	1.26	2.70	-1.44	-53.30	9.83	13.50	-3.67	-27.20
TOTAL	10.03	10.60	-0.57	-5.40	9.09	10.60	-1.51	-14.20	56.70	53.60	3.10	5.80

Table 1a: Staff in-kind contributions - continued

Number of Staff (FTE; 0.00)

	Actual 2014-15				Actual 2015-16				2016-17			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
OTHER PARTICIPANTS												
Other Participants - Sheep 20130062												
Programme Leader/Senior Manager	3.10	1.50	1.60	106.70	3.20	1.70	1.50	88.20	3.03	2.00	1.03	51.50
Key Researcher/Manager	2.60	2.40	0.20	8.30	2.90	2.80	0.10	3.60	2.90	3.40	-0.50	-14.70
Researcher/Professional	0.80	4.00	-3.20	-80.00	0.20	4.70	-4.50	-95.70	0.20	5.50	-5.30	-96.40
Support Staff	5.50	4.20	1.30	31.00	9.40	4.90	4.50	91.80	12.20	5.90	6.30	106.80
TOTAL	12.00	12.10	-0.10	-0.80	15.70	14.10	1.60	11.30	18.33	16.80	1.53	9.10
TOTAL OTHER PARTICIPANTS												
Programme Leader/Senior Manager	3.10	1.50	1.60	106.70	3.20	1.70	1.50	88.20	3.03	2.00	1.03	51.50
Key Researcher/Manager	2.60	2.40	0.20	8.30	2.90	2.80	0.10	3.60	2.90	3.40	-0.50	-14.70
Researcher/Professional	0.80	4.00	-3.20	-80.00	0.20	4.70	-4.50	-95.70	0.20	5.50	-5.30	-96.40
Support Staff	5.50	4.20	1.30	31.00	9.40	4.90	4.50	91.80	12.20	5.90	6.30	106.80
TOTAL	12.00	12.10	-0.10	-0.80	15.70	14.10	1.60	11.30	18.33	16.80	1.53	9.10
OTHER IN-KIND RESOURCES												
Programme Leader/Senior Manager	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.15	0.00
Key Researcher/Manager	2.00	0.00	2.00	0.00	3.30	0.00	3.30	0.00	0.53	0.00	0.53	0.00
Researcher/Professional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Staff	3.30	0.00	3.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	5.40	0.00	5.40	0.00	3.30	0.00	3.30	0.00	0.68	0.00	0.68	0.00
TOTAL STAFF IN-KIND (FTE)												
Programme Leader/Senior Manager	6.50	4.10	2.40	58.50	6.70	4.30	2.40	55.80	6.49	4.60	1.89	41.10
Key Researcher/Manager	8.10	4.50	3.60	80.00	9.80	4.90	4.90	100.00	6.97	5.10	1.87	36.70
Researcher/Professional	3.30	7.70	-4.40	-57.10	3.30	8.20	-4.90	-59.80	4.34	8.90	-4.56	-51.20
Support Staff	11.70	7.00	4.70	67.10	11.90	7.80	4.10	52.60	13.89	8.30	5.59	67.30
GRAND TOTAL	29.60	23.30	6.30	27.00	31.70	25.20	6.50	25.80	31.69	26.90	4.79	17.80

	Actual 2017-18				Actual 2018-19				Totals for 5 years			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual/Proj	Agr'mt	Diff	%Diff
OTHER PARTICIPANTS												
Other Participants - Sheep 20130062												
Programme Leader/Senior Manager	3.53	2.00	1.53	76.50	3.61	1.70	1.91	112.40	16.47	8.90	7.57	85.10
Key Researcher/Manager	3.30	3.30	0.00	0.00	2.55	2.90	-0.35	-12.10	14.25	14.80	-0.55	-3.70
Researcher/Professional	0.20	5.50	-5.30	-96.40	0.20	4.80	-4.60	-95.80	1.60	24.50	-22.90	-93.50
Support Staff	12.00	5.80	6.20	106.90	6.83	5.00	1.83	36.60	45.93	25.80	20.13	78.00
TOTAL	19.03	16.60	2.43	14.60	13.19	14.40	-1.21	-8.40	78.25	74.00	4.25	5.70
TOTAL OTHER PARTICIPANTS												
Programme Leader/Senior Manager	3.53	2.00	1.53	76.50	3.61	1.70	1.91	112.40	16.47	8.90	7.57	85.10
Key Researcher/Manager	3.30	3.30	0.00	0.00	2.55	2.90	-0.35	-12.10	14.25	14.80	-0.55	-3.70
Researcher/Professional	0.20	5.50	-5.30	-96.40	0.20	4.80	-4.60	-95.80	1.60	24.50	-22.90	-93.50
Support Staff	12.00	5.80	6.20	106.90	6.83	5.00	1.83	36.60	45.93	25.80	20.13	78.00
TOTAL	19.03	16.60	2.43	14.60	13.19	14.40	-1.21	-8.40	78.25	74.00	4.25	5.70
OTHER IN-KIND RESOURCES												
Programme Leader/Senior Manager	0.15	0.00	0.15	0.00	0.15	0.00	0.15	0.00	0.55	0.00	0.55	0.00
Key Researcher/Manager	1.83	0.00	1.83	0.00	2.00	0.00	2.00	0.00	9.66	0.00	9.66	0.00
Researcher/Professional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Staff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.30	0.00	3.30	0.00
TOTAL	1.98	0.00	1.98	0.00	2.15	0.00	2.15	0.00	13.51	0.00	13.51	0.00
TOTAL STAFF IN-KIND (FTE)												
Programme Leader/Senior Manager	6.49	4.60	1.89	41.10	6.83	4.30	2.53	58.80	33.01	21.90	11.11	50.70
Key Researcher/Manager	8.40	5.00	3.40	68.00	7.52	4.60	2.92	63.50	40.79	24.10	16.69	69.30
Researcher/Professional	2.67	9.10	-6.43	-70.70	1.99	8.40	-6.41	-76.30	15.60	42.30	-26.70	-63.10
Support Staff	13.48	8.50	4.98	58.60	8.09	7.70	0.39	5.10	59.06	39.30	19.76	50.30
GRAND TOTAL	31.04	27.20	3.84	14.10	24.43	25.00	-0.57	-2.30	148.46	127.60	20.86	16.30

Table 1b: Non-staff in-kind

($'000)

	Actual															
	2014-15				2015-16				2016-17				2017-18			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
ESSENTIAL PARTICIPANTS																
Australian Meat Processor Corporation Ltd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meat & Livestock Australia Limited	385	360	25	7	360	360	0	0	360	360	0	0	360	360	0	0
Murdoch University	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NSW Department of Primary Industries (former	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SA Dept of Primary Industries and Regions (inc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepmeat Council of Australia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
The University of New England	180	180	0	0	180	180	0	0	180	180	0	0	180	180	0	0
VIC Dept of Primary Industries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WA Agriculture Authority (Department of Agric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wool Producers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ESSENTIAL PARTICIPANTS	565	540	25	5	540	540	0	0	540	540	0	0	540	540	0	0
OTHER PARTICIPANTS																
Other Participants - Sheep 20130062	43	18	25	139	18	18	0	0	18	18	0	0	18	18	0	0
TOTAL OTHER PARTICIPANTS	43	18	25	139	18	18	0	0	18	18	0	0	18	18	0	0
OTHER NON-STAFF IN-KIND RESOURCES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL	608	558	50	9	558	558	0	0	558	558	0	0	558	558	0	0

	Actual 2018-19				Totals for 5 years			
	Actual	Agr'mt	Diff	%Diff	Actual/Proj	Agr'mt	Diff	%Diff
ESSENTIAL PARTICIPANTS								
Australian Meat Processor Corporation Ltd	0	0	0	0	0	0	0	0
Meat & Livestock Australia Limited	360	360	0	0	1,825	1,800	25	1
Murdoch University	0	0	0	0	0	0	0	0
NSW Department of Primary Industries (former	0	0	0	0	0	0	0	0
SA Dept of Primary Industries and Regions (inc	0	0	0	0	0	0	0	0
Sheepmeat Council of Australia	3	0	3	0	3	0	3	0
The University of New England	180	180	0	0	900	900	0	0
VIC Dept of Primary Industries	0	0	0	0	0	0	0	0
WA Agriculture Authority (Department of Agric	0	0	0	0	0	0	0	0
Wool Producers	0	0	0	0	0	0	0	0
TOTAL ESSENTIAL PARTICIPANTS	543	540	3	1	**2,728**	**2,700**	**28**	**1**
OTHER PARTICIPANTS								
Other Participants - Sheep 20130062	4	18	-14	-78	101	90	11	12
TOTAL OTHER PARTICIPANTS	4	18	-14	-78	**101**	**90**	**11**	**12**
OTHER NON-STAFF IN-KIND RESOURCES	0	0	0	0	0	0	0	0
GRAND TOTAL	547	558	-11	-2	2,829	2,790	39	1

Table 2: Cash contributions

Cash based accounting method

	Actual															
	2014-15				2015-16				2016-17				2017-18			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
ESSENTIAL PARTICIPANTS																
Australian Meat Processor Corporation Ltd	307	307	0	0	77	306	-229	-75	460	306	154	50	613	306	307	100
Meat & Livestock Australia Limited	1,193	1,550	-357	-23	1,595	1,550	45	3	1,565	1,550	15	1	1,913	1,550	363	23
Murdoch University	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NSW Department of Primary Industries (forme	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SA Dept of Primary Industries and Regions (inc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepmeat Council of Australia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
The University of New England	0	0	0	0	181	0	181	0	0	0	0	0	0	0	0	0
VIC Dept of Primary Industries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WA Agriculture Authority (Department of Agric	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wool Producers	112	150	-38	-25	150	150	0	0	112	150	-38	-25	188	150	38	25
TOTAL ESSENTIAL PARTICIPANTS' CASH	1,612	2,007	-395	-20	2,003	2,006	-3	0	2,137	2,006	131	7	2,714	2,006	708	35
OTHER PARTICIPANTS																
Other Participants - Sheep 20130062	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL OTHER PARTICIPANTS' CASH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Third Party Cash	2,310	1,725	585	34	518	0	518	0	358	0	358	0	127	0	127	0
TOTAL CASH CONTRIBUTIONS	3,922	3,732	190	5	2,521	2,006	515	26	2,495	2,006	489	24	2,841	2,006	835	42
CRC Program Funding	3,331	3,331	0	0	4,778	4,778	0	0	4,881	4,881	0	0	1,718	1,718	0	0
TOTAL CASH	7,253	7,063	190	3	7,299	6,784	515	8	7,376	6,887	489	7	4,559	3,724	835	22

	Actual 2018-19				Totals for 5 years			
	Actual	Agr'mt	Diff	%Diff	Actual/Proj	Agr'mt	Diff	%Diff
ESSENTIAL PARTICIPANTS								
Australian Meat Processor Corporation Ltd	76	306	-230	-75	1,533	1,531	2	0
Meat & Livestock Australia Limited	1,515	1,550	-35	-2	7,781	7,750	31	0
Murdoch University	0	0	0	0	0	0	0	0
NSW Department of Primary Industries (former	0	0	0	0	0	0	0	0
SA Dept of Primary Industries and Regions (inc	0	0	0	0	0	0	0	0
Sheepmeat Council of Australia	0	0	0	0	0	0	0	0
The University of New England	0	0	0	0	181	0	181	0
VIC Dept of Primary Industries	0	0	0	0	0	0	0	0
WA Agriculture Authority (Department of Agric	0	0	0	0	0	0	0	0
Wool Producers	188	150	38	25	750	750	0	0
TOTAL ESSENTIAL PARTICIPANTS' CASH	1,779	2,006	-227	-11	10,245	10,031	214	2
OTHER PARTICIPANTS								
Other Participants - Sheep 20130062	0	0	0	0	0	0	0	0
TOTAL OTHER PARTICIPANTS' CASH	0	0	0	0	0	0	0	0
Third Party Cash	1,343	0	1,343	0	4,656	1,725	2,931	170
TOTAL CASH CONTRIBUTIONS	3,122	2,006	1,116	56	14,901	11,756	3,145	27
CRC Program Funding	792	792	0	0	15,500	15,500	0	0
TOTAL CASH	3,914	2,798	1,116	40	**30,401**	**27,256**	**3,145**	**12**

Table 3: Operating Expenses

Accrual based accounting method ($,000)

	Actual															
	2014-15				2015-16				2016-17				2017-18			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
Employee Expenses	878	945	-67	-7	860	972	-112	-12	1,001	1,001	0	0	1,407	1,031	376	37
Supplier Expenses	3,227	4,868	-1,641	-34	4,341	5,008	-667	-13	5,772	4,524	1,248	28	4,526	3,570	956	27
Capital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Expenses	0	1,250	-1,250	-100	1,275	25	1,250	5,000	25	25	0	0	25	25	0	0
TOTAL EXPENSES	4,105	7,063	-2,958	-42	6,476	6,005	471	8	6,798	5,550	1,248	23	5,958	4,626	1,332	29

	Actual 2018-19				Totals for 5 years			
	Actual	Agr'mt	Diff	%Diff	Actual/Proj	Agr'mt	Diff	%Diff
Employee Expenses	3,114	1,061	2,053	194	7,260	5,010	2,250	45
Supplier Expenses	1,143	2,426	-1,283	-53	19,009	20,396	-1,387	-7
Capital	0	0	0	0	0	0	0	0
Other Expenses	125	525	-400	-76	1,450	1,850	-400	-22
TOTAL EXPENSES	4,382	4,012	370	9	**27,719**	**27,256**	**463**	**2**

Table 4: Allocation of Expenses

Accrual based accounting method ($,000)

	2014-15											
	Cash ($'000s)				Non-Staff In-kind ($'000s)				In-Kind Staff (FTE; 0.00)			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
PROGRAM												
Research Program 1	1,101	1,589	-488	-31	43	59	-16	-27	6.40	5.20	1.20	23.10
Research Program 2	1,358	2,574	-1,216	-47	385	425	-40	-9	13.30	14.60	-1.30	-8.90
Research Program 3	1,646	2,900	-1,254	-43	180	74	106	143	9.90	3.50	6.40	182.90
TOTAL	**4,105**	**7,063**	**-2,958**	**-42**	**608**	**558**	**50**	**9**	**29.60**	**23.30**	**6.30**	**27.00**

	2015-16											
	Cash ($'000s)				Non-Staff In-kind ($'000s)				In-Kind Staff (FTE; 0.00)			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
PROGRAM												
Research Program 1	1,485	1,644	-159	-10	78	62	16	26	6.60	5.10	1.50	29.40
Research Program 2	2,216	2,847	-631	-22	420	435	-15	-3	18.50	16.80	1.70	10.10
Research Program 3	2,775	2,293	482	21	60	61	-1	-2	6.60	3.30	3.30	100.00
TOTAL	**6,476**	**6,784**	**-308**	**-5**	**558**	**558**	**0**	**0**	**31.70**	**25.20**	**6.50**	**25.80**

	2016-17											
	Cash ($'000s)				Non-Staff In-kind ($'000s)				In-Kind Staff (FTE; 0.00)			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
PROGRAM												
Research Program 1	2,478	1,572	906	58	78	66	12	18	6.99	5.10	1.89	37.10
Research Program 2	1,987	2,652	-665	-25	420	442	-22	-5	20.02	19.90	0.12	0.60
Research Program 3	2,333	1,663	670	40	60	50	10	20	4.68	2.60	2.08	80.00
TOTAL	**6,798**	**5,887**	**911**	**16**	**558**	**558**	**0**	**0**	**31.69**	**27.60**	**4.09**	**14.80**

	2017-18											
	Cash ($'000s)				Non-Staff In-kind ($'000s)				In-Kind Staff (FTE; 0.00)			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
PROGRAM												
Research Program 1	2,514	1,716	798	47	78	83	-5	-6	6.49	5.00	1.49	29.80
Research Program 2	1,472	1,456	16	1	420	415	5	1	20.02	20.10	-0.08	-0.40
Research Program 3	1,972	1,552	420	27	60	60	0	0	4.53	2.70	1.83	67.80
TOTAL	**5,958**	**4,724**	**1,234**	**26**	**558**	**558**	**0**	**0**	**31.04**	**27.80**	**3.24**	**11.70**

	2018-19											
	Cash ($'000s)				Non-Staff In-kind ($'000s)				In-Kind Staff (FTE; 0.00)			
	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff	Actual	Agr'mt	Diff	%Diff
PROGRAM												
Research Program 1	2,089	1,022	1,067	104	97	84	13	16	6.16	5.10	1.06	20.80
Research Program 2	1,230	1,353	-123	-9	360	447	-87	-20	14.02	17.90	-3.88	-21.70
Research Program 3	1,063	423	640	151	90	27	63	233	4.25	2.60	1.65	63.50
TOTAL	**4,382**	**2,798**	**1,584**	**57**	**547**	**558**	**-11**	**-2**	**24.43**	**25.60**	**-1.17**	**-4.60**

	CUMULATIVE TOTAL TO 2018-19											
	Cash ($'000s)				Non-Staff In-kind ($'000s)				In-Kind Staff (FTE; 0.00)			
	Projected	Agr'mt	Diff	%Diff	Projected	Agr'mt	Diff	%Diff	Projected	Agr'mt	Diff	%Diff
PROGRAM												
Research Program 1	9,667	7,543	2,124	28	374	354	20	6	32.64	25.50	7.14	28.00
Research Program 2	8,263	10,882	-2,619	-24	2,005	2,164	-159	-7	85.86	89.30	-3.44	-3.90
Research Program 3	9,789	8,831	958	11	450	272	178	65	29.96	14.70	15.26	103.80
TOTAL	**27,719**	**27,256**	**463**	**2**	**2,829**	**2,790**	**39**	**1**	**148.46**	**129.50**	**18.96**	**14.60**

	TOTAL FOR 5 YEARS											
	Cash ($'000s)				Non-Staff In-kind ($'000s)				In-Kind Staff (FTE; 0.00)			
	Projected	Agr'mt	Diff	%Diff	Projected	Agr'mt	Diff	%Diff	Projected	Agr'mt	Diff	%Diff
PROGRAM												
Research Program	27,719	27,256	463	2	2,829	2,790	39	1	148.46	129.50	18.96	14.60
GRAND TOTAL	**27,719**	**27,256**	**463**	**2**	**2,829**	**2,790**	**39**	**1**	**148.46**	**129.50**	**18.96**	**14.60**

Table 5: Allocation by category

Accrual based accounting method ($,000)

	Research	Utilisation	Administration	Total
Program leader / senior manager (FTE)	6.00	0.00	0.84	6.84
Key Researcher / Manager (FTE)	7.33	0.00	0.18	7.51
Researcher / Professional (FTE)	1.82	0.00	0.18	2.00
Support Staff (FTE)	8.08	0.00	0.00	8.08
Non-staff In-kind ($'000s)	367	90	90	547
Cash ($'000s)	2,611	932	839	4,382

End of Commonwealth tables

STATEMENT OF EQUITY

ORGANISATION		FY2014-15 (Yr1)	FY2015-16 (Yr2)	FY2016-17 (Yr3)	FY2017-18 (Yr4)	FY2018-19 (Yr5)						Cumulative Contributions 30 June 2019	Cumulative Position as at 30 June
							Inkind $ Actual (PA computation)						
		Contributions	Total Contribution	Total Contribution	Total Contribution	In-kind FTE	Staff In-kind	Other In-kind	Total In-kind	Cash Contribution	Total Contribution		Participating Shares
MEMBER													
	AMPC	346,600	346,600	276,650	640,950	0.10	22,000		22,000	996,900	1,018,900	**2,629,700**	6.0%
	DEDJTR (DPIRD)	114,400	109,500	260,400	318,000	1.10	258,000		258,000		258,000	**1,060,300**	2.4%
	DPINSW	528,800	476,245	357,960	218,100	0.36	106,150		106,150		106,150	**1,687,255**	3.8%
	MLA (inc SG)	1,965,080	2,387,252	2,325,700	2,453,250	0.91	335,750	360,000	695,750	1,515,000	2,210,750	**11,342,032**	25.7%
	Murdoch	721,800	846,200	778,000	674,000	2.68	800,400		800,400		800,400	**3,820,400**	8.7%
	SARDI	162,000	268,400	263,900	129,250	0.12	34,300		34,300		34,300	**857,850**	1.9%
	SPA (SCA)	42,000	42,000	94,500	36,000	0.18	75,600		75,600		75,600	**290,100**	0.7%
	UNE	1,190,000	1,220,000	1,369,800	876,350	2.64	830,200	180,000	1,010,200		1,010,200	**5,666,350**	12.8%
	WAAA (DAFWA)	390,400	300,650	153,400	219,400	0.77	188,200		188,200		188,200	**1,252,050**	2.8%
	WPA	154,500	192,000	154,500	223,500	0.22	92,400		92,400	187,500	279,900	**1,004,400**	2.3%
Total Member		**5,615,580**	**6,188,847**	**6,034,810**	**5,788,800**	**9.1**	**2,743,000**	**540,000**	**3,283,000**	**2,699,400**	**5,982,400**	**29,610,437**	**67.1%**
NON-MEMBER													
Total Non-member		**5,171,991**	**4,774,600**	**4,552,600**	**18,000.0**	-	-	**4,000.0**	**4,000.0**	-	**4,000.0**	**14,521,191**	**32.9%**
GRAND TOTAL		**10,787,571**	**10,963,447**	**10,587,410**	**5,806,800**	**9.1**	**2,743,000**	**544,000**	**3,287,000**	**2,699,400**	**5,986,400**	**44,131,628**	**100.00%**